Safety Precautions

- Important Notes on exporting this product or equipment containing this product;
  If the end-user or application of this product is related to military affairs or weapons, its export may be controlled by “Foreign Exchange and Foreign Trade Control Law” of Japan where export license will be required before product can be exported from Japan.
- This product is designed and manufactured for use in General Purpose Industrial Equipment and it is not intended to be used in equipment or system that may cause personal injury or death.
- All servicing such as installation, wiring, operation, maintenance and etc., should be performed by qualified personnel only.
- Tighten mounting screws with an adequate torque by taking into consideration strength of the screws and the characteristics of material to which the product will be mounted. Over tightening can damage the screw and/or material; under tightening can result in loosening.
- Install safety equipment to prevent serious accidents or loss that is expected in case of failure of this product.
- Consult us before using this product under such special conditions and environments as nuclear energy control, aerospace, transportation, medical equipment, various safety equipments or equipments which require a lesser air contamination.
- We have been making the best effort to ensure the highest quality of our products, however, some applications with exceptionally large external noise disturbance and static electricity, or failure in input power, wiring and components may result in unexpected action. It is highly recommended that you make a fail-safe design and secure the safety in the operative range.
- If the motor shaft is not electrically grounded, it may cause an electrolytic corrosion to the bearing, depending on the condition of the machine and its mounting environment, and may result in the bearing noise. Checking and verification by customer is required.
- Failure of this product depending on its content may generate smoke of about one cigarette. Take this into consideration when the application of the machine is clean room related.
- Please be careful when using the product in an environment with high concentrations of sulfur or sulfuric gases, as sulfuration can lead to disconnection from the chip resistor or a poor contact connection.
- Do not input a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may lead to damage of the internal parts, causing smoke and/or fire and other troubles.
- The user is responsible for matching between machine and components in terms of configuration, dimensions, life expectancy, characteristics, when installing the machine or changing specification of the machine. The user is also responsible for complying with applicable laws and regulations.
- Manufacturer’s warranty will be invalid if the product has been used outside its stated specifications.
- Component parts are subject to minor change to improve performance.
- Read and observe the instruction manual to ensure correct use of the product.

Repair	Consult to the dealer from whom you have purchased this product for details of repair work. When the product is incorporated to the machine you have purchased, consult to the machine manufacturer or its dealer.
URL	Electronic data of this product (Instruction Manual, CAD data) can be downloaded from the following web site; industrial.panasonic.com/ac/e/

●Contact to : ——————————————

Panasonic Corporation,
Industrial Device Business Division
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The contents of this catalog apply to the products as of July 2021.

■AQCTB0100E 202107

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INDUSTRY

AC Servo Motor & Driver

MINAS A6 Family / MINAS E series

AC Servo Motor & Driver <MINAS A6 Family, MINAS E series>

AC Servo Motor & Driver

MINAS A6 Family

2021 / 7

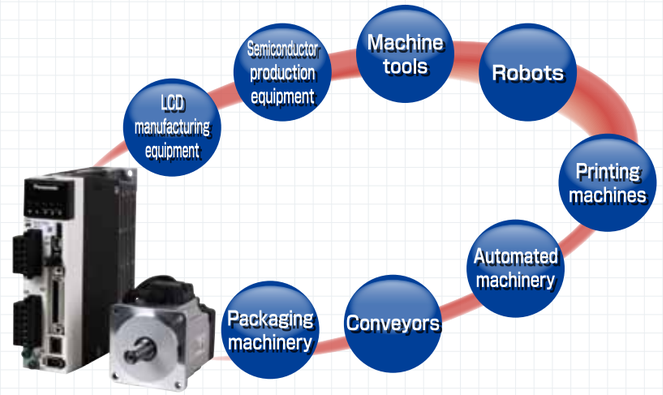
●This product is for industrial equipment. Don't use this product at general household.

2021.07 | industrial.panasonic.com/ac/e/

MINAS A6 Family

More compact, more faster and more easy-to-use Servomotors that meet the demands of the present age.

The MINAS A6 Family of advanced AC servomotors is changing the landscape of industrial machinery.

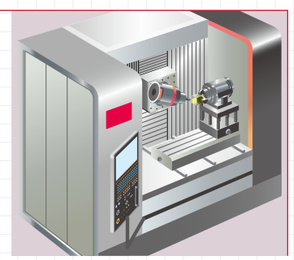


Robots

A robot is required to operate stably despite arm posture and position, workload and other conditions changing from moment to moment.
The MINAS A6 Family assures stable operation by suppressing effects of load to a minimum using “adaptive load control.”

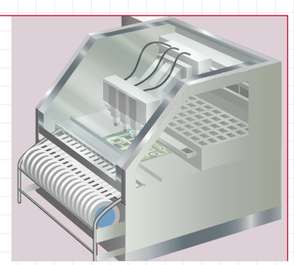
Processing machinery

With metal processing machine, it is very difficult to render mirror-like finishing on a polygonal body.
The A6 Family realizes “3.2 kHz frequency response” to improve feedback responsiveness, thus enabling mirror surfacing without generating lines or streaks.



Component mounting machines

The A6 Family also shows its versatility when used with a component mounting machine where speed and positional accuracy are demanded.
In addition to high frequency response, it can process accidental disturbances with the help of built-in “adaptive load control,” thus maintaining high productivity.



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Servomotors that flexibly and effectively fit into various system configurations MINAS A6 Family

Controller

●For compatible controllers, see our website or request the necessary information separately.

Modbus network (Block operation position control)

Pulse train position command (Block operation position control by external I/O)

Analog velocity control

Analog torque control

Driver

Basic type
A6SE series

RS485 communication type
A6SG series

Multifunction type
A6SF series

●For compatible controllers, see our website or request the necessary information separately.

RTEX Realtime Express

Standard type
A6NE series

Multifunction type
A6NF series

●For compatible controllers, see our website or request the necessary information separately.

EtherCAT®

Standard type
A6BE series
Special order product

Multifunction type
A6BF series
Special order product

Motor

MSMF
Low inertia

MDMF
Middle inertia

MQMF
Middle inertia/ Flat type

MGMF
Middle inertia/ Low speed high torque

MHMF
High inertia

MQMF
with gear reducer

MHMF
with gear reducer

Slim design and position control type

E series

●Ultra-small design and pulse train command type only, DIN-rail mountable (using mounting Kit)
●Rated output: 50 W to 400 W

MINAS A6 DC 24 V / 48 V type Special order product

●DC24 V / DC48 V power supply support, ultra-compact motor and driver.
●Rated output :
DC24 V: 100 W, 200 W
DC48 V: 200 W, 400 W
(Both have a flange angle of 60 mm)

MINAS A5 DC 24 V / 48 V type Special order product

RTEX Realtime Express

EtherCAT®

A5M/A5ML series | A5MN/A5MNL series | A5MB/A5MBL series

●DC24 V / DC48 V power supply support, ultra-compact motor and driver.
●Rated output: ·Flange size 20 mm square/10 W
·Flange size 25 mm square/10 W, 20 W, 30 W

Special order product For more information, visit the website or please request to our distributors separately.

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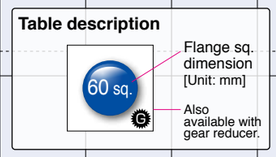
It is MINAS A6 Family lineup that meets the manufacturing industry needs. MINAS A6 Family

Motor line-up

		50 W	100 W	200 W	400 W	750 W	850 W	1000 W	1.0 kW	1.3 kW	1.5 kW	1.8 kW	2.0 kW	2.4 kW	2.9 kW	3.0 kW	4.0 kW	4.4 kW	5.0 kW	5.5 kW	7.5 kW	11.0 kW	15.0 kW	22.0 kW
Low inertia MSMF	100 V	38 sq.	38 sq.	60 sq.	60 sq.																			
	Rated rotational speed (Maximum rotational speed)	3000 r/min(6000 r/min)																						
	200 V	38 sq.	38 sq.	60 sq.	60 sq.	80 sq.		80 sq.	100 sq.		100 sq.		100 sq.			120 sq.	130 sq.		130 sq.					
	Rated rotational speed (Maximum rotational speed)	3000 r/min(6000 r/min)							3000 r/min(5000 r/min)				3000 r/min(5000 r/min)											
	400 V (Under development)								100 sq.		100 sq.		100 sq.			120 sq.	130 sq.		130 sq.					
	Rated rotational speed (Maximum rotational speed)								3000 r/min(5000 r/min)				3000 r/min(5000 r/min)											
Middle inertia/Flat type MQMF	100 V		60 sq. G	80 sq. G	80 sq. G																			
	Rated rotational speed (Maximum rotational speed)		3000 r/min(6500 r/min)																					
	200 V		60 sq. G	80 sq. G	80 sq. G																			
	Rated rotational speed (Maximum rotational speed)		3000 r/min(6500 r/min)																					
Middle inertia MDMF	200 V								130 sq.		130 sq.		130 sq.			130 sq.	176 sq.		176 sq.		176 sq.	220 sq.	220 sq.	220 sq.
	Rated rotational speed (Maximum rotational speed)								2000 r/min(3000 r/min)				2000 r/min(3000 r/min)								1500 r/min *1	1500 r/min(2000 r/min)		
	400 V (Under development)								130 sq.		130 sq.		130 sq.			130 sq.	176 sq.		176 sq.		176 sq.	220 sq.	220 sq.	220 sq.
	Rated rotational speed (Maximum rotational speed)								2000 r/min(3000 r/min)				2000 r/min(3000 r/min)								1500 r/min *1	1500 r/min(2000 r/min)		
Middle inertia/Low speed high torque MGMF	200 V					130 sq.			130 sq.				130 sq.	176 sq.	176 sq.			176 sq.						
	Rated rotational speed (Maximum rotational speed)					1500 r/min(3000 r/min)							1500 r/min(3000 r/min)											
	400 V (Under development)					130 sq.			130 sq.				130 sq.	176 sq.	176 sq.			176 sq.						
	Rated rotational speed (Maximum rotational speed)					1500 r/min(3000 r/min)							1500 r/min(3000 r/min)											
High inertia MHMF	100 V	40 sq.	40 sq. G	60 sq. G	60 sq. G																			
	Rated rotational speed (Maximum rotational speed)		3000 r/min(6500 r/min)																					
	200 V	40 sq.	40 sq. G	60 sq. G	60 sq. G	80 sq. G		80 sq.	130 sq.		130 sq.		176 sq.			176 sq.	176 sq.		176 sq.		176 sq.			
	Rated rotational speed (Maximum rotational speed)		3000 r/min(6500 r/min)			3000 r/min(6000 r/min)			2000 r/min(3000 r/min)				2000 r/min(3000 r/min)								1500 r/min *1			
	400 V (Under development)								130 sq.		130 sq.		176 sq.			176 sq.	176 sq.		176 sq.		176 sq.			
	Rated rotational speed (Maximum rotational speed)								2000 r/min(3000 r/min)				2000 r/min(3000 r/min)								1500 r/min *1			

Table description



*1 Maximum rotational speed is 3000 r/min.

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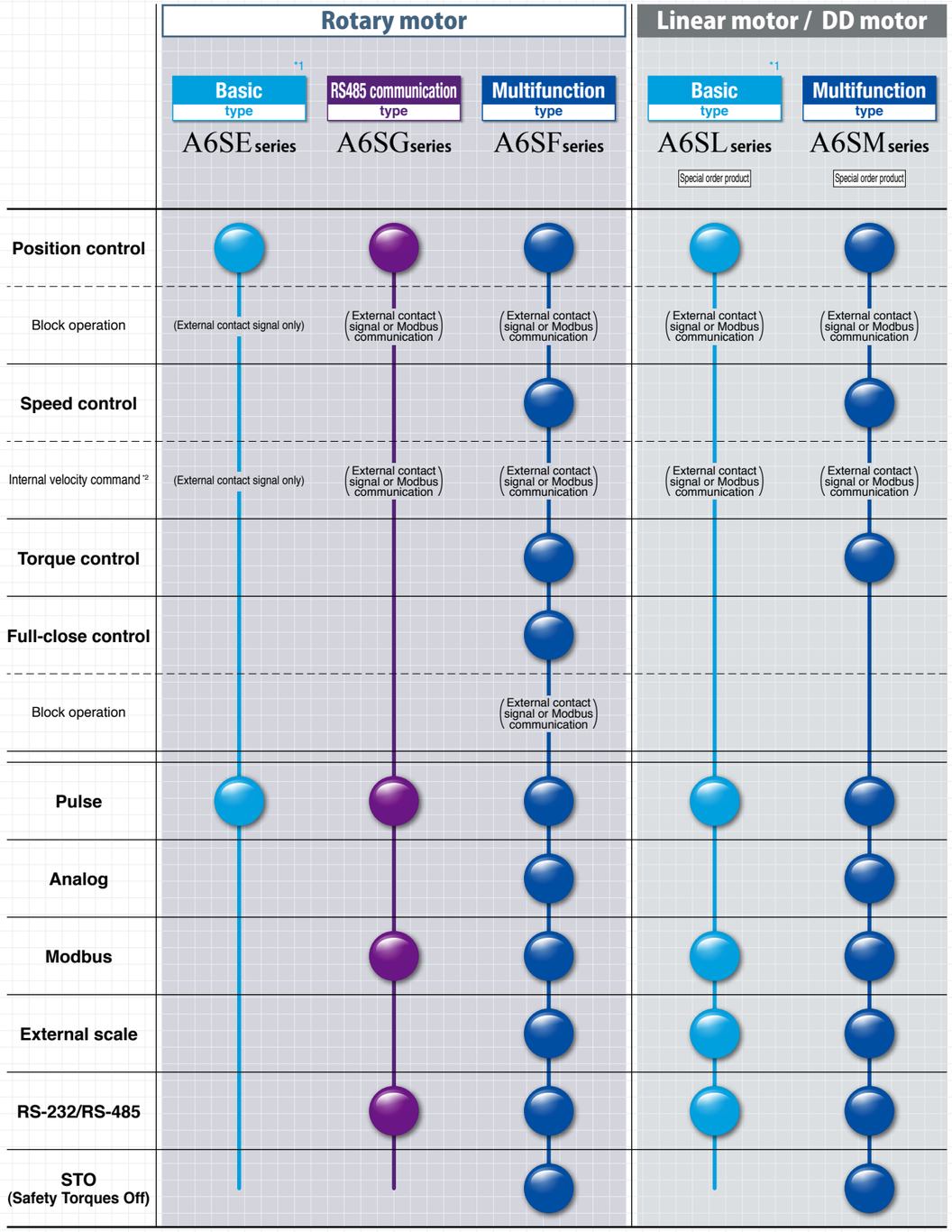
It is MINAS A6 Family lineup that meets the manufacturing industry needs. MINAS A6 Family

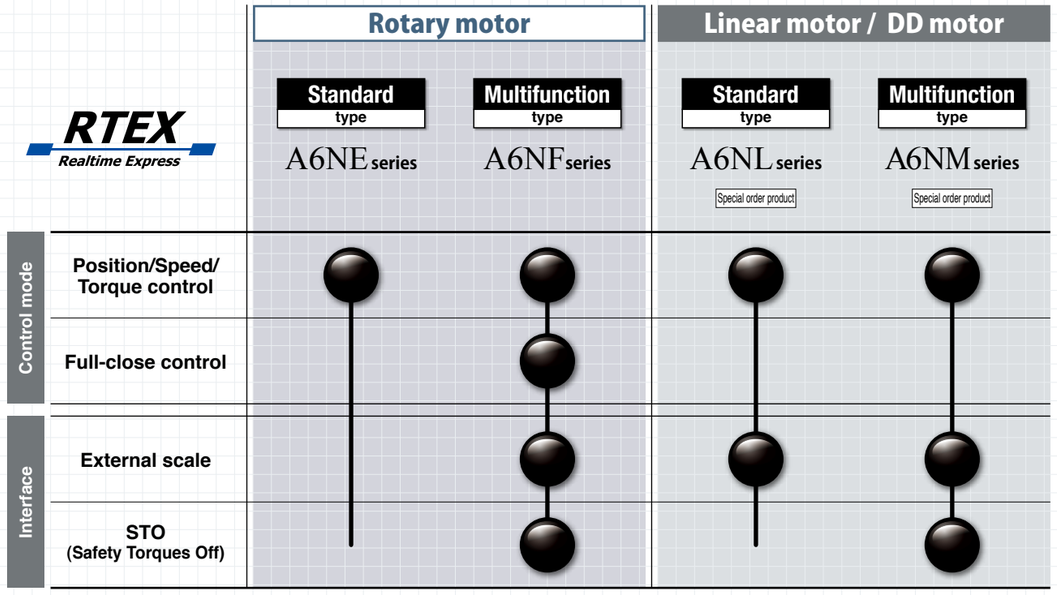
Driver line-up



*1 A6SE series driver (Position control only) does not correspond to the absolute system of using the serial communication with the host device. It supports incremental system only.
*2 When using internal speed command with Modbus, external servo ON is required.

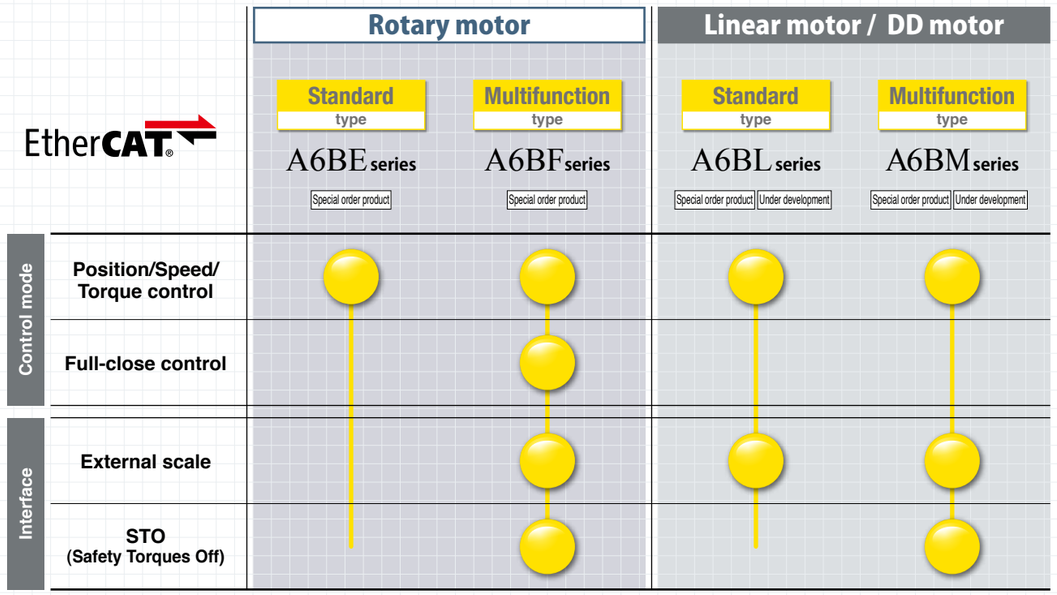
High speed communication For Realtime Express Network servo driver

▶ For Details see P.349



Servo drivers with EtherCAT open network

▶ For Details see P.369



● Please check the instruction manual for necessary wiring.
Special order product For more information, please visit our website or request to our distributors separately.

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Small, light, powerful and speedy[※1]

MINAS A6 Family

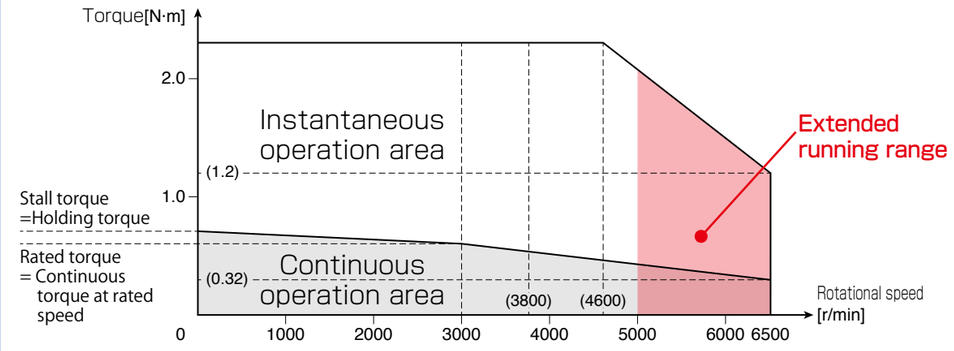
●Size of a typical business card (W90 mm × H55 mm)

High-speed, high-torque, compact and lightweight.[※1]

Max. speed	Max. torque	Overall length	Weight
6500 r/min[※2]	Approx.350 %[※2]	67.5 mm[※2]	750 g[※2]
Fast	High	Short	Light
A5Family[※3] 5000 r/min	A5Family[※3] Approx300 %	A5Family[※3] 99.0 mm	A5Family[※3] 960 g

※1 Middle and high inertia types only ※2 MHMF200 W ※3 MHMD200 W

Thanks to high-speed and high-torque, the application area is greatly expanded.



● The graph shows performance of the MHMF200 W (200 V).

Enhanced position detecting resolution enables smoother and more precise positioning.

Encoder		Communication speed		
23 bit (8388608 Pulse / rotation)		5 Mbps		
8 times higher resolution	+	Improved	=	Low vibrations High speed and high precision positioning
(A5Family[※4] 20 bit)		(A5Family 2.5 Mbps)		

※4 Incremental encoder

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Swifter, smarter and easier to use

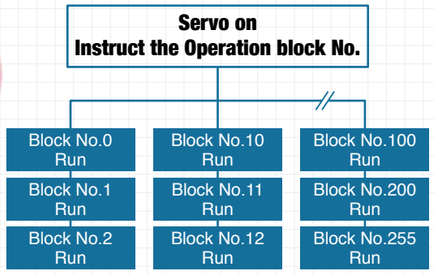
MINAS A6 Family

Powered Up compact driver

Full-scale

- New two-degree-of-freedom control system
- Frequency response 3.2 kHz
- Built-in filters and adjusting functions
- PANATERM Support
- Modbus Support (A6SF、A6SG Series)
- Block operation position control (Supports Modbus and external I/O)

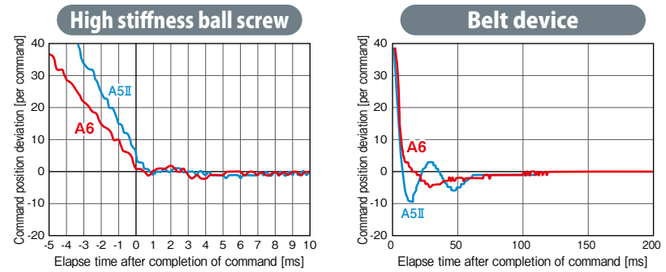
Image of block operations



High-speed response, high-precision positioning for quick and accurate movement

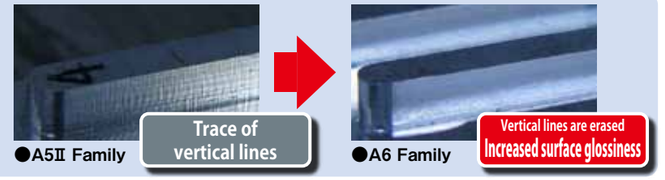
Our proprietary algorithm in addition to upgraded CPU and other hardware realized further high-speed response. Furthermore, high-precision positioning is achieved by automatically eliminating micro vibrations and machine oscillation caused by the resonance.

●Comparison of position setting waveforms



Example of operation with processing machine

A mirror finish is obtained even if a process that tends to cause streaking.



Easy and quick setting, shortening conventional settling time by approx. 64%※1

Newly developed fit gain function substantially reduces adjustment time. Adaptive notch filter and various gains can be automatically set and adjusted.

※1 Comparison with conventional product A5Ⅱ Family

■Settling time
(Measured on low stiffness resonant mechanism)

Ball screw settling time 0 ms

Belt device settling time 4 ms

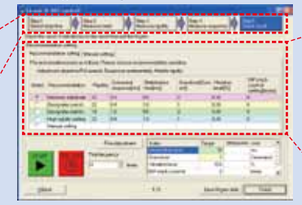
●The above is a measure based on our test environment

Adjustment completed in only 3 processes

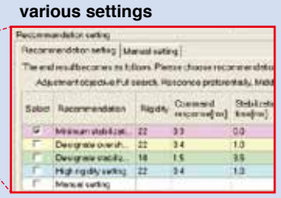
① Condition setting → ② Measurement → ③ Result determination

Load Stiffness
Command response

●Fit gain adjustment window



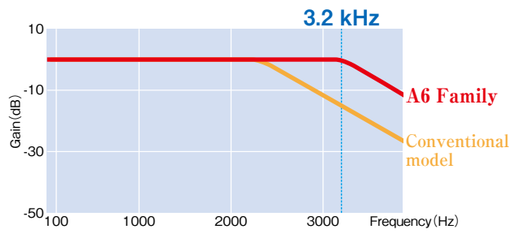
●Automatically proposes various settings



Realized 3.2 kHz frequency response to improve productivity

Realizes 3.2 kHz frequency response. At 139% that of conventional models *1, it enables high-speed operation and improves productivity.

※1 Comparison with conventional product A5Ⅱ Family



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Reduced maintenance work and trouble.

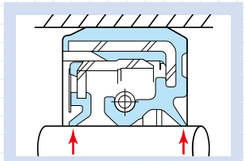
MINAS A6 Family

Lineup of motors protected by high dust-proof, high heat-resistant oil seal (With protective lip)

Motors protected by a highly dust-proof, oil-tight oil seal (with protection lip) have been added to the lineup of motor products equipped with oil seals of conventional specifications. The oil seals of this type of motor are made of a material of higher heat resistance.

You can select appropriate motor type according to your application environment such as dusty, powdery or gear connection necessity.

- Oil-seals (with protective lip) are not available for MSMF motors with flange size 80 mm or smaller.
- MQMF and MHMF motors with flange size of 80 mm or smaller provided with oils seals (with protective lip) are not mounting-compatible with A5 Family models.



Some products are provided with "protective lip" that prevents dust and oil penetration.

■Applicable oil seals

Flange size	Motor type	With oil seal		With oil seal (with protective lip)		
80 mm or less	MSMF	◎	Made of nitrile rubber (NBR)	No setting		
	MHMF,MQMF	◎		◎	Made of fluororubber	Not mounting-compatible with A5 Family products
100 mm or more	All Type	◎		◎		Mounting-compatible with A5 Family products

IP67 enclosure rating (Motors with flange size of 80 mm or smaller are order-made products)

Direct-mount connectors are used for the motor power supply and encoder input and output to improve sealing performance of the motor to IP67.

- IP67-compatible motors with flange size of 80 mm or smaller are order-made products.
- For environmental conditions of applications, refer to P.303.

What is IP?

An international standard that specifies the degree of dustproof and waterproof performance. (IP: Ingress Protection)

IP-67

- 6: Dust-tight type: Totally protected against dust penetration.
- 7: Protected against water penetration when immersed in water for the specified period of time and under the specified pressure.

Lifespan diagnosis / degradation diagnosis

It warns expected lifetime of the motor & driver, and deterioration limit of the equipment.

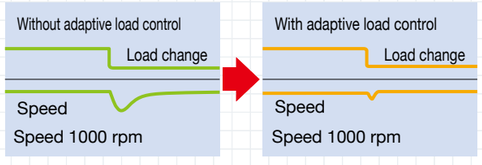
Geared servomotor

The geared servomotor lineup is also added.

Other driver functions

Adaptive load control

Adaptive load control automatically sets the best suitable gain table in response to fluctuations in inertia caused by changes in workload, thus keeping machines operating stably at all times.

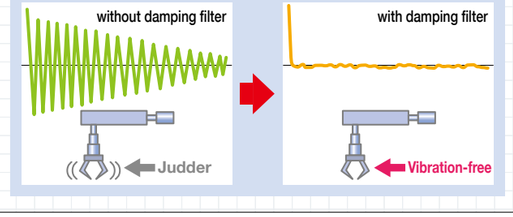


Friction torque compensation

This function reduces the effect of machine related friction and improves responsiveness. Three kinds of friction compensation can be set: unbalanced load compensation, which sets an offset torque that is constantly applied; kinetic friction compensation, which changes direction in response to the direction of movement; and viscous friction compensation, which changes according to the speed command.

Manual/Auto damping filter

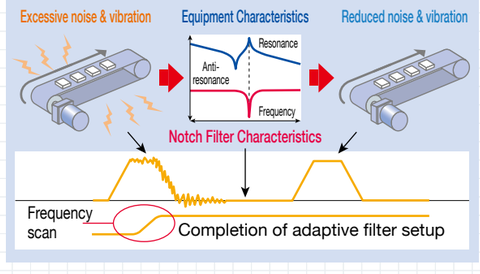
Equipped with a damping filter that is automatically set through the setup support software.This filter removes the natural vibration frequency component from the command input, greatly reducing vibration of the axis when stopping. The number of filters for simultaneous use has been increased to three from the conventional two filters.(Two from one in the two-degree-of-freedom-control mode.) The adaptive frequency has also been significantly expanded from 0.5 Hz to 300 Hz.



Manual/Auto notch filter

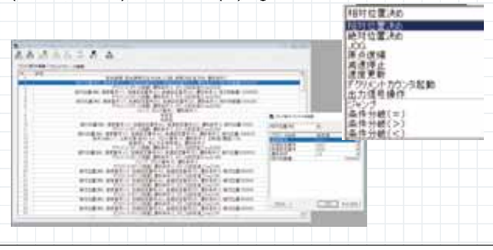
Equipped with auto-setting notch filters for greater convenience. Now there is no need to measure troublesome vibration frequencies.
Our notch filters automatically detect vibration and provide simple auto-setting. These notch filters greatly reduce noise and vibration caused by equipment resonance and respond quickly.

The A6 Family is equipped with 5 notch filters with frequencies settable from 50 Hz to 5000 Hz. Depth can be individually adjusted within this range. (Two of the filters share automatic settings.)



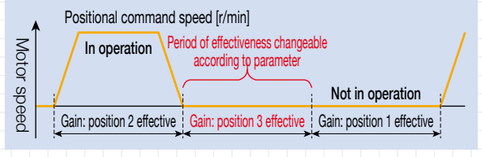
Block operation function

256 block patterns can be created. Easy control is possible because the instruction can be given to block No. by Modbus (RS232, RS485) or interface (IO) signal.



3-step gain

A 3-step gain switch is available in addition to the normal gain switch.This chooses appropriate gain tunings at both stopping and running. The 3-step gain switch gives you choices of 3 different tunings for normal running, stopping for faster positioning and at stopping. The right gaining tunings achieve lower vibration and quicker positioning time of your application.



Inertia ratio conversion

You can adjust right inertia ratio by Inertia ratio conversion input (J-SEL) of interface. When you have significant load inertia changes, it can adjust unbalanced speed and position gain turning combination.It ends up quicker response of your system.

Input/output signal assignment

You can use the parameters to arbitrarily allocate the universal 10 inputs and 6 outputs. (Inputs can be selected as either A contacts or B contacts). The Panaterm setup software provides an exclusive screen for a more simplified setup.

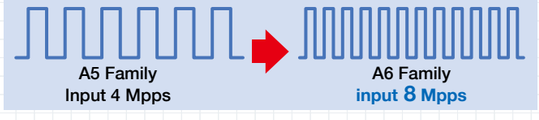
Torque limiter switching

These can be used for applications such as simplified pressure, tension control, and sensor-less homing.

Supports semi-/full-closed loop (8 Mpps input pulse, 4 Mpps output pulse) control.

Supports full-closed loop control. The A6SF series accommodates a command input of 8 Mpps and feedback output of 4 Mpps, enabling high-resolution, high-speed operation.Supports the industry's leading positioning resolution commands (pulse-train commands).

- The A6SE and A6SG series do not support full-closed loop control.
- Applicable scale: AB-phase feedback scale (general purpose product) and serial feedback scale (dedicated to Panasonic format product)



Dynamic braking

With parameter settings, you can select dynamic braking, which shorts servomotor windings U, V and W at Servo-OFF, during positive direction/ negative direction, and during power shutdown and tripping of the circuit breaker for over travel inhibition.

・The desired action sequence can be set up to accommodate your machine requirements.

Inrush current preventive function

This driver is equipped with a rush current preventive resistor to prevent the circuit breaker from shutting off the power supply as a result of inrush current occurring at power-on.

Parameter initialization

Using the front panel or by connecting a PC, you can restore the parameters to the factory settings.

Regenerative energy discharge

A regenerative resistor is used to discharge regenerative energy, which is the energy generated when stopping a load with a large moment of inertia or when using this unit in vertical operation. This energy is returned to the driver from the motor.

- Frame A, and frame B model drivers do not contain a regenerative resistor. Optional regenerative resisters are recommended.
- Frame C to frame F model drivers contain one regenerative resistor; however, adding an optional regenerative resistor provides additional regeneration capability.

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Multifunctional software for quick adjustment support

MINAS A6 Family

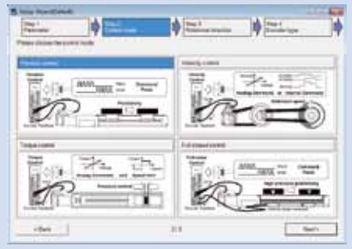
PANATERM set-up support software

The PANATERM set-up support software, with many added features. The PANATERM assists users in setting parameters, monitoring control conditions, setup support, and analyzing mechanical operation data on the PC screen, when installed in a commercially available personal computer, and connected to the MINAS A6 Family through the USB interface. Choose either English, Japanese, Chinese, Korean-language display.

Please download from our web site and use after install to the PC.
https://industrial.panasonic.com/ww/products/motors-compressors/fa-motors/ac-servo-motors/minas-a5-panaterm

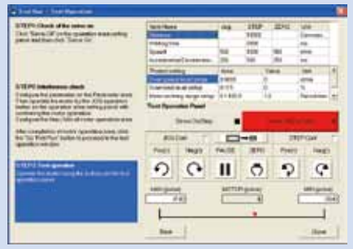
Setup wizard

This wizard supports fundamental settings in each control mode step by step, including reading of default setting. In On-line condition, Input data related to each step can be monitored in real time.



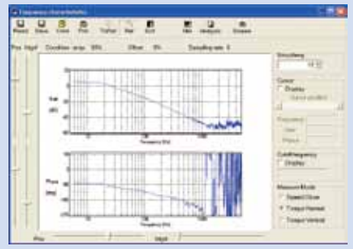
Trial run

This function supports positioning with the Z-phase search and software limit.



Frequency characteristics measurement function

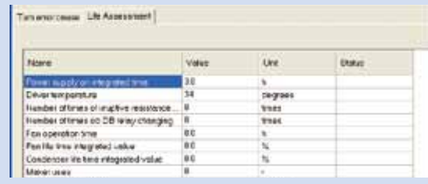
Can check frequency response characteristics of the mechanism and motor. Since resonance frequency of the mechanism is measurable, it is effective for start-up time reduction.



Service Life Prediction

The service life prediction function considers the internal temperature for main components such as the fan and condenser. If the rated value is exceeded, an alarm is displayed. This approach prevents unexpected suspension of operation and allows for planning of systemized maintenance.

Note: The life span prediction value should be considered as a guide only.

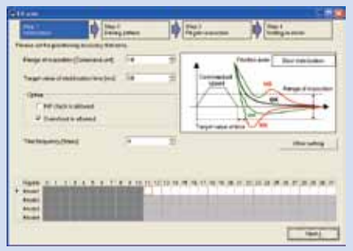


The fit gain function for setting Two-degree-of-freedom control.

1) Select the adjustment method 2) Load measurement
3) Confirming results Adjust gain to meet your needs

Fit gain

This function automatically searches the best suitable stiffness setting and mode and adjusts the gain once the target in-position range and setting time are set.



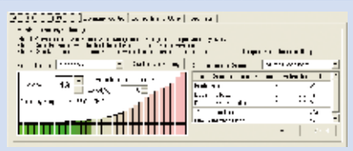
Encoder temperature monitor

The Encoder Temperature Monitor is a new function capable of real-time measurement of the interior temperature of the encoder, something that has been difficult to achieve in the past. It is valuable for monitoring the motor and can be used as a diagnostic in the event of a malfunction.

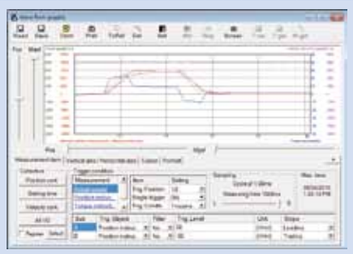
Deterioration diagnosis

From the equipment information that can be detected by the motor, it is possible to display and check the deterioration and aging status of the equipment.

Added New screen for gain adjustment, equipped with stiffness oscillation auto-reduction function



Significant increase of measuring objects Multi-functional waveform graphic



Other features It has convenient functions such as motor / driver information such as load factor, power supply voltage, driver temperature etc, logging function capable of recording interface recording, display function of non-rotating factors etc
●Deterioration diagnosis ●Block action editor / monitor (A6SE, A6SG, A6SF series) ●Battery refresh ●Object editor (A6BE, A6BF series)

• Hardware configuration

Personal computer	CPU	800 MHz or more
	Memory	System memory 512 MB or more Graphics memory 32 MB or more
	Hard disk capacity	Vacancy of 512MB or more recommended
	OS	Windows® Vista SP1 (32 bit), Windows® 7 (32 bit, 64 bit), Windows® 8 (32 bit, 64 bit), Windows® 10 (32 bit, 64 bit) Japanese, English, Chinese (Simplified), Korean version
	Serial communication function	USB port, COM port (Communication speeds: 2400 bps to 115200 bps) * A COM port is required to use RS232 communications. A 9600 bps or higher baud rate is recommended.
Display	Resolution	1024 × 768 pix or more
	Number of colors	24 bit colors (TrueColor) or more

<CAUTION> This software is applicable only to A5 Family, A6 Family. To apply this software to A, AⅢ, E or A4 series, consult our distributors.

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Lineup of two types of network servo driver

MINAS A6 Family

Realtime Express(RTEX)

Ultimate **Real-time** performance

- Com. period min. **0.0625 ms**
- Com. speed **100 Mbps** Full-duplex
- Velocity response **3200 Hz**

Functionality to meet various needs

- Precise position latch & comparing
- Infinitely rotatable absolute encoder
- IEC safety I/F model available [*1]

[*1]: Multi-functional type F. IEC61800-5-2 STO, IEC61508 SIL3.

RTEX Realtime Express

Simple network

- High-performance & Low-cost
- Isochronous established by ASIC
- Easy device development

Max **16000** times/s

MINAS A6N series

EtherCAT

High-Performance

- Frequency response: **3200 Hz**
- Supports network communication "**EtherCAT**".
- High-Speed **100 Mbps**
- Real-time auto tuning function,

EtherCAT®

High-functions

- **EtherCAT** with many supported applications
  <7 control modes, 32 hm methods, DC(Synch), SM2(Synch), FreeRUN (Non-synch)>
- System-up possible with various slaves.
- Supports PC-based controller.
- A6BL/A6BM (for Linear Motor) will be available soon.

Standards

- Official EtherCAT Conformance Tested model available.
- IEC safety I/F model available.[*2]

[*2]:Supported by multifunction type. EN61800-5-2

Small size servo driver with EtherCAT

MINAS A6B series 特注品

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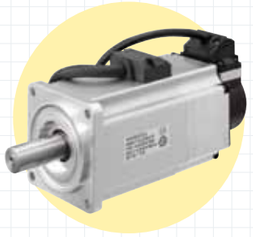
Absolute system can be configured without the battery.

Battery-less absolute encoder motor

Reduced the battery for the absolute encoder by installing the power generating element in the motor.
In addition to improving maintainability, we support the construction of ecological and economical industrial machines and systems.

Maintenance work such as battery replacement is reduced because battery is not required anymore.

Reduce wasteful inventory management and replacement costs as battery is no required anymore. It contributes to the construction of ecological and economical industrial machines and systems.



Battery-less absolute encoder motor list

	80 mm sq. or less Leadwire type						100 mm sq. or more Encoder connector (Small size JN2) type					
	50 W	100 W	200 W	400 W	750 W	1000 W	1.0 kW	1.5 kW	2.0 kW	3.0 kW	4.0 kW	5.0 kW
Low inertia **MSMF**	100 V 200 V	100 V 200 V	100 V 200 V	100 V 200 V	200 V	200 V	200 V	200 V	200 V	200 V	200 V	200 V
Middle inertia **MQMF**		100 V 200 V	100 V 200 V	100 V 200 V								
Middle inertia **MDMF**							200 V	200 V	200 V	200 V	200 V	200 V
Middle inertia **MGMF**							850 W 200 V	1.3 kW 200 V	1.8 kW 200 V	2.4 kW 200 V	2.9 kW 200 V	4.4 kW 200 V
High inertia **MHMF**	100 V 200 V	100 V 200 V	100 V 200 V	100 V 200 V	200 V	200 V	200 V	200 V	200 V	200 V	200 V	200 V

Table description
Voltage specifications: 100 V 200 V / 200 V
Coming soon

DC 24 V / 48 V type

Special order product

- DC24 V / DC48 V power supply support, ultra-compact motor and driver.
- Rated output :
  DC24 V: 100 W, 200 W
  DC48 V: 200 W, 400 W
  (Both have a flange size of 60 mm)

Dual-axis servo driver

Special order product Under development

- Reduced wiring by dual-axis integration
- Supports both rotary motors and linear / DD motors
- Rated output :
  Max.200 W ×2-axis
  Max.400 W ×2-axis
  Max.750 W ×2-axis
  Max.1 kW × 2-axis

RTEX Realtime Express

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Compliance with MINAS A6 Family international standards

(A6SF series) (A6SE and A6SG series)

		Driver	Motor
EU Directives	EMC Directives	EN55011 EN61000-6-2 EN61000-6-4 EN61800-3	—
	Low-Voltage Directives	EN61800-5-1 EN50178	EN60034-1 EN60034-5
	Machinery Directives Functional safety *1	ISO13849-1 EN61508 EN62061 EN61800-5-2 IEC61326-3-1 IEC60204-1	—
UL Standards		UL508C(E164620)	UL1004-1, UL 1004-6 (E327868)
CSA Standards		C22.2 No.274	C22.2 No.100
Radio Waves Act (South Korea) (KC)*2		KN11 KN61000-4-2,3,4,5,6,8,11	—

IEC : International Electrotechnical Commission
UL : Underwriters Laboratories
EN : Europaischen Normen
CSA : Canadian Standards Association
EMC : Electromagnetic Compatibility

Safety parameters

	With diagnosis by EMD	Without diagnosis by EMD
Safety level	EN61508 (SIL3) EN62061 (SILCL3)	EN61508 (SIL2) EN62061 (SILCL2)
Performance level	ISO13849-1 PL e (Cat.3)	ISO13849-1 PL d (Cat.3)
Safety function	EN61800-5-2 (SIL 3, STO)	EN61800-5-2 (SIL 2, STO)
Dangerous failure rate per unit time	<For size A,B,C,D,E,F> PFH = 1.34 × 10^{-8} (% SIL3 = 13.4 %) <For size G and H> PFH =1.78 × 10^{-8} (% SIL3 = 17.8 %)	<For size A,B,C,D,E,F> PFH = 1.40×10^{-8} (% SIL2 = 1.40 %) <For size G and H> PFH = 1.85×10^{-8} (% SIL2 = 1.85 %)
Dangerous side average failure time	MTTFd : High (100 years)	MTTFd : High (100 years)
Average self-diagnosis rate	DC : Medium	DC : Low
Mission time	15 years	15 years

• When export this product, follow statutory provisions of the destination country.
*1 A6SE, A6SG, A6NE and A6BE series doesn't correspond to the functional safety standard.
*2 Information related to the Korea Radio Law
This servo driver is a Class A commercial broadcasting radio wave generator not designed for home use.
The user and dealer should be aware of this fact.

A 급 기기 (업무용 방송통신기자재)
이 기기는 업무용(A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

(대상기종 : Servo Driver)

This products is not an object of china compulsory certification (CCC).

Low noise, compliant with EMC directives

Radiated noise is minimized to meet EMC directives and to support international standards.

Compliance with EU safety standards.

Features non-software-based independent redundant circuitry for motor power isolation. Independent redundant circuitry for motor power isolation. This obviates the need for magnetic contactors to isolate the required motor in order to accommodate low-voltage machinery commands.(The final safety compliance must be applied as machine.)

SEMI-F47

Includes a function in compliance with the SEMI F47 standard for voltage sag immunity under no load or light load. Ideal for the semiconductor and LCD industries.
- Excluding the single-phase 100-V type.
- Please verify the actual compliance with your machine checking the F47 standard for voltage sag immunity.

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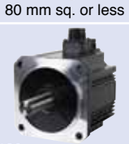
Motor Line-up

Motor Line-up

Motor			Rated output (kW)	Rated rotational speed (Max. speed) (r/min)	Rotary encoder 23-bit absolute	Enclosure (*1)	Motor lead-out configuration	Features	Applications
Low inertia	MSMF	80 mm sq. or less	0.05 0.1 0.2 0.4 0.75 1.0	3000 (6000)	○	IP65	Leadwire	· Small capacity · Suitable for high speed application · Suitable for all applications	· Bonder · Semiconductor production equipment · Packing machines etc
		80 mm sq. or less	0.05 0.1 0.2 0.4 0.75 1.0	3000 (6000)	○	IP67	Connector		
		100 mm sq. or more	1.0 1.5 2.0 3.0	3000 (5000)	○	IP67	Connector	· Middle capacity · Suitable for the machines directly coupled with ball screw and high stiffness and high repetitive application	· SMT machines · Food machines · LCD production equipment etc
			4.0 5.0	3000 (4500)					
	MQMF (Flat type)	80 mm sq. or less	0.1 0.2 0.4	3000 (6500)	○	IP65	Leadwire	· Small capacity · Flat type and suitable for low stiffness machines with belt driven · Motors with gear reducers are also available. (See. P.293)	· SMT machines · Inserter machines · Belt drive machines · unloading robot
		80 mm sq. or less	0.1 0.2 0.4	3000 (6500)	○	IP67	Connector		
Middle inertia	MDMF	130 mm sq. or more	1.0 1.5 2.0 3.0 4.0 5.0	2000 (3000)	○	IP67 (22.0 kW : IP44)	Connector (22.0 kW : Terminal)	· Middle capacity · Suitable for low stiffness machines with belt driven	· Conveyors · Robots · Machine tool etc
			7.5	1500 (3000)					
			11.0 15.0 22.0	1500 (2000)					
	MGMF (Low speed/ High torque type)	130 mm sq. or more	0.85 1.3 1.8 2.4 2.9 4.4 5.5	1500 (3000)	○	IP67	Connector	· Middle capacity · Suitable for low speed and high torque application	· Conveyors · Robots · Textile machines etc
High inertia	MHMF	80 mm sq. or less	0.05 0.1 0.2 0.4	3000 (6500)	○	IP65	Leadwire	· Small capacity · Suitable for low stiffness machines with belt driven · Motors with gear reducers are also available. (See. P.293)	· Conveyors · Robots etc
			0.75 1.0	3000 (6000)					
		80 mm sq. or less	0.05 0.1 0.2 0.4	3000 (6500)	○	IP67	Connector		
			0.75 1.0	3000 (6000)					
		 130 mm sq. or more	1.0 1.5 2.0 3.0 4.0 5.0	2000 (3000)	○	IP67	Connector	· Middle capacity · Suitable for low stiffness machines with belt driven, and large load moment of inertia	· Conveyors · Robots · LCD manufacturing equipment etc
			7.5	1500 (3000)					

(*1) Please refer to P.303 for protection class conditions.

*** For possible combinations of motors and drivers, see P.29 to P.42.**

- When using a rotary encoder as an absolute system (using multi-turn data), connect a battery to the absolute encoder.
- When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

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Model Designation

Refer to P.29 to P.42 for motor and driver combinations. * For combination of elements of model number, refer to Index P.448.

Servo Motor "Oil seal with protective lip" option is not available for motors above 7.5 kW.

M	S	M	F	5	A	Z	L	1	A	1	*
①			②	③		④	⑤	⑥	⑦		Special specifications

① Type

Symbol	Type	
MSM	Low inertia	(50 W to 5.0 kW)
MQM	Middle inertia	(100 W to 400 W)
MDM	Middle inertia	(1.0 kW to 22.0 kW)
MGM	Middle inertia	(0.85 kW to 5.5 kW)
MHM	High inertia	(50 W to 7.5 kW)

② Series

Symbol	Series name
F	A6 Family

③ Motor rated output

Symbol	Rated output
5A	50 W
01	100 W
02	200 W
04	400 W
08	750 W
09	0.85 kW, 1000 W (130 mm sq.) (80 mm sq.)
10	1.0 kW

Symbol	Rated output
13	1.3 kW
15	1.5 kW
18	1.8 kW
20	2.0 kW
24	2.4 kW
29	2.9 kW
30	3.0 kW
40	4.0 kW

Symbol	Rated output
44	4.4 kW
50	5.0 kW
55	5.5 kW
75	7.5 kW
C1	11.0 kW
C5	15.0 kW
D2	22.0 kW

④ Voltage specifications

Symbol	Specifications
1	100 V
2	200 V
Z	100 V/ 200 V common (50 W only)

⑥ Design order

Symbol	Specifications
1	Standard

<Note>
When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

⑤ Rotary encoder specifications

Symbol	Format	Pulse counts	Resolution	Wires
L	Absolute	23-bit	8388608	7

⑦ Motor specifications: IP67 *2 100 mm sq. to 220 mm sq. MSMF, MHMF, MDMF, MGMF

Symbol		Shaft		Holding brake		Oil seal		Encoder terminal	
		Round	Key-way	without	with	with	With protective lip	Connector JN2 (Small size)	Connector JL10 (Large size) *3
C	5	●		●		●		●	
C	6	●		●		●			●
C	7	●		●			●	●	
C	8	●		●			●		●
D	5	●			●	●		●	
D	6	●			●	●			●
D	7	●			●		●	●	
D	8	●			●		●		●
G	5		●	●		●		●	
G	6		●	●		●			●
G	7		●	●			●	●	
G	8		●	●			●		●
H	5		●		●	●		●	
H	6		●		●	●			●
H	7		●		●		●	●	
H	8		●		●		●		●

⑦ Motor specifications: 80 mm sq. or less MSMF 50 W to 1000 W

Symbol		Shaft		Holding brake		Oil seal		Motor encoder terminal *1	
		Round	Key-way, center tap	without	with	without	with	Connector JN	Lead wire
A	1	●		●		●		●	
A	2	●		●		●			●
B	1	●			●	●		●	
B	2	●			●	●			●
C	1	●		●			●	●	
C	2	●		●			●		●
D	1	●			●		●	●	
D	2	●			●		●		●
S	1		●	●		●		●	
S	2		●	●		●			●
T	1		●		●	●		●	
T	2		●		●	●			●
U	1		●	●			●	●	
U	2		●	●			●		●
V	1		●		●		●	●	
V	2		●		●		●		●

⑦ Motor specifications: 80 mm sq. or less MHMF 50 W to 1000 W MQMF 100 W to 400 W

Symbol		Shaft		Holding brake		Oil seal			Motor encoder terminal *1	
		Round	Key-way, center tap	without	with	without	with	With protective lip	Connector JN	Lead wire
A	1	●		●		●			●	
A	2	●		●		●				●
B	1	●			●	●			●	
B	2	●			●	●				●
C	1	●		●			●		●	
C	2	●		●			●			●
C	3	●		●				●	●	
C	4	●		●				●		●
D	1	●			●		●		●	
D	2	●			●		●			●
D	3	●			●			●	●	
D	4	●			●			●		●
S	1		●	●		●			●	
S	2		●	●		●				●
T	1		●		●	●			●	
T	2		●		●	●				●
U	1		●	●			●		●	
U	2		●	●			●			●
U	3		●	●				●	●	
U	4		●	●				●		●
V	1		●		●		●		●	
V	2		●		●		●			●
V	3		●		●			●	●	
V	4		●		●			●		●

*1 Connector type: IP67, Lead wire type: IP65 *2 22.0 kW: IP44
*3 Connector on the motor side encoder. (Also applicable to screwed type.)

Servo Driver "Basic" and "RS485 communication" types are not available for G-Frame and H-Frame drivers.

M	A	D	L	N	1	5	S	E	*	*	*
①			②	③	④	⑤	⑥	⑦			Special specifications

① Frame symbol

Symbol	Frame
MAD	A-Frame
MBD	B-Frame
MCD	C-Frame
MDD	D-Frame

Symbol	Frame
MED	E-Frame
MFD	F-Frame
MGD	G-Frame
MHD	H-Frame

② Series

Symbol	Series name
L	A6 Family

③ Safety Function

Symbol	Specifications
N	without the safety function
T	with the safety function

④ Max. current rating

Symbol	Current rating
0	6 A
1	8 A
2	12 A
3	22 A
4	24 A
5	40 A
8	60 A

Symbol	Current rating
9	80 A
A	100 A
B	120 A
C	160 A
E	240 A
F	360 A

⑤ Supply voltage specifications

Symbol	Specifications
1	Single phase 100 V
3	3-phase 200 V
5	Single/3-phase 200 V

⑥ I/f specifications ⑦ Classification of type

Symbol (specification)	Symbol	Specification
S (Analog/Pulse)	E	Basic type (Pulse train only)
	F	Multi fanction type (Pulse, analog, full-closed)
	G	RS485 communication type (Pulse train only)

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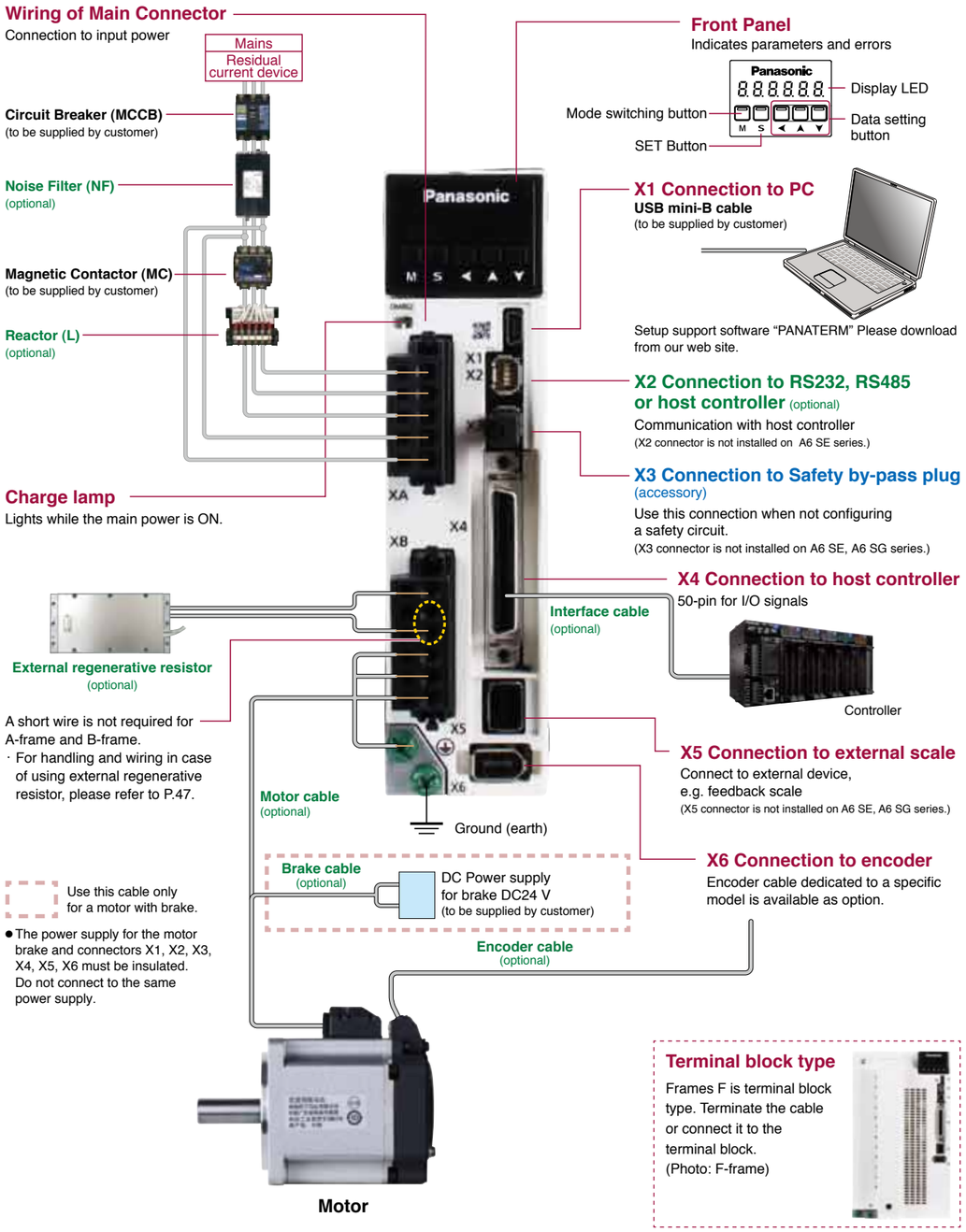
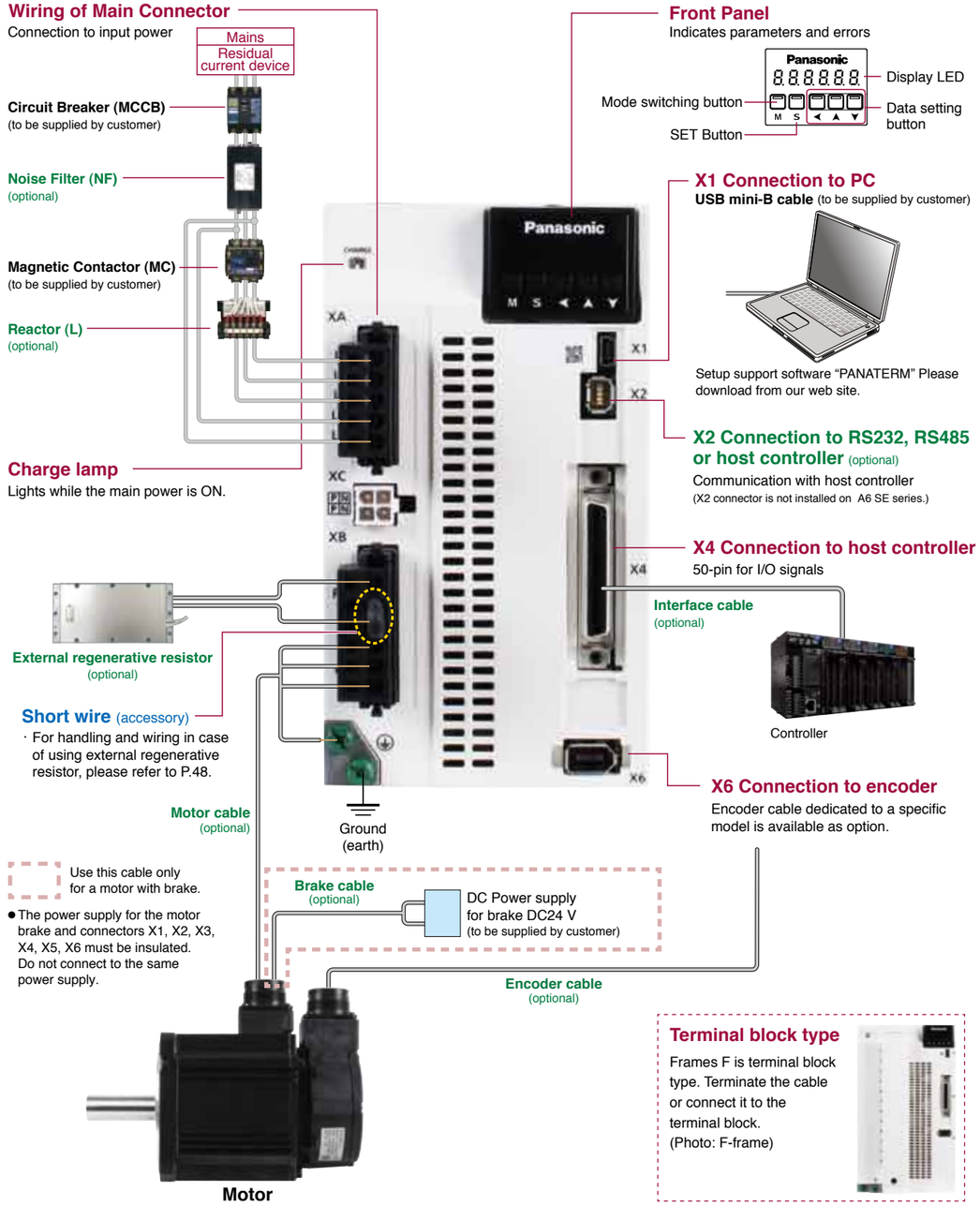
Overall Wiring

<A6SF Series (Driver: A-frame Motor: 200 W)>



<A6SG Series/ A6SE Series (Driver: D-frame Motor: 1.0 kW)>

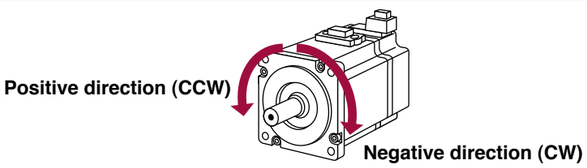


<Caution>

Apply adequate tightening torque to the product mounting screw by taking into consideration strength of the screw and the characteristics of material to which the product is installed. Overtightening can damage the screw and/or material; undertightening can result in loosening.

<Note>

Initial setup of rotational direction:
positive = CCW and negative = CW.
Pay an extra attention.



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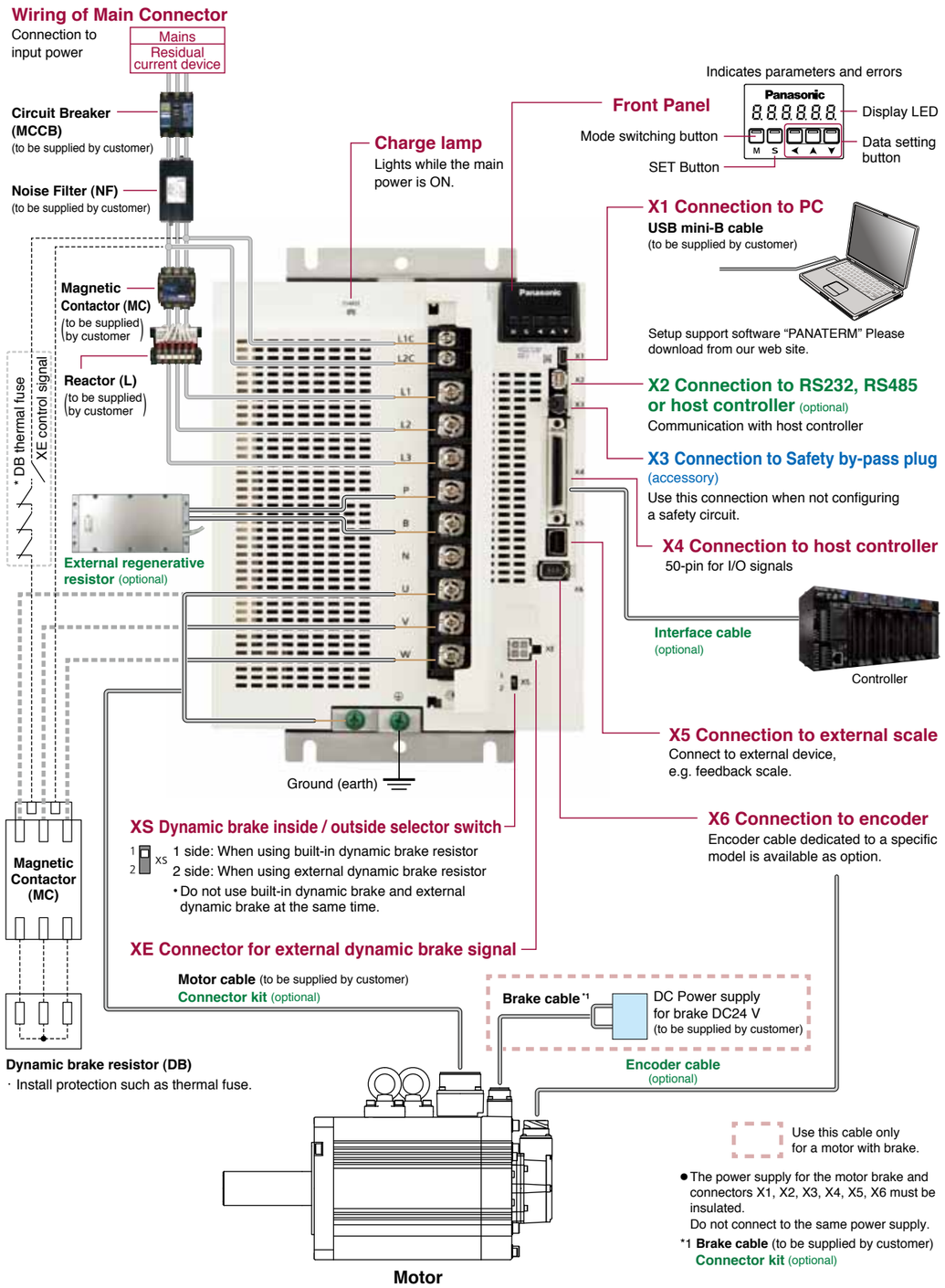
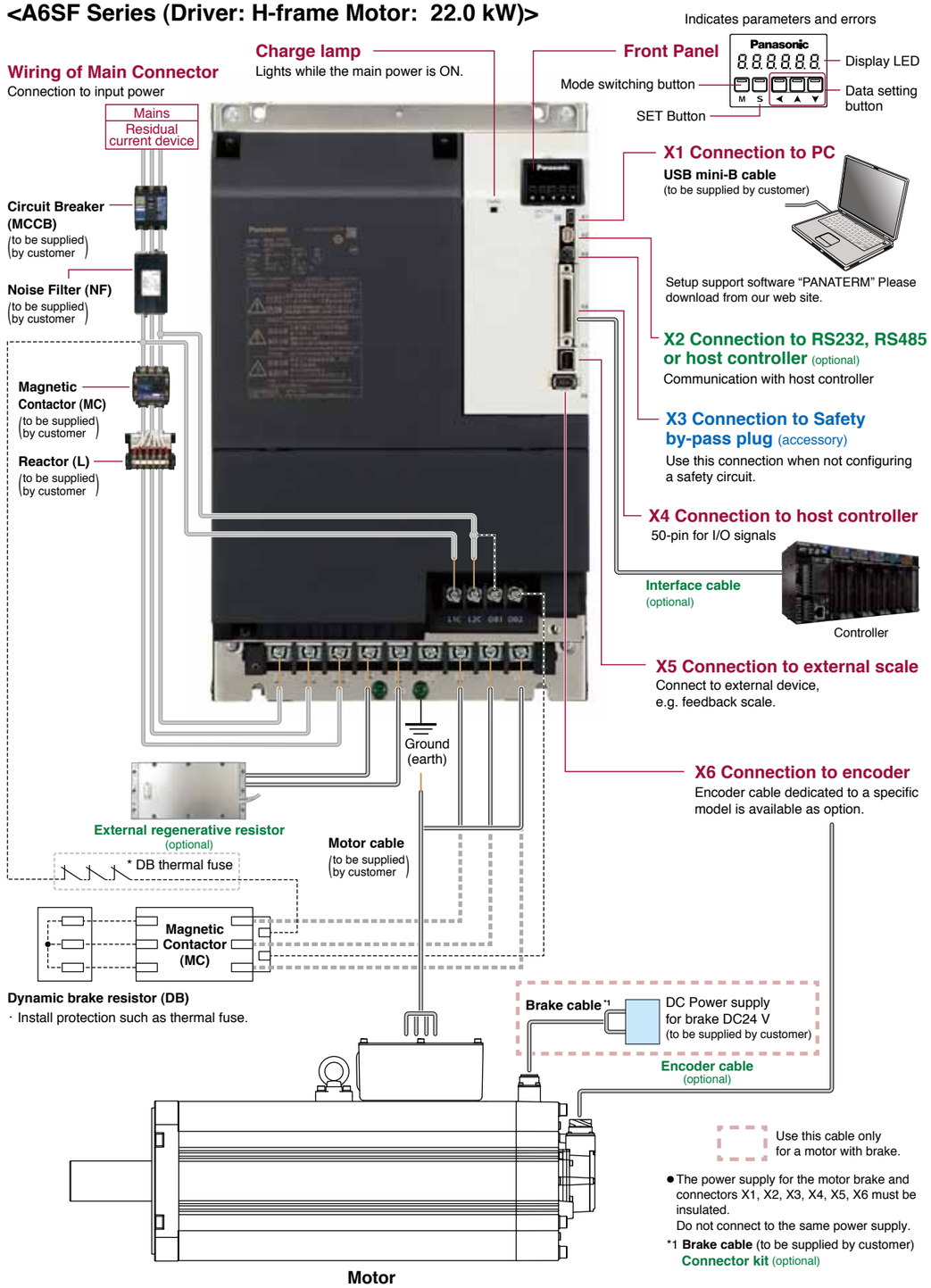
Overall Wiring

<A6SF Series (Driver: G-frame Motor: 7.5 kW)>



<Caution> Apply adequate tightening torque to the product mounting screw by taking into consideration strength of the screw and the characteristics of material to which the product is installed. Overtightening can damage the screw and/or material; undertightening can result in loosening.

<A6SF Series (Driver: H-frame Motor: 22.0 kW)>



<Note> Initial setup of rotational direction: positive = CCW and negative = CW. Pay an extra attention.

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Driver and List of Applicable Peripheral Devices

Driver	Applicable motor	Voltage (V) *1	Rated output (kW)	Required Power at the (rated load) (kVA)	Circuit breaker (rated current) (A)	Noise filter (Single phase / 3-phase)	Surge absorber (Single phase / 3-phase)	Ferrite core	Rated operating current of magnetic (contactor contact configuration) *2	Diameter and withstand voltage of main circuit cable	Crimp terminal for main circuit terminal block *3	Diameter and withstand voltage of control power supply cable	Crimp terminal for control power supply terminal block	Diameter and withstand voltage of motor cable *4	Diameter and withstand voltage of brake cable
MADL	MSMF MHMF	Single phase, 100	0.05	approx. 0.4	10	DV0P4170	DV0P4190	DV0P1460	20 A (3P+1a)	0.75 mm²/ AWG18 600 VAC or more to 2.0 mm²/ AWG14 600 VAC or more	Connection to exclusive connector	0.75 mm²/ AWG18 600 VAC or more	Connection to exclusive connector	0.75 mm²/ AWG18 600 VAC or more to 2.0 mm²/ AWG14 600 VAC or more	0.28 mm² to 0.75 mm²/ AWG22 to AWG18 100 VAC or more
	MSMF MQMF MHMF		0.1												
	MSMF MHMF	Single/ 3-phase 200	0.05	approx. 0.5		DV0P4170 / DV0PM20042	DV0P4190 / DV0P1450								
	MSMF MQMF MHMF		0.1, 0.2												
MBDL	MSMF MQMF MHMF	Single phase, 100	0.2			DV0P4170	DV0P4190								
		Single/ 3-phase 200	0.4	approx. 0.9		DV0P4170 / DV0PM20042	DV0P4190 / DV0P1450								
MCDL	MSMF MQMF MHMF	Single phase, 100	0.4	approx. 0.9	15	DV0PM20042	DV0P4190								
	MSMF MHMF	Single/ 3-phase 200	0.75	approx. 1.8			DV0P4190 / DV0P1450								
MDDL	MGMF	Single/ 3-phase 200	0.85	approx. 2.0	20	DV0P4220	DV0P4190 / DV0P1450		30 A (3P+1a)						
	MSMF		1.0 (80 mm sq.)	approx. 2.4											
	MDMF MHMF		1.0												
	MHMF		1.0 (80 mm sq.)												
	MSMF		1.0												
	MGMF		1.3	approx. 2.6											
	MSMF MDMF MHMF		1.5	approx. 2.9											
MEDL	MGMF	3-phase 200	1.8	approx. 3.4	30	DV0PM20043	DV0P1450		60 A (3P+1a)	2.0 mm²/ AWG14 600 VAC or more to 3.5 mm²/ AWG12 600 VAC or more				2.0 mm²/ AWG14 600 VAC or more to 3.5 mm²/ AWG12 600 VAC or more	0.75 mm²/ AWG18 100 VAC or more
	MSMF MDMF MHMF		2.0	approx. 3.8											
	MGMF		2.4	approx. 4.5										3.5 mm²/ AWG12 600 VAC or more	
MFDL	MGMF	3-phase 200	2.9	approx. 5.0	50	DV0P3410	DV0P1450		100 A (3P+1a)	3.5 mm²/ AWG12 600 VAC or more	11 mm or smaller φ5.3 Terminal block M5		11 mm or smaller φ5.3 Terminal block M5		
	MSMF MDMF MHMF		3.0	approx. 5.2											
	MSMF MDMF MHMF		4.0	approx. 6.5											
	MGMF		4.4	approx. 7.0											
	MSMF MDMF MHMF		5.0	approx. 7.8											
MGDL	MGMF	3-phase 200	5.5	approx. 8.5	60	HF3080C-SZA (Recommended components)	DV0P1450	DV0P1460 RJ8095 (Recommended components) T400-61D *5	100 A (3P+1a)	8.0 mm²/ AWG8 600 VAC or more				14 mm²/ AWG6 600 VAC or more	0.75 mm²/ AWG18 100 VAC or more
	MDMF		7.5	approx. 11											
	MHMF														
MHDL	MDMF	3-phase 200	11.0	approx. 15	125	HF3100C-SZA (Recommended components)	DV0P1450		150 A (3P+1a)	22 mm²/ AWG4 600 VAC or more	16 mm or smaller φ6.4 Terminal block M6		10 mm or smaller φ4.3 Terminal block M4	22 mm²/ AWG4 600 VAC or more *6 22.8 mm or smaller φ8.5 Terminal block M8	
			15.0	approx. 20											
			22.0	approx. 28	175					38 mm²/ AWG2 600 VAC or more					

*1 Select peripheral devices for single/3phase common specification according to the power source.
*2 The magnetic contactor used for the external dynamic brake resistor should have the same rating as the magnetic contactor used for the main circuit.
*3 For the ground screw, use the same crimp terminal as that for the main circuit terminal block.
*4 The thickness of the grounding wire and the thickness of the external dynamic brake resistor should be the same as or larger than the thickness of the motor wire. The motor wire is a shielded wire that complies with the European Union Directive / UL standard. (G and H frame only)
*5 Please use all to comply with international standards.
*6 22.0 kW The connection of the motor power line is a terminal block. In order to comply with the CSA standard, it is necessary to use a CSA standard-certified power wire round terminal.

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Related page

Noise filter ..... P.412 “Composition of Peripheral Devices”
Surge absorber ..... P.413 “Composition of Peripheral Devices”
Ferrite core ..... P.414 “Composition of Peripheral Devices”
Motor/brake connector .... P.307 “Specifications of Motor connector”

About circuit breaker and magnetic contactor

To comply to EC Directives, install a circuit breaker between the power and the noise filter without fail, and the circuit breaker should conform to IEC Standards and UL recognized (Listed and Ⓤʟ marked).

Suitable for use on a circuit capable of delivering not more than 5000 Arms symmetrical amperes, below the maximum input voltage of the product.

If the short-circuit current of the power supply exceeds this value, install a current limit device (current limiting fuse, current limiting circuit breaker, transformer, etc.) to limit the short-circuit current.

<Caution>

· Select a circuit breaker and noise filter which match to the capacity of power supply (including a load condition).

Terminal block and protective earth terminals

· Use a copper conductor cables with temperature rating of 75 °C or higher.
· Use the attached exclusive connector for A-frame to E-frame, and maintain the peeled off length of 8 mm to 9 mm.

■ Fastening torque list (Terminal block screw/Terminal cover fastening screw)

Driver		Terminal block screw		Terminal cover fastening screw	
Frame	Terminal name	Nominal size	Fastening torque (N·m) Note)1	Nominal size	Fastening torque (N·m) Note)1
MFDL	L1, L2, L3, L1C, L2C, P, RB, B, N, U, V, W	M5	1.0 to 1.7	M3	0.19 to 0.21
MGDL	L1C, L2C	M4	0.7 to 1.0	M3	0.19 to 0.21
	L1, L2, L3, P, B, N, U, V, W	M5	2.0 to 2.4		
MHDL	L1C, L2C, DB1, DB2	M4	0.7 to 1.0	M5	2.0 to 2.5
	L1, L2, L3, P, B, N, U, V, W	M6	2.2 to 2.5	M3	0.19 to 0.21

■ Fastening torque list (Ground terminal screw/Connector to host controller [X4])

Driver frame	Ground screw		Connector to host controller (X4)	
	Nominal size	Fastening torque (N·m) Note)1	Nominal size	Fastening torque (N·m) Note)1
MADL, MBDL, MCDL, MDDL, MEDL	M4	1.0 to 1.2	M2.6	0.3 to 0.35
MFDL	M5	1.8 to 2.0		
MGDL	M5	1.8 to 2.0		
MHDL	M6	2.4 to 2.6		

■ Motor: Fastening torque

Motor	U, V, W terminal Ground terminal screw		Terminal box cover fastening screw	
	Nominal size	Fastening torque (N·m) Note)1	Nominal size	Fastening torque (N·m) Note)1
MDMF 22.0 kW	M8	12.0	M5	4.4

Note)1 **<Caution>**

· Applying fastening torque larger than the maximum value may result in damage to the product.
· Do not turn on power without tightening all terminal block screws properly, otherwise, loose contacts may generate heat (smoking, firing) .

<Remarks>

· To check for looseness, conduct periodic inspection of fastening torque once a year.

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Motor						Driver			Power capacity (at rated load) (kVA)		Optional parts ▶ refer to P.306						
Motor series		Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions (page)	A6SF series Multi function type (Pulse, analog, full-closed)	A6SG series RS485 communication / A6SE series Basic (Pulse signal input) Note)2, Note)4	Frame			Encoder Cable Note)3 23-bit Absolute: Use in the absolute system (with battery box) Note)5 — Fixed cable	Encoder Cable Note)3 23-bit Absolute: Use in the Incremental system (without battery box) — Fixed cable	Motor Cable Note)3: without Brake — Movable cable	Motor Cable Note)3: with Brake — Movable cable	Brake Cable Note)3 — Movable cable	External Regenerative Resistor	Reactor (Single phase / 3-phase)	Noise Filter (Single phase / 3-phase)
Low inertia	MSMF (Leadwire type) 3000 r/min IP65	Single phase 100 V	50	MSMF5AZL1 ☐ 2	63, 119	MADLT01SF	MADLN01S◇	A-frame ★	Approx.	0.4	MFECA 0＊＊0EAE (For fixed)	MFECA 0＊＊0EAD (For fixed)	MFMCA 0＊＊0EED	MFMCA 0＊＊0EED	MFMCB 0＊＊0GET Note)6	DV0P4280	DV0P227	DV0P4170
			100	MSMF011L1 ☐ 2	65, 120	MADLT11SF	MADLN11S◇											
			200	MSMF021L1 ☐ 2	67, 121	MBDLT21SF	MBDLN21S◇	B-frame ★	Approx.	0.5						DV0P4283	DV0P228	
			400	MSMF041L1 ☐ 2	69, 123	MCDLT31SF	MCDLN31S◇	C-frame	Approx.	0.9						DV0P4282		DV0PM20042
		Single phase/ 3-phase 200 V	50	MSMF5AZL1 ☐ 2	64, 119	MADLT05SF	MADLN05S◇	A-frame ★	Approx.	0.5						DV0P4281	DV0P227 / DV0P220	DV0P4170 / DV0PM20042
			100	MSMF012L1 ☐ 2	66, 120	MADLT05SF	MADLN05S◇											
			200	MSMF022L1 ☐ 2	68, 121	MADLT15SF	MADLN15S◇									DV0P4283		
			400	MSMF042L1 ☐ 2	70, 123	MBDLT25SF	MBDLN25S◇	B-frame ★	Approx.	0.9							DV0P228 / DV0P220	
			750	MSMF082L1 ☐ 2	71, 124	MCDLT35SF	MCDLN35S◇	C-frame	Approx.	1.8								DV0PM20042
			1000	MSMF092L1 ☐ 2	72, 125	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.4						DV0P4284	DV0P228 / DV0P222	DV0P4220
Middle inertia Flat type	MQMF (Leadwire type) 3000 r/min IP65	Single phase 100 V	100	MQMF011L1 ☐ 2 MQMF011L1 ☐ 4	79, 135	MADLT11SF	MADLN11S◇	A-frame ★	Approx.	0.4	MFECA 0＊＊0EAE (For fixed)	MFECA 0＊＊0EAD (For fixed)	MFMCA 0＊＊0EED	MFMCA 0＊＊0EED	MFMCB 0＊＊0GET Note)6	DV0P4280	DV0P227	DV0P4170
			200	MQMF021L1 ☐ 2 MQMF021L1 ☐ 4	81, 139	MBDLT21SF	MBDLN21S◇	B-frame ★	Approx.	0.5						DV0P4283	DV0P228	
			400	MQMF041L1 ☐ 2 MQMF041L1 ☐ 4	83, 143	MCDLT31SF	MCDLN31S◇	C-frame	Approx.	0.9						DV0P4282		DV0PM20042
		Single phase/ 3-phase 200 V	100	MQMF012L1 ☐ 2 MQMF012L1 ☐ 4	80, 135	MADLT05SF	MADLN05S◇	A-frame ★	Approx.	0.5						DV0P4281	DV0P227 / DV0P220	DV0P4170 / DV0PM20042
			200	MQMF022L1 ☐ 2 MQMF022L1 ☐ 4	82, 139	MADLT15SF	MADLN15S◇									DV0P4283		
			400	MQMF042L1 ☐ 2 MQMF042L1 ☐ 4	84, 143	MBDLT25SF	MBDLN25S◇	B-frame ★	Approx.	0.9							DV0P228 / DV0P220	
High inertia	MHMF (Leadwire type) 3000 r/min IP65	Single phase 100 V	50	MHMF5AZL1 ☐ 2 MHMF5AZL1 ☐ 4	85, 147	MADLT01SF	MADLN01S◇	A-frame ★	Approx.	0.4	MFECA 0＊＊0EAE (For fixed)	MFECA 0＊＊0EAD (For fixed)	MFMCA 0＊＊0EED	MFMCA 0＊＊0EED	MFMCB 0＊＊0GET Note)6	DV0P4280	DV0P227	DV0P4170
			100	MHMF011L1 ☐ 2 MHMF011L1 ☐ 4	87, 151	MADLT11SF	MADLN11S◇											
			200	MHMF021L1 ☐ 2 MHMF021L1 ☐ 4	89, 155	MBDLT21SF	MBDLN21S◇	B-frame ★	Approx.	0.5						DV0P4283	DV0P228	
			400	MHMF041L1 ☐ 2 MHMF041L1 ☐ 4	91, 159	MCDLT31SF	MCDLN31S◇	C-frame	Approx.	0.9						DV0P4282		DV0PM20042
		Single phase/ 3-phase 200 V	50	MHMF5AZL1 ☐ 2 MHMF5AZL1 ☐ 4	86, 147	MADLT05SF	MADLN05S◇	A-frame ★	Approx.	0.5						DV0P4281	DV0P227 / DV0P220	DV0P4170 / DV0PM20042
			100	MHMF012L1 ☐ 2 MHMF012L1 ☐ 4	88, 151	MADLT05SF	MADLN05S◇											
			200	MHMF022L1 ☐ 2 MHMF022L1 ☐ 4	90, 155	MADLT15SF	MADLN15S◇									DV0P4283		
			400	MHMF042L1 ☐ 2 MHMF042L1 ☐ 4	92, 159	MBDLT25SF	MBDLN25S◇	B-frame ★	Approx.	0.9							DV0P228 / DV0P220	
			750	MHMF082L1 ☐ 2 MHMF082L1 ☐ 4	93, 163	MCDLT35SF	MCDLN35S◇	C-frame	Approx.	1.8								DV0PM20042
			1000	MHMF092L1 ☐ 2 MHMF092L1 ☐ 4	94, 167	MDDLT55SF	MDDLN55S◇	D-frame	Approx.	2.4						DV0P4284	DV0P228 / DV0P222	DV0P4220

★: Frame-A and B drivers are not equipped with regenerative resistors.When regeneration occurs, please prepare an optional external regenerative resistor.

Note)1 ☐ : Represents the motor specifications. (refer to “Model designation” P.22.)

Note)2 ◇ : Represents the driver specifications. (refer to “Model designation” P.22.)

Note)3 ＊＊: Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030EAE

Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.

Note)5 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number “DV0P2990” separately.

Note)6 Brake cable and motor cables are required for the motors with brake.

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Motor						Driver			Power capacity (at rated load) (kVA)		Optional parts ▶ refer to P.306							
Motor series		Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions (page)	A6SF series Multi fanction type (Pulse, analog, full-closed)	A6SG series RS485 communication / A6SE series Basic (Pulse signal input) Note)2, Note)5	Frame			Encoder Cable Note)3		Motor Cable Note)3		Brake Cable Note)3	External Regenerative Resistor	Reactor (Single phase / 3-phase)	Noise Filter (Single phase / 3-phase)
											23-bit Absolute							
											Use in the absolute system (with battery) Note)6	Use in the Incremental system (without battery box)	without Brake	with Brake				
Low inertia	MSMF (Connector type) 3000 r/min IP67	Single phase 100 V	50	MSMF5AZL1 □ 1	63, 119	MADLT01SF	MADLN01S◇	A-frame ★	Approx.	0.4	MFECA 0 ∗ ∗ 0MJE (For movable, direction of motor shaft) / MFECA 0 ∗ ∗ 0MKE (For movable, opposite direction of motor shaft) / MFECA 0 ∗ ∗ 0TJE (For fixed, direction of motor shaft) / MFECA 0 ∗ ∗ 0TKE (For fixed, opposite direction of motor shaft)	MFECA 0 ∗ ∗ 0MJD (For movable, direction of motor shaft) / MFECA 0 ∗ ∗ 0MKD (For movable, opposite direction of motor shaft) / MFECA 0 ∗ ∗ 0TJD (For fixed, direction of motor shaft) / MFECA 0 ∗ ∗ 0TKD (For fixed, opposite direction of motor shaft)	MFMCA 0 ∗ ∗ 0NJD (For movable, direction of motor shaft) / MFMCA 0 ∗ ∗ 0NKD (For movable, opposite direction of motor shaft) / MFMCA 0 ∗ ∗ 0RJD (For fixed, direction of motor shaft) / MFMCA 0 ∗ ∗ 0RKD (For fixed, opposite direction of motor shaft) Note)4		MFMCB 0 ∗ ∗ 0PJT (For movable, direction of motor shaft) / MFMCB 0 ∗ ∗ 0PKT (For movable, opposite direction of motor shaft) / MFMCB 0 ∗ ∗ 0SJT (For fixed, direction of motor shaft) / MFMCB 0 ∗ ∗ 0SKT (For fixed, opposite direction of motor shaft) Note)7	DV0P4280	DV0P227	DV0P4170
			100	MSMF011L1 □ 1	65, 121	MADLT11SF	MADLN11S◇											
			200	MSMF021L1 □ 1	67, 122	MBDLT21SF	MBDLN21S◇	B-frame ★	Approx.	0.5						DV0P4283	DV0P228	
			400	MSMF041L1 □ 1	69, 123	MCDLT31SF	MCDLN31S◇	C-frame	Approx.	0.9						DV0P4282		DV0PM20042
		Single phase/ 3-phase 200 V	50	MSMF5AZL1 □ 1	64, 119	MADLT05SF	MADLN05S◇	A-frame ★	Approx.	0.5						DV0P4281	DV0P227 / DV0P220	DV0P4170 / DV0PM20042
			100	MSMF012L1 □ 1	66, 121	MADLT05SF	MADLN05S◇											
			200	MSMF022L1 □ 1	68, 122	MADLT15SF	MADLN15S◇									DV0P4283		
			400	MSMF042L1 □ 1	70, 123	MBDLT25SF	MBDLN25S◇	B-frame ★	Approx.	0.9							DV0P228 / DV0P220	DV0PM20042
			750	MSMF082L1 □ 1	71, 125	MCDLT35SF	MCDLN35S◇	C-frame	Approx.	1.8								
			1000	MSMF092L1 □ 1	72, 126	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.4						DV0P4284	DV0P228 / DV0P222	DV0P4220
Middle inertia Flat type	MQMF (Connector type) 3000 r/min IP67	Single phase 100 V	100	MQMF011L1 □ 1 / MQMF011L1 □ 3	79, 137	MADLT11SF	MADLN11S◇	A-frame ★	Approx.	0.4	MFECA 0 ∗ ∗ 0MJE (For movable, direction of motor shaft) / MFECA 0 ∗ ∗ 0MKE (For movable, opposite direction of motor shaft) / MFECA 0 ∗ ∗ 0TJE (For fixed, direction of motor shaft) / MFECA 0 ∗ ∗ 0TKE (For fixed, opposite direction of motor shaft)	MFECA 0 ∗ ∗ 0MJD (For movable, direction of motor shaft) / MFECA 0 ∗ ∗ 0MKD (For movable, opposite direction of motor shaft) / MFECA 0 ∗ ∗ 0TJD (For fixed, direction of motor shaft) / MFECA 0 ∗ ∗ 0TKD (For fixed, opposite direction of motor shaft)	MFMCA 0 ∗ ∗ 0UFD (For movable, direction of motor shaft) / MFMCA 0 ∗ ∗ 0UGD (For movable, opposite direction of motor shaft) / MFMCA 0 ∗ ∗ 0WFD (For fixed, direction of motor shaft) / MFMCA 0 ∗ ∗ 0WGD (For fixed, opposite direction of motor shaft)	MFMCA 0 ∗ ∗ 0VFD (For movable, direction of motor shaft) / MFMCA 0 ∗ ∗ 0VGD (For movable, opposite direction of motor shaft) / MFMCA 0 ∗ ∗ 0XFD (For fixed, direction of motor shaft) / MFMCA 0 ∗ ∗ 0XGD (For fixed, opposite direction of motor shaft)	–	DV0P4280	DV0P227	DV0P4170
			200	MQMF021L1 □ 1 / MQMF021L1 □ 3	81, 141	MBDLT21SF	MBDLN21S◇	B-frame ★	Approx.	0.5						DV0P4283	DV0P228	
			400	MQMF041L1 □ 1 / MQMF041L1 □ 3	83, 145	MCDLT31SF	MCDLN31S◇	C-frame	Approx.	0.9						DV0P4282		DV0PM20042
		Single phase/ 3-phase 200 V	100	MQMF012L1 □ 1 / MQMF012L1 □ 3	80, 137	MADLT05SF	MADLN05S◇	A-frame ★	Approx.	0.5						DV0P4281	DV0P227 / DV0P220	DV0P4170 / DV0PM20042
			200	MQMF022L1 □ 1 / MQMF022L1 □ 3	82, 141	MADLT15SF	MADLN15S◇									DV0P4283		
			400	MQMF042L1 □ 1 / MQMF042L1 □ 3	84, 145	MBDLT25SF	MBDLN25S◇	B-frame ★	Approx.	0.9							DV0P228 / DV0P220	

★: Frame-A and B drivers are not equipped with regenerative resistors.When regeneration occurs, please prepare an optional external regenerative resistor.

Note)1 □ : Represents the motor specifications. (refer to “Model designation” P.22.)

Note)2 ◇ : Represents the driver specifications. (refer to “Model designation” P.22.)

Note)3 ∗ ∗ : Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030MJE

Note)4 Cables for opposite to output shaft cannot be used with 50 W or 100 W motor. (MSMF connector type only.)

Note)5 Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.

Note)6 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number “DV0P2990” separately.

Note)7 Brake cable and motor cables are required for the motors with brake.

[Movable : For application where the cable is movable.
Fixed : For application where the cable is fixed.
Direction of motor shaft/Opposite direction of motor shaft : Cable direction]

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Motor					Driver			Power capacity (at rated load) (kVA)		Optional parts ▶ refer to P.306							
Motor series		Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions (page)	A6SF series Multi function type (Pulse, analog, full-closed)	A6SG series RS485 communication / A6SE series Basic (Pulse signal input) Note)2, Note)4	Frame		Encoder Cable Note)3		Motor Cable Note)3		Brake Cable Note)3	External Regenerative Resistor	Reactor (Single phase / 3-phase)	Noise Filter (Single phase / 3-phase)
										23-bit Absolute							
										Use in the absolute system (with battery box) Note)5	Use in the Incremental system (without battery box)	without Brake	with Brake				
High inertia	MHMF (Connector type) 3000 r/min IP67	Single phase 100 V	50	MHMF5AZL1 □ 1 MHMF5AZL1 □ 3	85, 149	MADLT01SF	MADLN01S◇	A-frame ★	Approx. 0.4	MFECA 0 ∗ ∗ 0MJE (For movable, direction of motor shaft) MFECA 0 ∗ ∗ 0MKE (For movable, opposite direction of motor shaft) MFECA 0 ∗ ∗ 0TJE (For fixed, direction of motor shaft) MFECA 0 ∗ ∗ 0TKE (For fixed, opposite direction of motor shaft)	MFECA 0 ∗ ∗ 0MJD (For movable, direction of motor shaft) MFECA 0 ∗ ∗ 0MKD (For movable, opposite direction of motor shaft) MFECA 0 ∗ ∗ 0TJD (For fixed, direction of motor shaft) MFECA 0 ∗ ∗ 0TKD (For fixed, opposite direction of motor shaft)	MFMCA 0 ∗ ∗ 7UFD (Movable/fixed common-use, direction of motor shaft) MFMCA 0 ∗ ∗ 7UGD (Movable/fixed common-use, opposite direction of motor shaft) MFMCA 0 ∗ ∗ 0UFD (For movable, direction of motor shaft) MFMCA 0 ∗ ∗ 0UGD (For movable, opposite direction of motor shaft) MFMCA 0 ∗ ∗ 0WFD (For fixed, direction of motor shaft) MFMCA 0 ∗ ∗ 0WGD (For fixed, opposite direction of motor shaft)	MFMCA 0 ∗ ∗ 7VFD (Movable/fixed common-use, direction of motor shaft) MFMCA 0 ∗ ∗ 7VGD (Movable/fixed common-use, opposite direction of motor shaft) MFMCA 0 ∗ ∗ 0VFD (For movable, direction of motor shaft) MFMCA 0 ∗ ∗ 0VGD (For movable, opposite direction of motor shaft) MFMCA 0 ∗ ∗ 0XFD (For fixed, direction of motor shaft) MFMCA 0 ∗ ∗ 0XGD (For fixed, opposite direction of motor shaft)	–	DV0P4280	DV0P227	DV0P4170
			100	MHMF011L1 □ 1 MHMF011L1 □ 3	87, 153	MADLT11SF	MADLN11S◇										
			200	MHMF021L1 □ 1 MHMF021L1 □ 3	89, 157	MBDLT21SF	MBDLN21S◇	B-frame ★	Approx. 0.5						DV0P4283	DV0P228	
			400	MHMF041L1 □ 1 MHMF041L1 □ 3	91, 161	MCDLT31SF	MCDLN31S◇	C-frame	Approx. 0.9						DV0P4282		DV0PM20042
		Single phase/ 3-phase 200 V	50	MHMF5AZL1 □ 1 MHMF5AZL1 □ 3	86, 149	MADLT05SF	MADLN05S◇	A-frame ★	Approx. 0.5						DV0P4281	DV0P227 / DV0P220	DV0P4170 / DV0PM20042
			100	MHMF012L1 □ 1 MHMF012L1 □ 3	88, 153	MADLT05SF	MADLN05S◇										
			200	MHMF022L1 □ 1 MHMF022L1 □ 3	90, 157	MADLT15SF	MADLN15S◇								DV0P4283	DV0P228 / DV0P220	DV0PM20042
			400	MHMF042L1 □ 1 MHMF042L1 □ 3	92, 161	MBDLT25SF	MBDLN25S◇	B-frame ★	Approx. 0.9								
			750	MHMF082L1 □ 1 MHMF082L1 □ 3	93, 165	MCDLT35SF	MCDLN35S◇	C-frame	Approx. 1.8								
			1000	MHMF092L1 □ 1 MHMF092L1 □ 3	94, 169	MDDLT55SF	MDDLN55S◇	D-frame	Approx. 2.4						DV0P4284	DV0P228 / DV0P222	DV0P4220

★: Frame-A and B drivers are not equipped with regenerative resistors.When regeneration occurs, please prepare an optional external regenerative resistor.

Note)1 □ : Represents the motor specifications. (refer to “Model designation” P.22.)

Note)2 ◇ : Represents the driver specifications. (refer to “Model designation” P.22.)

Note)3 ∗ ∗ : Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030MJE

Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.

Note)5 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number “DV0P2990” separately.

[Movable : For application where the cable is movable.
Fixed : For application where the cable is fixed.
Direction of motor shaft/Opposite direction of motor shaft : Cable direction]

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100 mm sq. or more 0.85 kW to 5.0 kW

IP67 motor Encoder connector (Large size JL10) type

Motor						Driver			Power capacity (at rated load) (kVA)		Optional parts ▶ refer to P.306						
Motor series		Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions (page)	A6SF series Multi fanction type (Pulse, analog, full-closed)	A6SG series RS485 communication / A6SE series Basic (Pulse signal input) Note)2, Note)4	Frame			Encoder Cable Note)3,5		Motor Cable Note)3,5		External Regenerative Resistor	Reactor (Single phase / 3-phase)	Noise Filter
											JL10 (Large size) (One-touch lock type / N/MS screwed type)		JL10 (One-touch lock type / JL04 screwed type)				
											23-bit Absolute						
											Use in the absolute system (with battery box) Note)7	Use in the Incremental system (without battery box)	without Brake	with Brake			
											Fixed cable		Movable cable				
Low inertia	MSMF Large size JL10 type 3000 r/min IP67	Single phase/ 3-phase 200 V	1000	MSMF102L1 □ 6 MSMF102L1 □ 8	73, 127	MDDLT55SF	MDDLN55S◇	D-frame	Approx.	2.4	MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P222	DV0P4220
			1500	MSMF152L1 □ 6 MSMF152L1 □ 8	74, 128	MDDLT55SF	MDDLN55S◇		Approx.	2.9						DV0PM20047 / DV0P222	
		3-phase 200 V	2000	MSMF202L1 □ 6 MSMF202L1 □ 8	75, 129	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.8					DV0P4285 Note)6	DV0P223	DV0PM20043
			3000	MSMF302L1 □ 6 MSMF302L1 □ 8	76, 131	MFDLTA3SF	MFDLNA3S◇	F-frame	Approx.	5.2			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P224	DV0P3410
			4000	MSMF402L1 □ 6 MSMF402L1 □ 8	77, 132	MFDLTB3SF	MFDLNB3S◇		Approx.	6.5						DV0P225	
			5000	MSMF502L1 □ 6 MSMF502L1 □ 8	78, 133	MFDLTB3SF	MFDLNB3S◇		Approx.	7.8							
Middle inertia	MDMF Large size JL10 type 2000 r/min IP67	Single phase/ 3-phase 200 V	1000	MDMF102L1 □ 6 MDMF102L1 □ 8	102, 180	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.4	MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P222	DV0P4220
			1500	MDMF152L1 □ 6 MDMF152L1 □ 8	103, 181	MDDLT55SF	MDDLN55S◇		Approx.	2.9						DV0PM20047 / DV0P222	
		3-phase 200 V	2000	MDMF202L1 □ 6 MDMF202L1 □ 8	104, 183	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.8					DV0P4285 Note)6	DV0P223	DV0PM20043
			3000	MDMF302L1 □ 6 MDMF302L1 □ 8	105, 184	MFDLTA3SF	MFDLNA3S◇	F-frame	Approx.	5.2			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P224	DV0P3410
			4000	MDMF402L1 □ 6 MDMF402L1 □ 8	106, 185	MFDLTB3SF	MFDLNB3S◇		Approx.	6.5						DV0P225	
			5000	MDMF502L1 □ 6 MDMF502L1 □ 8	107, 187	MFDLTB3SF	MFDLNB3S◇		Approx.	7.8							
	MGMF Large size JL10 type (Low speed/ High torque type) 1500 r/min IP67	Single phase/ 3-phase 200 V	850	MGMF092L1 □ 6 MGMF092L1 □ 8	112, 193	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.0	MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P221	DV0P4220
			1300	MGMF132L1 □ 6 MGMF132L1 □ 8	113, 195	MDDLT55SF	MDDLN55S◇		Approx.	2.6						DV0PM20047 / DV0P222	
		3-phase 200 V	1800	MGMF182L1 □ 6 MGMF182L1 □ 8	114, 196	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.4			MFMCE 0＊＊3EUT / MFMCE 0＊＊3ECT	MFMCD 0＊＊3FUT / MFMCD 0＊＊3FCT	DV0P4285	DV0P223	DV0PM20043
			2400	MGMF242L1 □ 6 MGMF242L1 □ 8	115, 197	MEDLT93SF	MEDLN93S◇		Approx.	4.5						DV0P224	
			2900	MGMF292L1 □ 6 MGMF292L1 □ 8	116, 199	MFDLTB3SF	MFDLNB3S◇	F-frame	Approx.	5.0			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P225	DV0P3410
			4400	MGMF442L1 □ 6 MGMF442L1 □ 8	117, 200	MFDLTB3SF	MFDLNB3S◇		Approx.	7.0							
High inertia	MHMF Large size JL10 type 2000 r/min IP67	Single phase/ 3-phase 200 V	1000	MHMF102L1 □ 6 MHMF102L1 □ 8	95, 171	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.4	MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P222	DV0P4220
			1500	MHMF152L1 □ 6 MHMF152L1 □ 8	96, 172	MDDLT55SF	MDDLN55S◇		Approx.	2.9						DV0PM20047 / DV0P222	
		3-phase 200 V	2000	MHMF202L1 □ 6 MHMF202L1 □ 8	97, 173	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.8			MFMCE 0＊＊2EUD / MFMCE 0＊＊2ECD	MFMCE 0＊＊2FUD / MFMCE 0＊＊2FCD	DV0P4285 Note)6	DV0P223	DV0PM20043
			3000	MHMF302L1 □ 6 MHMF302L1 □ 8	98, 175	MFDLTA3SF	MFDLNA3S◇	F-frame	Approx.	5.2			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P224	DV0P3410
			4000	MHMF402L1 □ 6 MHMF402L1 □ 8	99, 176	MFDLTB3SF	MFDLNB3S◇		Approx.	6.5						DV0P225	
			5000	MHMF502L1 □ 6 MHMF502L1 □ 8	100, 177	MFDLTB3SF	MFDLNB3S◇		Approx.	7.8							

Note)1 □ : Represents the motor specifications. (refer to “Model designation” P.22.)
Note)2 ◇ : Represents the driver specifications. (refer to “Model designation” P.22.)
Note)3 ＊＊ : Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030EPE
Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.
Note)5 Use of JL10 type encoder cables and motor cables enable one-touch lock connections. Conventional screwed type N/MS and JL04V type cables can also be used.
Note)6 For other possible combinations, refer to P.343.
Note)7 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number “DV0P2990” separately.

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100 mm sq. or more 0.85 kW to 5.0 kW

IP67 motor Encoder connector (Small size JN2) type

Motor						Driver			Power capacity (at rated load) (kVA)		Optional parts ▶ refer to P.306						
											Encoder Cable Note)3		Motor Cable Note)3,5				
											JN2 (Small size) (One-touch lock type)		JL10 (One-touch lock type / JL04 screwed type)				
											23-bit Absolute						
Motor series		Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions (page)	A6SF series Multi fanction type (Pulse, analog, full-closed)	A6SG series RS485 communication / A6SE series Basic (Pulse signal input) Note)2, Note)4	Frame			Use in the absolute system (with battery box) Note)7	Use in the Incremental system (without battery box)	without Brake	with Brake	External Regenerative Resistor	Reactor (Single phase / 3-phase)	Noise Filter
											Fixed cable		Movable cable				
Low inertia	MSMF Small size JN2 type 3000 r/min IP67	Single phase/ 3-phase 200 V	1000	MSMF102L1 □ 5 MSMF102L1 □ 7	73, 127	MDDLT55SF	MDDLN55S◇	D-frame	Approx.	2.4	MFECA 0＊＊0ETE	MFECA 0＊＊0ETD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P222	DV0P4220
			1500	MSMF152L1 □ 5 MSMF152L1 □ 7	74, 129	MDDLT55SF	MDDLN55S◇		Approx.	2.9						DV0PM20047 / DV0P222	
		3-phase 200 V	2000	MSMF202L1 □ 5 MSMF202L1 □ 7	75, 130	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.8					DV0P4285 Note)6	DV0P223	DV0PM20043
			3000	MSMF302L1 □ 5 MSMF302L1 □ 7	76, 131	MFDLTA3SF	MFDLNA3S◇	F-frame	Approx.	5.2			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P224	DV0P3410
			4000	MSMF402L1 □ 5 MSMF402L1 □ 7	77, 133	MFDLTB3SF	MFDLNB3S◇		Approx.	6.5						DV0P225	
			5000	MSMF502L1 □ 5 MSMF502L1 □ 7	78, 134	MFDLTB3SF	MFDLNB3S◇		Approx.	7.8							
Middle inertia	MDMF Small size JN2 type 2000 r/min IP67	Single phase/ 3-phase 200 V	1000	MDMF102L1 □ 5 MDMF102L1 □ 7	102, 181	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.4	MFECA 0＊＊0ETE	MFECA 0＊＊0ETD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P222	DV0P4220
			1500	MDMF152L1 □ 5 MDMF152L1 □ 7	103, 182	MDDLT55SF	MDDLN55S◇		Approx.	2.9						DV0PM20047 / DV0P222	
		3-phase 200 V	2000	MDMF202L1 □ 5 MDMF202L1 □ 7	104, 183	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.8					DV0P4285 Note)6	DV0P223	DV0PM20043
			3000	MDMF302L1 □ 5 MDMF302L1 □ 7	105, 185	MFDLTA3SF	MFDLNA3S◇	F-frame	Approx.	5.2			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P224	DV0P3410
			4000	MDMF402L1 □ 5 MDMF402L1 □ 7	106, 186	MFDLTB3SF	MFDLNB3S◇		Approx.	6.5						DV0P225	
			5000	MDMF502L1 □ 5 MDMF502L1 □ 7	107, 187	MFDLTB3SF	MFDLNB3S◇		Approx.	7.8							
	MGMF Small size JN2 type (Low speed/ High torque type) 1500 r/min IP67	Single phase/ 3-phase 200 V	850	MGMF092L1 □ 5 MGMF092L1 □ 7	112, 194	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.0	MFECA 0＊＊0ETE	MFECA 0＊＊0ETD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P221	DV0P4220
			1300	MGMF132L1 □ 5 MGMF132L1 □ 7	113, 195	MDDLT55SF	MDDLN55S◇		Approx.	2.6						DV0PM20047 / DV0P222	
		3-phase 200 V	1800	MGMF182L1 □ 5 MGMF182L1 □ 7	114, 197	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.4			MFMCE 0＊＊3EUT / MFMCE 0＊＊3ECT	MFMCD 0＊＊3FUT / MFMCD 0＊＊3FCT	DV0P4285	DV0P223	DV0PM20043
			2400	MGMF242 L1 □ 5 MGMF242 L1 □ 7	115, 198	MEDLT93SF	MEDLN93S◇		Approx.	4.5						DV0P224	
			2900	MGMF292L1 □ 5 MGMF292L1 □ 7	116, 199	MFDLTB3SF	MFDLNB3S◇	F-frame	Approx.	5.0			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P225	DV0P3410
			4400	MGMF442L1 □ 5 MGMF442L1 □ 7	117, 201	MFDLTB3SF	MFDLNB3S◇		Approx.	7.0							
High inertia	MHMF Small size JN2 type 2000 r/min IP67	Single phase/ 3-phase 200 V	1000	MHMF102L1 □ 5 MHMF102L1 □ 7	95, 171	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.4	MFECA 0＊＊0ETE	MFECA 0＊＊0ETD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P222	DV0P4220
			1500	MHMF152L1 □ 5 MHMF152L1 □ 7	96, 173	MDDLT55SF	MDDLN55S◇		Approx.	2.9						DV0PM20047 / DV0P222	
		3-phase 200 V	2000	MHMF202L1 □ 5 MHMF202L1 □ 7	97, 174	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.8			MFMCE 0＊＊2EUD / MFMCE 0＊＊2ECD	MFMCE 0＊＊2FUD / MFMCE 0＊＊2FCD	DV0P4285 Note)6	DV0P223	DV0PM20043
			3000	MHMF302L1 □ 5 MHMF302L1 □ 7	98, 175	MFDLTA3SF	MFDLNA3S◇	F-frame	Approx.	5.2			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P224	DV0P3410
			4000	MHMF402L1 □ 5 MHMF402L1 □ 7	99, 177	MFDLTB3SF	MFDLNB3S◇		Approx.	6.5						DV0P225	
			5000	MHMF502L1 □ 5 MHMF502L1 □ 7	100, 178	MFDLTB3SF	MFDLNB3S◇		Approx.	7.8							

Note)1 □ : Represents the motor specifications. (refer to “Model designation” P.22.)
Note)2 ◇ : Represents the driver specifications. (refer to “Model designation” P.22.)
Note)3 ＊＊ : Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030ETE
Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.
Note)5 Use of JL10 type motor cables enable one-touch lock connections. Conventional screwed type JL04V type cables can also be used.
Note)6 For other possible combinations, refer to P.343.
Note)7 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number “DV0P2990” separately.

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176 mm sq. or more 5.5 kW to 22.0 kW

IP67 motor Encoder connector (Large size JL10) type

Motor						Driver					Optional parts ▶ refer to P.306					
Motor series		Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions (page)	A6SF series Multi function type (Pulse, analog, full-closed)	A6SG series RS485 communication / A6SE series Basic (Pulse signal input)	Frame	Power capacity (at rated load) (kVA)		Encoder Cable Note)2,3 JL10 (Large size) (One-touch lock type / N/MS screwed type)		Motor Cable Note)6		External Regenerative Resistor	Reactor (Single phase / 3-phase)	Noise Filter
											23-bit Absolute						
											Use in the absolute system (with battery box) Note)4	Use in the Incremental system (without battery box)	without Brake	with Brake			
											Fixed cable						
Middle inertia	MDMF Large size JL10 type 1500 r/min IP67 IP44 (22000 W)	3-phase 200 V	7500	MDMF752L1 □ 6	108 188	MGDLTC3SF	—	G-frame	Approx. 11		MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	Note)6	Note)6	DV0P4285 ×3 in parallel	— Note)5	HF3080C-SZA (Recommended components) P.413
			11000	MDMFC12L1 □ 6	109 189	MHDLTE3SF	—	H-frame	Approx. 15						DV0P4285 ×6 in parallel		HF3100C-SZA (Recommended components) P.413
			15000	MDMFC52L1 □ 6	110 191	MHDLTE3SF	—		Approx. 20								
			22000	MDMFD22L1 □ 6	111 192	MHDLTF3SF	—		Approx. 28				Note)6 (U, V, W, Ground : M8 terminal block)	Note)6 (U, V, W, Ground : M8 terminal block)			
	MGMF Large size JL10 type (Low speed/ High torque type) 1500 r/min IP67	3-phase 200 V	5500	MGMF552L1 □ 6	118 201	MGDLTC3SF	—	G-frame	Approx. 8.5		MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	Note)6	Note)6	DV0P4285 ×3 in parallel	— Note)5	HF3080C-SZA (Recommended components) P.413
High inertia	MHMF Large size JL10 type 1500 r/min IP67	3-phase 200 V	7500	MHMF752L1 □ 6	101 179	MGDLTC3SF	—	G-frame	Approx. 11		MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	Note)6	Note)6		— Note)5	HF3080C-SZA (Recommended components) P.413

■ About dynamic brake

G frame is built-in / external, H frame is external

The indication of the internal / {external} dynamic brake resistance capacity is the maximum allowable inertia (load inertia moment ratio to rotor inertia moment is 10 times) up to three consecutive emergency stops at the rated speed. If used under conditions higher than that, the resistance may break and the dynamic brake may not operate.

Recommended resistance: 1.2 Ω 400 W or more × 3 pieces

For inquiries: Iwaki Musen Kenkyusho Co.,Ltd. Tel: +81-44-833-4311

Note)1 □ : Represents the motor specifications. (refer to “Model designation” P.22.)

Note)2 ＊＊ : Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030ETE

Note)3 Use of JL10 type encoder cables and motor cables enable one-touch lock connections. Conventional screwed type N/MS and JL04V type cables can also be used.

Note)4 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number “DV0P2990” separately.

Note)5 The reactor has to be prepared by the customer.

Note)6 We recommend purchasing an optional connector kit.

■ Connector kit (option) components Note)6

Motor	Driver Frame	Driver Connection terminal	Option No. Connector Kit for motor, encoder connection	Encoder Cable Motor side	Encoder Cable Driver side	Motor Cable Motor side	Motor Cable Driver side	Brake Cable Motor side	Brake Cable Power supply for brake
MDMF 7.5 kW MGMF 5.5 kW MHMF 7.5 kW	G	M5	DV0PM20107	Large size connector One-touch lock type	For Connector X6	Connector Screwed type	(to be supplied by customer) M5 Round terminal	not included	(to be supplied by customer)
			DV0PM20108					Connector Screwed type	
			DV0PM20111	Large size connector Screwed type				not included	
			DV0PM20112					Connector Screwed type	
MDMF 11.0 kW MDMF 15.0 kW	H	M6	DV0PM20107	Large size connector One-touch lock type	For Connector X6	Connector Screwed type	(to be supplied by customer) M6 Round terminal	not included	(to be supplied by customer)
			DV0PM20108					Connector Screwed type	
			DV0PM20111	Large size connector Screwed type				not included	
			DV0PM20112					Connector Screwed type	
MDMF 22.0 kW	H	M6	DV0PM20109	Large size connector One-touch lock type	For Connector X6	Terminal block (to be supplied by customer) M8 Round terminal	(to be supplied by customer) M6 Round terminal	not included	(to be supplied by customer)
			DV0PM20110					Connector Screwed type	
			DV0PM20113	Large size connector Screwed type				not included	
			DV0PM20114					Connector Screwed type	

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176 mm sq. or more 5.5 kW to 22.0 kW

IP67 motor Encoder connector (Small size JN2) type

Motor						Driver			Power capacity (at rated load) (kVA)		Optional parts ▶ refer to P.306						
Motor series		Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions (page)	A6SF series Multi fanction type (Pulse, analog, full-closed)	A6SG series RS485 communication / A6SE series Basic (Pulse signal input)	Frame			Encoder Cable Note)2		Motor Cable		External Regenerative Resistor	Reactor (Single phase / 3-phase)	Noise Filter
											JN2 (Small size) (One-touch lock type)		Note)5				
											23-bit Absolute						
											Use in the absolute system (with battery box) Note)3	Use in the Incremental system (without battery box)	without Brake	with Brake			
											Fixed cable						
Middle inertia	MDMF Small size JN2 type 1500 r/min IP67 IP44 (22000 W)	3-phase 200 V	7500	MDMF752L1 □ 5	108 189	MGDLTC3SF	—	G-frame	Approx.	11	MFECA 0＊＊0ETE	MFECA 0＊＊0ETD	Note)5	Note)5	DV0P4285 ×3 in parallel	– Note)4	HF3080C-SZA (Recommended components) P.413
			11000	MDMFC12L1 □ 5	109 190	MHDLTE3SF	—	H-frame	Approx.	15					DV0P4285 ×6 in parallel		HF3100C-SZA (Recommended components) P.413
			15000	MDMFC52L1 □ 5	110 191	MHDLTE3SF	—		Approx.	20							
			22000	MDMFD22L1 □ 5	111 193	MHDLTF3SF	—		Approx.	28			Note)5 (U, V, W, Ground : M8 terminal block)	Note)5 (U, V, W, Ground : M8 terminal block)			
	MGMF Small size JN2 type (Low speed/ High torque type) 1500 r/min IP67	3-phase 200 V	5500	MGMF552L1 □ 5	118 202	MGDLTC3SF	—	G-frame	Approx.	8.5	MFECA 0＊＊0ETE	MFECA 0＊＊0ETD	Note)5	Note)5	DV0P4285 ×3 in parallel	– Note)4	HF3080C-SZA (Recommended components) P.413
High inertia	MHMF Small size JN2 type 1500 r/min IP67	3-phase 200 V	7500	MHMF752L1 □ 5	101 179	MGDLTC3SF	—	G-frame	Approx.	11	MFECA 0＊＊0ETE	MFECA 0＊＊0ETD	Note)5	Note)5		– Note)4	HF3080C-SZA (Recommended components) P.413

■ About dynamic brake

G frame is built-in / external, H frame is external

The indication of the internal / {external} dynamic brake resistance capacity is the maximum allowable inertia (load inertia moment ratio to rotor inertia moment is 10 times) up to three consecutive emergency stops at the rated speed. If used under conditions higher than that, the resistance may break and the dynamic brake may not operate.

Recommended resistance: 1.2 Ω 400 W or more × 3 pieces

For inquiries: Iwaki Musen Kenkyusho Co.,Ltd. Tel: +81-44-833-4311

■ Connector kit (option) components Note)5

Motor	Driver		Option No. Connector Kit for motor, encoder connection	Encoder Cable		Motor Cable		Brake Cable	
	Frame	Connection terminal		Motor side	Driver side	Motor side	Driver side	Motor side	Power supply for brake
MDMF 7.5 kW MGMF 5.5 kW MHMF 7.5 kW	G	M5	DV0PM20056	Small size connector Screwed type	For Connector X6	Connector Screwed type	(to be supplied by customer) M5 Round terminal	not included	(to be supplied by customer)
			DV0PM20057					Connector Screwed type	
MDMF 11.0 kW MDMF 15.0 kW	H	M6	DV0PM20056	Small size connector Screwed type	For Connector X6	Connector Screwed type	(to be supplied by customer) M6 Round terminal	not included	(to be supplied by customer)
			DV0PM20057					Connector Screwed type	
MDMF 22.0 kW	H	M6	DV0PM20115	Small size connector Screwed type	For Connector X6	Terminal block (to be supplied by customer) M8 Round terminal	(to be supplied by customer) M6 Round terminal	not included	(to be supplied by customer)
			DV0PM20116					Connector Screwed type	

Note)1 □ : Represents the motor specifications. (refer to “Model designation” P.22.)

Note)2 ＊＊ : Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030ETE

Note)3 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number “DV0P2990” separately.

Note)4 The reactor has to be prepared by the customer.

Note)5 We recommend purchasing an optional connector kit.

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A6SF series (Multifunction type)

Position, Speed, Torque, Full-closed type

Basic Specifications	Input power	100 V	Main circuit	Single phase 100 V +10 % –15 % to 120 V +10 % –15 % 50 Hz / 60 Hz
			Control circuit	Single phase 100 V +10 % –15 % to 120 V +10 % –15 % 50 Hz / 60 Hz
		200 V	Main circuit: A-frame to D-frame	Single/3-phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
			Main circuit: E-frame to H-frame	3-phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
			Control circuit: A-frame to D-frame	Single phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
			Control circuit: E-frame to H-frame	Single phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
	Environment		temperature	Ambient temperature: 0 ˚C to 55 ˚C (free from freezing) Storage temperature: –20 ˚C to 65 ˚C (Max.temperature guarantee: 80 ˚C for 72 hours free from condensation*1)
			humidity	Both operating and storage : 20 %RH to 85 %RH (free from condensation*1)
			Altitude	Lower than 1000 m
			Vibration	5.88 m/s^2 or less, 10 Hz to 60 Hz
	Control method			IGBT PWM Sinusoidal wave drive
	Encoder feedback			23-bit (8388608 resolution) absolute encoder, 7-wire serial * When using it as an incremental system (not using multi-turn data), do not connect the battery for absolute encoder. Parameter Pr. 0.15 must be set to “1” (factory settings).
	External scale feedback			A/B phase, homing signal differential input. Serial communication is also supported. Manufacturers that support serial communication scale: Fagor Automation S.Coop., HEIDENHAIN, Magnescale Co., Ltd., Mitutoyo Corporation Nidec Sankyo Corporation, Renishaw plc
	Interface connector	Control signal	Input	General purpose 10 inputs The function of general-purpose input is selected by parameters.
			Output	General purpose 6 outputs The function of general-purpose output is selected by parameters.
		Analog signal	Input	3 inputs (16-bit A/D : 1 input, 12-bit A/D : 2 inputs)
			Output	2 outputs (Analog monitor: 2 output)
		Pulse signal	Input	2 inputs (Photo-coupler input, Line receiver input) Both open collector and line driver interface can be connected. High speed line driver interface can be connected.
			Output	4 outputs (Line driver: 3 output, open collector: 1 output) Line driver output for encoder pulses (A/B/Z signal) or external feedback pulses (EXA/EXB/EXZ signal) open collector output also available for Z or EXZ signal.
	Communication function		USB	USB interface to connect to computers for parameter setting or status monitoring.
			RS232	1:1 communication
			RS485	1: n communication (max 31) (Supports Modbus)
	Safety function			A dedicated connector is provided for Functional Safety.
	Front panel			(1) 5 keys (2) LED (6-digit)
	Regeneration			A-frame, B-frame, G-frame, H-frame: no built-in regenerative resistor (external resistor only) C-frame to F-frame: Built-in regenerative resistor (external resistor is also enabled.)
	Dynamic brake			A-frame to G-frame: Built-in H-frame: External resistor only
	Control mode			Switching among the following 7 mode is enabled, (1) Position control (2) Speed control (3) Toque control (4) Position/Speed control (5) Position/Torque control (6) Speed/Torque control (7) Full-closed control

*1 Air containing water vapor will become saturated with water vapor as the temperature falls, causing dew.

Function	Control input		(1) servo-ON input (2) Alarm clear input (3) Gain switch input (4) Positive direction drive inhibit input (5) Negative direction drive inhibit input (6) Forced alarm input (7) Inertia ratio switch input
	Control output		(1) Servo-alarm output (2) Servo-ready output (3) External brake off output (4) At-speed output (5) Torque in-limit output (6) Zero speed detection output (7) Warning output (8) Alarm clear attribute output (9) Servo on status output
	Position control	Control input	(1) Deviation counter clear input (2) Command pulse inhibit input (3) Command division/multiplication switch input (4) Anti-vibration switch input (5) Torque limit switch input (6) Control mode switch input
		Control output	(1) In-position output (2) Position command ON/OFF output
		Pulse input: Max. command pulse frequency	500 kpps (Optocoupler interface), 8 Mpps (When using line receiver input multiplied by 4)
		Pulse input: Input pulse signal format	Differential input. Selectable by parameter. ([1]Positive/Negative pulse [2]A/B quadrature [3]Pulse/Direction)
		Pulse input: Electronic gear (Division/Multiplication of command pulse)	Applicable scaling ratio: 1/1000 times to 8000 times Any value of 1 - 2^{30} can be set for both numerator (which corresponds to encoder resolution) and denominator (which corresponds to command pulse resolution per motor revolution), but the combination has to be within the range shown above.
		Pulse input: Smoothing filter	Primary delay filter or FIR type filter is adaptable to the command input
		Analog input: Torque limit command input	Individual torque limit for both positive and negative direction is enabled.
		Analog input: Torque feed forward input	Analog voltage can be used as torque feed forward input.
		Two-degree-of-freedom control	Available
		Anti-vibration control	Available
		Load variation suppression control	Available
		Block operation	Modbus (RS 232, RS 485) or interface is selectable
	Speed control	Control input	(1) Internal command velocity selection input (2) Speed zero clamp input (3) Velocity command sign input (4) Control mode switch input
		Control output	(1) Speed coincidence output (2) Velocity command ON/OFF output
		Analog input: Velocity command input	Velocity command input with analog voltage is possible. Scale setting and command polarity vary depending on parameters. (6 V/Rated rotational speed: Default)
		Analog input: Torque limit command input	Individual torque limit for both positive and negative direction is enabled.
		Analog input: Torque feed forward input	Analog voltage can be used as torque feed forward input.
		Internal velocity command	Switching the internal 8 speed is enabled by command input.
		Soft-start/down function	Individual setup of acceleration and deceleration is enabled, with 0 s to 10 s/1000 r/min. Sigmoid acceleration/deceleration is also enabled.
		Speed zero clamp	Internal velocity command can be clamped to 0 with speed zero clamp input.
		Two-degree-of-freedom control	Available
	Torque control	Control input	Speed zero clamp input, torque command sign input, control mode switch input.
		Control output	(1) Speed coincidence output (2) Speed in-limit output
		Analog input: Torque command input	Torque command input with analog voltage is possible. Scale setting and command polarity vary depending on parameters. (3 V/rated torque Default)
		Speed limit function	Speed limit value with parameter is enabled.
	Full-closed control	Control input	(1) Deviation counter clear input (2) Command pulse inhibit input (3) Command division/multiplication switch input (4) Anti-vibration switch input (5) Torque limit switch input
		Control output	(1) In-position output (2) Position command ON/OFF output
		Pulse input: Max. command pulse frequency	500 kpps (Optocoupler interface), 8 Mpps (When using line receiver input multiplied by 4)
		Pulse input: Input pulse signal format	Differential input. Selectable by parameter. ([1]Positive/Negative pulse [2]A/B quadrature [3]Pulse/Direction)
		Pulse input: Electronic gear (Division/Multiplication of command pulse)	Applicable scaling ratio: 1/1000 times to 8000 times Any value of 1 - 2^{30} can be set for both numerator (which corresponds to encoder resolution) and denominator (which corresponds to command pulse resolution per motor revolution), but the combination has to be within the range shown above.
		Pulse input: Smoothing filter	Primary delay filter or FIR type filter is adaptable to the command input
		Analog input: Torque limit command input	Individual torque limit for both positive and negative direction is enabled.
		Analog input: Torque feed forward input	Analog voltage can be used as torque feed forward input.
		Setting range of external scale division/multiplication	1/40 times to 1280 times Although ratio of the encoder pulse (numerator) and external scale pulse (denominator) can be arbitrarily set in the range of 1 to 2^{23} for the numerator and in the range of 1 to 2^{23} for the denominator, this product should be used within the aforementioned range.
		Two-degree-of-freedom control	Available
		Anti-vibration control	Available
		Load variation suppression control	Available
		Block operation	Modbus (RS 232, RS 485) or interface is selectable
	Common	Auto tuning	The load inertia is identified in real time by the driving state of the motor operating according to the command given by the controlling device and set up support software “PANATERM”. The gain is set automatically in accordance with the rigidity setting.
		Division of encoder feedback pulse	Set up of any value is enabled (encoder pulses count is the max.).
		Protective function: Hard error	Over-voltage, under-voltage, over-speed, over-load, over-heat, over-current and encoder error etc.
		Protective function: Soft error	Excess position deviation, command pulse division error, EEPROM error etc.
		Alarm data trace back	Tracing back of alarm data is available

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Basic Specifications	Input power	100 V	Main circuit	Single phase 100 V +10 % –15 % to 120 V +10 % –15 % 50 Hz / 60 Hz
			Control circuit	Single phase 100 V +10 % –15 % to 120 V +10 % –15 % 50 Hz / 60 Hz
		200 V	Main circuit: A-frame to D-frame	Single/3-phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
			Main circuit: E-frame to F-frame	3-phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
			Control circuit: A-frame to D-frame	Single phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
			Control circuit: E-frame to F-frame	Single phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
	Environment		temperature	Ambient temperature: 0 ˚C to 55 ˚C (free from freezing) Storage temperature: –20 ˚C to 65 ˚C (Max.temperature guarantee: 80 ˚C for 72 hours free from condensation*1)
			humidity	Both operating and storage : 20 %RH to 85 %RH (free from condensation*1)
			Altitude	Lower than 1000 m
			Vibration	5.88 m/s^2 or less, 10 Hz to 60 Hz
	Control method			IGBT PWM Sinusoidal wave drive
	Encoder feedback			23-bit (8388608 resolution) absolute encoder, 7-wire serial * A6SG series When using it as an incremental system (not using multi-turn data), do not connect the battery for absolute encoder. Parameter Pr. 0.15 must be set to “1” (factory settings). * A6SE series Since it can be used only as an incremental system, do not connect the battery for absolute encoder. Parameter Pr. 0.15 must be set to “1” (factory settings).
	Interface connector	Control signal	Input	General purpose 10 inputs The function of general-purpose input is selected by parameters.
			Output	General purpose 6 outputs The function of general-purpose input is selected by parameters.
		Analog signal	Input	None
			Output	2 outputs (Analog monitor: 2 output)
		Pulse signal	Input	2 inputs (Photo-coupler input, Line receiver input)
			Output	4 outputs (Line driver: 3 output, open collector: 1 output)
	Communication function		USB	USB interface to connect to computers for parameter setting or status monitoring.
			RS232	1:1 communication
			RS485	1: n communication (max 31)
				* RS485, RS232 connector is not installed on A6 SE series.
	Front panel			(1) 5 keys (2) LED (6-digit)
	Regeneration			A-frame, B,-frame: no built-in regenerative resistor (external resistor only) C-frame to F-frame: Built-in regenerative resistor (external resistor is also enabled.)
	Dynamic brake			A-frame to F-frame: Built-in
	Control mode			(1) Position control (2) Internal velocity command (3) Position/Internal velocity command

*1 Air containing water vapor will become saturated with water vapor as the temperature falls, causing dew.

Function	Control input		(1) servo-ON input (2) Alarm clear input (3) Gain switch input (4) Positive direction drive inhibit input (5) Negative direction drive inhibit input (6) Forced alarm input (7) Inertia ratio switch input
	Control output		(1) Servo-alarm output (2) Servo-ready output (3) External brake off output (4) At-speed output (5) Torque in-limit output (6) Zero speed detection output (7) Warning output (8) Alarm clear attribute output (9) Servo on status output
	Position control	Control input	(1) Deviation counter clear input (2) Command pulse inhibit input (3) Command division/multiplication switch input (4) Anti-vibration switch input (5) Torque limit switch input (6) Control mode switch input
		Control output	(1) In-position output (2) Position command ON/OFF output
		Pulse input: Max. command pulse frequency	500 kpps (Optocoupler interface) 8 Mpps (Line receiver interface)
		Pulse input: Input pulse signal format	Differential input. Selectable by parameter. ([1]Positive/Negative pulse [2]A/B quadrature [3]Pulse/Direction)
		Pulse input: Electronic gear (Division/Multiplication of command pulse)	Applicable scaling ratio: 1/1000 times to 8000 times Any value of 1 - 2^{30} can be set for both numerator (which corresponds to encoder resolution) and denominator (which corresponds to command pulse resolution per motor revolution), but the combination has to be within the range shown above.
		Pulse input: Smoothing filter	Primary delay filter or FIR type filter is adaptable to the command input
		Anti-vibration control	Available
		Two-degree-of-freedom control	Available
		Load variation suppression control	Available
		Block operation	Modbus (RS 232, RS 485) or interface is selectable. (A6SE : interface only.)
	Speed control	Control input	(1) Internal command velocity selection input (2) Speed zero clamp input (3) Velocity command sign input (4) Control mode switch input
		Control output	(1) Speed coincidence output (2) Velocity command ON/OFF output
		Internal velocity command	Switching the internal 8 speed is enabled by command input.
		Soft-start/down function	Individual setup of acceleration and deceleration is enabled, with 0 s to 10 s/1000 r/min. Sigmoid acceleration/deceleration is also enabled.
		Zero-speed clamp	Internal velocity command can be clamped to 0 with speed zero clamp input.
		Two-degree-of-freedom control	Available
	Common	Auto tuning	The load inertia is identified in real time by the driving state of the motor operating according to the command given by the controlling device and set up support software “PANATERM”. The gain is set automatically in accordance with the rigidity setting.
		Division of encoder feedback pulse	Set up of any value is enabled (encoder pulses count is the max.).
		Protective function: Hard error	Over-voltage, under-voltage, over-speed, over-load, over-heat, over-current and encoder error etc.
		Protective function: Soft error	Excess position deviation, command pulse division error, EEPROM error etc.
		Alarm data trace back	Tracing back of alarm data is available

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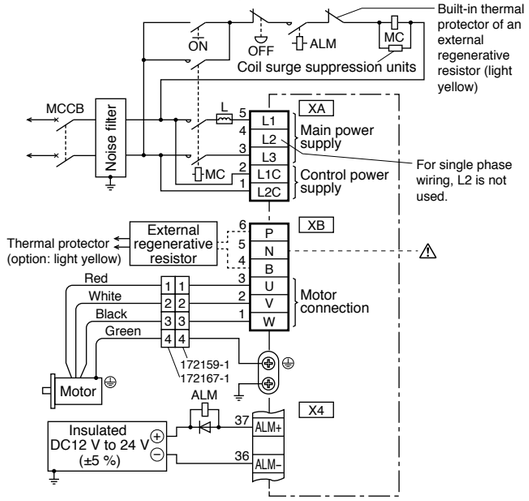
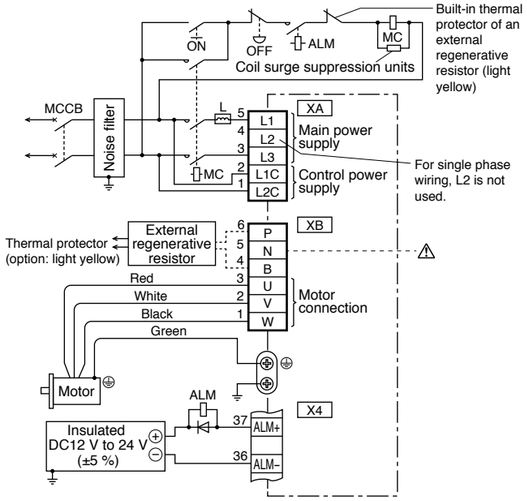
In Case of Single phase, A-frame, B-frame, 100 V / 200 V type

● In Case of Leadwire type



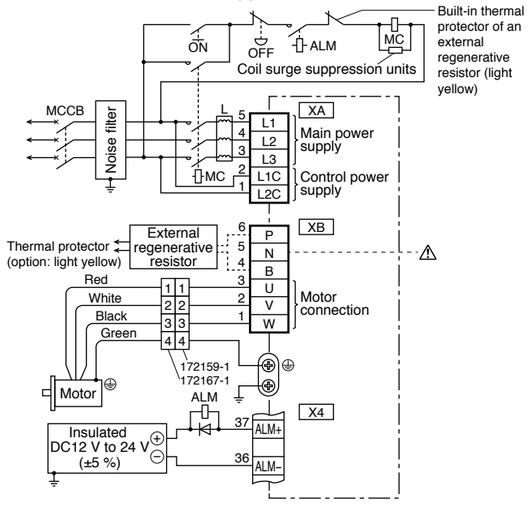
● In Case of Connector type



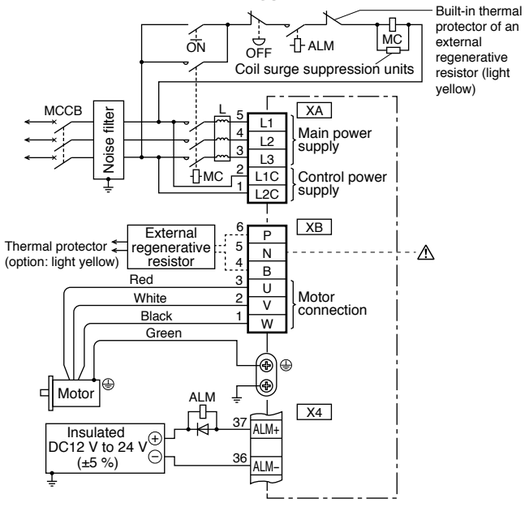
● The pin number of X4 is based on the factory setting parameters.
* Power supply for motor brake and connector X4 requires insulation. Do not connect to the same power supply.

In Case of 3-phase, A-frame, B-frame, 200 V type

● In Case of Leadwire type



● In Case of Connector type



● The pin number of X4 is based on the factory setting parameters.
* Power supply for motor brake and connector X4 requires insulation. Do not connect to the same power supply.

Connect an external regenerative resistor.

Frame No.	Short wire (Accessory)	Built-in regenerative resistor	Connection of the connector XB ⚠ Do not connect anything to N.	
			In case of using an external regenerative resistor	In case of not using an external regenerative resistor
A-frame B-frame	without	without	• Connect an external regenerative resistor between P-B.	• Always open between P-B.

*** Refer to P.307 Specifications of Motor connector.**

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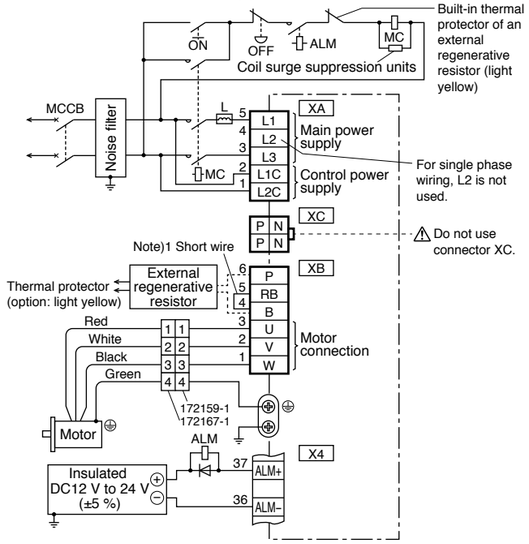
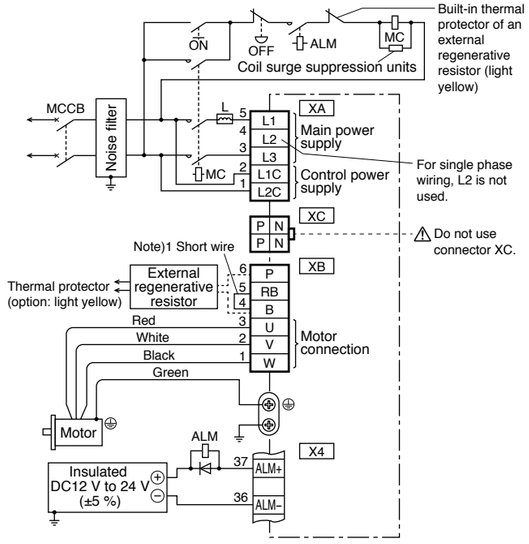
In Case of Single phase, C-frame, D-frame, 100 V / 200 V type

● In Case of Leadwire type



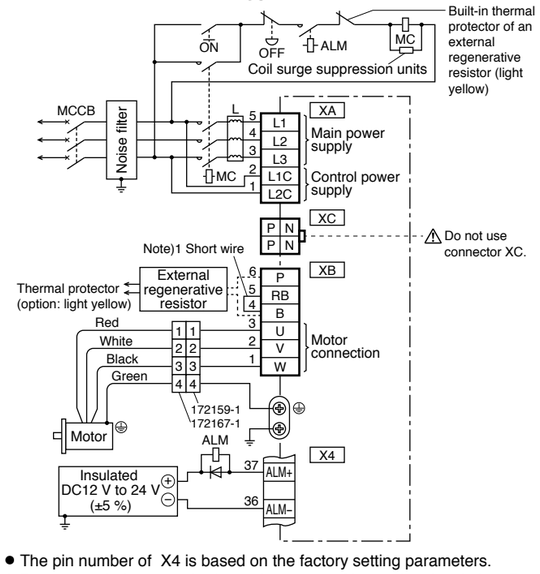
● In Case of Connector type



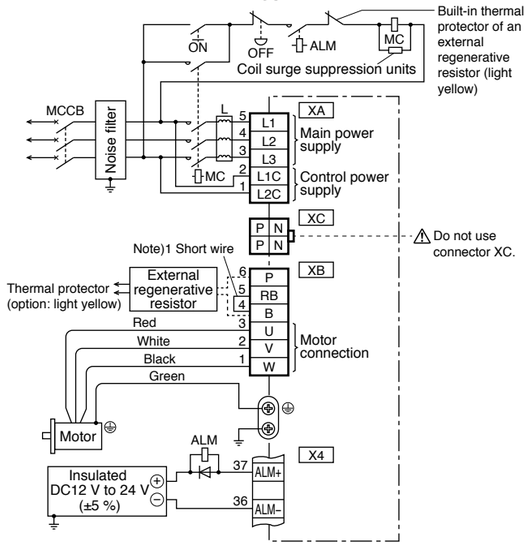
● The pin number of X4 is based on the factory setting parameters.
* Power supply for motor brake and connector X4 requires insulation. Do not connect to the same power supply.

In Case of 3-phase, C-frame, D-frame, 200 V type

● In Case of Leadwire type



● In Case of Connector type



● The pin number of X4 is based on the factory setting parameters.
* Power supply for motor brake and connector X4 requires insulation. Do not connect to the same power supply.

Note)1

Frame No.	Short wire (Accessory)	Built-in regenerative resistor	Connection of the connector XB ⚠ Do not connect anything to N.	
			In case of using an external regenerative resistor	In case of not using an external regenerative resistor
C-frame D-frame	with	with	• Remove the short wire accessory from between RB-B. • Connect an external regenerative resistor between P-B.	• Shorted between RB-B with an attached short wire

*** Refer to P.307, P.308, Specifications of Motor connector.**

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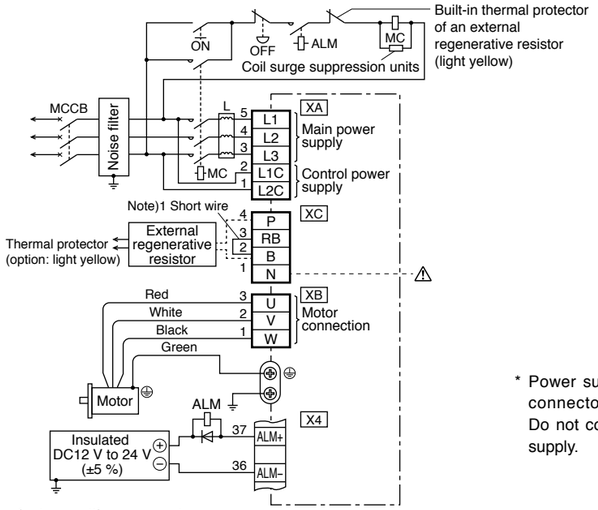
In Case of 3-phase, E-frame, 200 V type



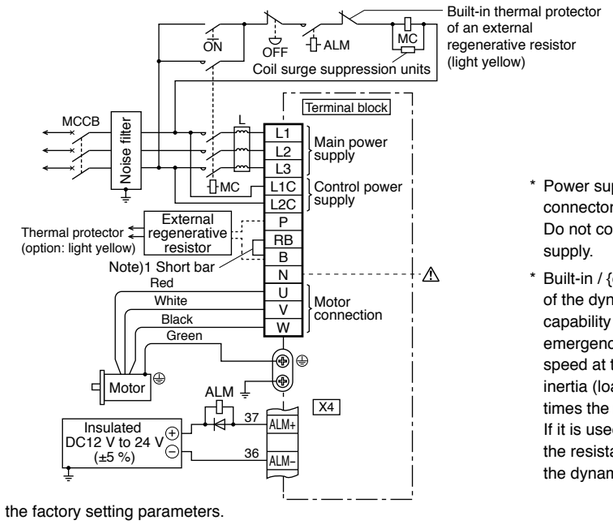
* Power supply for motor brake and connector X4 requires insulation. Do not connect to the same power supply.

● The pin number of X4 is based on the factory setting parameters.

Note)1

Frame No.	Short wire (Accessory)	Built-in regenerative resistor	Connection of the connector XC ⚠ Do not connect anything to N.	
			In case of using an external regenerative resistor	In case of not using an external regenerative resistor
E-frame	with	with	• Remove the short wire accessory from between RB-B. • Connect an external regenerative resistor between P-B.	• Shorted between RB-B with an attached short wire

In Case of 3-phase, F-frame, 200 V type



* Power supply for motor brake and connector X4 requires insulation. Do not connect to the same power supply.

* Built-in / {external} The standard of the dynamic brake resistance's capability is up to three consecutive emergency stops from the rated speed at the maximum allowable inertia (load inertia moment ratio 10 times the rotor inertia moment). If it is used under more conditions, the resistance may be broken and the dynamic brake may not operate.

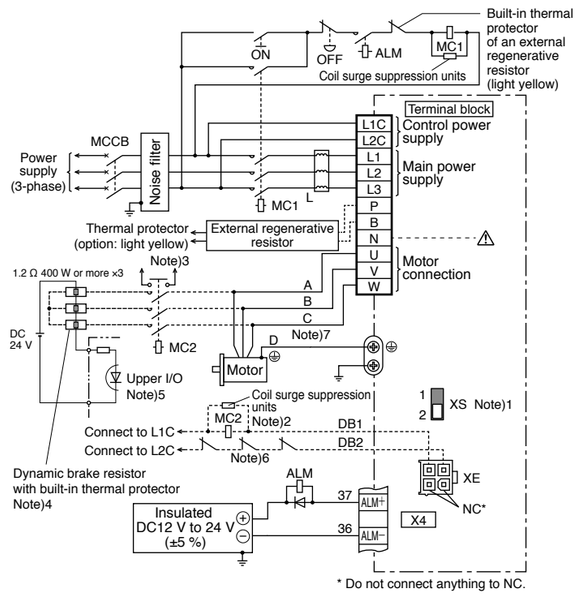
● The pin number of X4 is based on the factory setting parameters.

Note)1

Frame No.	Short bar (Accessory)	Built-in regenerative resistor	Connection of terminal block ⚠ Do not connect anything to N.	
			In case of using an external regenerative resistor	In case of not using an external regenerative resistor
F-frame	with	with	• Remove the short bar accessory from between RB-B. • Connect an external regenerative resistor between P-B.	• Shorted between RB-B with an attached short bar

*** Refer to P.308, Specifications of Motor connector.**

In Case of 3-phase, G-frame, 200 V type



● The pin number of X4 is based on the factory setting parameters.

■ Connection of regenerative resistor

Frame No.	Short bar (Accessory)	Built-in regenerative resistor	Connection of terminal block ⚠ Do not connect anything to N.	
			In case of using an external regenerative resistor	In case of not using an external regenerative resistor
G-frame	without	without	• Connect an external regenerative resistor between P-B.	• Always open between P-B.

■ About the Dynamic Brake

G frame has built-in dynamic brake resistor.When using built-in dynamic brake, set switch XS to "1" side.
When exceeding the capacity of built-in dynamic brake resistor, set switch XS to "2" side and use external dynamic brake resistor.

■ When using external dynamic brake

Note 1) Set switch XS to "2" side.
Note 2) Make the electromagnetic contactor (MC2) the same as the electromagnetic contactor (MC1) of the main circuit.
Note 3) Provide an auxiliary contact, and configure protection so that the servo will not turn on in the external sequence if the main contact is welded.
Note 4) Mount the dynamic brake resistor on incombustible material such as metal.
Note 5) Install a thermal protector on the dynamic brake resistor and monitor it with the upper I / O, and configure protection so that the servo is not turned on in the external sequence when the thermal protector is operating.
Note 6) If the upper I / O cannot monitor the thermal protector, input the output of the thermal protector between L2C and DB2 so that the dynamic brake does not operate when the temperature protection works.

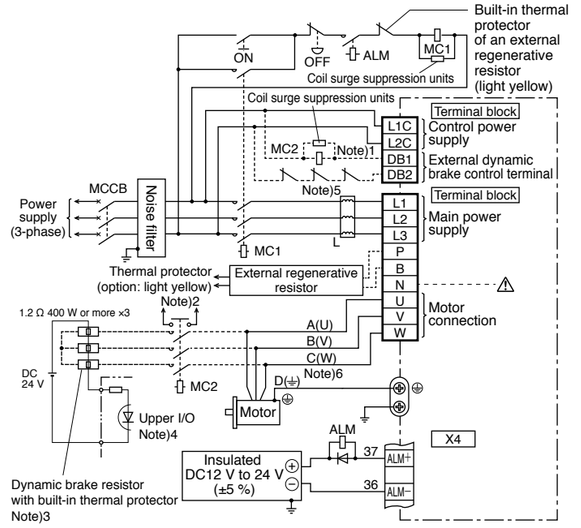
■ About motor wiring

Note 7) This is the terminal symbol of the connector.

* Power supply for motor brake and connector X4 requires insulation. Do not connect to the same power supply.

* Do not use built-in dynamic brake and external dynamic brake at the same time.

In Case of 3-phase, H-frame, 200 V type



● The pin number of X4 is based on the factory setting parameters.

■ Connection of regenerative resistor

Frame No.	Short bar (Accessory)	Built-in regenerative resistor	Connection of terminal block ⚠ Do not connect anything to N.	
			In case of using an external regenerative resistor	In case of not using an external regenerative resistor
H-frame	without	without	• Connect an external regenerative resistor between P-B.	• Always open between P-B.

■ About the Dynamic Brake

The H frame does not have a built-in dynamic brake resistor, so it will be in a free run state when the motor does emergency stop. Use an external dynamic brake resistor if it may cause a machine collision.

■ When using external dynamic brake

Note 1) Make the electromagnetic contactor (MC2) the same as the electromagnetic contactor (MC1) of the main circuit.
Note 2) Provide an auxiliary contact, and configure protection so that the servo will not turn on in the external sequence if the main contact is welded.
Note 3) Mount the dynamic brake resistor on incombustible material such as metal.
Note 4) Install a thermal protector on the dynamic brake resistor and monitor it with the upper I / O, and configure protection so that the servo is not turned on in the external sequence when the thermal protector is operating.
Note 5) If the upper I / O cannot monitor the thermal protector, input the output of the thermal protector between L2C and DB2 so that the dynamic brake does not operate when the temperature protection works.

■ About motor wiring

Note 6) This is the terminal symbol of the connector.
( ) Is the terminal symbol of 22.0 kW motor.

* Do not use built-in dynamic brake and external dynamic brake at the same time.

*** Refer to P.308, Specifications of Motor connector.**

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Wiring to the Connector, X3 * Excluding A6SE, A6SG Series

Connecting the host controller can configure a safety circuit that controls the safety functions.

When not constructing the safety circuit, use the supplied safety bypass plug.

Outline Description of Safe Torque Off (STO)

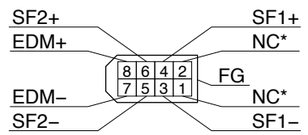
The safe torque off (STO) function is a safety function that shuts the motor current and turns off motor output torque by forcibly turning off the driving signal of the servo driver internal power transistor. For this purpose, the STO uses safety input signal and hardware (circuit).

When STO function operates, the servo driver turns off the servo ready output signal (S-RDY) and enters STO state. When the driver becomes STO state, front panel displays the “St.”. Then, when the driver's state is STO input is off and servo-on input is off, the driver automatically becomes servo-off.

Safety Precautions

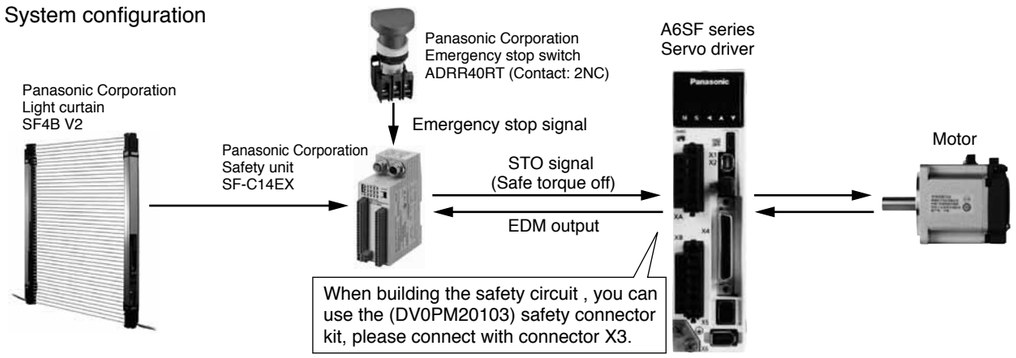
- When using the STO function, be sure to perform equipment risk assessment to ensure that the system conforms to the safety requirements.
- Even while the STO function is working, the following potential safety hazards exist. Check safety in risk assessment.
  - The motor may move when external force (e.g. gravity force on vertical axis) is exerted on it. Provide an external brake, etc., as necessary to secure the motor. Note that the purpose of motor with brake is holding and it cannot be used for braking application.
  - When parameter Pr5.10 Sequence at alarm is set to free run (disable dynamic brake), the motor is free run state and requires longer stop distance even if no external force is applied. Make sure that this does not cause any problem.
  - When power transistor, etc., becomes defective, the motor will move to the extent equivalent of 180 electrical angle (max.). Make sure that this does not cause any problem.
  - The STO turns off the current to the motor but does not turn off power to the servo driver and does not isolate it. When starting maintenance service on the servo driver, turn off the driver by using a different disconnecting device.
- External device monitor (EDM) output signal is not a safety signal. Do not use it for an application other than failure monitoring.
- Dynamic brake and external brake release signal output are not related to safety function. When designing the system, make sure that the failure of external brake release during STO condition does not result in danger condition.
- When using STO function, connect equipment conforming to the safety standards.

[Connector pin assignment]
(Viewed from cable)



* Do not connect anything to NC.

- System configuration



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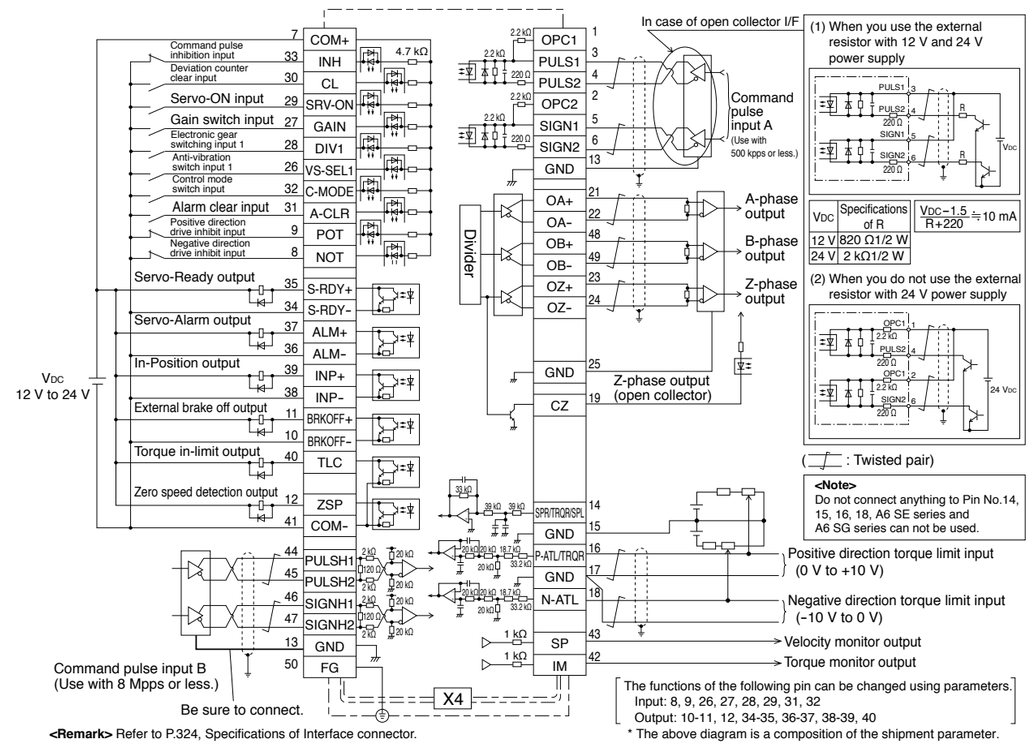
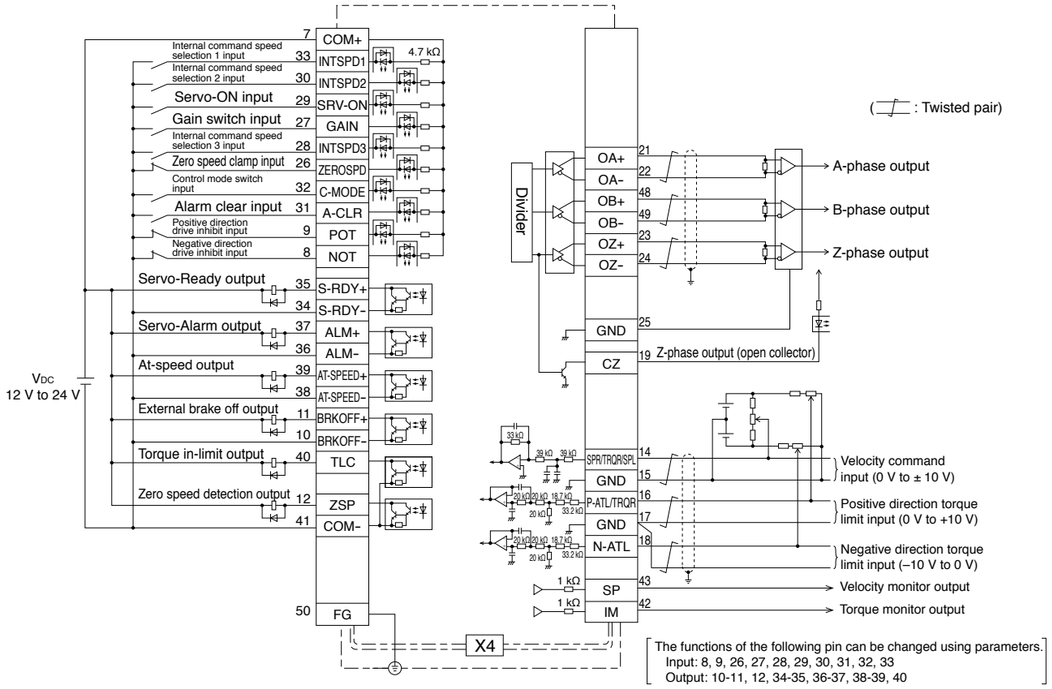
Wiring Example of Position Control Mode



<Remark> Refer to P.324, Specifications of Interface connector.

Wiring Example of Velocity Control Mode * Internal velocity command is available only for A6SE and A6SG series



<Remark> Refer to P.324, Specifications of Interface connector.

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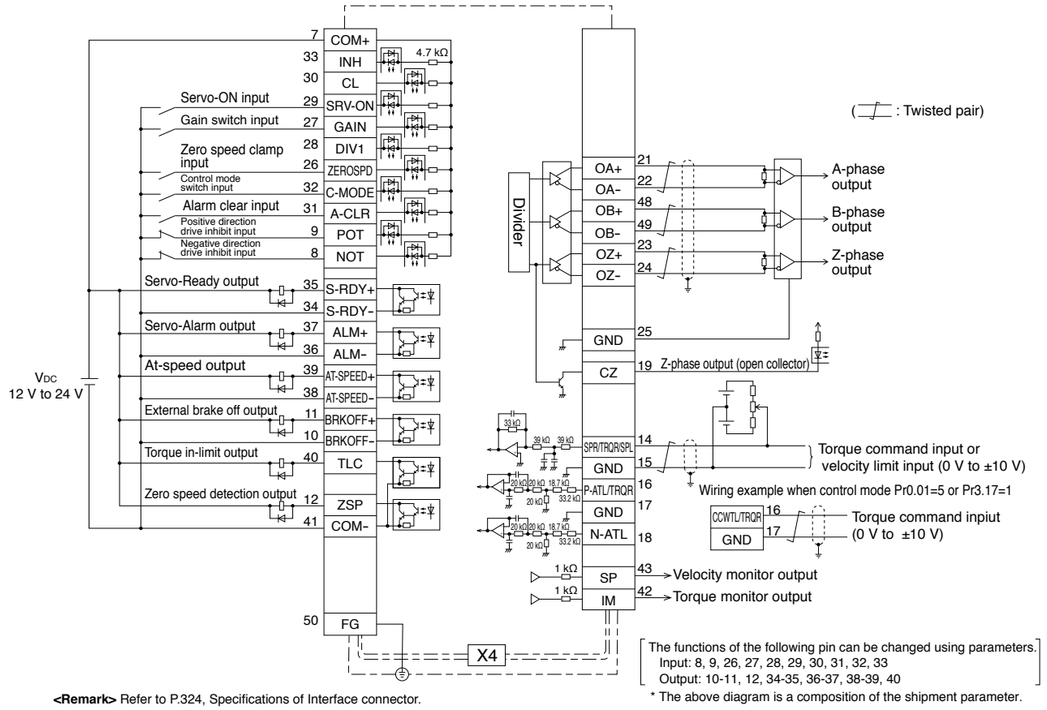
Wiring Example of Torque Control Mode

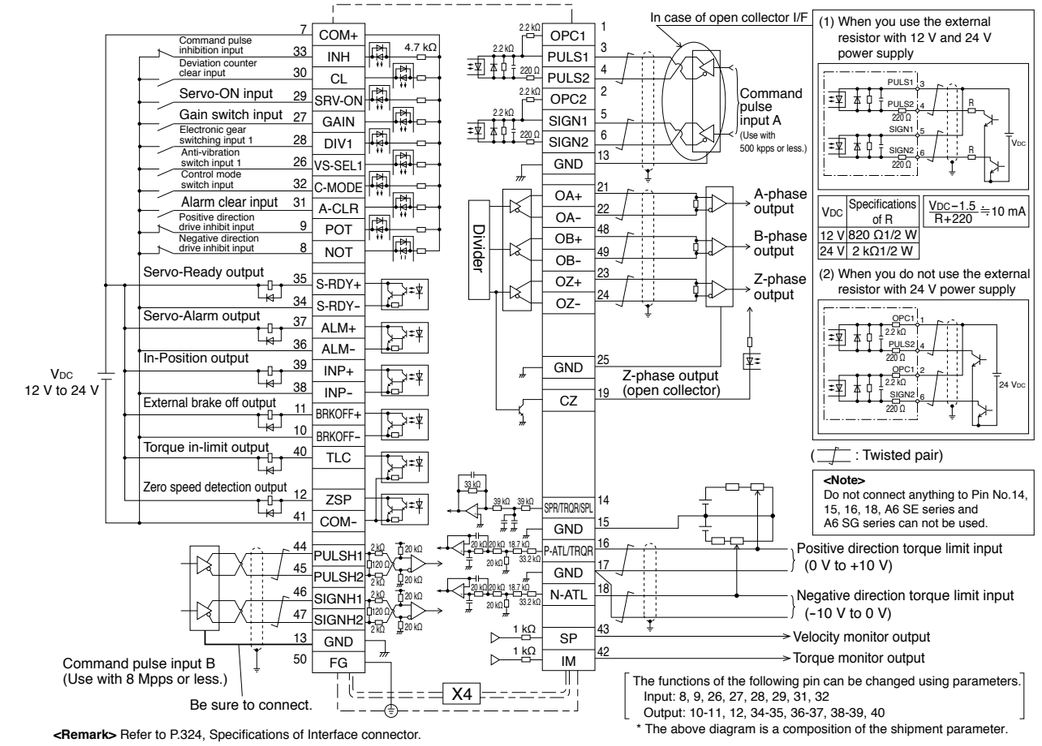
* Excluding A6SE, A6SG Series



<Remark> Refer to P.324, Specifications of Interface connector.

Wiring Example of Full-closed Control Mode

* Excluding A6SE, A6SG Series



<Remark> Refer to P.324, Specifications of Interface connector.

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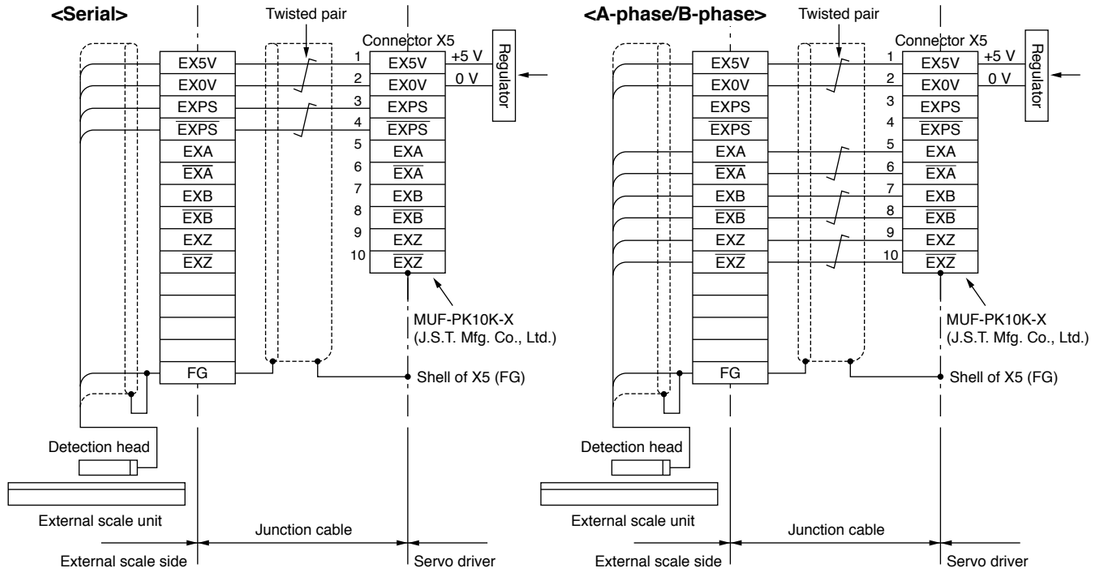
Applicable External Scale

Applicable External Scale	Manufacturer	Model No.	Resolution [µm]	Maximum speed (m/s)*1
Parallel type (AB-phase)	General	—	Maximum speed after 4 × multiplication : 4 Mpps	
Serial type (Incremental system)	Magnescale Co., Ltd.	SL700-PL101RP/RHP SL710-PL101RP/RHP	0.1	10
		SR75 / SR85	0.01 to 1	3.3
		BF1	0.001/0.01	0.4/1.8
		SQ10	0.05/0.1/ 0.5/1	3
	NIDEC SANKYO CORPORATION	PSLH041 + PSLG	0.1	6
	Renishaw plc	TONiC	0.001 to 5	6.48 m/s @ 1 µm 0.648 m/s @ 0.1 µm
		ATOM	0.001 to 10	
		VIONIC	0.0025 to 5	
Serial type (Absolute system)	Fagor Automation S.Coop	S2AP/SV2AP/G2AP	0.01/0.05	3
		LAP	0.01/0.05	3
		EXA/ EXG/ EXT	0.01/0.05	8
		H2AP-D200/H2AP-D90	29 bit/23 bit	750 r/min, 1500 r/min
		S2AP-D170,/S2AP-D90	23 bit	1500 r/min
	HEIDENHAIN	LIC2197P/LIC2199P	0.05/0.1	10
		LIC4193P/LIC4195P LIC4197P/LIC4199P	0.001/0.005/0.01	10
		LC195P/LC495P	0.001/0.01	3
		ECA 4490P	27 bits to 29 bits	7000 r/min to 550 r/min (Depends on drum size)
		RCN 2x90P/RCN 5x90P	26 bits/28 bits	1500 r/min
		RCN 8x90P	29 bit	500 r/min
	RSF Electronik	MC 15P MP/MC 15P MK	0.05/0.1	10
	Magnescale Co., Ltd.	SR77 / SR87	0.01 to 1	3.3
	Mitutoyo Corporation	AT573-SC/H	0.05	2.5
		ST700	0.1	5
		ST1300	0.001/0.01	8
	Renishaw plc	RESOLUTE	0.001	A5/0.4, A6/4
			0.05	A5/20, A6/100
			0.1	A5/40, A6/100

*1 The maximum speed is a characteristic of the driver. It is limited by the configration of the machine and the system.

* For more information about the external scale product, please contact the manufacturer.

Wiring Diagram of X5



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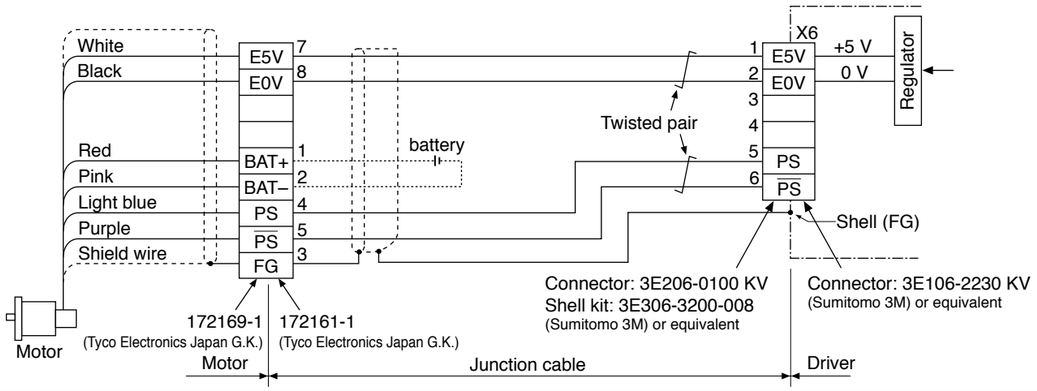
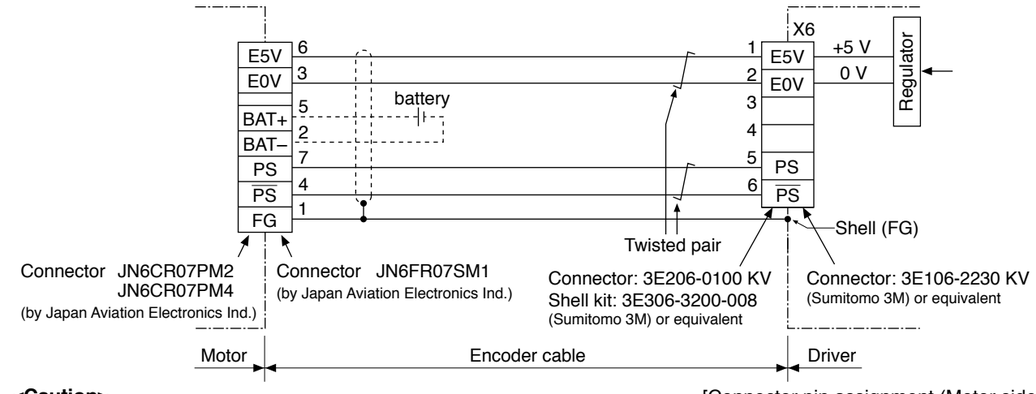
When using a 23-bit absolute encoder as an absolute system*.

* When use a multi-turn data.

● MSMF 50 W to 1000 W ● MHMF 50 W to 1000 W ● MQMF 100 W to 400 W <Leadwire type>



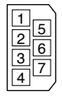
● MSMF 50 W to 1000 W ● MHMF 50 W to 1000 W ● MQMF 100 W to 400 W <Connector type>



<Caution>

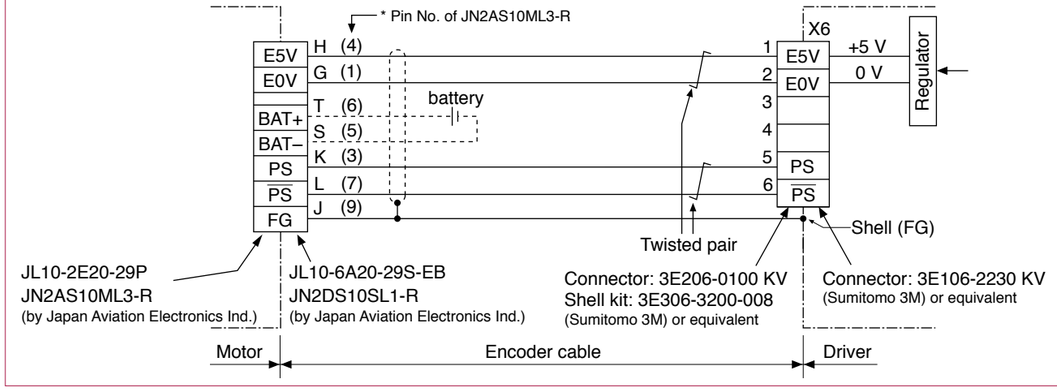
- Tighten the motor connector mounting screw (M2) with a torque between 0.19 N·m and 0.21 N·m. To avoid damage, be sure to use only the screw supplied with the connector.
- Do not remove the gasket supplied with the junction cable connector. Securely install the gasket in place. Otherwise, the degree of protection of IP67 will not be guaranteed.

[Connector pin assignment (Motor side)]



(Viewed from cable)

● MSMF 1.0 kW to 5.0 kW ● MHMF 1.0 kW to 5.0 kW
● MDMF 1.0 kW to 5.0 kW ● MGMF 0.85 kW to 4.4 kW

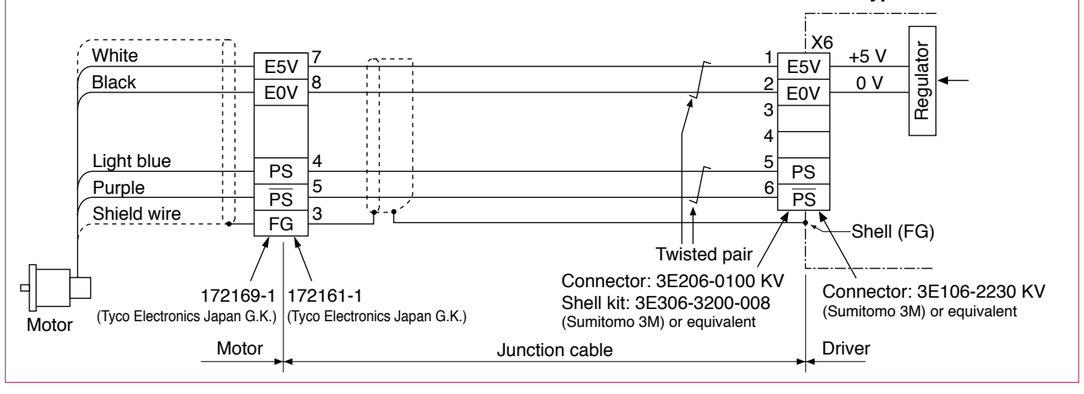


[Connector pin assignment] Refer to P.307, P.308 “Specifications of Motor connector”.

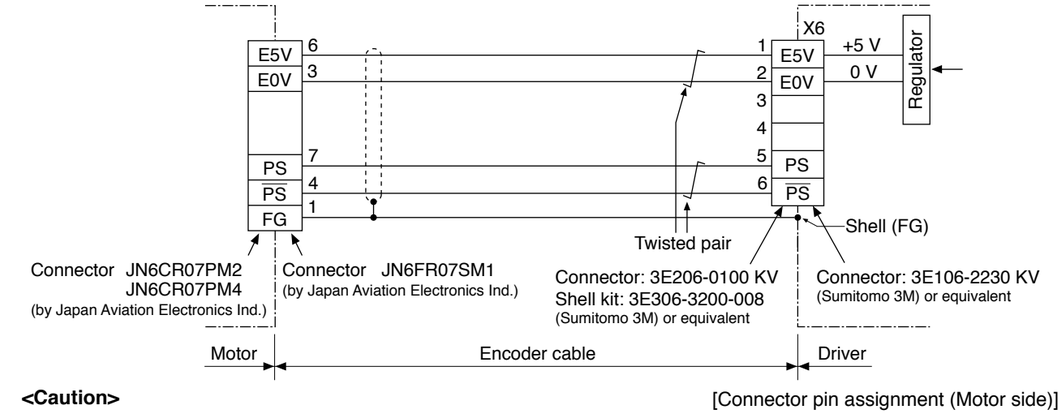
When using a 23-bit absolute encoder as a incremental system*.

* When do not use a multi-turn data.

● MSMF 50 W to 1000 W ● MHMF 50 W to 1000 W ● MQMF 100 W to 400 W <Leadwire type>



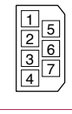
● MSMF 50 W to 1000 W ● MHMF 50 W to 1000 W ● MQMF 100 W to 400 W <Connector type>



<Caution>

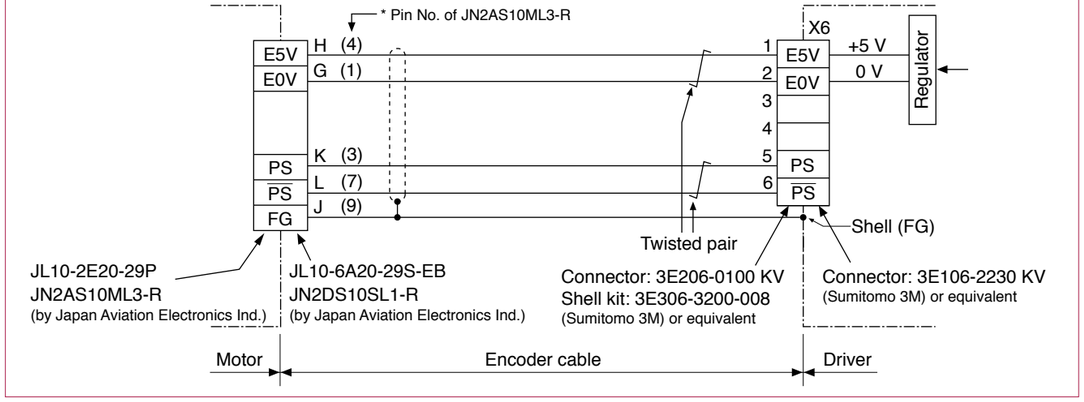
- Tighten the motor connector mounting screw (M2) with a torque between 0.19 N·m and 0.21 N·m. To avoid damage, be sure to use only the screw supplied with the connector.
- Do not remove the gasket supplied with the junction cable connector. Securely install the gasket in place. Otherwise, the degree of protection of IP67 will not be guaranteed.

[Connector pin assignment (Motor side)]



(Viewed from cable)

● MSMF 1.0 kW to 5.0 kW ● MHMF 1.0 kW to 5.0 kW
● MDMF 1.0 kW to 5.0 kW ● MGMF 0.85 kW to 4.4 kW



[Connector pin assignment] Refer to P.307, P.308 “Specifications of Motor connector”.

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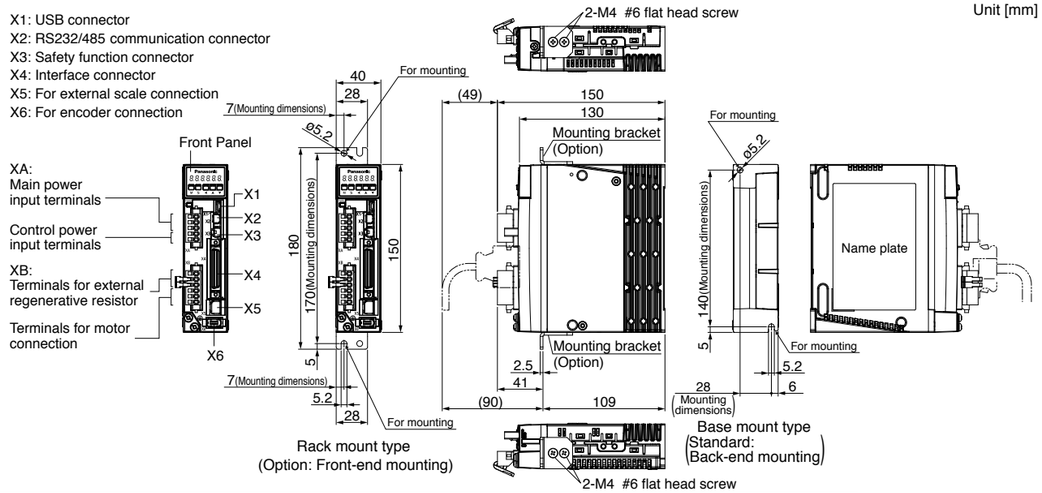
* All dimensions shown in this catalog are for A6SF series. But external dimensions are also same for A6SE and A6SG series. For external appearance, please refer to P.23 and P.24.

A-frame

Unit [mm]

X1: USB connector
X2: RS232/485 communication connector
X3: Safety function connector
X4: Interface connector
X5: For external scale connection
X6: For encoder connection



A-frame: Connector of driver side			Multifunction type	RS485 communication type	Basic type
Connector XA	S05B-F32SK-GGXR	J.S.T. Mfg. Co., Ltd.	●	●	●
Connector XB	S06B-F32SK-GGXR	J.S.T. Mfg. Co., Ltd.	●	●	●
Connector X1	UB-M5BR-DMP14-4S (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●	●
Connector X2	1-2040537-1 (or equivalent)	Tyco Electronics Japan G.K.	●	●	—
Connector X3	2040537-1 (or equivalent)	Tyco Electronics Japan G.K.	●	—	—
Connector X4	10250-52A2PE (or equivalent)	Sumitomo 3M	●	●	●
Connector X5	MUF-RS10DK-GKXR (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	—	—
Connector X6	3E106-2230 KV (or equivalent)	Sumitomo 3M	●	●	●

<Attached to the driver>

Connector of power and motor side			Multifunction type	RS485 communication type	Basic type
Connector XA	05JFAT-SAXGF	J.S.T. Mfg. Co., Ltd.	●	●	●
Connector XB	06JFAT-SAXGF	J.S.T. Mfg. Co., Ltd.	●	●	●

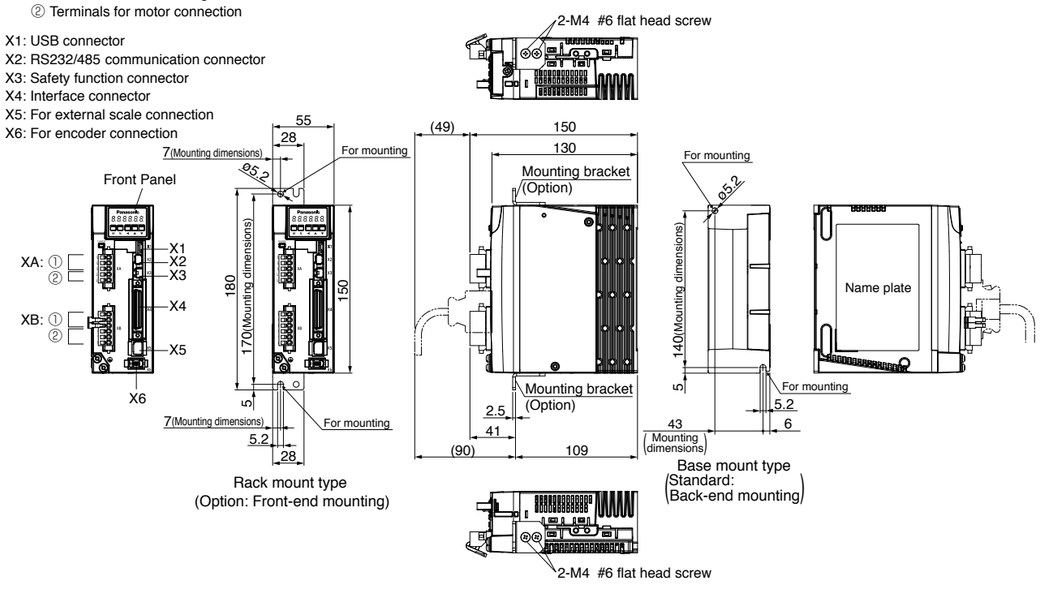
Mass: 0.8 kg

B-frame

Unit [mm]

XA: ① Main power input terminals
② Control power input terminals
XB: ① Terminals for external regenerative resistor
② Terminals for motor connection

X1: USB connector
X2: RS232/485 communication connector
X3: Safety function connector
X4: Interface connector
X5: For external scale connection
X6: For encoder connection



* For connectors used to connect to the driver, power supply and motor, refer to the A-frame table because both frames use the same connectors.

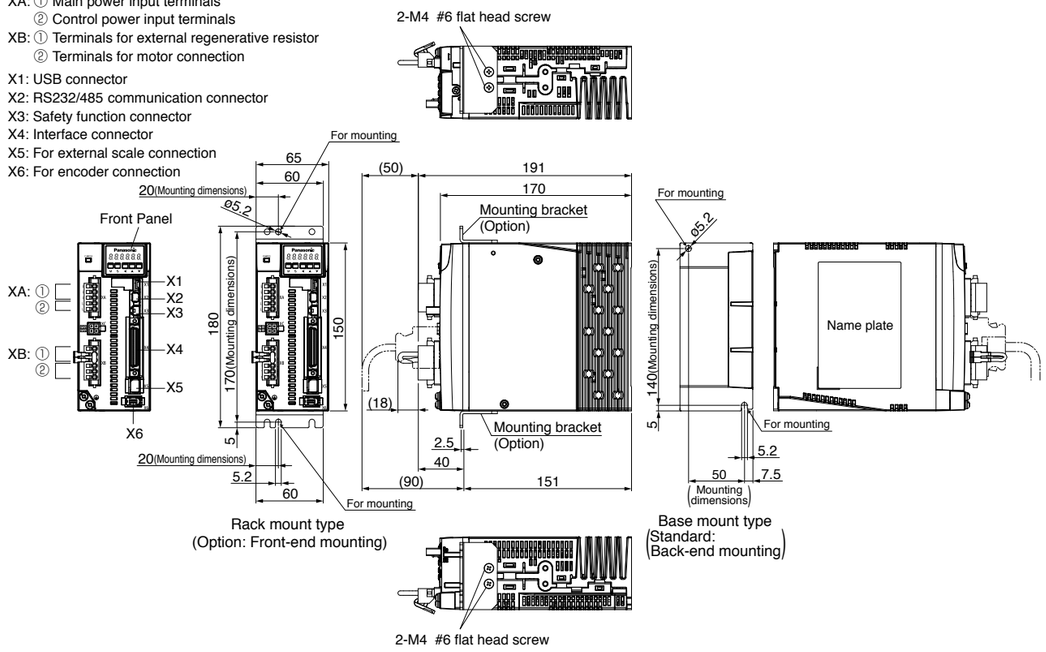
Mass: 1.0 kg

C-frame

Unit [mm]

XA: ① Main power input terminals
② Control power input terminals
XB: ① Terminals for external regenerative resistor
② Terminals for motor connection

X1: USB connector
X2: RS232/485 communication connector
X3: Safety function connector
X4: Interface connector
X5: For external scale connection
X6: For encoder connection



* For connectors used to connect to the driver, power supply and motor, refer to the A-frame table because both frames use the same connectors.

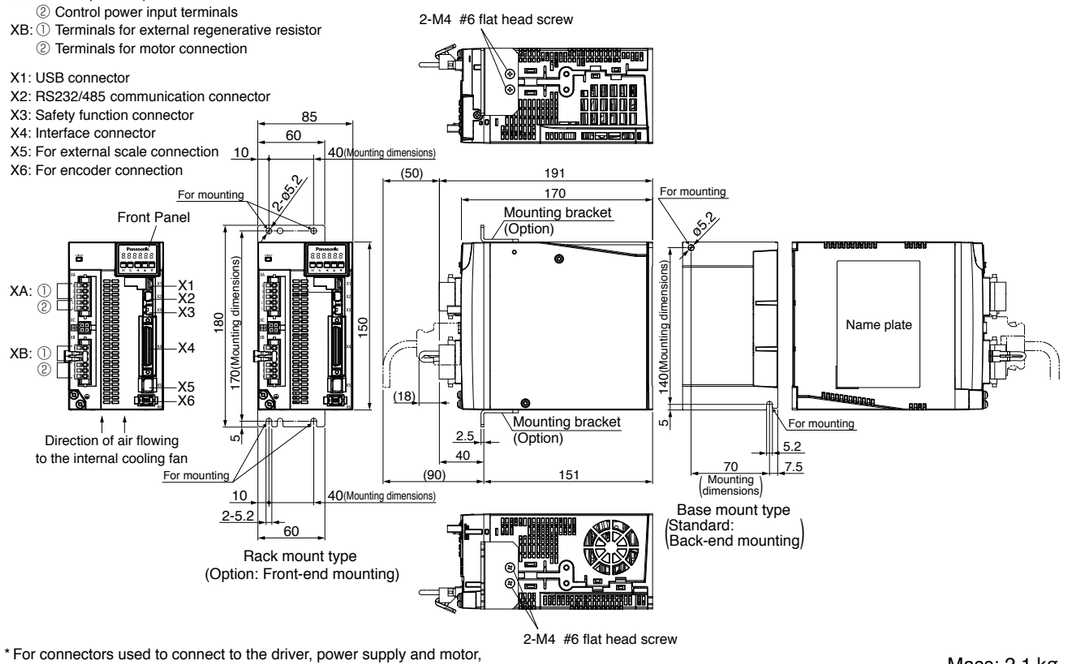
Mass: 1.6 kg

D-frame (200 V)

Unit [mm]

XA: ① Main power input terminals
② Control power input terminals
XB: ① Terminals for external regenerative resistor
② Terminals for motor connection

X1: USB connector
X2: RS232/485 communication connector
X3: Safety function connector
X4: Interface connector
X5: For external scale connection
X6: For encoder connection



* For connectors used to connect to the driver, power supply and motor, refer to the A-frame table because both frames use the same connectors.

Mass: 2.1 kg

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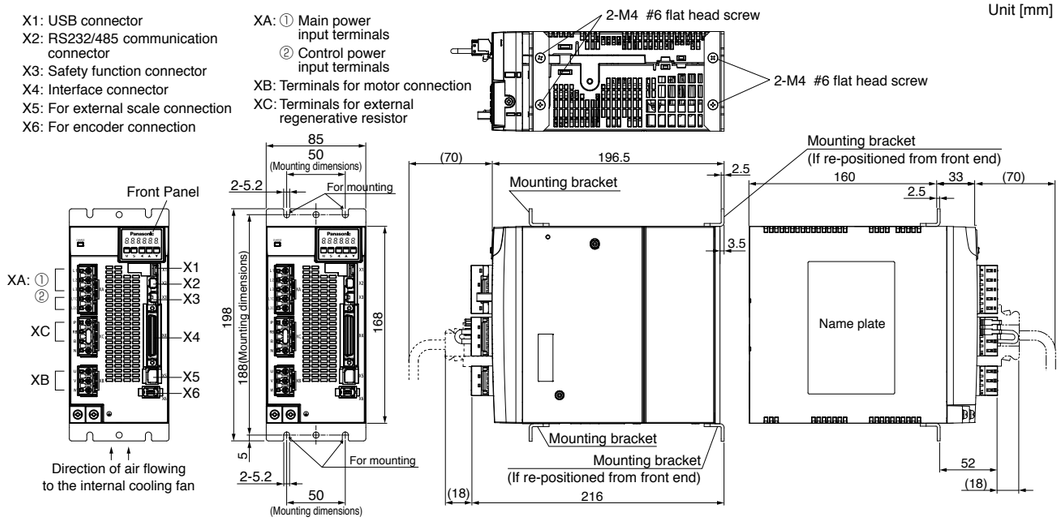
* All dimensions shown in this catalog are for A6SF series. But external dimensions are also same for A6SE and A6SG series. For external appearance, please refer to P.23 and P.24.

E-frame (200 V)

Unit [mm]

X1: USB connector
X2: RS232/485 communication connector
X3: Safety function connector
X4: Interface connector
X5: For external scale connection
X6: For encoder connection

XA: ① Main power input terminals
② Control power input terminals
XB: Terminals for motor connection
XC: Terminals for external regenerative resistor



E-frame: Connector of driver side		
Connector XA	S05B-JTSLSK-GSANXR	J.S.T. Mfg. Co., Ltd.
Connector XB	S03B-JTSLSK-GSANXR	J.S.T. Mfg. Co., Ltd.
Connector XC	S04B-JTSLSS-GSANXR	J.S.T. Mfg. Co., Ltd.

<Attached to the driver>

E-frame: Connector of power and motor side		
Connector XA	05JFAT-SAXGSA-L	J.S.T. Mfg. Co., Ltd.
Connector XB	03JFAT-SAXGSA-L	J.S.T. Mfg. Co., Ltd.
Connector XC	04JFAT-SAXGSA-L	J.S.T. Mfg. Co., Ltd.

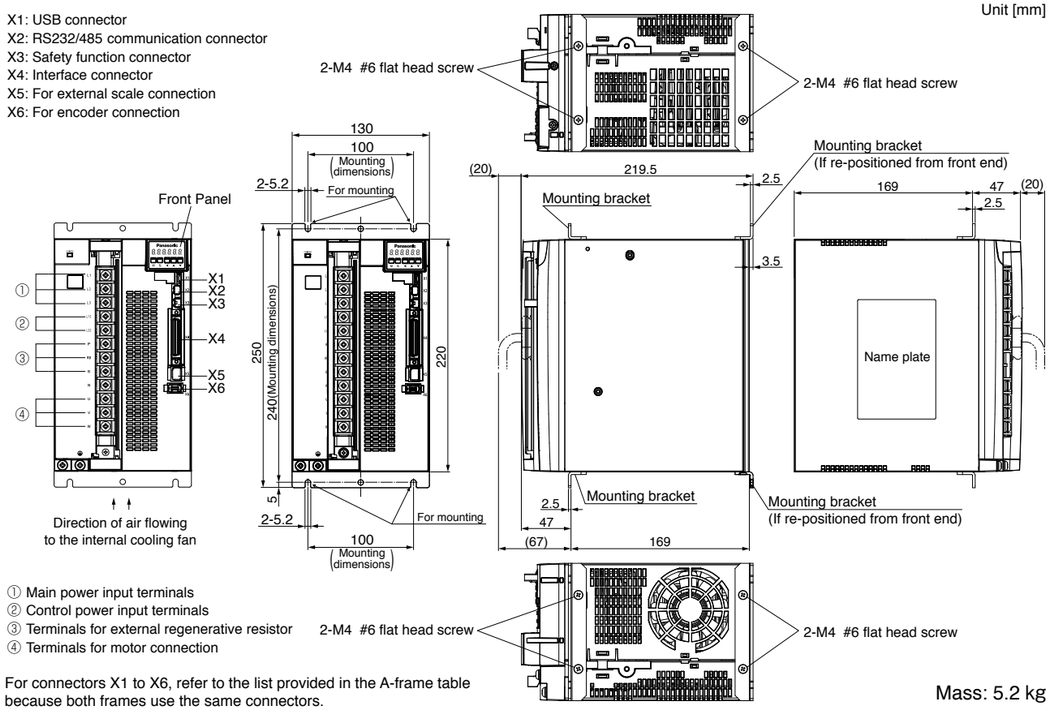
* For connectors X1 to X6, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 2.7 kg

F-frame (200 V)

Unit [mm]

X1: USB connector
X2: RS232/485 communication connector
X3: Safety function connector
X4: Interface connector
X5: For external scale connection
X6: For encoder connection



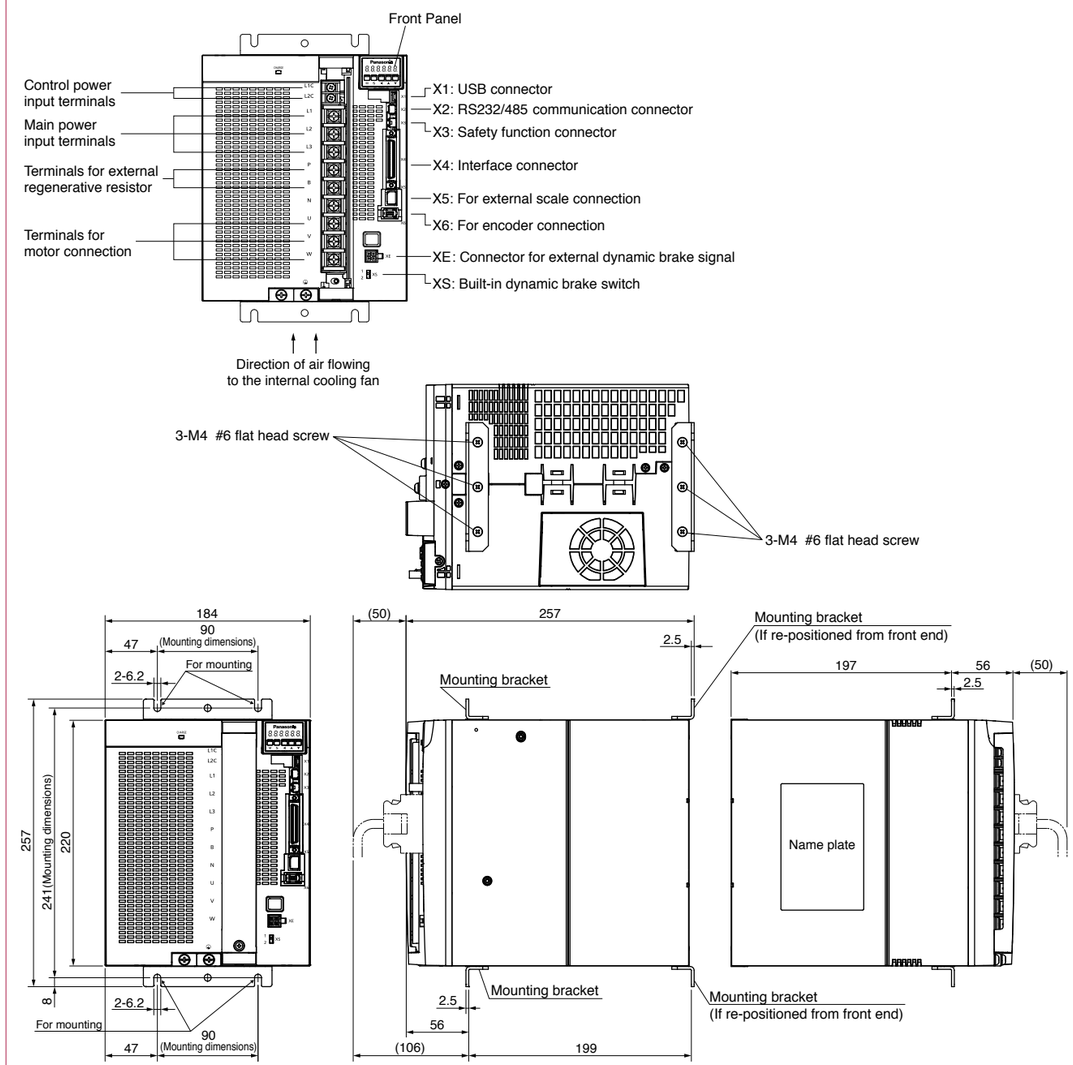
① Main power input terminals
② Control power input terminals
③ Terminals for external regenerative resistor
④ Terminals for motor connection

* For connectors X1 to X6, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 5.2 kg

G-frame (200 V) (The lineup of A6SE and A6SG series is not available.)

Unit [mm]



Connector of driver side	Controlor side (customer prepares)
Connector XE : 5569-04A2-210 (MOLEX)	Connector : 5557-04R-210 (MOLEX) Pin : 5556PBTL

* For connectors X1 to X6, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 8.2 kg

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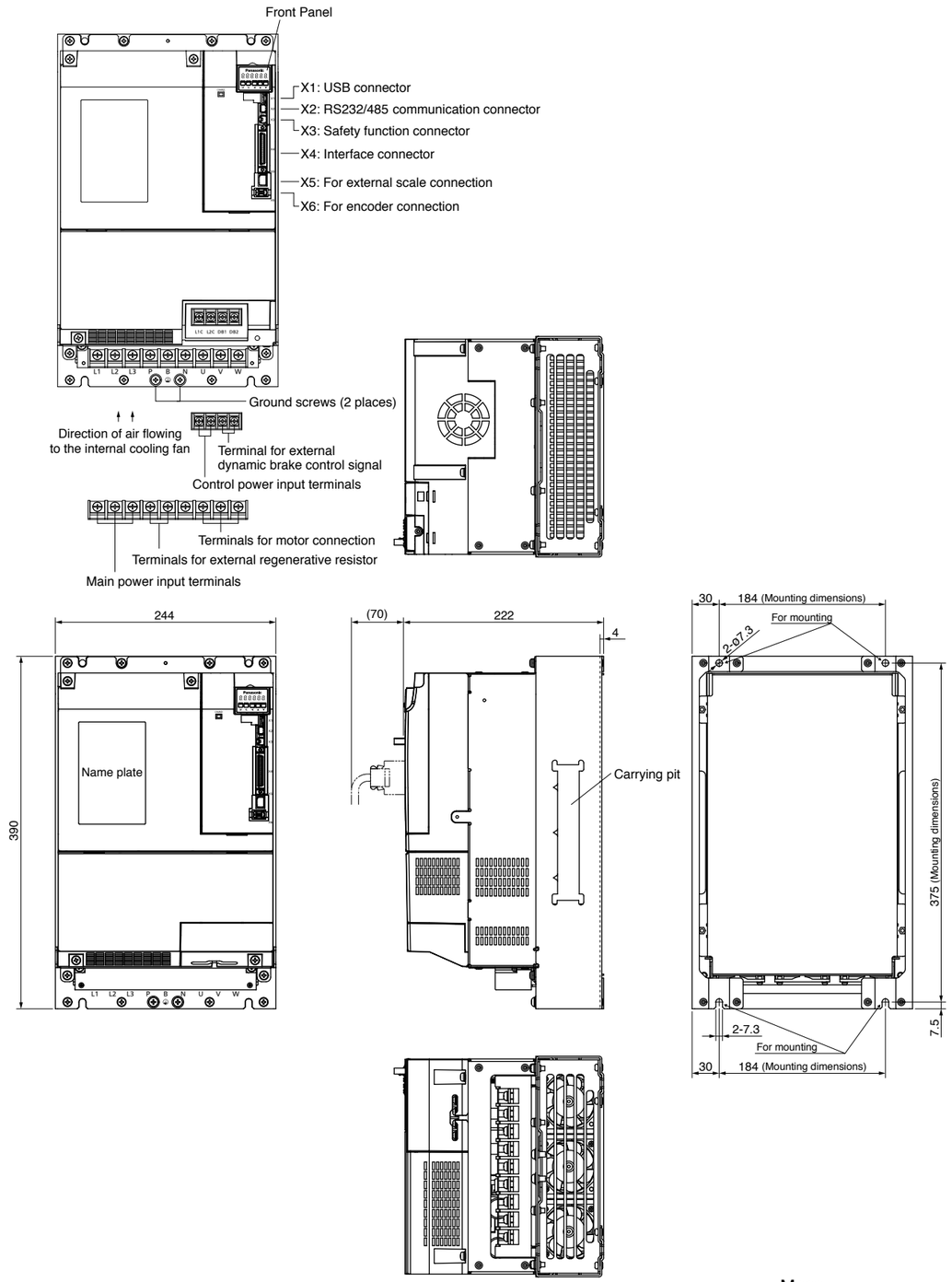
H-frame (200 V) (The lineup of A6SE and A6SG series is not available.)

Unit [mm]



Mass:
MHDLTE3SF/ 14.2 kg
MHDLTF3SF/ 15.2 kg

* For connectors X1 to X6, refer to the list provided in the A-frame table because both frames use the same connectors.

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Features

- Line-up IP67 motor: 50 W to 5.0 kW
- Max speed: 6500r/min (MHMF 50 W to 400 W)
- Low inertia (MSMF) to High inertia (MHMF).
- Low cogging torque: Rated torque ratio 0.5 % (typical value).
- 23-bit absolute encoder (8388608 pulse).

Motor Lineup

80 mm sq. or less

MSMF
Low inertia

Max. speed : 6000 r/min
Rated speed : 3000 r/min
Rated output :
50 W to 1000 W
Enclosure:
IP65: Leadwire type
IP67: Connector type

MQMF
(Flat type)
Middle inertia

Max. speed : 6500 r/min
Rated speed : 3000 r/min
Rated output :
100 W to 400 W
Enclosure:
IP65: Leadwire type
IP67: Connector type

MHMF
High inertia

Max. speed :
6500 r/min
6000 r/min (750 W,1000 W)
Rated speed : 3000 r/min
Rated output :
50 W to 1000 W
Enclosure:
IP65: Leadwire type
IP67: Connector type

100 mm sq. or more

MSMF
Low inertia

Max. speed : 5000 r/min
4500 r/min (4.0 kW,5.0 kW)
Rated speed : 3000 r/min
Rated output : 1.0 kW to 5.0 kW
Enclosure : IP67

MDMF
Middle inertia

Max. speed : 3000 r/min
: 2000 r/min (11.0 kW to 22.0 kW)
Rated speed : 2000 r/min
: 1500 r/min (11.0 kW to 22.0 kW)
Rated output : 1.0 kW to 22.0 kW
Enclosure : IP67, IP44 (22.0 kW)

MGMF
(Low speed/ High torque type)
Middle inertia

Max. speed : 3000 r/min
Rated speed : 1500 r/min
Rated output : 0.85 kW to 5.5 kW
Enclosure : IP67

MHMF
High inertia

Max. speed : 3000 r/min
Rated speed : 2000 r/min
: 1500 r/min (7.5 kW)
Rated output : 1.0 kW to 7.5 kW
Enclosure : IP67

Motor Contents

MSMF
50 W to 5.0 kW P.63

MQMF
100 W to 400 W P.79

MHMF
50 W to 7.5 kW P.85

MDMF
1.0 kW to 22.0 kW P.102

MGMF
0.85 kW to 5.5 kW P.112

Dimensions
MSMF
(50 W to 1000 W) P.119
MSMF
(1.0 kW to 5.0 kW)..... P.127
MQMF
(100 W to 400 W) P.135
MHMF
(50 W to 1000 W) P.147
MHMF
(1.0 kW to 7.5 kW)..... P.171
MDMF
(1.0 kW to 22.0 kW)..... P.180
MGMF
(0.85 kW to 5.5 kW)..... P.193

Special Order Product ..P.203

Motors with Gear Reducer P.293

Motor Specification Description
Environmental Conditions... P.303
Notes on [Motor specification] page..... P.303
Permissible Load at Output Shaft..... P.304
Built-in Holding Brake P.305

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Specifications

			AC100 V
Motor model *1			MSMF5AZL1□□
Applicable driver	Model No.	Multifunction type	MADLT01SF
		RS485 communication type *2	MADLN01SG
		Basic type *2	MADLN01SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.4
Rated output		(W)	50
Rated torque		(N·m)	0.16
Continuous stall torque		(N·m)	0.16
Momentary Max. peak torque		(N·m)	0.48
Rated current		(A(rms))	1.1
Max. current		(A(o-p))	4.7
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4280		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		0.026
	With brake		0.029
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88.0
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

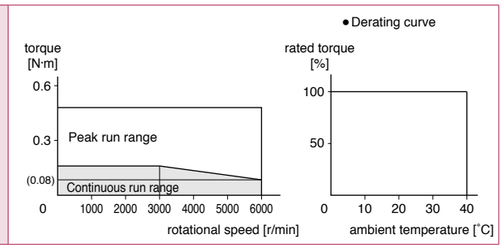
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

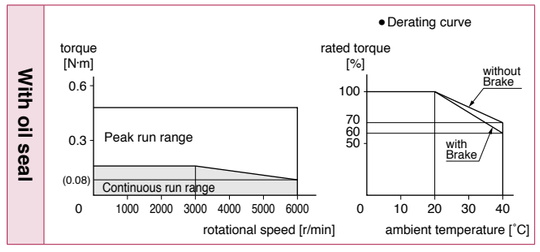
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.119		—	P.119		—
Connector type (IP67)	P.119		—	P.120		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1			MSMF5AZL1□□
Applicable driver	Model No.	Multifunction type	MADLT05SF
		RS485 communication type *2	MADLN05SG
		Basic type *2	MADLN05SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	50
Rated torque		(N·m)	0.16
Continuous stall torque		(N·m)	0.16
Momentary Max. peak torque		(N·m)	0.48
Rated current		(A(rms))	1.1
Max. current		(A(o-p))	4.7
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4281		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		0.026
	With brake		0.029
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88.0
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

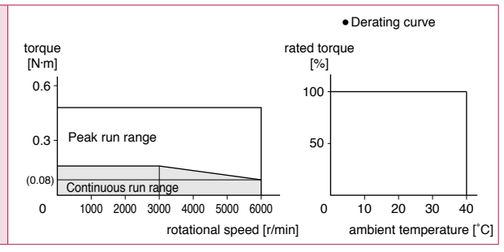
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

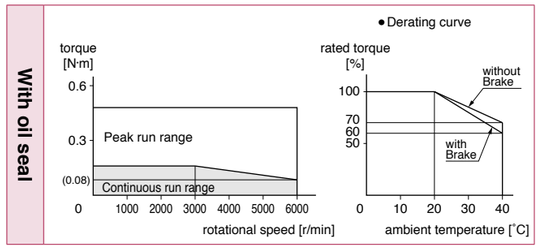
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.119		—	P.119		—
Connector type (IP67)	P.119		—	P.120		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC100 V
Motor model *1			MSMF011L1□□
Applicable driver	Model No.	Multifunction type	MADLT11SF
		RS485 communication type *2	MADLN11SG
		Basic type *2	MADLN11SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.4
Rated output		(W)	100
Rated torque		(N·m)	0.32
Continuous stall torque		(N·m)	0.32
Momentary Max. peak torque		(N·m)	0.95
Rated current		(A(rms))	1.6
Max. current		(A(o-p))	6.9
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4280		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.048
	With brake		0.051
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88.0
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

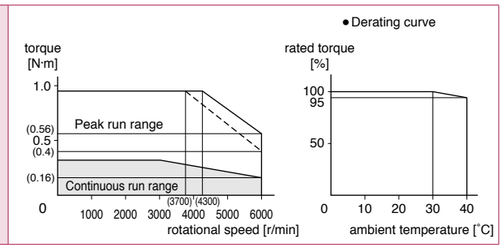
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

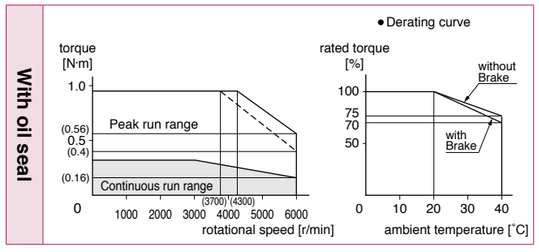
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.120		—	P.120		—
Connector type (IP67)	P.121		—	P.121		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1			MSMF012L1□□
Applicable driver	Model No.	Multifunction type	MADLT05SF
		RS485 communication type *2	MADLN05SG
		Basic type *2	MADLN05SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	100
Rated torque		(N·m)	0.32
Continuous stall torque		(N·m)	0.32
Momentary Max. peak torque		(N·m)	0.95
Rated current		(A(rms))	1.1
Max. current		(A(o-p))	4.7
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4281		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.048
	With brake		0.051
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88.0
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

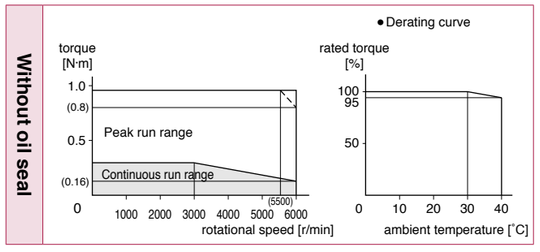
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

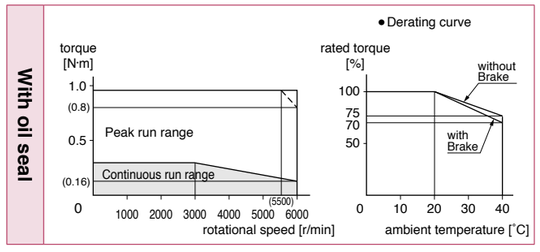
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.120		—	P.120		—
Connector type (IP67)	P.121		—	P.121		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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100 V MSMF 200 W [Low inertia 60 mm sq.]

Specifications

			AC100 V
Motor model *1			MSMF021L1□□
Applicable driver	Model No.	Multifunction type	MBDLT21SF
		RS485 communication type *2	MBDLN21SG
		Basic type *2	MBDLN21SE
	Frame symbol		B-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	200
Rated torque		(N·m)	0.64
Continuous stall torque		(N·m)	0.64
Momentary Max. peak torque		(N·m)	1.91
Rated current		(A(rms))	2.5
Max. current		(A(o-p))	10.6
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.14
	With brake		0.17
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98.0

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

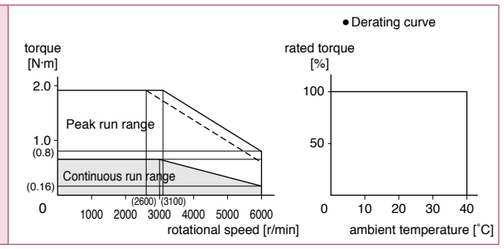
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

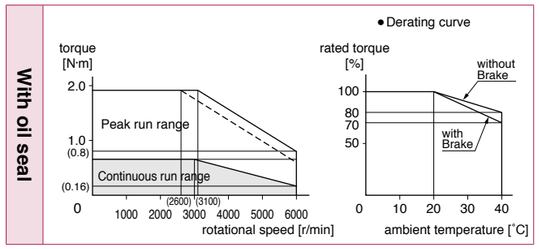
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.121		—	P.122		—
Connector type (IP67)	P.122		—	P.122		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1			MSMF022L1□□
Applicable driver	Model No.	Multifunction type	MADLT15SF
		RS485 communication type *2	MADLN15SG
		Basic type *2	MADLN15SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	200
Rated torque		(N·m)	0.64
Continuous stall torque		(N·m)	0.64
Momentary Max. peak torque		(N·m)	1.91
Rated current		(A(rms))	1.5
Max. current		(A(o-p))	6.5
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.14
	With brake		0.17
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98.0

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

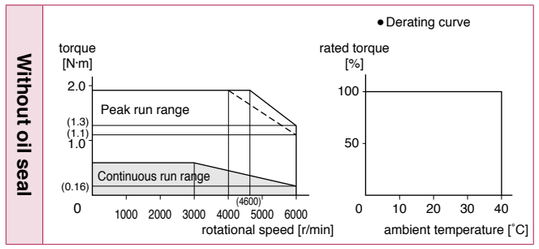
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

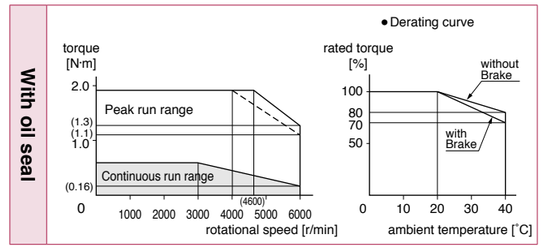
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.121		—	P.122		—
Connector type (IP67)	P.122		—	P.122		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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100 V MSMF 400 W [Low inertia 60 mm sq.]

Specifications

			AC100 V
Motor model *1			MSMF041L1□□
Applicable driver	Model No.	Multifunction type	MCDLT31SF
		RS485 communication type *2	MCDLN31SG
		Basic type *2	MCDLN31SE
	Frame symbol		C-frame
Power supply capacity		(kVA)	0.9
Rated output		(W)	400
Rated torque		(N·m)	1.27
Continuous stall torque		(N·m)	1.27
Momentary Max. peak torque		(N·m)	3.82
Rated current		(A(rms))	4.6
Max. current		(A(o-p))	19.5
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4282		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.27
	With brake		0.30
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

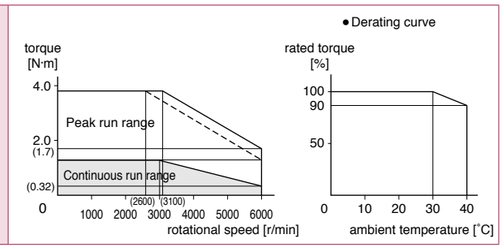
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98.0

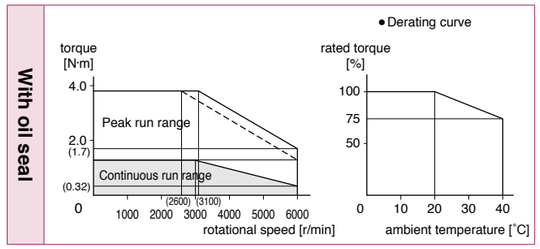
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.123		—	P.123		—
Connector type (IP67)	P.123		—	P.124		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MSMF 400 W [Low inertia 60 mm sq.]

Specifications

			AC200 V
Motor model *1			MSMF042L1□□
Applicable driver	Model No.	Multifunction type	MBDLT25SF
		RS485 communication type *2	MBDLN25SG
		Basic type *2	MBDLN25SE
	Frame symbol		B-frame
Power supply capacity		(kVA)	0.9
Rated output		(W)	400
Rated torque		(N·m)	1.27
Continuous stall torque		(N·m)	1.27
Momentary Max. peak torque		(N·m)	3.82
Rated current		(A(rms))	2.4
Max. current		(A(o-p))	10.2
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.27
	With brake		0.30
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

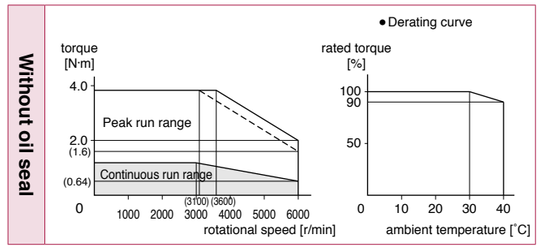
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98.0

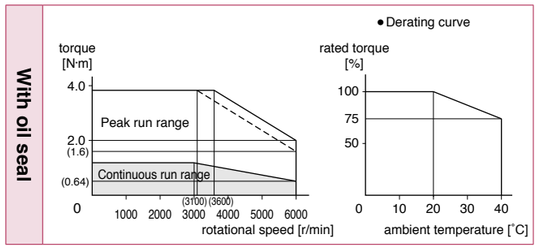
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.123		—	P.123		—
Connector type (IP67)	P.123		—	P.124		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MSMF 750 W [Low inertia 80 mm sq.]

Specifications

			AC200 V
Motor model *1			MSMF082L1□□
Applicable driver	Model No.	Multifunction type	MCDLT35SF
		RS485 communication type *2	MCDLN35SG
		Basic type *2	MCDLN35SE
	Frame symbol		C-frame
Power supply capacity		(kVA)	1.8
Rated output		(W)	750
Rated torque		(N·m)	2.39
Continuous stall torque		(N·m)	2.39
Momentary Max. peak torque		(N·m)	7.16
Rated current		(A(rms))	4.1
Max. current		(A(o-p))	17.4
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.96
	With brake		1.06
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	2.45 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During operation	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

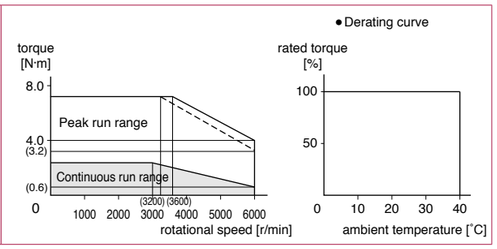
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

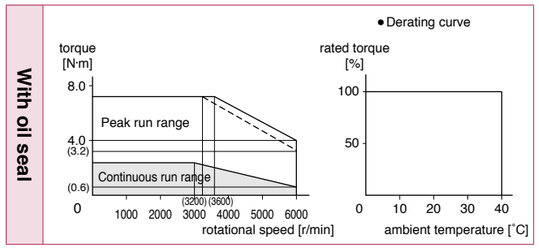
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.124		—	P.124		—
Connector type (IP67)	P.125		—	P.125		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MSMF 1000 W [Low inertia 80 mm sq.]

Specifications

			AC200 V
Motor model *1			MSMF092L1□□
Applicable driver	Model No.	Multifunction type	MDDLT45SF
		RS485 communication type *2	MDDLN45SG
		Basic type *2	MDDLN45SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.4
Rated output		(W)	1000
Rated torque		(N·m)	3.18
Continuous stall torque		(N·m)	3.18
Momentary Max. peak torque		(N·m)	9.55
Rated current		(A(rms))	5.7
Max. current		(A(o-p))	24.2
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		1.26
	With brake		1.36
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	3.80 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During operation	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

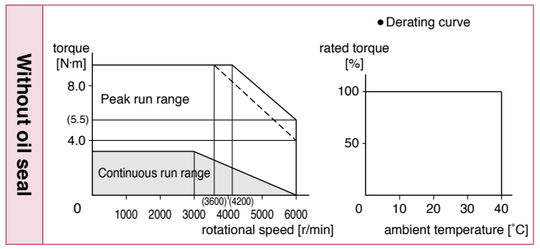
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

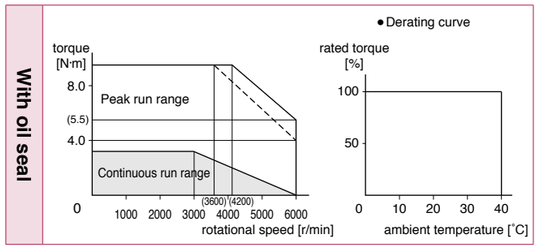
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.125		—	P.126		—
Connector type (IP67)	P.126		—	P.126		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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200 V MSMF 1.0 kW [Low inertia 100 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MSMF102L1□□
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.4
Rated output		(W)	1000
Rated torque		(N·m)	3.18
Continuous stall torque		(N·m)	3.82
Momentary Max. peak torque		(N·m)	9.55
Rated current		(A(rms))	6.6
Max. current		(A(o-p))	28
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	5000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		2.15
	With brake		2.47
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

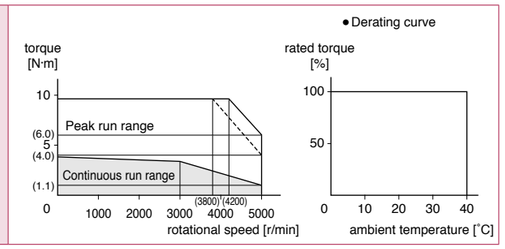
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.127		—	P.127	
Encoder connector Small size (JN2) type	—	P.127		—	P.128	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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200 V MSMF 1.5 kW [Low inertia 100 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MSMF152L1□□
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.9
Rated output		(W)	1500
Rated torque		(N·m)	4.77
Continuous stall torque		(N·m)	5.72
Momentary Max. peak torque		(N·m)	14.3
Rated current		(A(rms))	8.2
Max. current		(A(o-p))	35
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	5000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		3.10
	With brake		3.45
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

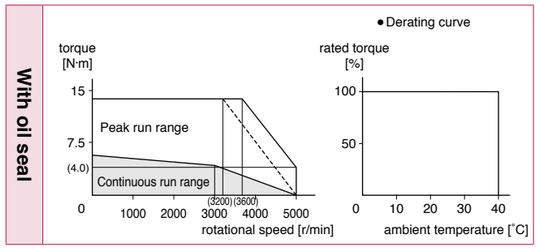
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.128		—	P.128	
Encoder connector Small size (JN2) type	—	P.129		—	P.129	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MSMF 2.0 kW [Low inertia 100 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MSMF202L1□□
Applicable driver	Model No.	Multifunction type	MEDLT83SF
		RS485 communication type *2	MEDLN83SG
		Basic type *2	MEDLN83SE
	Frame symbol		E-frame
Power supply capacity		(kVA)	3.8
Rated output		(W)	2000
Rated torque		(N·m)	6.37
Continuous stall torque		(N·m)	7.64
Momentary Max. peak torque		(N·m)	19.1
Rated current		(A(rms))	11.3
Max. current		(A(o-p))	48
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	5000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		4.06
	With brake		4.41
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

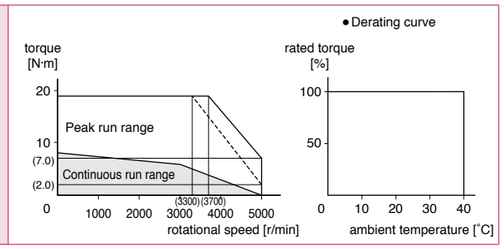
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.129		—	P.130	
Encoder connector Small size (JN2) type	—	P.130		—	P.130	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MSMF 3.0 kW [Low inertia 120 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MSMF302L1□□
Applicable driver	Model No.	Multifunction type	MFDLTA3SF
		RS485 communication type *2	MFDLNA3SG
		Basic type *2	MFDLNA3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	5.2
Rated output		(W)	3000
Rated torque		(N·m)	9.55
Continuous stall torque		(N·m)	11.0
Momentary Max. peak torque		(N·m)	28.6
Rated current		(A(rms))	18.1
Max. current		(A(o-p))	77
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	5000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		7.04
	With brake		7.38
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	12.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

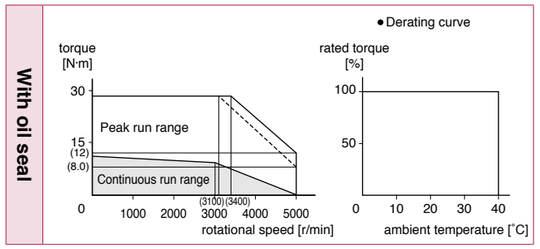
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.131		—	P.131	
Encoder connector Small size (JN2) type	—	P.131		—	P.132	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MSMF 4.0 kW [Low inertia 130 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MSMF402L1□□
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	6.5
Rated output		(W)	4000
Rated torque		(N·m)	12.7
Continuous stall torque		(N·m)	15.2
Momentary Max. peak torque		(N·m)	38.2
Rated current		(A(rms))	19.6
Max. current		(A(o-p))	83
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	4500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		14.4
	With brake		15.6
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	16.2 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

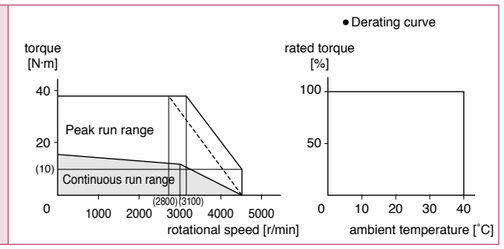
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.132		—	P.132	
Encoder connector Small size (JN2) type	—	P.133		—	P.133	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1	IP67		MSMF502L1□□
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	7.8
Rated output		(W)	5000
Rated torque		(N·m)	15.9
Continuous stall torque		(N·m)	19.1
Momentary Max. peak torque		(N·m)	47.7
Rated current		(A(rms))	24.0
Max. current		(A(o-p))	102
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	4500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		19.0
	With brake		20.2
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	22.0 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

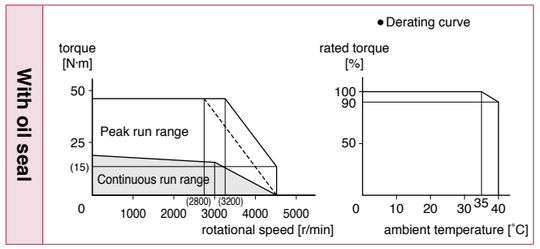
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.133		—	P.134	
Encoder connector Small size (JN2) type	—	P.134		—	P.134	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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100 V MQMF 100 W [Middle inertia Flat type 60 mm sq.]

Specifications

			AC100 V
Motor model *1			MQMF011L1□□
Applicable driver	Model No.	Multifunction type	MADLT11SF
		RS485 communication type *2	MADLN11SG
		Basic type *2	MADLN11SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.4
Rated output		(W)	100
Rated torque		(N·m)	0.32
Continuous stall torque		(N·m)	0.33
Momentary Max. peak torque		(N·m)	1.11
Rated current		(A(rms))	1.6
Max. current		(A(o-p))	7.9
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4280		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.15
	With brake		0.18
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.39 or more
Engaging time (ms)	15 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

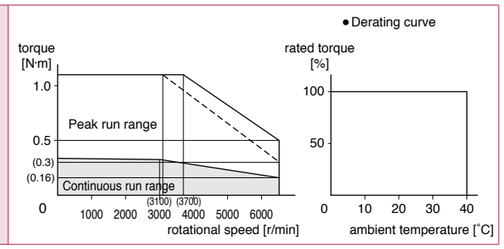
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

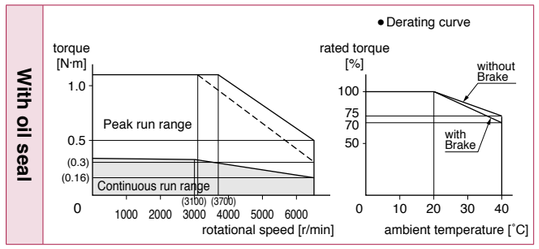
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.135	P.135	P.135	P.136	P.136	P.136
Connector type (IP67)	P.137	P.137	P.137	P.138	P.138	P.138

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1			MQMF012L1□□
Applicable driver	Model No.	Multifunction type	MADLT05SF
		RS485 communication type *2	MADLN05SG
		Basic type *2	MADLN05SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	100
Rated torque		(N·m)	0.32
Continuous stall torque		(N·m)	0.33
Momentary Max. peak torque		(N·m)	1.11
Rated current		(A(rms))	1.1
Max. current		(A(o-p))	5.5
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4281		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.15
	With brake		0.18
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.39 or more
Engaging time (ms)	15 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

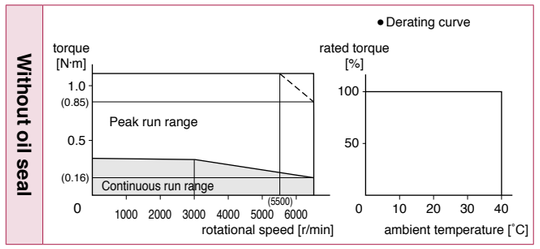
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

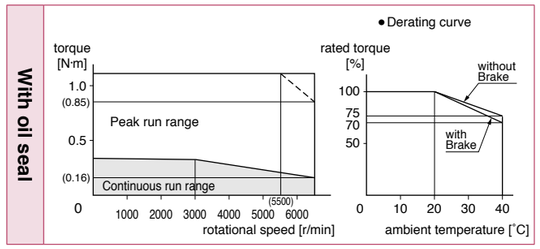
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.135	P.135	P.135	P.136	P.136	P.136
Connector type (IP67)	P.137	P.137	P.137	P.138	P.138	P.138

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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100 V MQMF 200 W [Middle inertia Flat type 80 mm sq.]

Specifications

			AC100 V
Motor model *1			MQMF021L1□□
Applicable driver	Model No.	Multifunction type	MBDLT21SF
		RS485 communication type *2	MBDLN21SG
		Basic type *2	MBDLN21SE
	Frame symbol		B-frame
Power supply capacity (kVA)			0.5
Rated output (W)			200
Rated torque (N·m)			0.64
Continuous stall torque (N·m)			0.76
Momentary Max. peak torque (N·m)			2.23
Rated current (A(rms))			2.1
Max. current (A(o-p))			10.4
Regenerative brake frequency (times/min) Note)1		Without option	No limit Note)2
		DV0P4283	No limit Note)2
Rated rotational speed (r/min)			3000
Max. rotational speed (r/min)			6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)		Without brake	0.50
		With brake	0.59
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

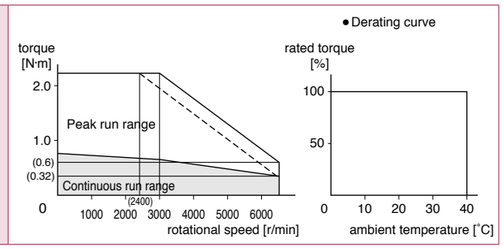
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

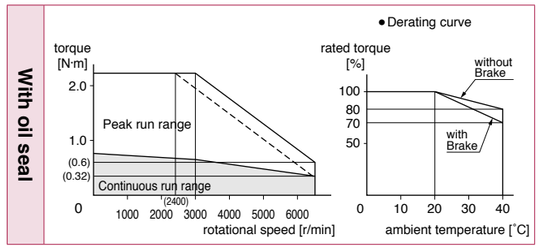
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.139	P.139	P.139	P.140	P.140	P.140
Connector type (IP67)	P.141	P.141	P.141	P.142	P.142	P.142

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1			MQMF022L1□□
Applicable driver	Model No.	Multifunction type	MADLT15SF
		RS485 communication type *2	MADLN15SG
		Basic type *2	MADLN15SE
	Frame symbol		A-frame
Power supply capacity (kVA)			0.5
Rated output (W)			200
Rated torque (N·m)			0.64
Continuous stall torque (N·m)			0.76
Momentary Max. peak torque (N·m)			2.23
Rated current (A(rms))			1.4
Max. current (A(o-p))			6.9
Regenerative brake frequency (times/min) Note)1		Without option	No limit Note)2
		DV0P4283	No limit Note)2
Rated rotational speed (r/min)			3000
Max. rotational speed (r/min)			6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)		Without brake	0.50
		With brake	0.59
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

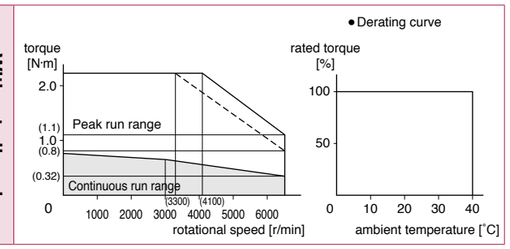
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

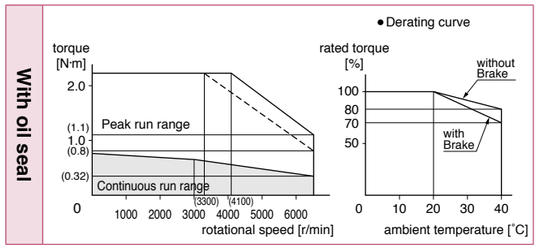
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.139	P.139	P.139	P.140	P.140	P.140
Connector type (IP67)	P.141	P.141	P.141	P.142	P.142	P.142

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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100 V MQMF 400 W [Middle inertia Flat type 80 mm sq.]

Specifications

			AC100 V
Motor model *1			MQMF041L1□□
Applicable driver	Model No.	Multifunction type	MCDLT31SF
		RS485 communication type *2	MCDLN31SG
		Basic type *2	MCDLN31SE
	Frame symbol		C-frame
Power supply capacity		(kVA)	0.9
Rated output		(W)	400
Rated torque		(N·m)	1.27
Continuous stall torque		(N·m)	1.40
Momentary Max. peak torque		(N·m)	4.46
Rated current		(A(rms))	4.1
Max. current		(A(o-p))	20.3
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4282		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.98
	With brake		1.06
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

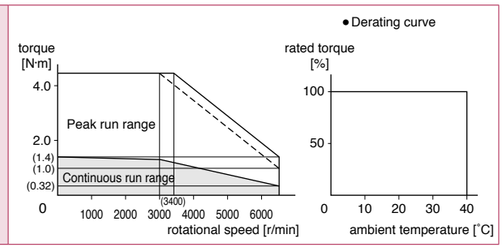
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

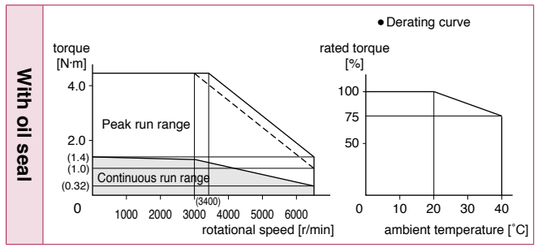
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.143	P.143	P.143	P.144	P.144	P.144
Connector type (IP67)	P.145	P.145	P.145	P.146	P.146	P.146

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Specifications

			AC200 V
Motor model *1			MQMF042L1□□
Applicable driver	Model No.	Multifunction type	MBDLT25SF
		RS485 communication type *2	MBDLN25SG
		Basic type *2	MBDLN25SE
	Frame symbol		B-frame
Power supply capacity		(kVA)	0.9
Rated output		(W)	400
Rated torque		(N·m)	1.27
Continuous stall torque		(N·m)	1.40
Momentary Max. peak torque		(N·m)	4.46
Rated current		(A(rms))	2.1
Max. current		(A(o-p))	10.4
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.98
	With brake		1.06
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

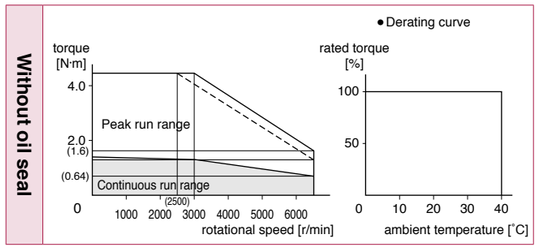
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

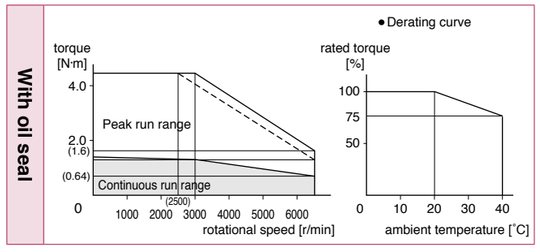
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.143	P.143	P.143	P.144	P.144	P.144
Connector type (IP67)	P.145	P.145	P.145	P.146	P.146	P.146

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Specifications

			AC100 V
Motor model *1			MHMF5AZL1□□
Applicable driver	Model No.	Multifunction type	MADLT01SF
		RS485 communication type *2	MADLN01SG
		Basic type *2	MADLN01SE
	Frame symbol		A-frame
Power supply capacity (kVA)			0.4
Rated output (W)			50
Rated torque (N·m)			0.16
Continuous stall torque (N·m)			0.18
Momentary Max. peak torque (N·m)			0.56
Rated current (A(rms))			1.1
Max. current (A(o-p))			5.5
Regenerative brake frequency (times/min) Note)1		Without option	No limit Note)2
		DV0P4280	No limit Note)2
Rated rotational speed (r/min)			3000
Max. rotational speed (r/min)			6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)		Without brake	0.038
		With brake	0.042
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	49

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

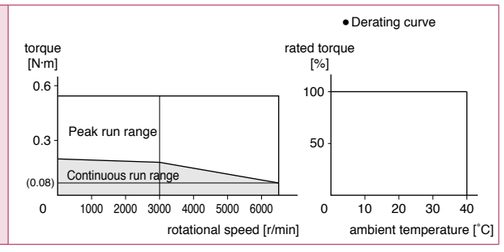
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

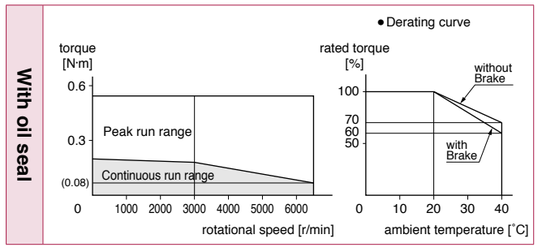
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.147	P.147	P.147	P.148	P.148	P.148
Connector type (IP67)	P.149	P.149	P.149	P.150	P.150	P.150

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1			MHMF5AZL1□□
Applicable driver	Model No.	Multifunction type	MADLT05SF
		RS485 communication type *2	MADLN05SG
		Basic type *2	MADLN05SE
	Frame symbol		A-frame
Power supply capacity (kVA)			0.5
Rated output (W)			50
Rated torque (N·m)			0.16
Continuous stall torque (N·m)			0.18
Momentary Max. peak torque (N·m)			0.56
Rated current (A(rms))			1.1
Max. current (A(o-p))			5.5
Regenerative brake frequency (times/min) Note)1		Without option	No limit Note)2
		DV0P4281	No limit Note)2
Rated rotational speed (r/min)			3000
Max. rotational speed (r/min)			6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)		Without brake	0.038
		With brake	0.042
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	49

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

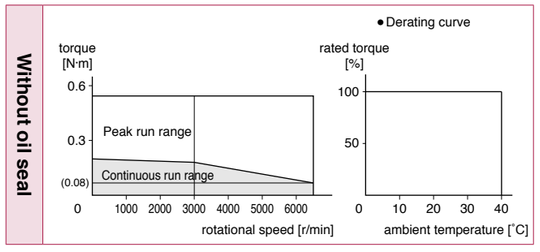
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

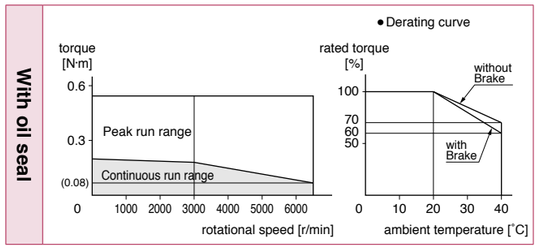
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.147	P.147	P.147	P.148	P.148	P.148
Connector type (IP67)	P.149	P.149	P.149	P.150	P.150	P.150

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Specifications

			AC100 V
Motor model *1			MHMF011L1□□
Applicable driver	Model No.	Multifunction type	MADLT11SF
		RS485 communication type *2	MADLN11SG
		Basic type *2	MADLN11SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.4
Rated output		(W)	100
Rated torque		(N·m)	0.32
Continuous stall torque		(N·m)	0.33
Momentary Max. peak torque		(N·m)	1.11
Rated current		(A(rms))	1.6
Max. current		(A(o-p))	7.9
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4280		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.071
	With brake		0.074
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized.
Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

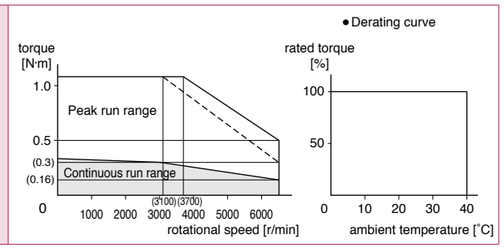
During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

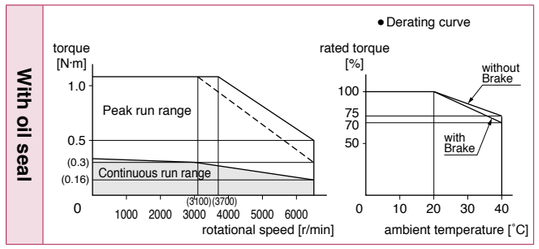
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type".
Detail of model designation, refer to P.22.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.151	P.151	P.151	P.152	P.152	P.152
Connector type (IP67)	P.153	P.153	P.153	P.154	P.154	P.154

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1			MHMF012L1□□
Applicable driver	Model No.	Multifunction type	MADLT05SF
		RS485 communication type *2	MADLN05SG
		Basic type *2	MADLN05SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	100
Rated torque		(N·m)	0.32
Continuous stall torque		(N·m)	0.33
Momentary Max. peak torque		(N·m)	1.11
Rated current		(A(rms))	1.1
Max. current		(A(o-p))	5.5
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4281		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.071
	With brake		0.074
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized.
Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

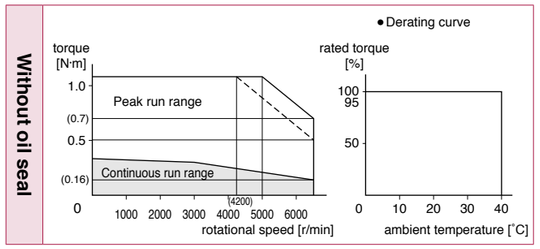
During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

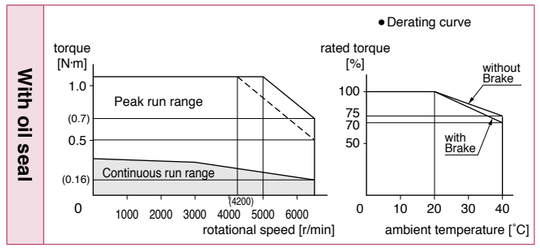
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type".
Detail of model designation, refer to P.22.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.151	P.151	P.151	P.152	P.152	P.152
Connector type (IP67)	P.153	P.153	P.153	P.154	P.154	P.154

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC100 V
Motor model *1			MHMF021L1□□
Applicable driver	Model No.	Multifunction type	MBDLT21SF
		RS485 communication type *2	MBDLN21SG
		Basic type *2	MBDLN21SE
	Frame symbol		B-frame
Power supply capacity (kVA)			0.5
Rated output (W)			200
Rated torque (N·m)			0.64
Continuous stall torque (N·m)			0.76
Momentary Max. peak torque (N·m)			2.23
Rated current (A(rms))			2.1
Max. current (A(o-p))			10.4
Regenerative brake frequency (times/min) Note)1		Without option	No limit Note)2
		DV0P4283	No limit Note)2
Rated rotational speed (r/min)			3000
Max. rotational speed (r/min)			6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)		Without brake	0.29
		With brake	0.31
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

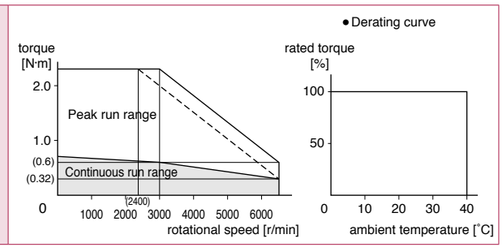
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

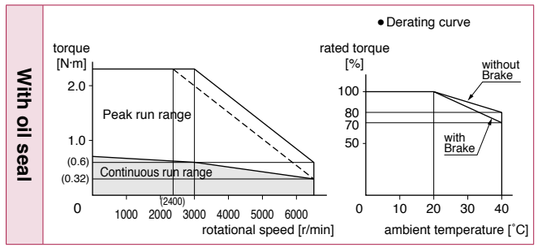
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.155	P.155	P.155	P.156	P.156	P.156
Connector type (IP67)	P.157	P.157	P.157	P.158	P.158	P.158

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1			MHMF022L1□□
Applicable driver	Model No.	Multifunction type	MADLT15SF
		RS485 communication type *2	MADLN15SG
		Basic type *2	MADLN15SE
	Frame symbol		A-frame
Power supply capacity (kVA)			0.5
Rated output (W)			200
Rated torque (N·m)			0.64
Continuous stall torque (N·m)			0.76
Momentary Max. peak torque (N·m)			2.23
Rated current (A(rms))			1.4
Max. current (A(o-p))			6.9
Regenerative brake frequency (times/min) Note)1		Without option	No limit Note)2
		DV0P4283	No limit Note)2
Rated rotational speed (r/min)			3000
Max. rotational speed (r/min)			6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)		Without brake	0.29
		With brake	0.31
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.57.

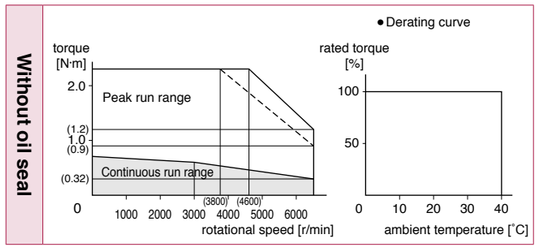
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

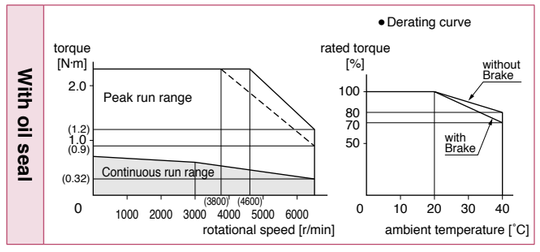
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.155	P.155	P.155	P.156	P.156	P.156
Connector type (IP67)	P.157	P.157	P.157	P.158	P.158	P.158

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Specifications

			AC100 V
Motor model *1			MHMF041L1□□
Applicable driver	Model No.	Multifunction type	MCDLT31SF
		RS485 communication type *2	MCDLN31SG
		Basic type *2	MCDLN31SE
	Frame symbol		C-frame
Power supply capacity		(kVA)	0.9
Rated output		(W)	400
Rated torque		(N·m)	1.27
Continuous stall torque		(N·m)	1.40
Momentary Max. peak torque		(N·m)	4.46
Rated current		(A(rms))	4.1
Max. current		(A(o-p))	20.3
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4282		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.56
	With brake		0.58
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

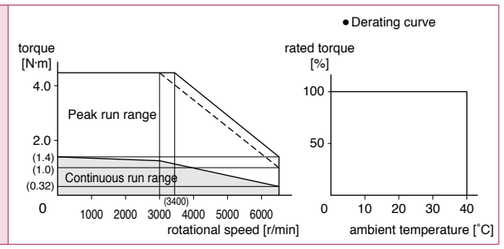
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

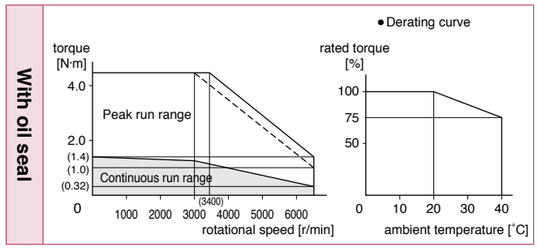
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC100 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.159	P.159	P.159	P.160	P.160	P.160
Connector type (IP67)	P.161	P.161	P.161	P.162	P.162	P.162

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1			MHMF042L1□□
Applicable driver	Model No.	Multifunction type	MBDLT25SF
		RS485 communication type *2	MBDLN25SG
		Basic type *2	MBDLN25SE
	Frame symbol		B-frame
Power supply capacity		(kVA)	0.9
Rated output		(W)	400
Rated torque		(N·m)	1.27
Continuous stall torque		(N·m)	1.40
Momentary Max. peak torque		(N·m)	4.46
Rated current		(A(rms))	2.1
Max. current		(A(o-p))	10.4
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.56
	With brake		0.58
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

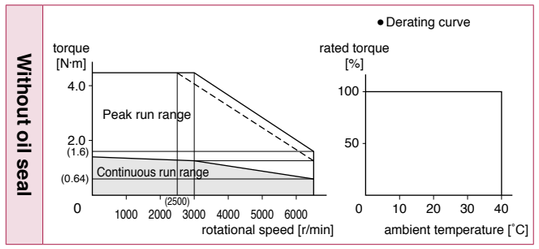
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

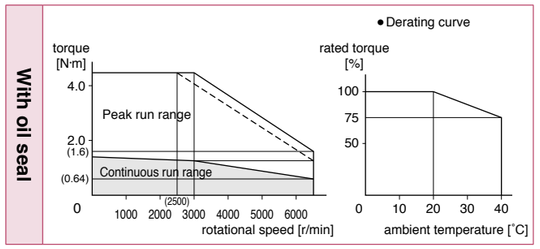
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.159	P.159	P.159	P.160	P.160	P.160
Connector type (IP67)	P.161	P.161	P.161	P.162	P.162	P.162

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Specifications

			AC200 V
Motor model *1			MHMF082L1□□
Applicable driver	Model No.	Multifunction type	MCDLT35SF
		RS485 communication type *2	MCDLN35SG
		Basic type *2	MCDLN35SE
	Frame symbol		C-frame
Power supply capacity		(kVA)	1.8
Rated output		(W)	750
Rated torque		(N·m)	2.39
Continuous stall torque		(N·m)	2.86
Momentary Max. peak torque		(N·m)	8.36
Rated current		(A(rms))	3.8
Max. current		(A(o-p))	18.8
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		1.56
	With brake		1.66
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	3.8 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During operation	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

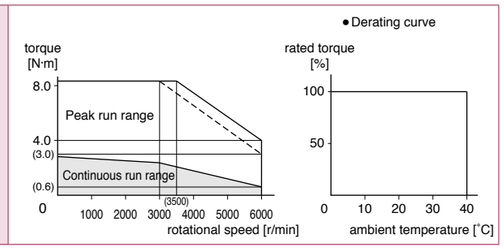
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

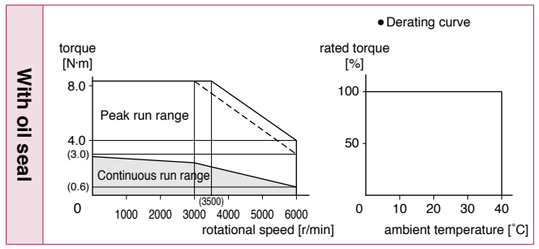
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.163	P.163	P.163	P.164	P.164	P.164
Connector type (IP67)	P.165	P.165	P.165	P.166	P.166	P.166

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Specifications

			AC200 V
Motor model *1			MHMF092L1□□
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.4
Rated output		(W)	1000
Rated torque		(N·m)	3.18
Continuous stall torque		(N·m)	3.34
Momentary Max. peak torque		(N·m)	11.1
Rated current		(A(rms))	5.7
Max. current		(A(o-p))	28.2
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		2.03
	With brake		2.13
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	3.8 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During operation	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

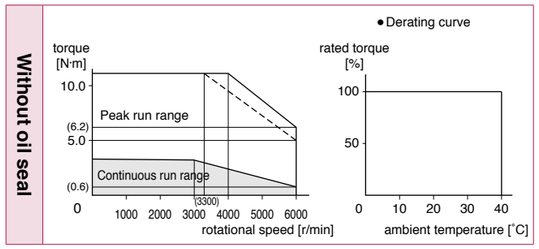
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

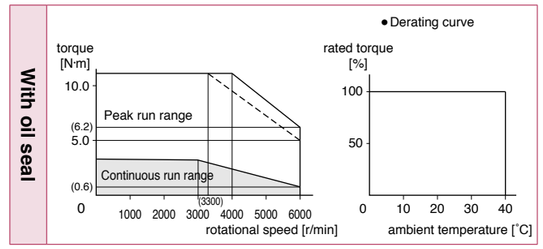
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.167	P.167	P.167	P.168	P.168	P.168
Connector type (IP67)	P.169	P.169	P.169	P.170	P.170	P.170

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MHMF 1.0 kW [High inertia 130 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MHMF102L1□□
Applicable driver	Model No.	Multifunction type	MDDLT45SF
		RS485 communication type *2	MDDLN45SG
		Basic type *2	MDDLN45SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.4
Rated output		(W)	1000
Rated torque		(N·m)	4.77
Continuous stall torque		(N·m)	5.25
Momentary Max. peak torque		(N·m)	14.3
Rated current		(A(rms))	5.2
Max. current		(A(o-p))	22
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		22.9
	With brake		24.1
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

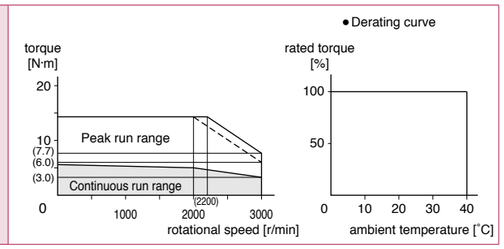
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.171		—	P.171	
Encoder connector Small size (JN2) type	—	P.171		—	P.172	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MHMF 1.5 kW [High inertia 130 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MHMF152L1□□
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.9
Rated output		(W)	1500
Rated torque		(N·m)	7.16
Continuous stall torque		(N·m)	7.52
Momentary Max. peak torque		(N·m)	21.5
Rated current		(A(rms))	8.0
Max. current		(A(o-p))	34
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		33.4
	With brake		34.6
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

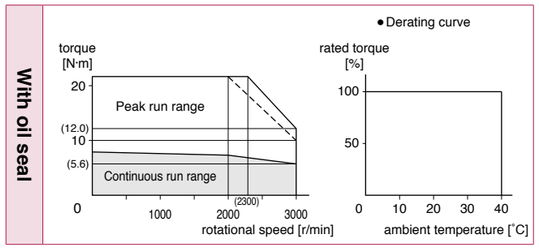
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.172		—	P.172	
Encoder connector Small size (JN2) type	—	P.173		—	P.173	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MHMF 2.0 kW [High inertia 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MHMF202L1□□
Applicable driver	Model No.	Multifunction type	MEDLT83SF
		RS485 communication type *2	MEDLN83SG
		Basic type *2	MEDLN83SE
	Frame symbol		E-frame
Power supply capacity		(kVA)	3.8
Rated output		(W)	2000
Rated torque		(N·m)	9.55
Continuous stall torque		(N·m)	11.5
Momentary Max. peak torque		(N·m)	28.6
Rated current		(A(rms))	12.5
Max. current		(A(o-p))	53
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		55.7
	With brake		61.0
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

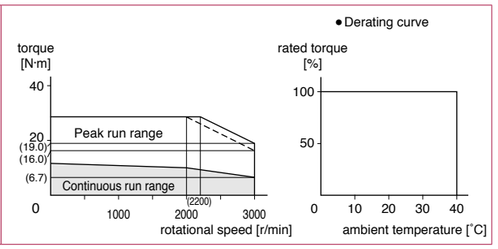
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.173		—	P.174	
Encoder connector Small size (JN2) type	—	P.174		—	P.174	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MHMF 3.0 kW [High inertia 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MHMF302L1□□
Applicable driver	Model No.	Multifunction type	MFDLTA3SF
		RS485 communication type *2	MFDLNA3SG
		Basic type *2	MFDLNA3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	5.2
Rated output		(W)	3000
Rated torque		(N·m)	14.3
Continuous stall torque		(N·m)	17.2
Momentary Max. peak torque		(N·m)	43.0
Rated current		(A(rms))	17.0
Max. current		(A(o-p))	72
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		85.3
	With brake		90.7
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

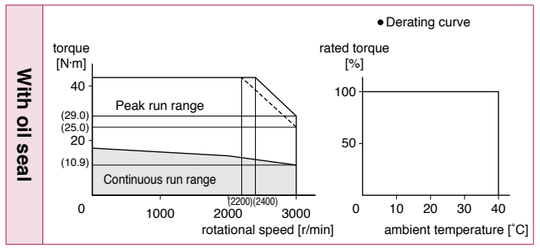
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.175		—	P.175	
Encoder connector Small size (JN2) type	—	P.175		—	P.176	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MHMF 4.0 kW [High inertia 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MHMF402L1□□
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	6.5
Rated output		(W)	4000
Rated torque		(N·m)	19.1
Continuous stall torque		(N·m)	22.0
Momentary Max. peak torque		(N·m)	57.3
Rated current		(A(rms))	20
Max. current		(A(o-p))	85
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		104
	With brake		110
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

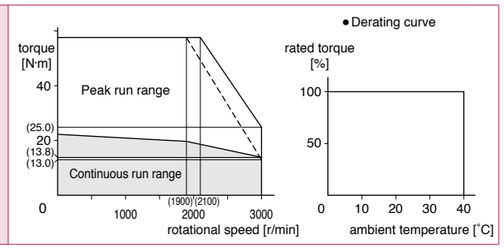
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.176		—	P.176	
Encoder connector Small size (JN2) type	—	P.177		—	P.177	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1	IP67		MHMF502L1□□
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	7.8
Rated output		(W)	5000
Rated torque		(N·m)	23.9
Continuous stall torque		(N·m)	26.3
Momentary Max. peak torque		(N·m)	71.6
Rated current		(A(rms))	23.3
Max. current		(A(o-p))	99
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		146
	With brake		151
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

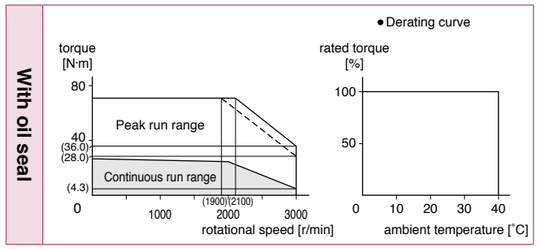
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.177		—	P.178	
Encoder connector Small size (JN2) type	—	P.178		—	P.178	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MHMF 7.5 kW [High inertia 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MHMF752L1□□
Applicable driver	Model No.	Multifunction type	MGDLTC3SF
		RS485 communication type *2	—
		Basic type *2	—
	Frame symbol		G-frame
Power supply capacity		(kVA)	11
Rated output		(W)	7500
Rated torque		(N·m)	47.8
Continuous stall torque		(N·m)	47.8
Momentary Max. peak torque		(N·m)	125
Rated current		(A(rms))	40.2
Max. current		(A(o-p))	154
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×3		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		272
	With brake		279
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	63.0 or more
Engaging time (ms)	200 or less
Releasing time (ms) Note)4	80 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	2058
	Thrust load A-direction (N)	980
	Thrust load B-direction (N)	1176
During operation	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.60.

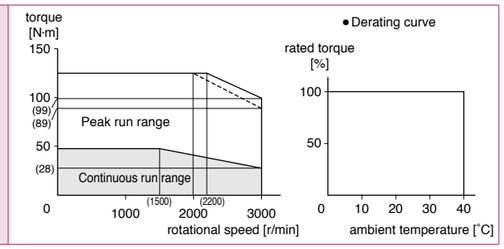
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.179	—	—	P.179	—
Encoder connector Small size (JN2) type	—	P.179	—	—	P.180	—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MDMF 1.0 kW [Middle inertia 130 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MDMF102L1□□
Applicable driver	Model No.	Multifunction type	MDDLT45SF
		RS485 communication type *2	MDDLN45SG
		Basic type *2	MDDLN45SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.4
Rated output		(W)	1000
Rated torque		(N·m)	4.77
Continuous stall torque		(N·m)	5.25
Momentary Max. peak torque		(N·m)	14.3
Rated current		(A(rms))	5.2
Max. current		(A(o-p))	22
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		6.18
	With brake		7.40
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

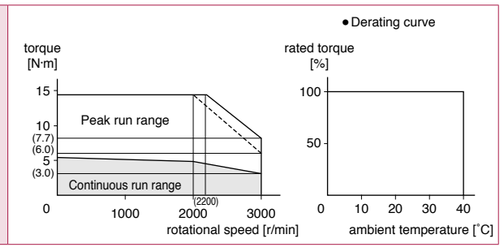
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.180		—	P.180	
Encoder connector Small size (JN2) type	—	P.181		—	P.181	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MDMF 1.5 kW [Middle inertia 130 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MDMF152L1□□
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.9
Rated output		(W)	1500
Rated torque		(N·m)	7.16
Continuous stall torque		(N·m)	7.52
Momentary Max. peak torque		(N·m)	21.5
Rated current		(A(rms))	8.0
Max. current		(A(o-p))	34
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		9.16
	With brake		10.4
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

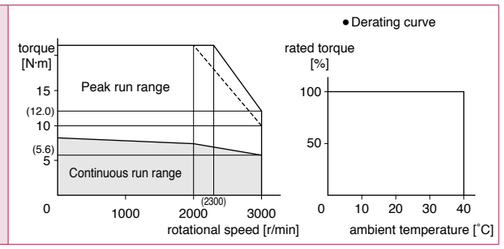
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.181		—	P.182	
Encoder connector Small size (JN2) type	—	P.182		—	P.182	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MDMF 2.0 kW [Middle inertia 130 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MDMF202L1□□
Applicable driver	Model No.	Multifunction type	MEDLT83SF
		RS485 communication type *2	MEDLN83SG
		Basic type *2	MEDLN83SE
	Frame symbol		E-frame
Power supply capacity		(kVA)	3.8
Rated output		(W)	2000
Rated torque		(N·m)	9.55
Continuous stall torque		(N·m)	10.0
Momentary Max. peak torque		(N·m)	28.6
Rated current		(A(rms))	9.9
Max. current		(A(o-p))	42
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		12.1
	With brake		13.3
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

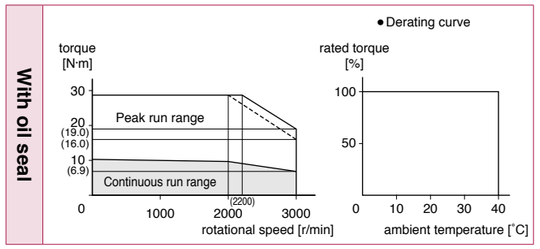
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.183		—	P.183	
Encoder connector Small size (JN2) type	—	P.183		—	P.184	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MDMF 3.0 kW [Middle inertia 130 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MDMF302L1□□
Applicable driver	Model No.	Multifunction type	MFDLTA3SF
		RS485 communication type *2	MFDLNA3SG
		Basic type *2	MFDLNA3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	5.2
Rated output		(W)	3000
Rated torque		(N·m)	14.3
Continuous stall torque		(N·m)	15.0
Momentary Max. peak torque		(N·m)	43.0
Rated current		(A(rms))	16.4
Max. current		(A(o-p))	70
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		18.6
	With brake		19.6
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	22.0 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

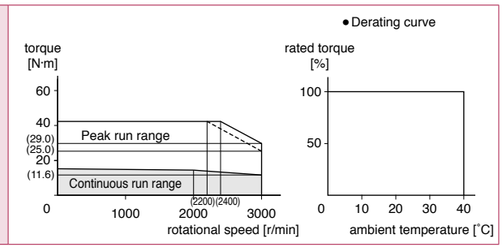
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.184		—	P.184	
Encoder connector Small size (JN2) type	—	P.185		—	P.185	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MDMF 4.0 kW [Middle inertia 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MDMF402L1□□
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	6.5
Rated output		(W)	4000
Rated torque		(N·m)	19.1
Continuous stall torque		(N·m)	22.0
Momentary Max. peak torque		(N·m)	57.3
Rated current		(A(rms))	20.0
Max. current		(A(o-p))	85
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		46.9
	With brake		52.3
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

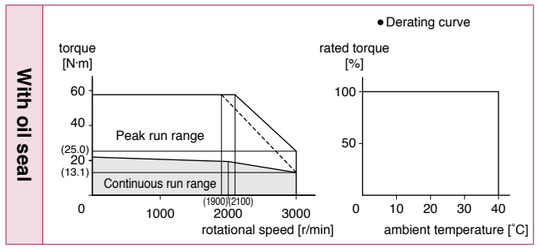
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.185		—	P.186	
Encoder connector Small size (JN2) type	—	P.186		—	P.186	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MDMF 5.0 kW [Middle inertia 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MDMF502L1□□
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	7.8
Rated output		(W)	5000
Rated torque		(N·m)	23.9
Continuous stall torque		(N·m)	26.3
Momentary Max. peak torque		(N·m)	71.6
Rated current		(A(rms))	23.3
Max. current		(A(o-p))	99
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		58.2
	With brake		63.0
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

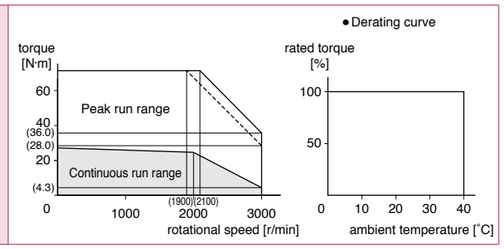
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.187		—	P.187	
Encoder connector Small size (JN2) type	—	P.187		—	P.188	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MDMF 7.5 kW [Middle inertia 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MDMF752L1□□
Applicable driver	Model No.	Multifunction type	MGDLTC3SF
		RS485 communication type *2	—
		Basic type *2	—
	Frame symbol		G-frame
Power supply capacity		(kVA)	11
Rated output		(W)	7500
Rated torque		(N·m)	47.8
Continuous stall torque		(N·m)	47.8
Momentary Max. peak torque		(N·m)	125
Rated current		(A(rms))	40.2
Max. current		(A(o-p))	154
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×3		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		122
	With brake		127
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	63.0 or more
Engaging time (ms)	200 or less
Releasing time (ms) Note)4	80 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	2058
	Thrust load A-direction (N)	980
	Thrust load B-direction (N)	1176
During operation	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.60.

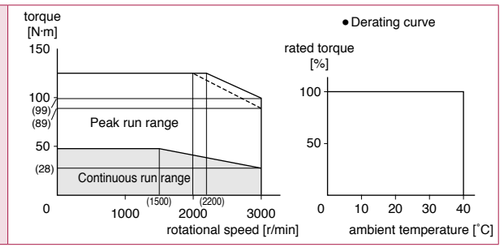
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.188	—	—	P.188	—
Encoder connector Small size (JN2) type	—	P.189	—	—	P.189	—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Specifications

			AC200 V
Motor model *1	IP67		MDMFC12L1□□
Applicable driver	Model No.	Multifunction type	MHDLTE3SF
		RS485 communication type *2	—
		Basic type *2	—
	Frame symbol		H-frame
Power supply capacity		(kVA)	15
Rated output		(W)	11000
Rated torque		(N·m)	70.0
Continuous stall torque		(N·m)	70.0
Momentary Max. peak torque		(N·m)	175
Rated current		(A(rms))	57.1
Max. current		(A(o-p))	209
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×6		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	2000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		205
	With brake		214
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized.
Do not use this for braking the motor in motion.)

Static friction torque (N·m)	100 or more
Engaging time (ms)	300 or less
Releasing time (ms) Note)4	140 or less
Exciting current (DC) (A)	1.08
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

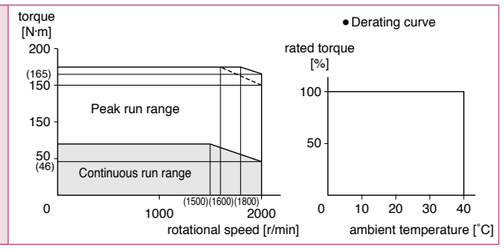
During assembly	Radial load P-direction (N)	4508
	Thrust load A-direction (N)	1470
	Thrust load B-direction (N)	2646
During operation	Radial load P-direction (N)	2254
	Thrust load A, B-direction (N)	686

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.61.

*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type".
Detail of model designation, refer to P.22.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.189	—	—	P.190	—
Encoder connector Small size (JN2) type	—	P.190	—	—	P.190	—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1	IP67		MDMFC52L1□□
Applicable driver	Model No.	Multifunction type	MHDLTE3SF
		RS485 communication type *2	—
		Basic type *2	—
	Frame symbol		H-frame
Power supply capacity		(kVA)	20
Rated output		(W)	15000
Rated torque		(N·m)	95.5
Continuous stall torque		(N·m)	95.5
Momentary Max. peak torque		(N·m)	224
Rated current		(A(rms))	65.8
Max. current		(A(o-p))	225
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×6		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	2000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		280
	With brake		289
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized.
Do not use this for braking the motor in motion.)

Static friction torque (N·m)	100 or more
Engaging time (ms)	300 or less
Releasing time (ms) Note)4	140 or less
Exciting current (DC) (A)	1.08
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

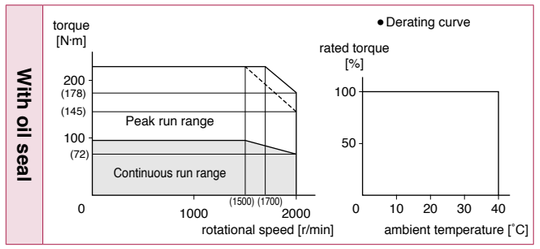
During assembly	Radial load P-direction (N)	4508
	Thrust load A-direction (N)	1470
	Thrust load B-direction (N)	2646
During operation	Radial load P-direction (N)	2254
	Thrust load A, B-direction (N)	686

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.61.

*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type".
Detail of model designation, refer to P.22.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.191	—	—	P.191	—
Encoder connector Small size (JN2) type	—	P.191	—	—	P.192	—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MDMF 22.0 kW [Middle inertia 220 mm sq.]

Specifications

			AC200 V
Motor model *1	IP44		MDMFD22L1□□
Applicable driver	Model No.	Multifunction type	MHDLTF3SF
		RS485 communication type *2	—
		Basic type *2	—
	Frame symbol		H-frame
Power supply capacity		(kVA)	28
Rated output		(W)	22000
Rated torque		(N·m)	140
Continuous stall torque		(N·m)	140
Momentary Max. peak torque		(N·m)	350
Rated current		(A(rms))	80.9
Max. current		(A(o-p))	294
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×6		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	2000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		431
	With brake		455
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	200 or more
Engaging time (ms)	300 or less
Releasing time (ms) Note)4	150 or less
Exciting current (DC) (A)	1.72
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	4508
	Thrust load A-direction (N)	1470
	Thrust load B-direction (N)	2646
During operation	Radial load P-direction (N)	2254
	Thrust load A, B-direction (N)	686

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.61.

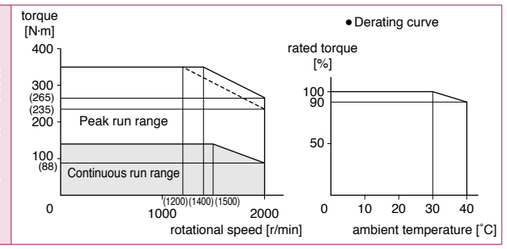
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.192	—	—	P.192	—
Encoder connector Small size (JN2) type	—	P.193	—	—	P.193	—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MGMF 0.85 kW [Middle inertia Low speed/High torque type 130 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MGMF092L1□□
Applicable driver	Model No.	Multifunction type	MDDLT45SF
		RS485 communication type *2	MDDLN45SG
		Basic type *2	MDDLN45SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.0
Rated output		(W)	850
Rated torque		(N·m)	5.41
Continuous stall torque		(N·m)	5.41
Momentary Max. peak torque		(N·m)	14.3
Rated current		(A(rms))	5.9
Max. current		(A(o-p))	22
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		6.18
	With brake		7.40
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	686
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

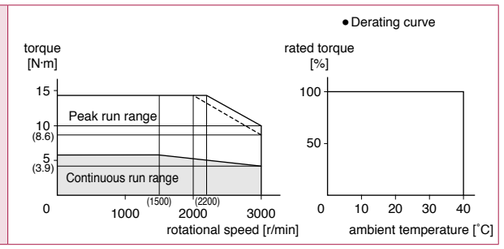
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.193		—	P.194	
Encoder connector Small size (JN2) type	—	P.194		—	P.194	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MGMF 1.3 kW [Middle inertia Low speed/High torque type 130 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MGMF132L1□□
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.6
Rated output		(W)	1300
Rated torque		(N·m)	8.28
Continuous stall torque		(N·m)	8.28
Momentary Max. peak torque		(N·m)	23.3
Rated current		(A(rms))	9.3
Max. current		(A(o-p))	37
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		9.16
	With brake		10.4
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	686
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.58.

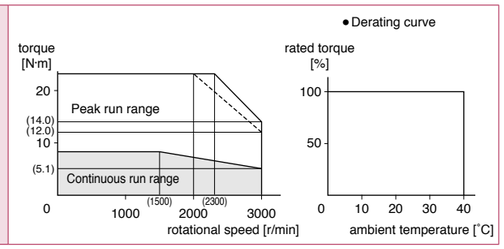
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.195		—	P.195	
Encoder connector Small size (JN2) type	—	P.195		—	P.196	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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Specifications

			AC200 V
Motor model *1	IP67		MGMF182L1□□
Applicable driver	Model No.	Multifunction type	MEDLT83SF
		RS485 communication type *2	MEDLN83SG
		Basic type *2	MEDLN83SE
	Frame symbol		E-frame
Power supply capacity		(kVA)	3.4
Rated output		(W)	1800
Rated torque		(N·m)	11.5
Continuous stall torque		(N·m)	11.5
Momentary Max. peak torque		(N·m)	28.7
Rated current		(A(rms))	11.8
Max. current		(A(o-p))	42
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		12.1
	With brake		13.3
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	686
	Thrust load A, B-direction (N)	196

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

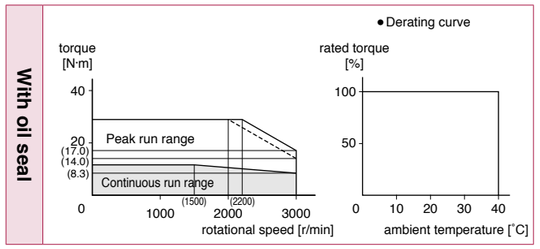
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.196		—	P.196	
Encoder connector Small size (JN2) type	—	P.197		—	P.197	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MGMF 2.4 kW [Middle inertia Low speed/High torque type 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MGMF242L1□□
Applicable driver	Model No.	Multifunction type	MEDLT93SF
		RS485 communication type *2	MEDLN93SG
		Basic type *2	MEDLN93SE
	Frame symbol		E-frame
Power supply capacity		(kVA)	4.5
Rated output		(W)	2400
Rated torque		(N·m)	15.3
Continuous stall torque		(N·m)	15.3
Momentary Max. peak torque		(N·m)	45.2
Rated current		(A(rms))	16.0
Max. current		(A(o-p))	67
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		46.9
	With brake		52.3
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

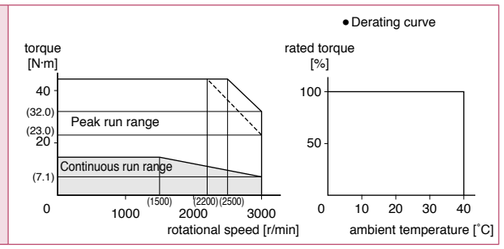
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.197		—	P.198	
Encoder connector Small size (JN2) type	—	P.198		—	P.198	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MGMF 2.9 kW [Middle inertia Low speed/High torque type 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MGMF292L1□□
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	5.0
Rated output		(W)	2900
Rated torque		(N·m)	18.5
Continuous stall torque		(N·m)	18.5
Momentary Max. peak torque		(N·m)	45.2
Rated current		(A(rms))	19.3
Max. current		(A(o-p))	67
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		46.9
	With brake		52.3
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

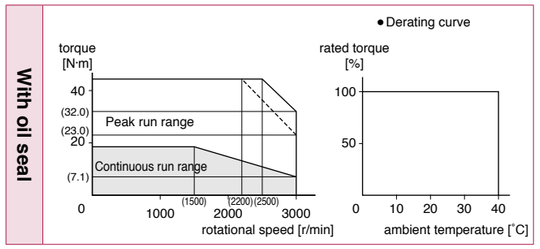
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.199		—	P.199	
Encoder connector Small size (JN2) type	—	P.199		—	P.200	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MGMF 4.4 kW [Middle inertia Low speed/High torque type 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MGMF442L1□□
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	7.0
Rated output		(W)	4400
Rated torque		(N·m)	28.0
Continuous stall torque		(N·m)	28.0
Momentary Max. peak torque		(N·m)	70.0
Rated current		(A(rms))	27.2
Max. current		(A(o-p))	96
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		58.2
	With brake		63.0
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	1470
	Thrust load A, B-direction (N)	490

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.59.

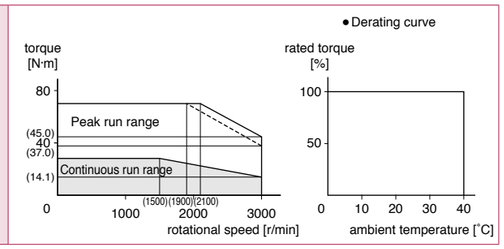
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.200		—	P.200	
Encoder connector Small size (JN2) type	—	P.201		—	P.201	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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200 V MGMF 5.5 kW [Middle inertia Low speed/High torque type 176 mm sq.]

Specifications

			AC200 V
Motor model *1	IP67		MGMF552L1□□
Applicable driver	Model No.	Multifunction type	MGDLTC3SF
		RS485 communication type *2	—
		Basic type *2	—
	Frame symbol		G-frame
Power supply capacity		(kVA)	8.5
Rated output		(W)	5500
Rated torque		(N·m)	35.0
Continuous stall torque		(N·m)	35.0
Momentary Max. peak torque		(N·m)	102
Rated current		(A(rms))	39.8
Max. current		(A(o-p))	164
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×3		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		83.0
	With brake		88.0
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	63.0 or more
Engaging time (ms)	200 or less
Releasing time (ms) Note)4	80 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	2058
	Thrust load A-direction (N)	980
	Thrust load B-direction (N)	1176
During operation	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

- For details of Note)1 to Note)4, refer to P.303.
- Dimensions of Driver, refer to P.60.

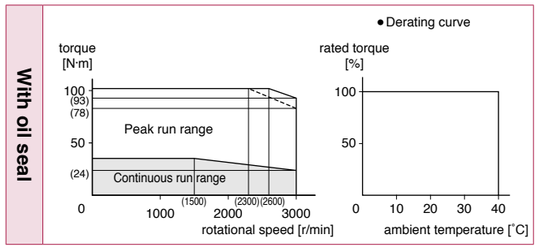
*1 □□ in the motor part number represents the motor specifications.

*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.22.

*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.201	—	—	P.202	—
Encoder connector Small size (JN2) type	—	P.202	—	—	P.202	—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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MSMF 50 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

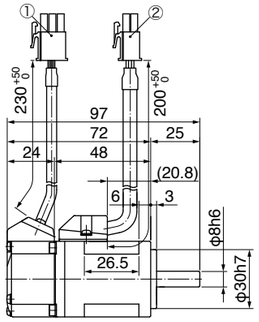
① Encoder connector
② Motor connector

Mass: 0.32 kg

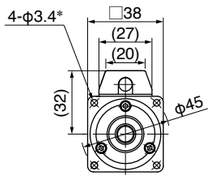
● Motor model

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF5AZL1A2	MSMF5AZL1C2
	Key-way, center tap	MSMF5AZL1S2	MSMF5AZL1U2
200 V	Round	MSMF5AZL1A2	MSMF5AZL1C2
	Key-way, center tap	MSMF5AZL1S2	MSMF5AZL1U2

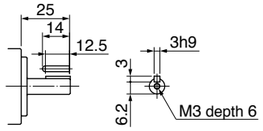
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

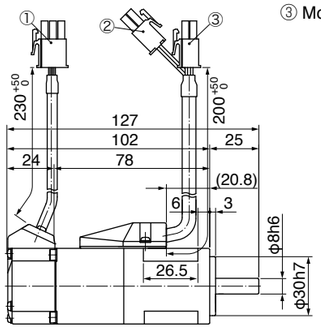
① Encoder connector
② Brake connector
③ Motor connector

Mass: 0.53 kg

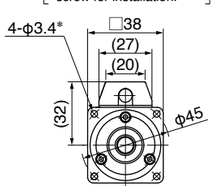
● Motor model

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF5AZL1B2	MSMF5AZL1D2
	Key-way, center tap	MSMF5AZL1T2	MSMF5AZL1V2
200 V	Round	MSMF5AZL1B2	MSMF5AZL1D2
	Key-way, center tap	MSMF5AZL1T2	MSMF5AZL1V2

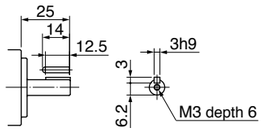
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

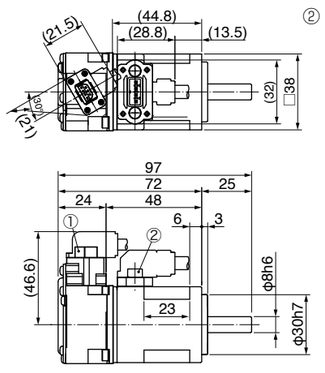
① Encoder connector
② Motor connector

Mass: 0.32 kg

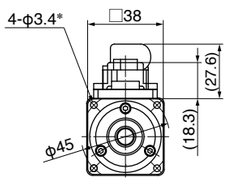
● Motor model

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF5AZL1A1	MSMF5AZL1C1
	Key-way, center tap	MSMF5AZL1S1	MSMF5AZL1U1
200 V	Round	MSMF5AZL1A1	MSMF5AZL1C1
	Key-way, center tap	MSMF5AZL1S1	MSMF5AZL1U1

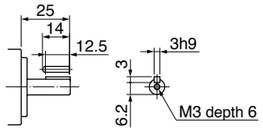
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.63, P.64.

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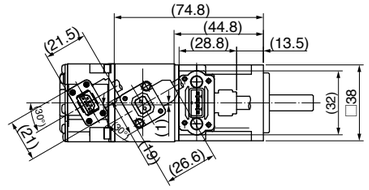
MSMF 50 W

Connector type (IP67) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft



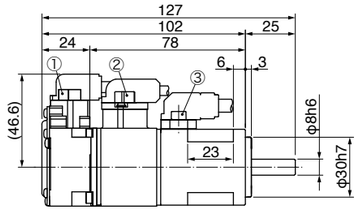
① Encoder connector
② Brake connector
③ Motor connector

Mass: 0.53 kg

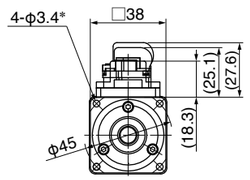
● Motor model

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF5AZL1B1	MSMF5AZL1D1
	Key-way, center tap	MSMF5AZL1T1	MSMF5AZL1V1
200 V	Round	MSMF5AZL1B1	MSMF5AZL1D1
	Key-way, center tap	MSMF5AZL1T1	MSMF5AZL1V1

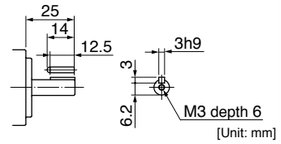
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

MSMF 100 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

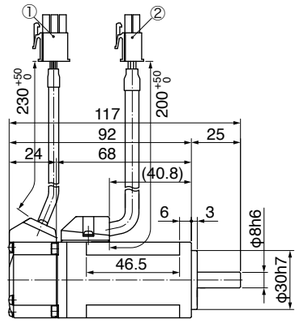
① Encoder connector
② Motor connector

Mass: 0.47 kg

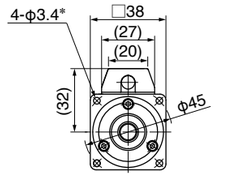
● Motor model

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF011L1A2	MSMF011L1C2
	Key-way, center tap	MSMF011L1S2	MSMF011L1U2
200 V	Round	MSMF012L1A2	MSMF012L1C2
	Key-way, center tap	MSMF012L1S2	MSMF012L1U2

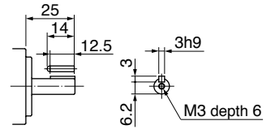
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

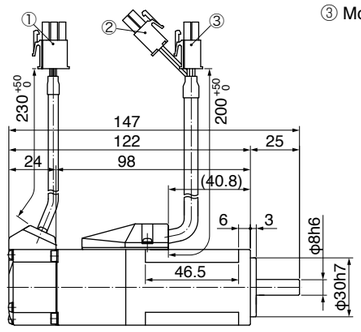
① Encoder connector
② Brake connector
③ Motor connector

Mass: 0.68 kg

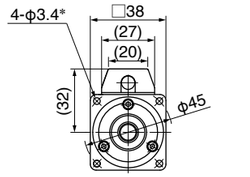
● Motor model

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF011L1B2	MSMF011L1D2
	Key-way, center tap	MSMF011L1T2	MSMF011L1V2
200 V	Round	MSMF012L1B2	MSMF012L1D2
	Key-way, center tap	MSMF012L1T2	MSMF012L1V2

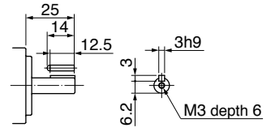
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.63 to P.66.

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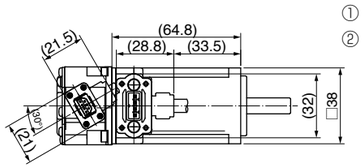
MSMF 100 W

Connector type (IP67) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft



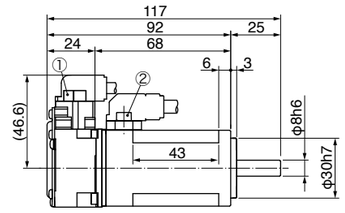
① Encoder connector
② Motor connector

Mass: 0.47 kg

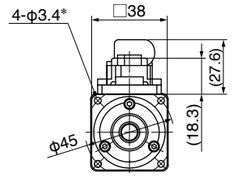
● Motor model

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF011L1A1	MSMF011L1C1
	Key-way, center tap	MSMF011L1S1	MSMF011L1U1
200 V	Round	MSMF012L1A1	MSMF012L1C1
	Key-way, center tap	MSMF012L1S1	MSMF012L1U1

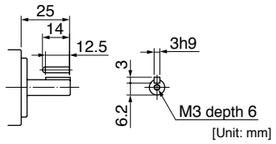
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]

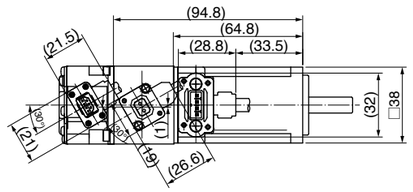


Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft



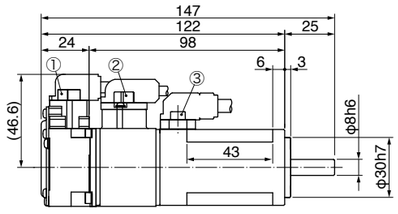
① Encoder connector
② Brake connector
③ Motor connector

Mass: 0.68 kg

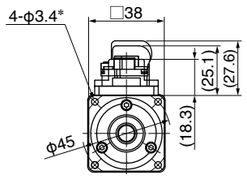
● Motor model

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF011L1B1	MSMF011L1D1
	Key-way, center tap	MSMF011L1T1	MSMF011L1V1
200 V	Round	MSMF012L1B1	MSMF012L1D1
	Key-way, center tap	MSMF012L1T1	MSMF012L1V1

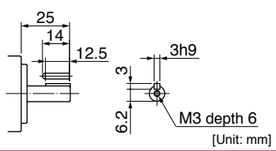
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



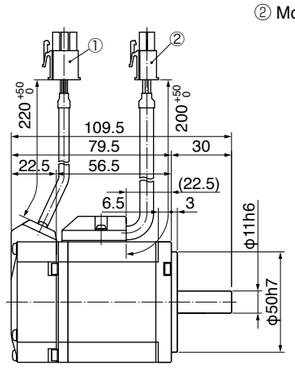
Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

MSMF 200 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

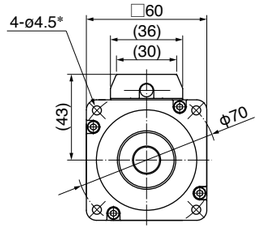
Mass: 0.82 kg

● Motor model

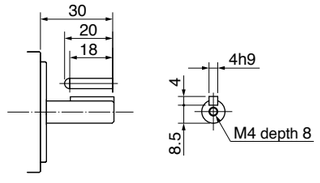
Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF021L1A2	MSMF021L1C2
	Key-way, center tap	MSMF021L1S2	MSMF021L1U2
200 V	Round	MSMF022L1A2	MSMF022L1C2
	Key-way, center tap	MSMF022L1S2	MSMF022L1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.65 to P.68.

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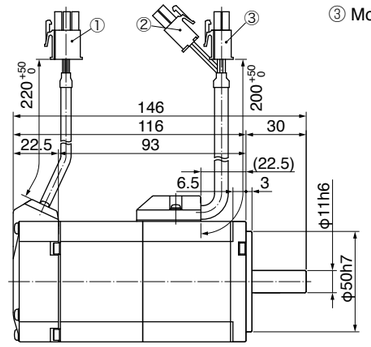
MSMF 200 W

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Brake connector
③ Motor connector

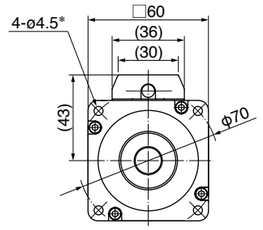
Mass: 1.3 kg

● Motor model

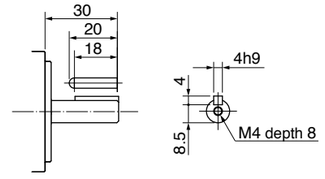
Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF021L1B2	MSMF021L1D2
	Key-way, center tap	MSMF021L1T2	MSMF021L1V2
200 V	Round	MSMF022L1B2	MSMF022L1D2
	Key-way, center tap	MSMF022L1T2	MSMF022L1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[* Use hexagon socket head screw for installation.]

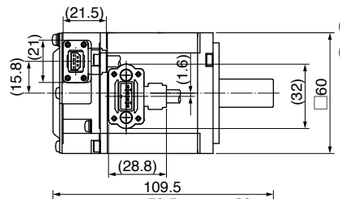


Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

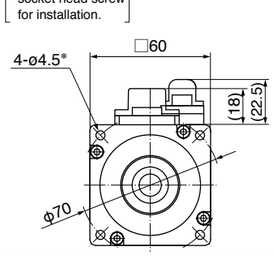
Mass: 0.82 kg

● Motor model

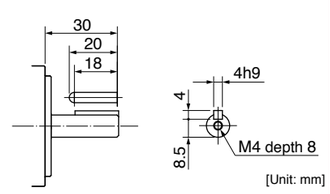
Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF021L1A1	MSMF021L1C1
	Key-way, center tap	MSMF021L1S1	MSMF021L1U1
200 V	Round	MSMF022L1A1	MSMF022L1C1
	Key-way, center tap	MSMF022L1S1	MSMF022L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[* Use hexagon socket head screw for installation.]

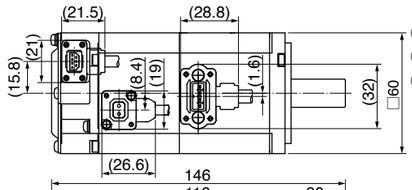


Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Brake connector
③ Motor connector

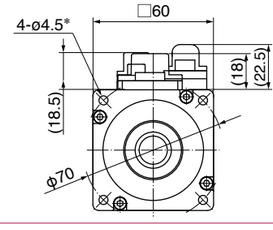
● Motor model

Mass: 1.3 kg

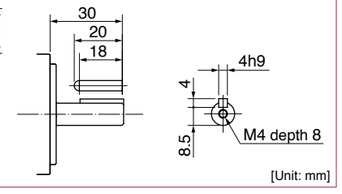
Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF021L1B1	MSMF021L1D1
	Key-way, center tap	MSMF021L1T1	MSMF021L1V1
200 V	Round	MSMF022L1B1	MSMF022L1D1
	Key-way, center tap	MSMF022L1T1	MSMF022L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.67, P.68.

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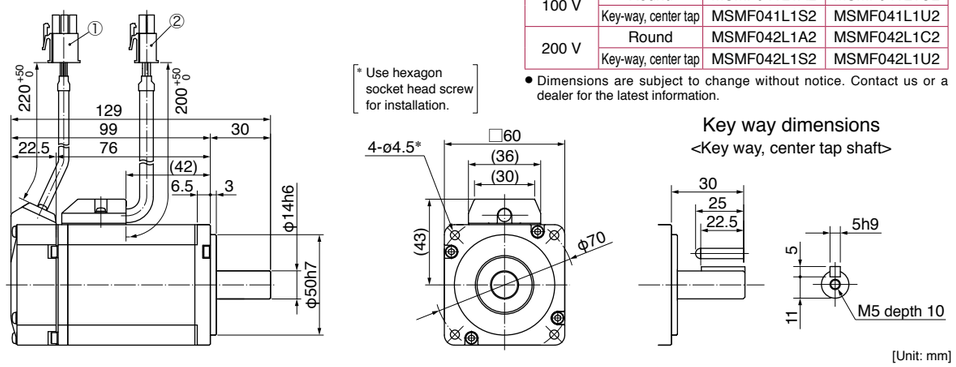
MSMF 400 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft



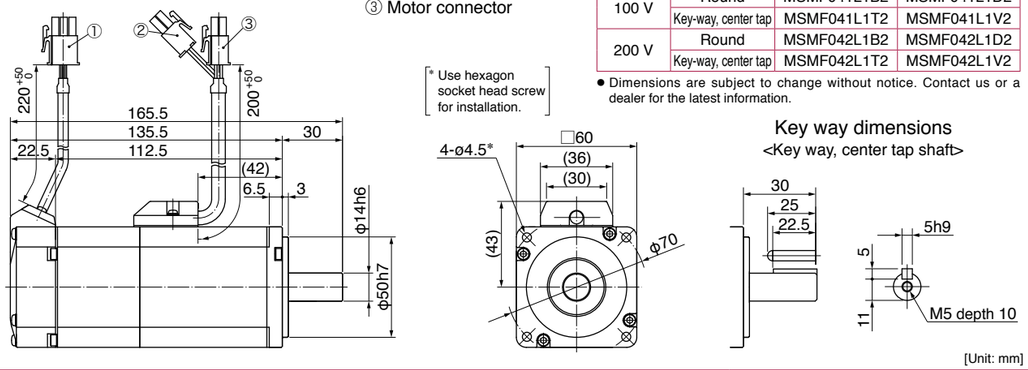
● Motor model — Mass: 1.2 kg

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF041L1A2	MSMF041L1C2
	Key-way, center tap	MSMF041L1S2	MSMF041L1U2
200 V	Round	MSMF042L1A2	MSMF042L1C2
	Key-way, center tap	MSMF042L1S2	MSMF042L1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft



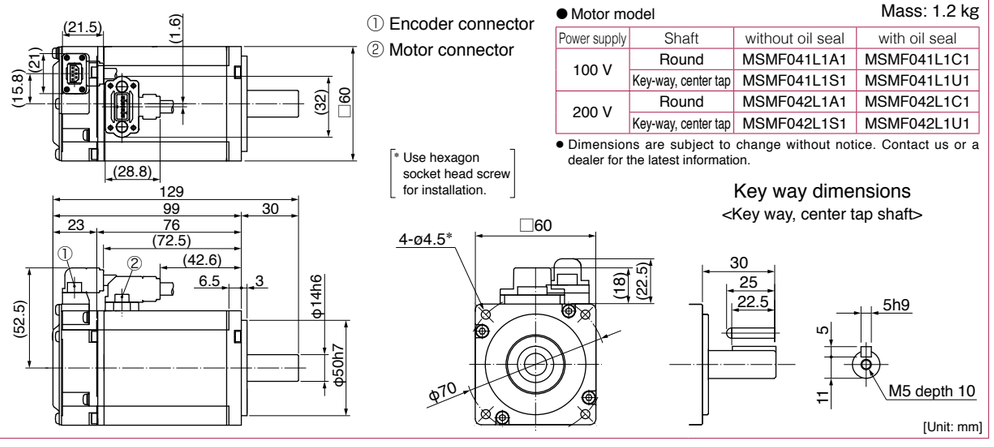
● Motor model — Mass: 1.7 kg

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF041L1B2	MSMF041L1D2
	Key-way, center tap	MSMF041L1T2	MSMF041L1V2
200 V	Round	MSMF042L1B2	MSMF042L1D2
	Key-way, center tap	MSMF042L1T2	MSMF042L1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Connector type (IP67) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft



● Motor model — Mass: 1.2 kg

Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF041L1A1	MSMF041L1C1
	Key-way, center tap	MSMF041L1S1	MSMF041L1U1
200 V	Round	MSMF042L1A1	MSMF042L1C1
	Key-way, center tap	MSMF042L1S1	MSMF042L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.69, P.70.

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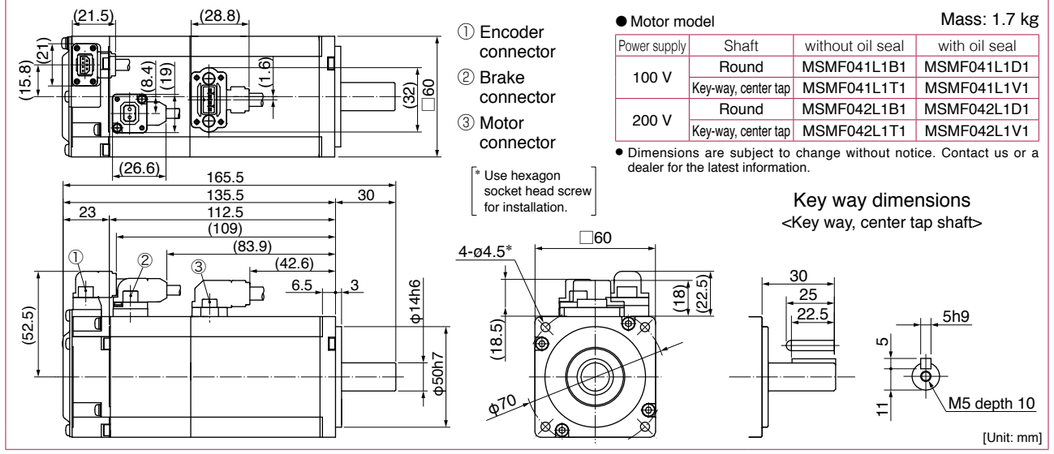
MSMF 400 W

Connector type (IP67) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft



● Motor model — Mass: 1.7 kg

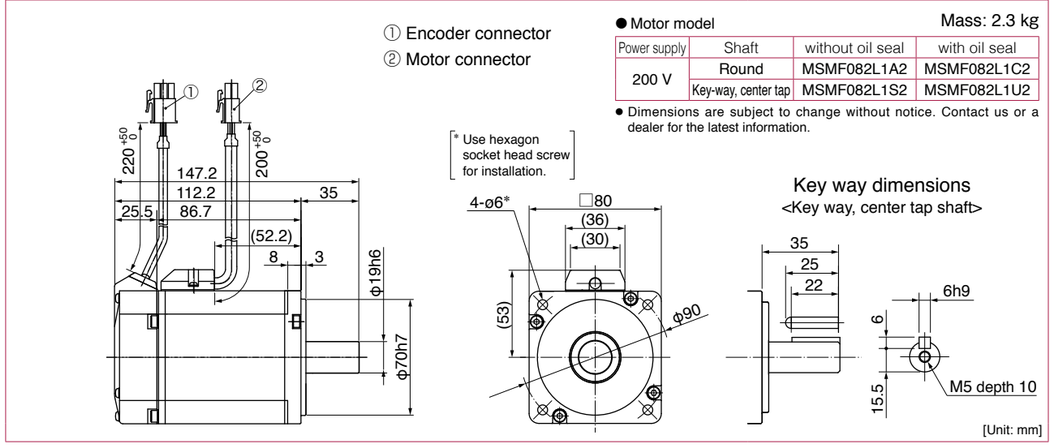
Power supply	Shaft	without oil seal	with oil seal
100 V	Round	MSMF041L1B1	MSMF041L1D1
	Key-way, center tap	MSMF041L1T1	MSMF041L1V1
200 V	Round	MSMF042L1B1	MSMF042L1D1
	Key-way, center tap	MSMF042L1T1	MSMF042L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MSMF 750 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft



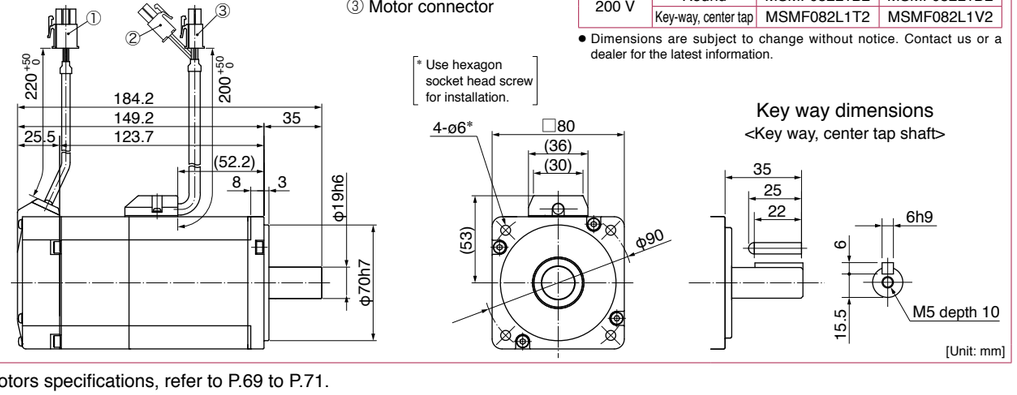
● Motor model — Mass: 2.3 kg

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF082L1A2	MSMF082L1C2
	Key-way, center tap	MSMF082L1S2	MSMF082L1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft



● Motor model — Mass: 3.1 kg

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF082L1B2	MSMF082L1D2
	Key-way, center tap	MSMF082L1T2	MSMF082L1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.69 to P.71.

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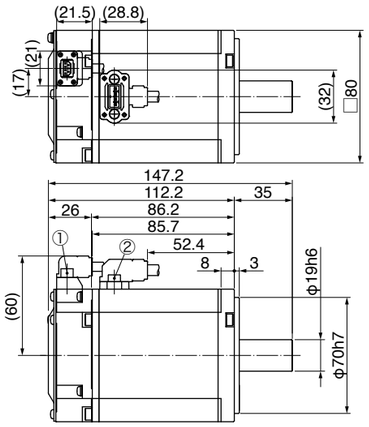
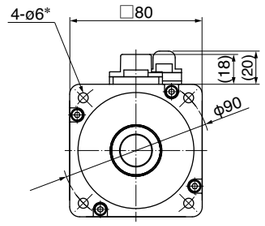
MSMF 750 W

Connector type (IP67) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

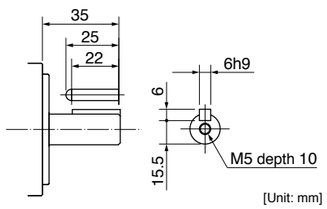


① Encoder connector
② Motor connector

* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



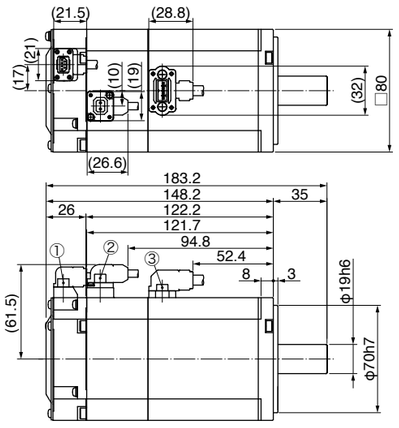
● Motor model — Mass: 2.3 kg

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF082L1A1	MSMF082L1C1
	Key-way, center tap	MSMF082L1S1	MSMF082L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

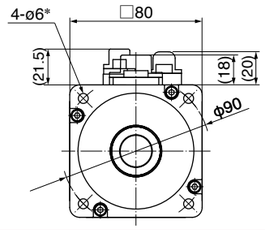
[Unit: mm]

Connector type (IP67) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

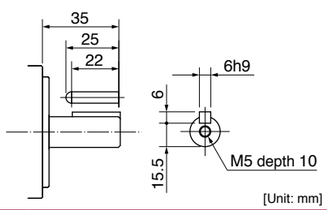


① Encoder connector
② Brake connector
③ Motor connector

* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model — Mass: 3.1 kg

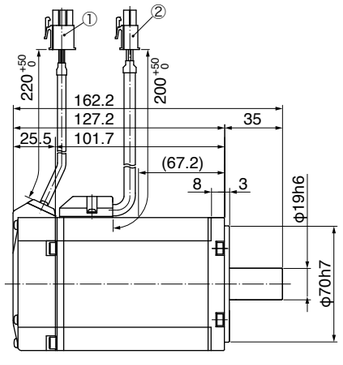
Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF082L1B1	MSMF082L1D1
	Key-way, center tap	MSMF082L1T1	MSMF082L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

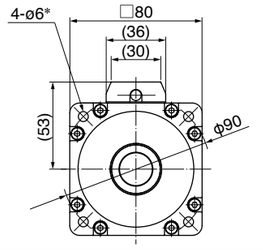
MSMF 1000 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

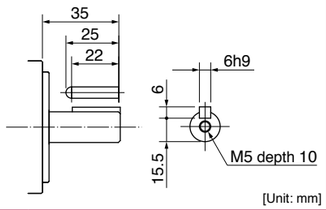


① Encoder connector
② Motor connector

* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model — Mass: 2.8 kg

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF092L1A2	MSMF092L1C2
	Key-way, center tap	MSMF092L1S2	MSMF092L1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.71, P.72.

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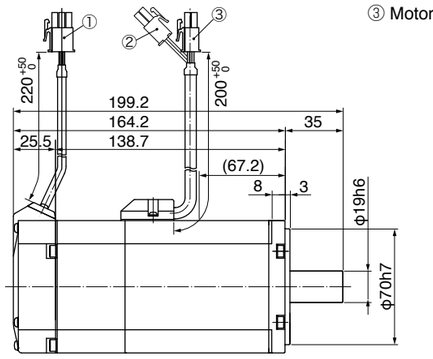
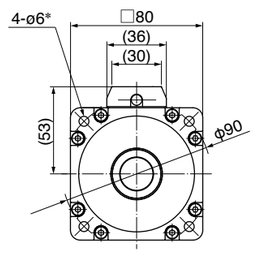
MSMF 1000 W

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

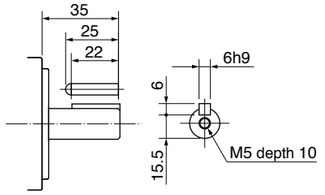


① Encoder connector
② Brake connector
③ Motor connector

* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



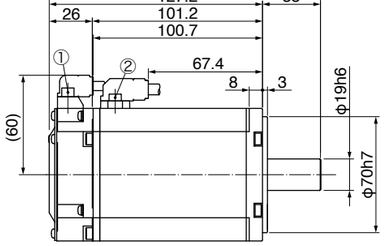
● Motor model — Mass: 3.6 kg

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF092L1B2	MSMF092L1D2
	Key-way, center tap	MSMF092L1T2	MSMF092L1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

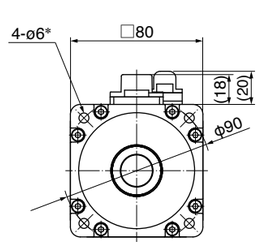
[Unit: mm]

Connector type (IP67) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

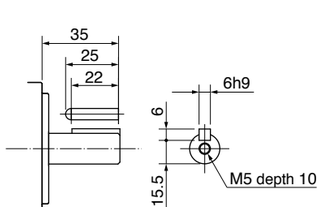


① Encoder connector
② Motor connector

* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



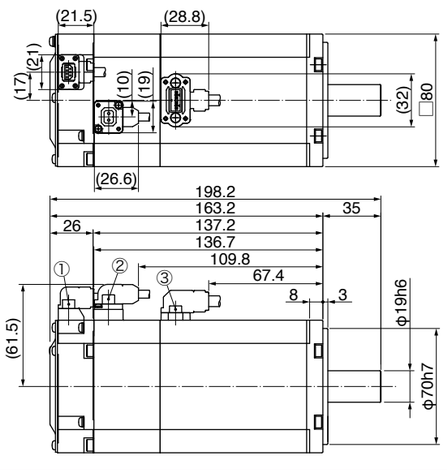
● Motor model — Mass: 2.8 kg

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF092L1A1	MSMF092L1C1
	Key-way, center tap	MSMF092L1S1	MSMF092L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

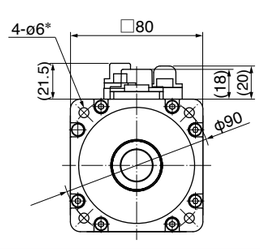
[Unit: mm]

Connector type (IP67) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

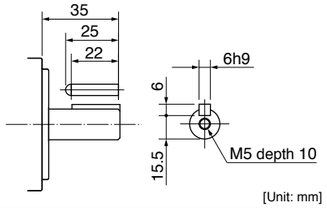


① Encoder connector
② Brake connector
③ Motor connector

* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model — Mass: 3.6 kg

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF092L1B1	MSMF092L1D1
	Key-way, center tap	MSMF092L1T1	MSMF092L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.72.

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MSMF 1.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

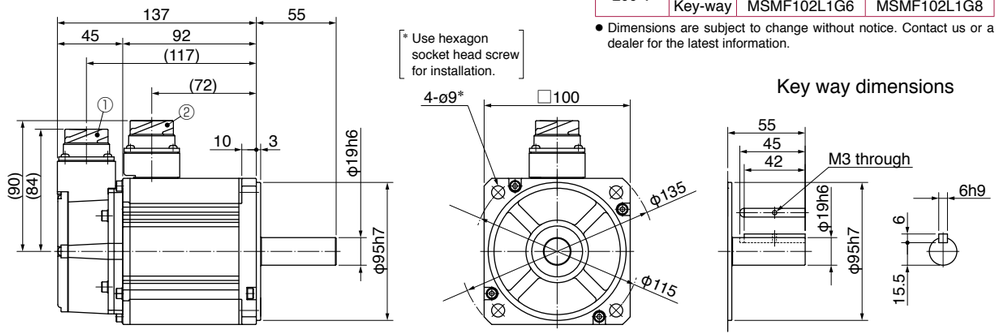
① Encoder connector (Large size JL10)
② Motor connector

Mass: 3.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF102L1C6	MSMF102L1C8
	Key-way	MSMF102L1G6	MSMF102L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

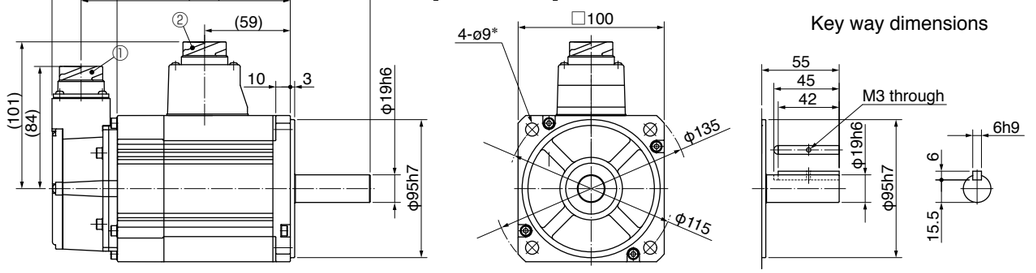
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 4.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF102L1D6	MSMF102L1D8
	Key-way	MSMF102L1H6	MSMF102L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

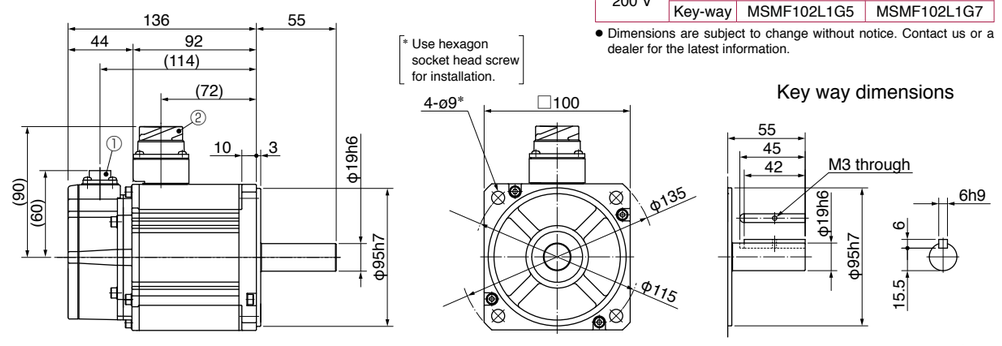
① Encoder connector (Small size JN2)
② Motor connector

Mass: 3.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF102L1C5	MSMF102L1C7
	Key-way	MSMF102L1G5	MSMF102L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.73.

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MSMF 1.0 kW

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

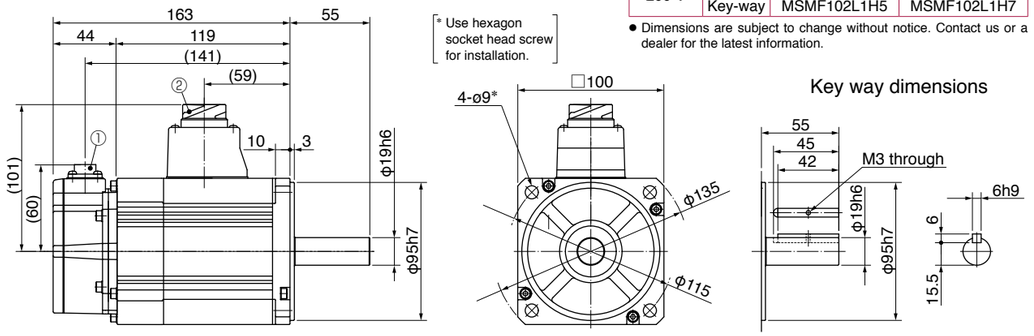
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 4.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF102L1D5	MSMF102L1D7
	Key-way	MSMF102L1H5	MSMF102L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 1.5 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

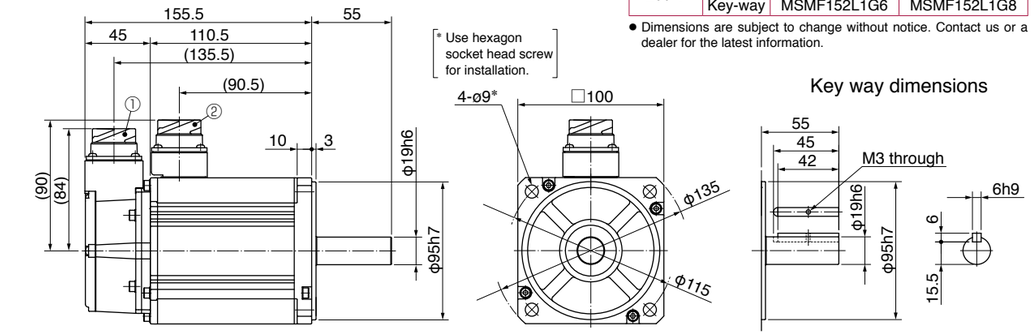
① Encoder connector (Large size JL10)
② Motor connector

Mass: 4.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF152L1C6	MSMF152L1C8
	Key-way	MSMF152L1G6	MSMF152L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

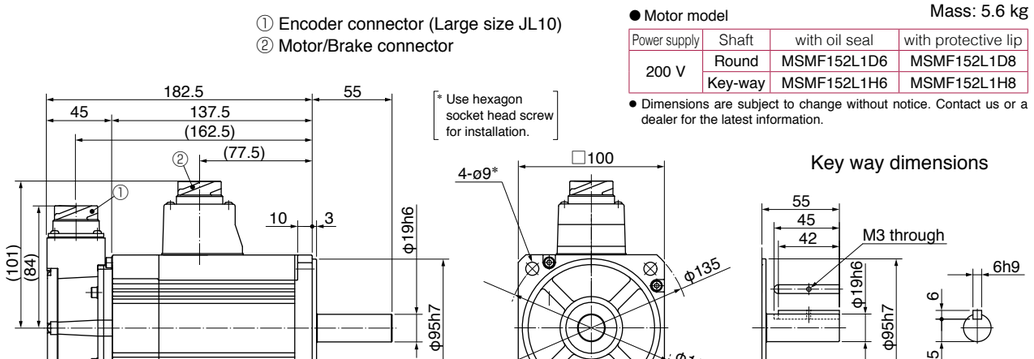
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 5.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF152L1D6	MSMF152L1D8
	Key-way	MSMF152L1H6	MSMF152L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.73, P.74.

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MSMF 1.5 kW

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

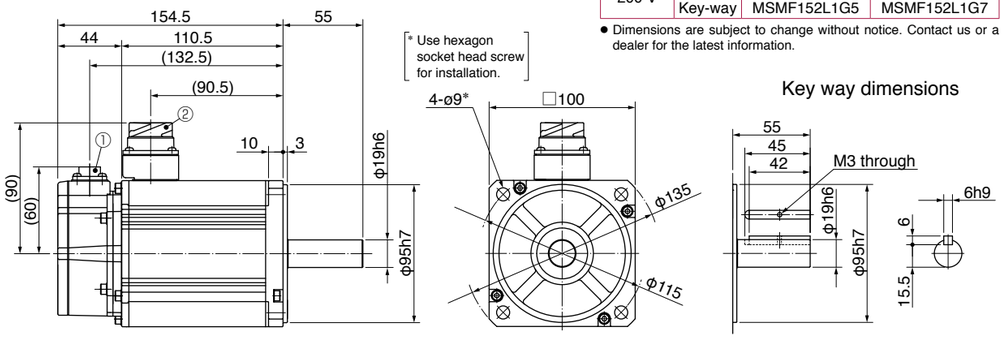
① Encoder connector (Small size JN2)
② Motor connector

Mass: 4.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF152L1C5	MSMF152L1C7
	Key-way	MSMF152L1G5	MSMF152L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

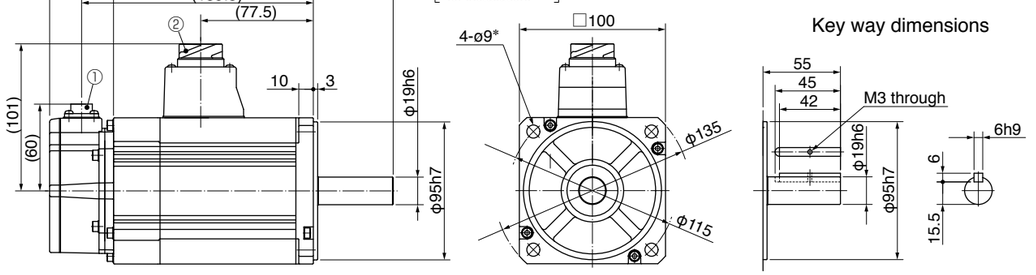
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 5.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF152L1D5	MSMF152L1D7
	Key-way	MSMF152L1H5	MSMF152L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 2.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

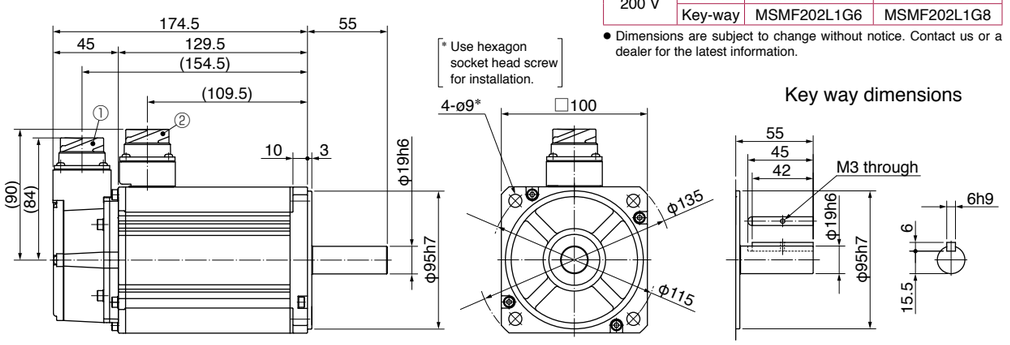
① Encoder connector (Large size JL10)
② Motor connector

Mass: 5.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF202L1C6	MSMF202L1C8
	Key-way	MSMF202L1G6	MSMF202L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.74, P.75.

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MSMF 2.0 kW

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

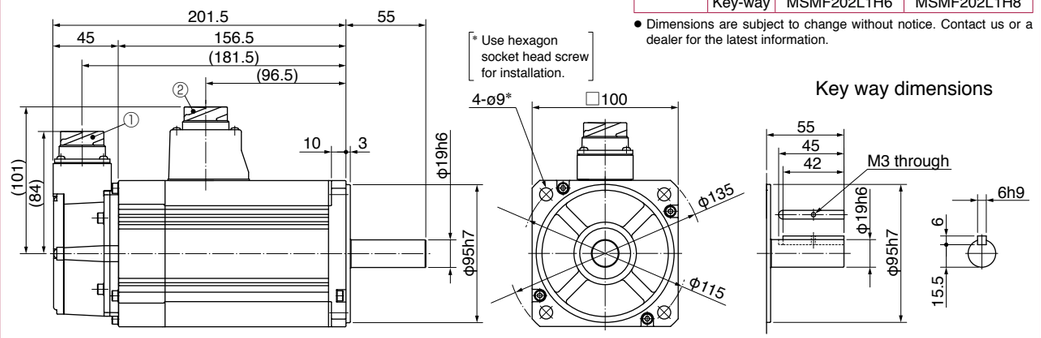
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 6.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF202L1D6	MSMF202L1D8
	Key-way	MSMF202L1H6	MSMF202L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

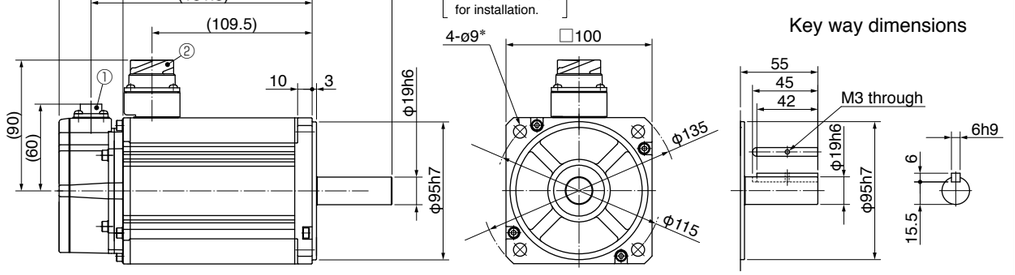
① Encoder connector (Small size JN2)
② Motor connector

Mass: 5.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF202L1C5	MSMF202L1C7
	Key-way	MSMF202L1G5	MSMF202L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

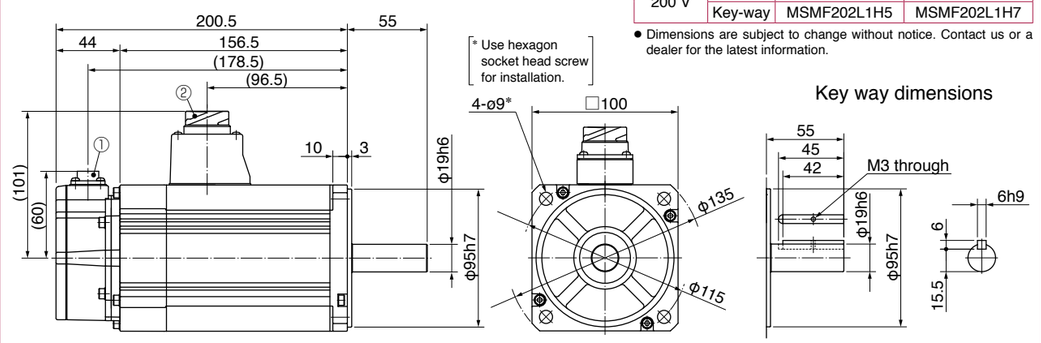
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 6.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF202L1D5	MSMF202L1D7
	Key-way	MSMF202L1H5	MSMF202L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.75.

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MSMF 3.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

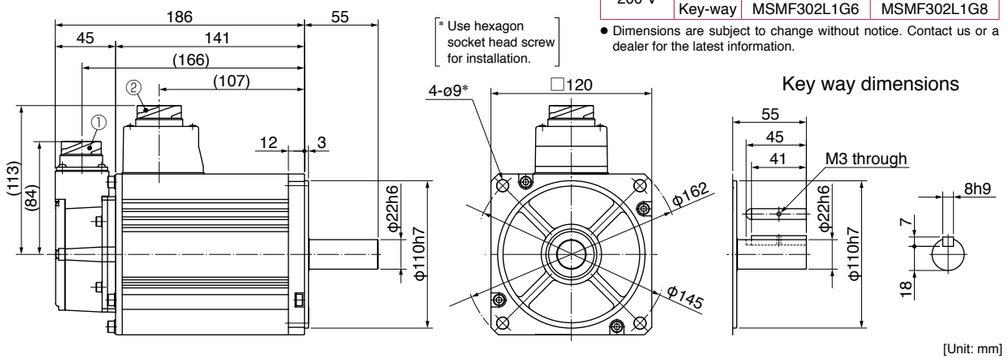
① Encoder connector (Large size JL10)
② Motor connector

Mass: 8.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF302L1C6	MSMF302L1C8
	Key-way	MSMF302L1G6	MSMF302L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

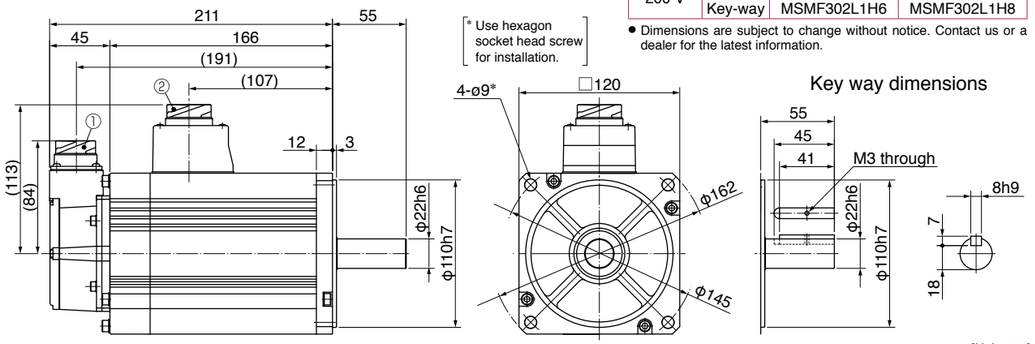
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 9.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF302L1D6	MSMF302L1D8
	Key-way	MSMF302L1H6	MSMF302L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

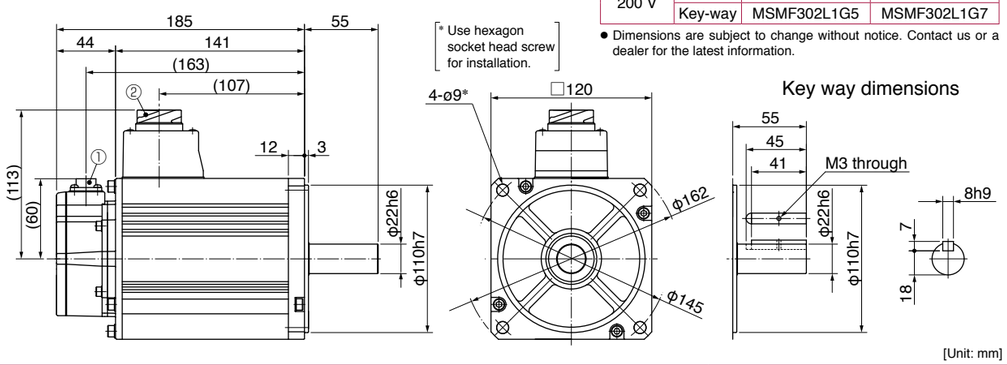
① Encoder connector (Small size JN2)
② Motor connector

Mass: 8.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF302L1C5	MSMF302L1C7
	Key-way	MSMF302L1G5	MSMF302L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.76.

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MSMF 3.0 kW

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

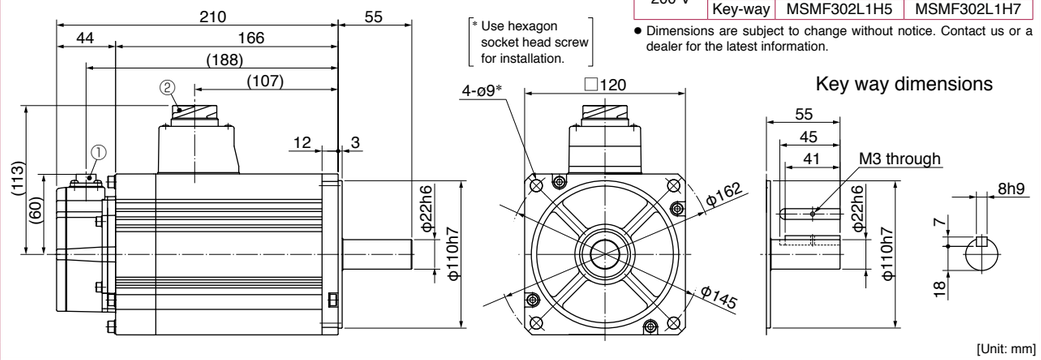
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 9.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF302L1D5	MSMF302L1D7
	Key-way	MSMF302L1H5	MSMF302L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 4.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

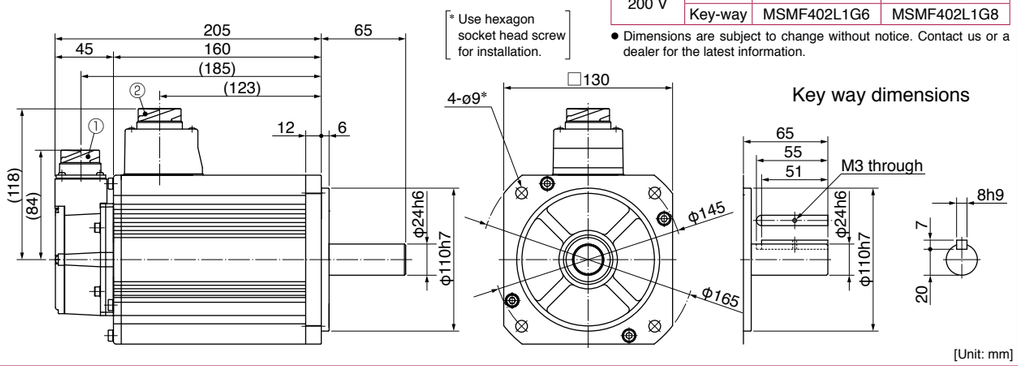
① Encoder connector (Large size JL10)
② Motor connector

Mass: 11.5 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF402L1C6	MSMF402L1C8
	Key-way	MSMF402L1G6	MSMF402L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

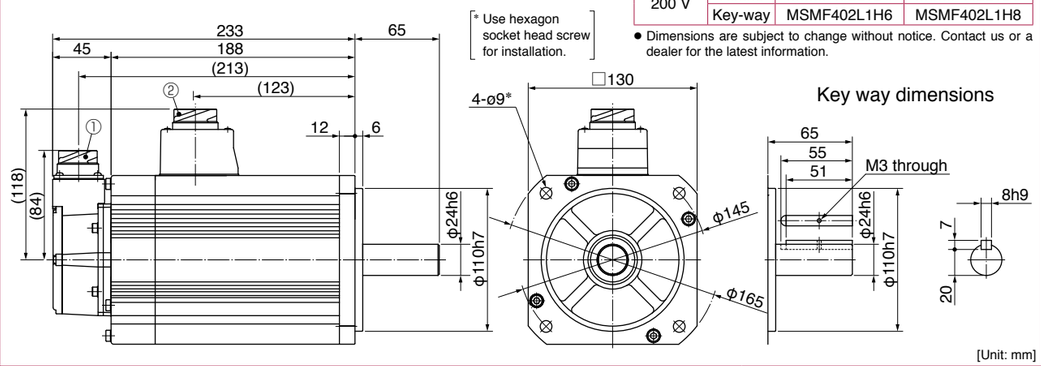
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 13.2 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF402L1D6	MSMF402L1D8
	Key-way	MSMF402L1H6	MSMF402L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.76, P.77.

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MSMF 4.0 kW

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

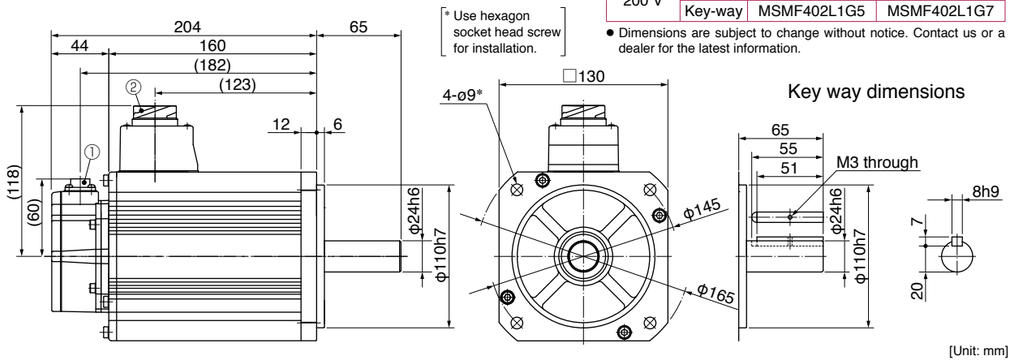
① Encoder connector (Small size JN2)
② Motor connector

Mass: 11.5 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF402L1C5	MSMF402L1C7
	Key-way	MSMF402L1G5	MSMF402L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

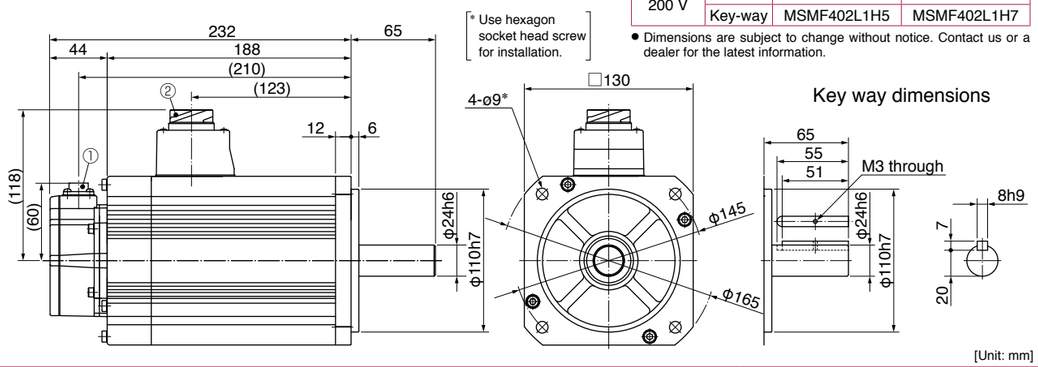
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 13.2 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF402L1D5	MSMF402L1D7
	Key-way	MSMF402L1H5	MSMF402L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 5.0 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

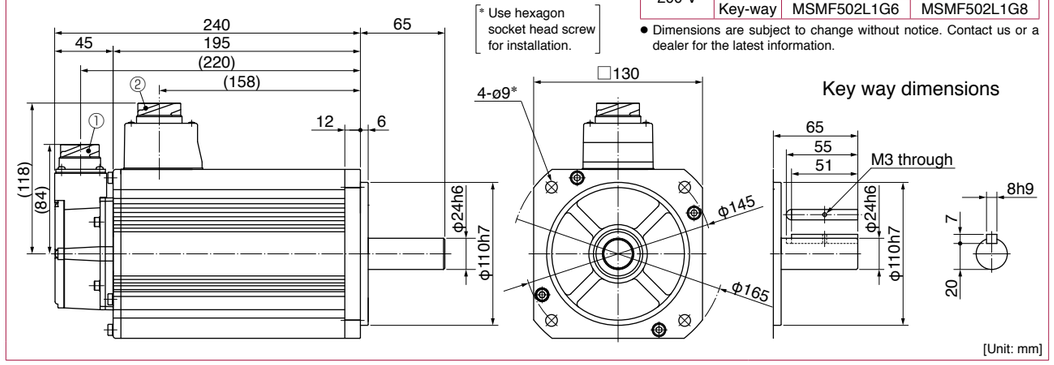
① Encoder connector (Large size JL10)
② Motor connector

Mass: 14.5 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF502L1C6	MSMF502L1C8
	Key-way	MSMF502L1G6	MSMF502L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.77, P.78.

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MSMF 5.0 kW

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

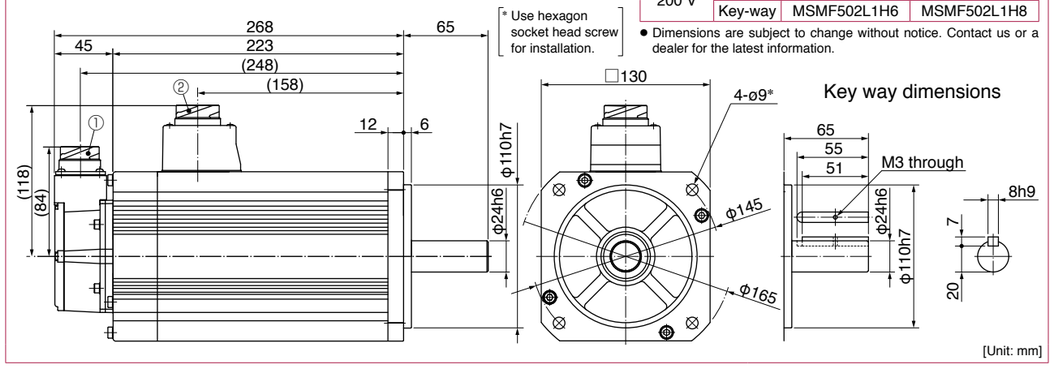
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 16.1 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF502L1D6	MSMF502L1D8
	Key-way	MSMF502L1H6	MSMF502L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

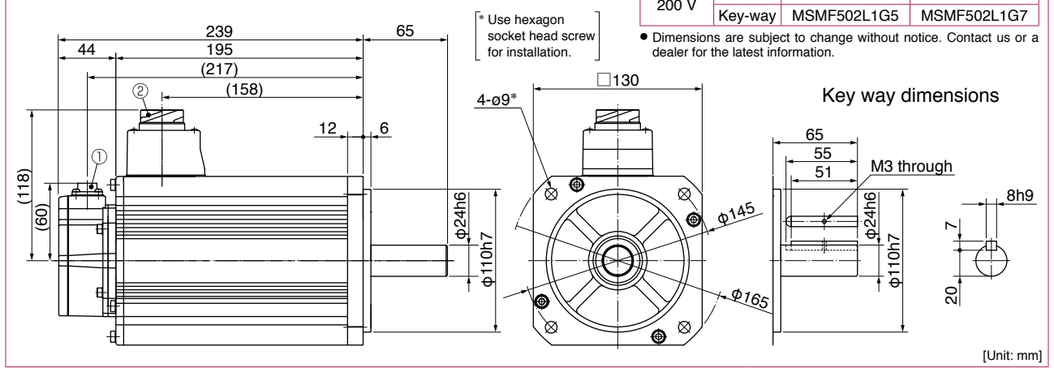
① Encoder connector (Small size JN2)
② Motor connector

Mass: 14.5 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF502L1C5	MSMF502L1C7
	Key-way	MSMF502L1G5	MSMF502L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

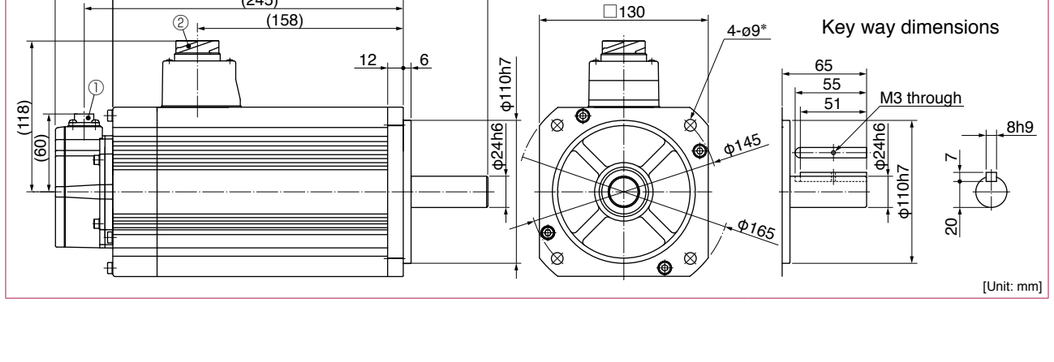
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 16.1 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF502L1D5	MSMF502L1D7
	Key-way	MSMF502L1H5	MSMF502L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.78.

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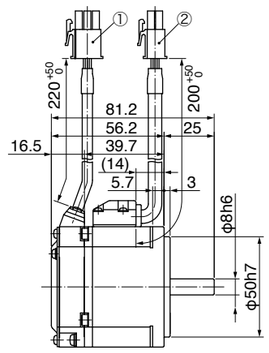
MQMF 100 W

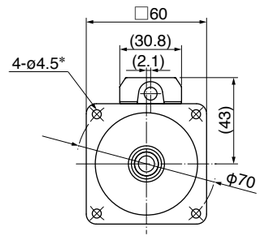
Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.54 kg

① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.

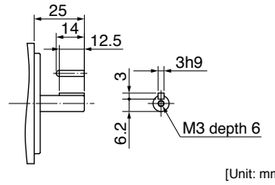


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1A2
	Key-way, center tap	MQMF011L1S2
200 V	Round	MQMF012L1A2
	Key-way, center tap	MQMF012L1S2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

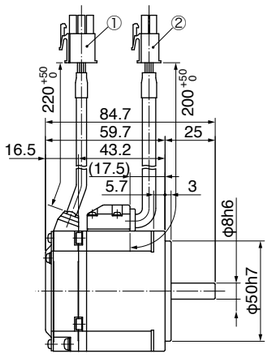


[Unit: mm]

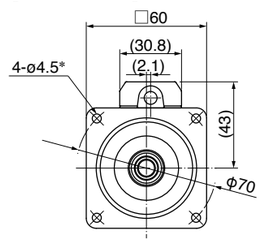
Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.57 kg

① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.

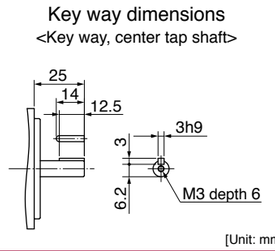


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1C2
	Key-way, center tap	MQMF011L1U2
200 V	Round	MQMF012L1C2
	Key-way, center tap	MQMF012L1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

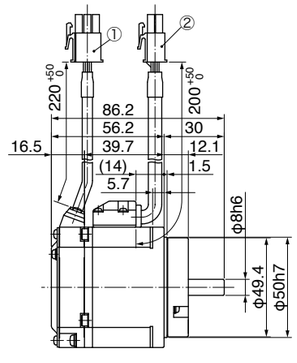


[Unit: mm]

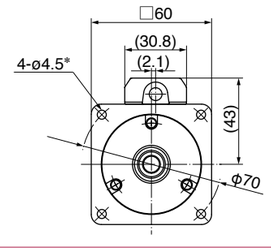
Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.61 kg

① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.

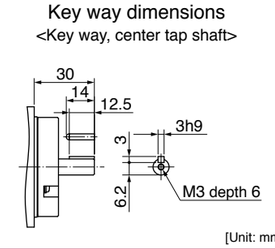


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1C4
	Key-way, center tap	MQMF011L1U4
200 V	Round	MQMF012L1C4
	Key-way, center tap	MQMF012L1U4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.79, P.80.

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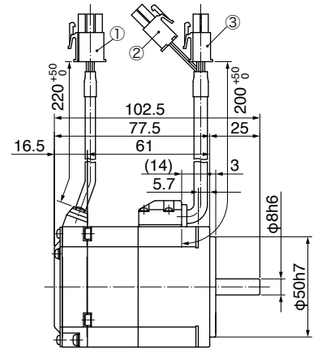
MQMF 100 W

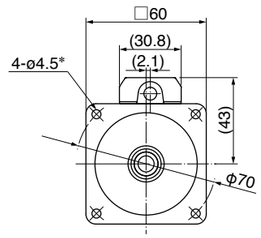
Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.79 kg

① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.

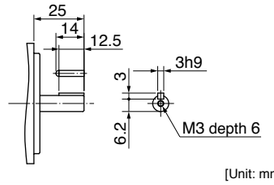


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1B2
	Key-way, center tap	MQMF011L1T2
200 V	Round	MQMF012L1B2
	Key-way, center tap	MQMF012L1T2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

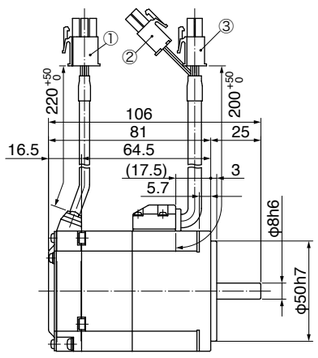


[Unit: mm]

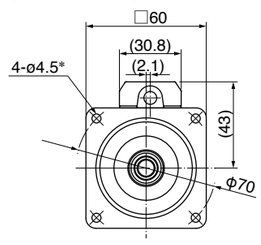
Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.82 kg

① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.

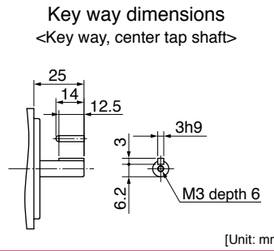


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1D2
	Key-way, center tap	MQMF011L1V2
200 V	Round	MQMF012L1D2
	Key-way, center tap	MQMF012L1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

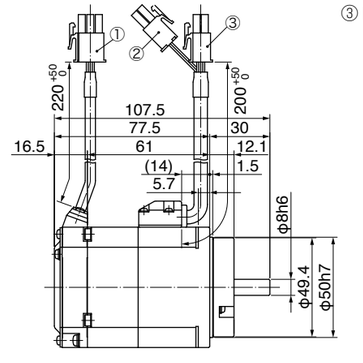


[Unit: mm]

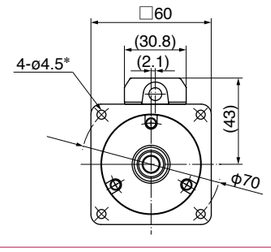
Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.86 kg

① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.

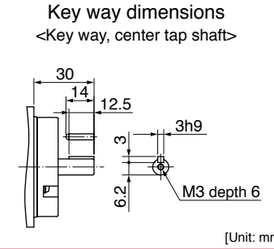


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1D4
	Key-way, center tap	MQMF011L1V4
200 V	Round	MQMF012L1D4
	Key-way, center tap	MQMF012L1V4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.79, P.80.

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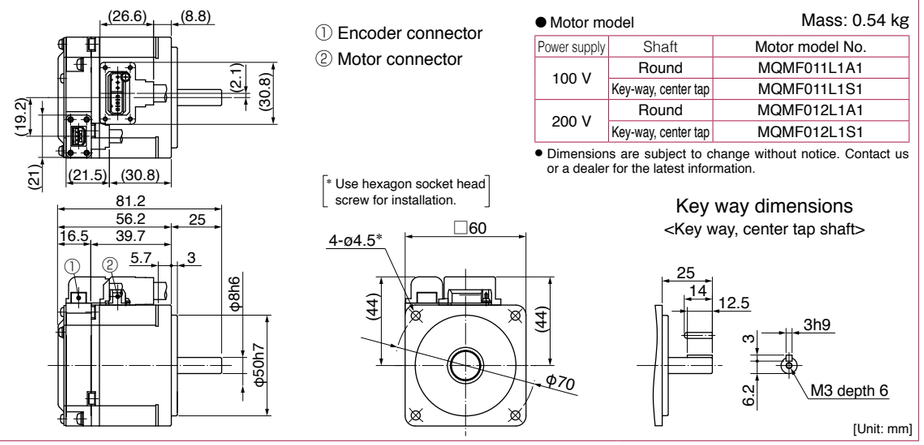
MQMF 100 W

Connector type (IP67) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

* Use hexagon socket head screw for installation.

● Motor model Mass: 0.54 kg

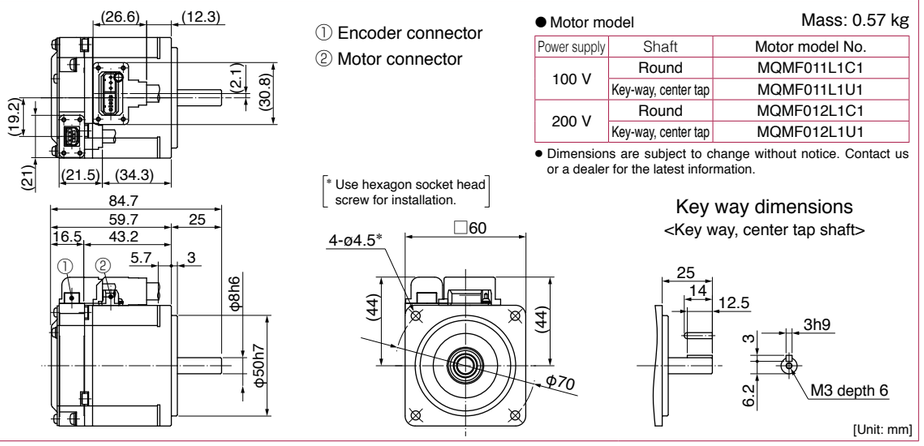
Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1A1
	Key-way, center tap	MQMF011L1S1
200 V	Round	MQMF012L1A1
	Key-way, center tap	MQMF012L1S1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · without brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

* Use hexagon socket head screw for installation.

● Motor model Mass: 0.57 kg

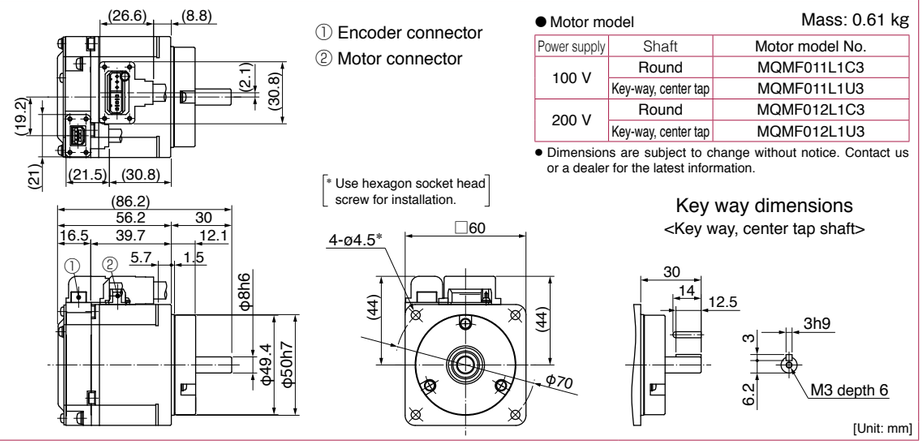
Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1C1
	Key-way, center tap	MQMF011L1U1
200 V	Round	MQMF012L1C1
	Key-way, center tap	MQMF012L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

* Use hexagon socket head screw for installation.

● Motor model Mass: 0.61 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1C3
	Key-way, center tap	MQMF011L1U3
200 V	Round	MQMF012L1C3
	Key-way, center tap	MQMF012L1U3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.79, P.80.

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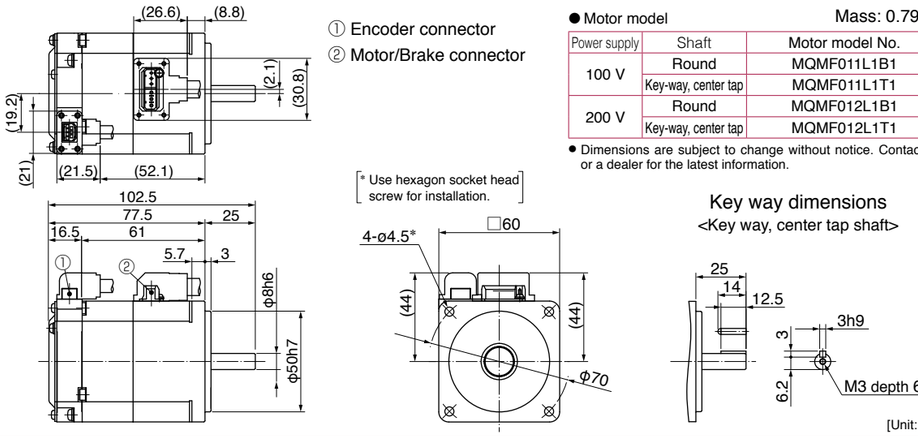
MQMF 100 W

Connector type (IP67) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

* Use hexagon socket head screw for installation.

● Motor model Mass: 0.79 kg

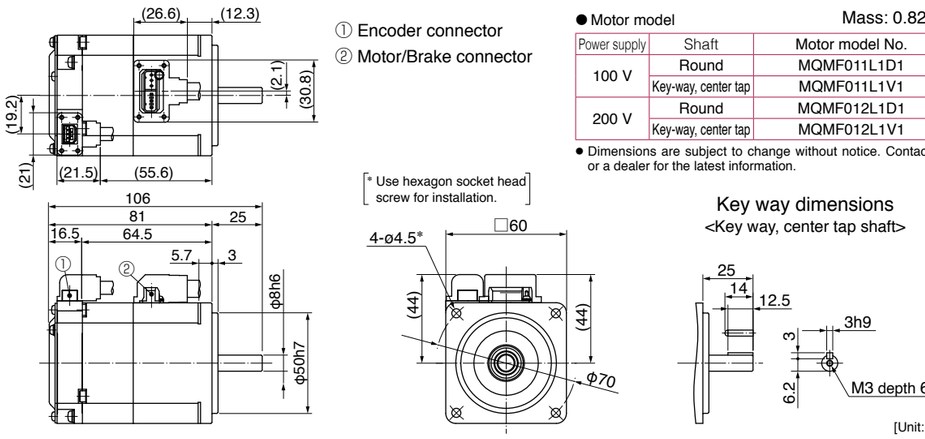
Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1B1
	Key-way, center tap	MQMF011L1T1
200 V	Round	MQMF012L1B1
	Key-way, center tap	MQMF012L1T1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · with brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

* Use hexagon socket head screw for installation.

● Motor model Mass: 0.82 kg

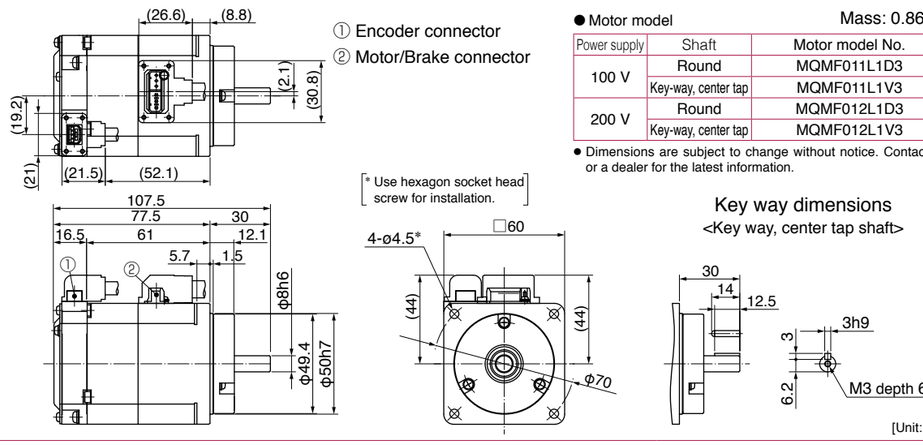
Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1D1
	Key-way, center tap	MQMF011L1V1
200 V	Round	MQMF012L1D1
	Key-way, center tap	MQMF012L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

* Use hexagon socket head screw for installation.

● Motor model Mass: 0.86 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF011L1D3
	Key-way, center tap	MQMF011L1V3
200 V	Round	MQMF012L1D3
	Key-way, center tap	MQMF012L1V3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.79, P.80.

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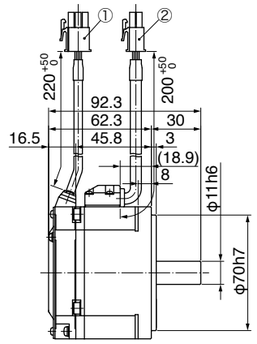
MQMF 200 W

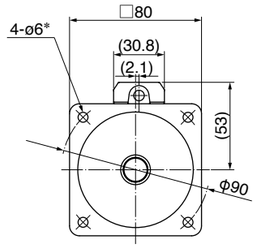
Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.1 kg

① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]

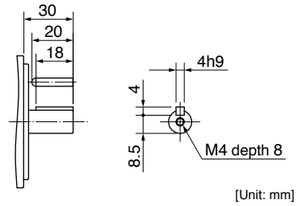


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1A2
	Key-way, center tap	MQMF021L1S2
200 V	Round	MQMF022L1A2
	Key-way, center tap	MQMF022L1S2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

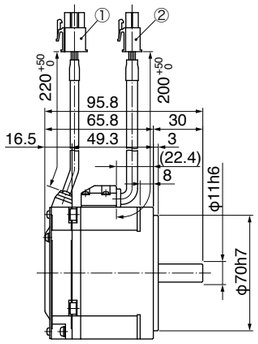


[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.2 kg

① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]

● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1C2
	Key-way, center tap	MQMF021L1U2
200 V	Round	MQMF022L1C2
	Key-way, center tap	MQMF022L1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

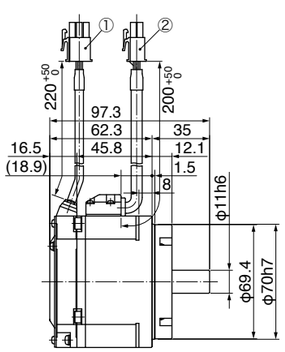
Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

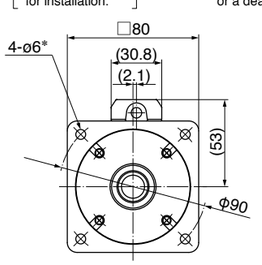
Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.3 kg

① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]

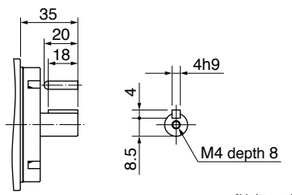


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1C4
	Key-way, center tap	MQMF021L1U4
200 V	Round	MQMF022L1C4
	Key-way, center tap	MQMF022L1U4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.81, P.82.

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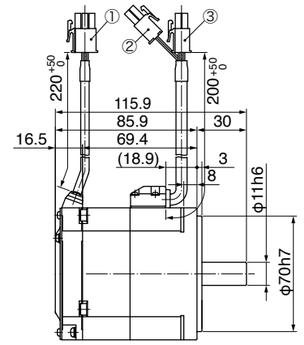
MQMF 200 W

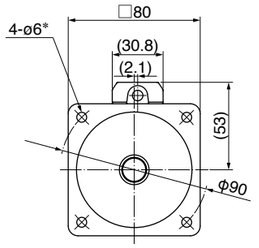
Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.5 kg

① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]

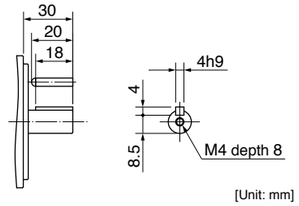


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1B2
	Key-way, center tap	MQMF021L1T2
200 V	Round	MQMF022L1B2
	Key-way, center tap	MQMF022L1T2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

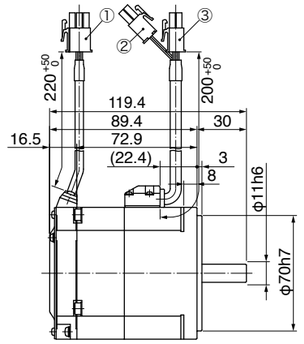


[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.6 kg

① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]

● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1D2
	Key-way, center tap	MQMF021L1V2
200 V	Round	MQMF022L1D2
	Key-way, center tap	MQMF022L1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

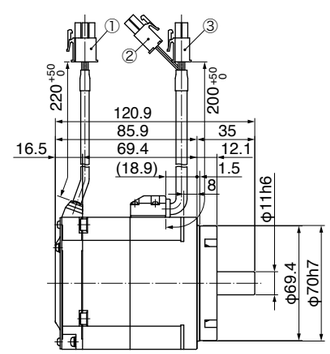
Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

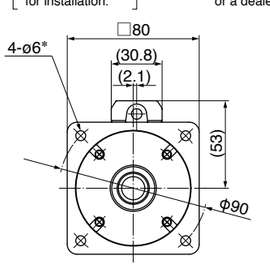
Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.7 kg

① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]

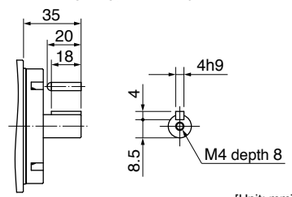


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1D4
	Key-way, center tap	MQMF021L1V4
200 V	Round	MQMF022L1D4
	Key-way, center tap	MQMF022L1V4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.81, P.82.

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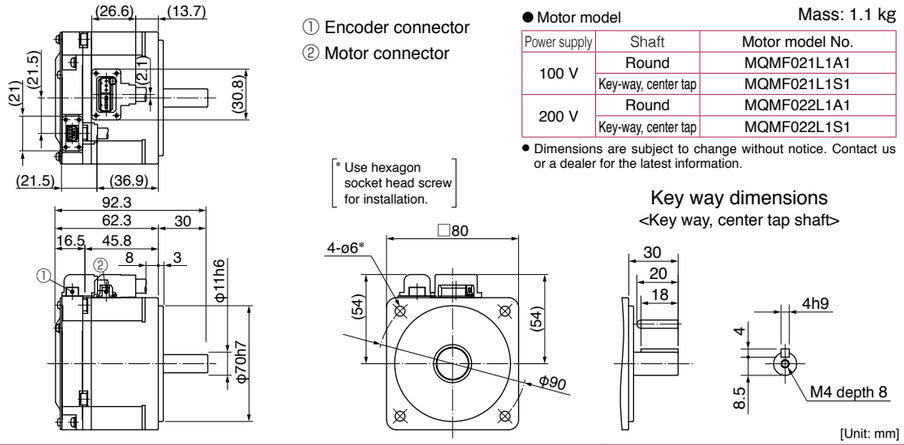
MQMF 200 W

Connector type (IP67) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

● Motor model — Mass: 1.1 kg

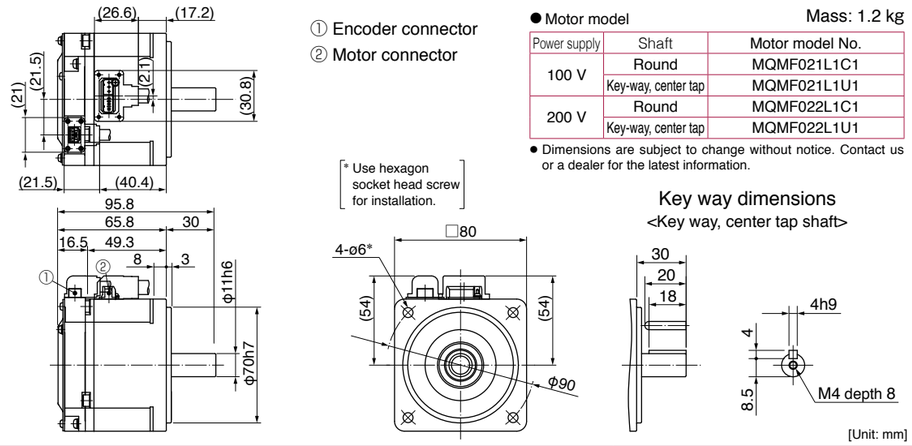
Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1A1
	Key-way, center tap	MQMF021L1S1
200 V	Round	MQMF022L1A1
	Key-way, center tap	MQMF022L1S1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · without brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

● Motor model — Mass: 1.2 kg

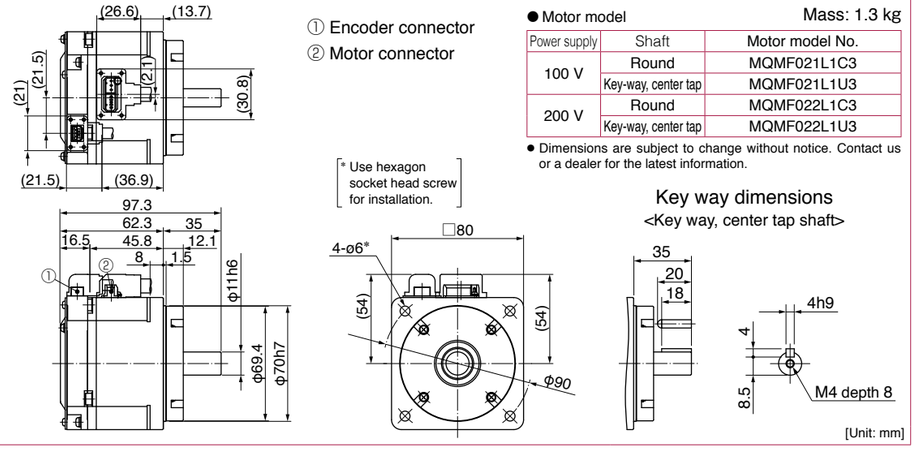
Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1C1
	Key-way, center tap	MQMF021L1U1
200 V	Round	MQMF022L1C1
	Key-way, center tap	MQMF022L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

● Motor model — Mass: 1.3 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1C3
	Key-way, center tap	MQMF021L1U3
200 V	Round	MQMF022L1C3
	Key-way, center tap	MQMF022L1U3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.81, P.82.

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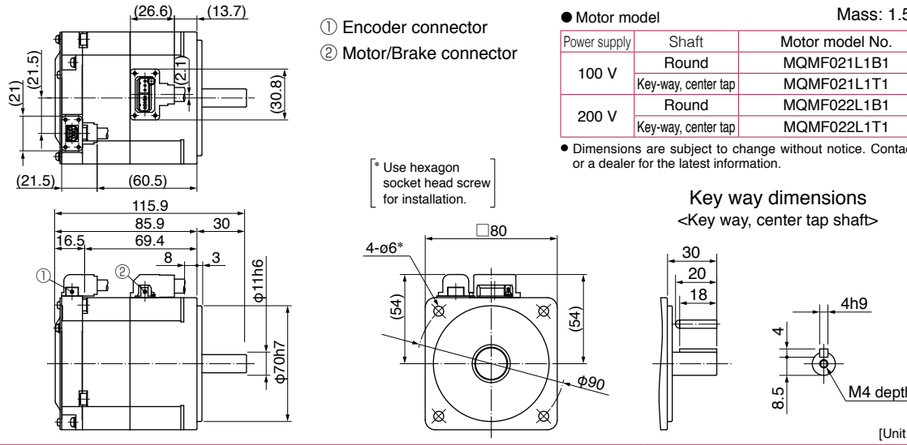
MQMF 200 W

Connector type (IP67) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 1.5 kg

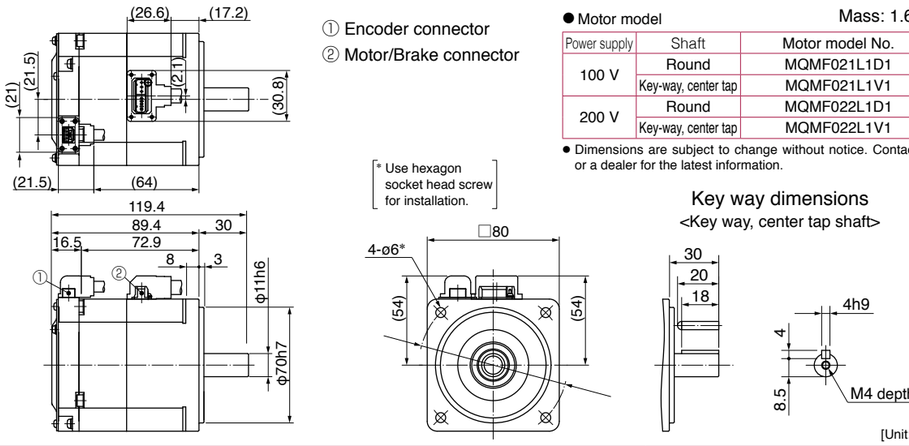
Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1B1
	Key-way, center tap	MQMF021L1T1
200 V	Round	MQMF022L1B1
	Key-way, center tap	MQMF022L1T1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · with brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 1.6 kg

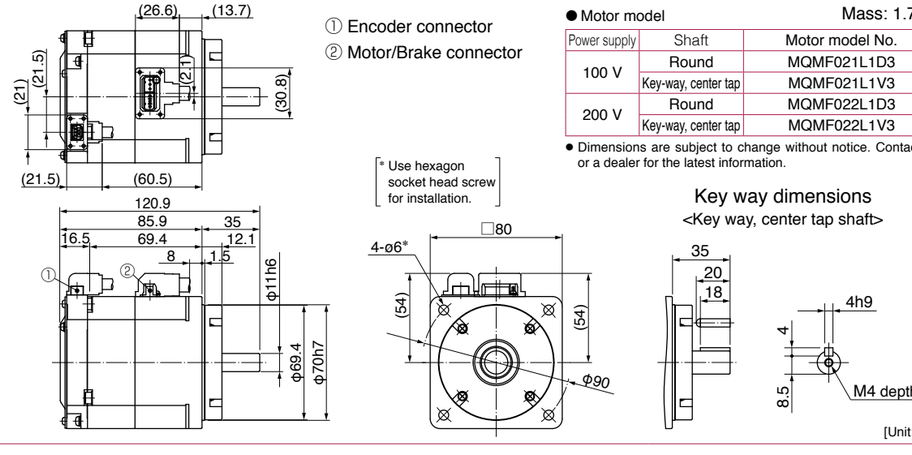
Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1D1
	Key-way, center tap	MQMF021L1V1
200 V	Round	MQMF022L1D1
	Key-way, center tap	MQMF022L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 1.7 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF021L1D3
	Key-way, center tap	MQMF021L1V3
200 V	Round	MQMF022L1D3
	Key-way, center tap	MQMF022L1V3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.81, P.82.

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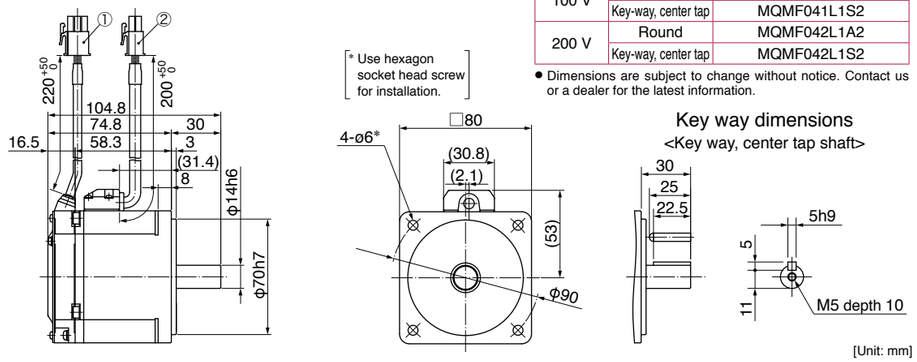
MQMF 400 W

Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



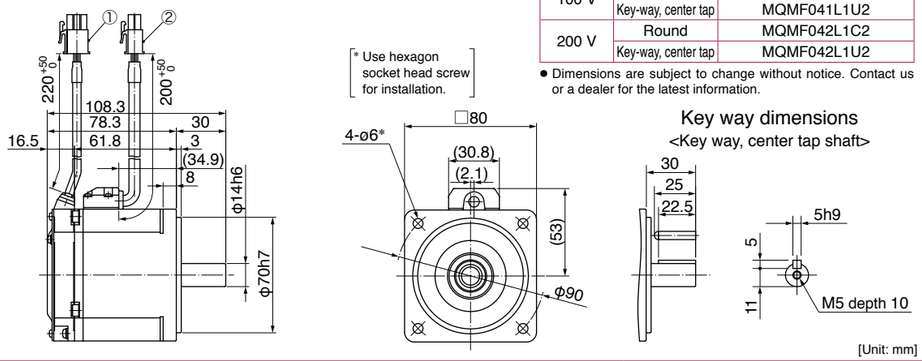
● Motor model — Mass: 1.5 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1A2
	Key-way, center tap	MQMF041L1S2
200 V	Round	MQMF042L1A2
	Key-way, center tap	MQMF042L1S2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft



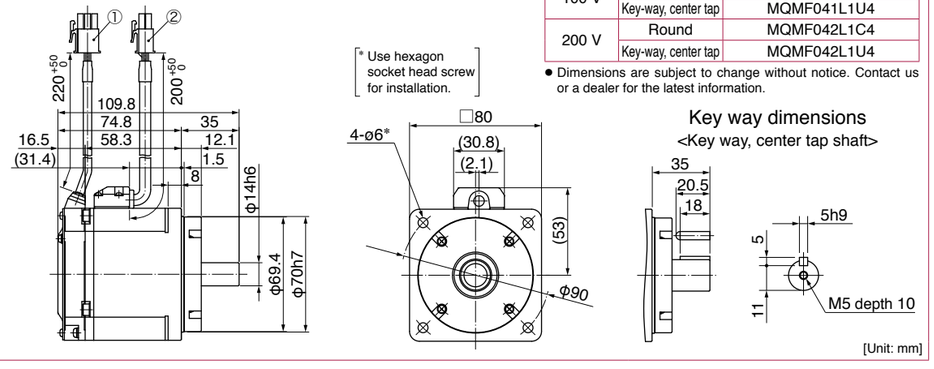
● Motor model — Mass: 1.6 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1C2
	Key-way, center tap	MQMF041L1U2
200 V	Round	MQMF042L1C2
	Key-way, center tap	MQMF042L1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



● Motor model — Mass: 1.7 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1C4
	Key-way, center tap	MQMF041L1U4
200 V	Round	MQMF042L1C4
	Key-way, center tap	MQMF042L1U4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.83, P.84.

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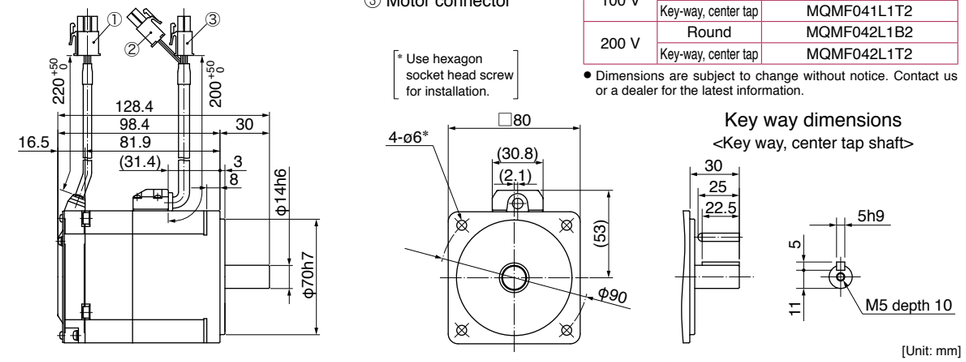
MQMF 400 W

Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



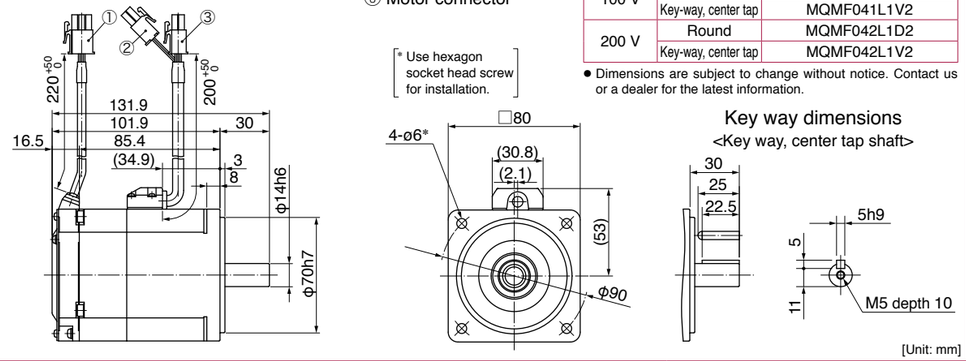
● Motor model — Mass: 2.0 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1B2
	Key-way, center tap	MQMF041L1T2
200 V	Round	MQMF042L1B2
	Key-way, center tap	MQMF042L1T2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft



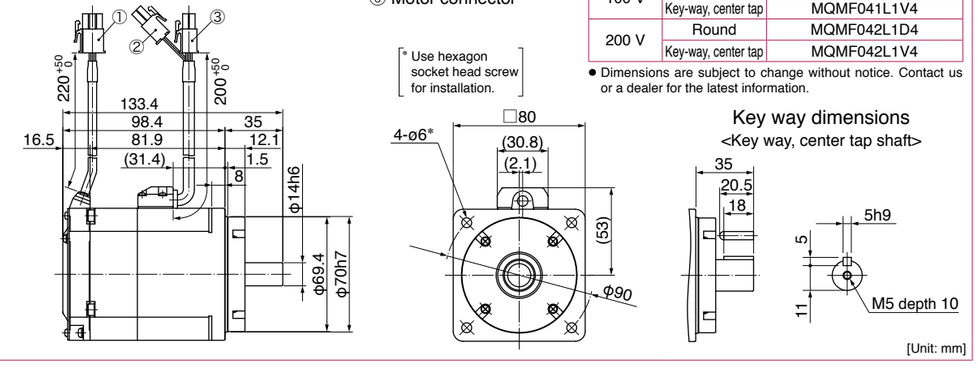
● Motor model — Mass: 2.1 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1D2
	Key-way, center tap	MQMF041L1V2
200 V	Round	MQMF042L1D2
	Key-way, center tap	MQMF042L1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



● Motor model — Mass: 2.2 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1D4
	Key-way, center tap	MQMF041L1V4
200 V	Round	MQMF042L1D4
	Key-way, center tap	MQMF042L1V4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.83, P.84.

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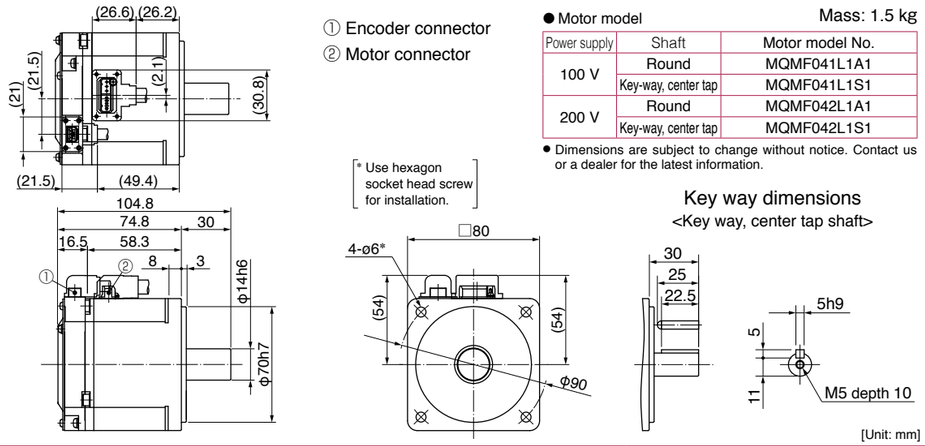
MQMF 400 W

Connector type (IP67) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

* Use hexagon socket head screw for installation.

● Motor model — Mass: 1.5 kg

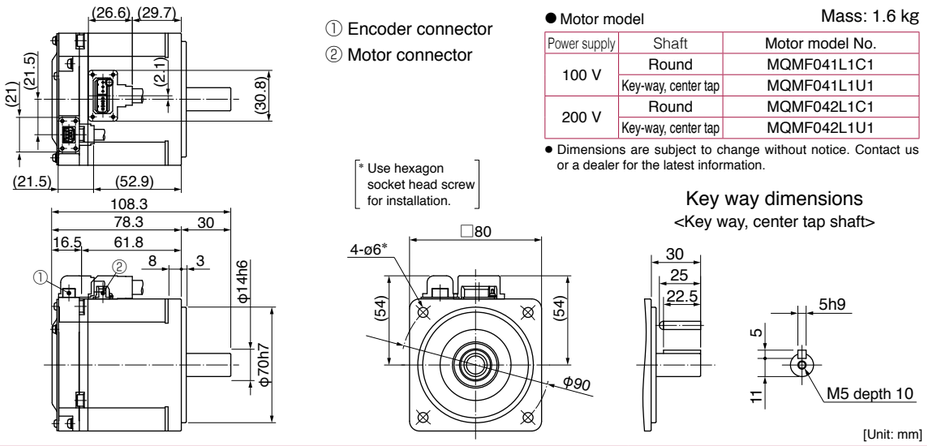
Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1A1
	Key-way, center tap	MQMF041L1S1
200 V	Round	MQMF042L1A1
	Key-way, center tap	MQMF042L1S1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · without brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

* Use hexagon socket head screw for installation.

● Motor model — Mass: 1.6 kg

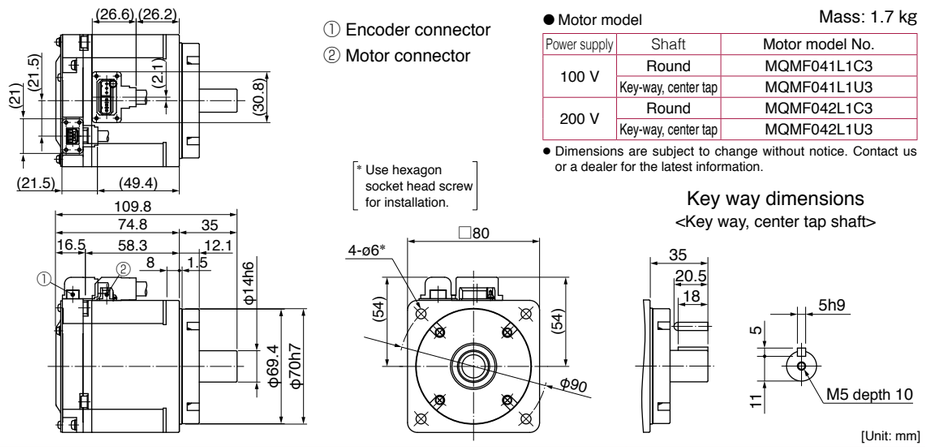
Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1C1
	Key-way, center tap	MQMF041L1U1
200 V	Round	MQMF042L1C1
	Key-way, center tap	MQMF042L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

* Use hexagon socket head screw for installation.

● Motor model — Mass: 1.7 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1C3
	Key-way, center tap	MQMF041L1U3
200 V	Round	MQMF042L1C3
	Key-way, center tap	MQMF042L1U3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.83, P.84.

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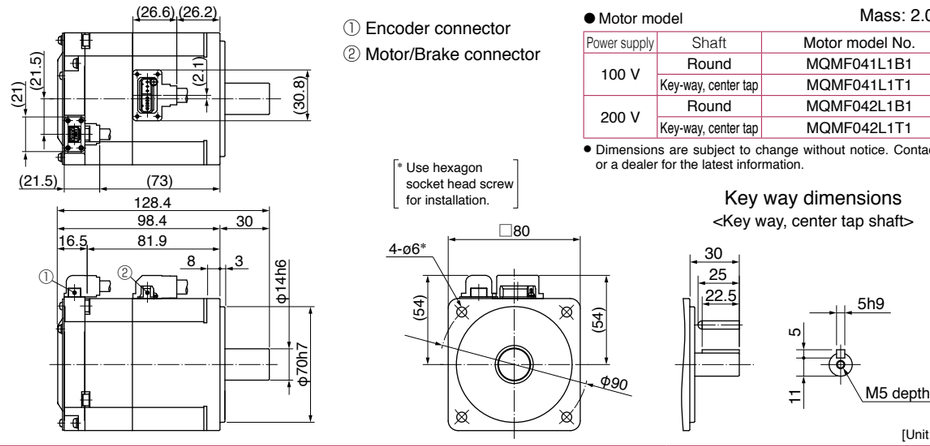
MQMF 400 W

Connector type (IP67) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

* Use hexagon socket head screw for installation.

● Motor model — Mass: 2.0 kg

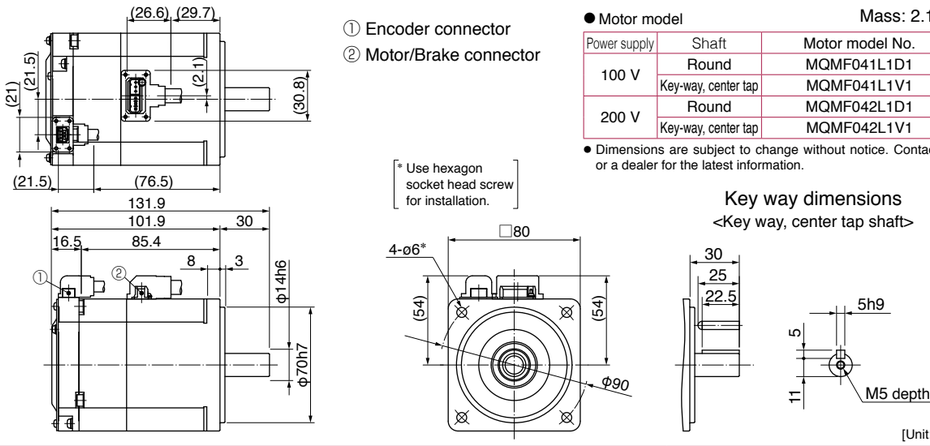
Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1B1
	Key-way, center tap	MQMF041L1T1
200 V	Round	MQMF042L1B1
	Key-way, center tap	MQMF042L1T1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · with brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

* Use hexagon socket head screw for installation.

● Motor model — Mass: 2.1 kg

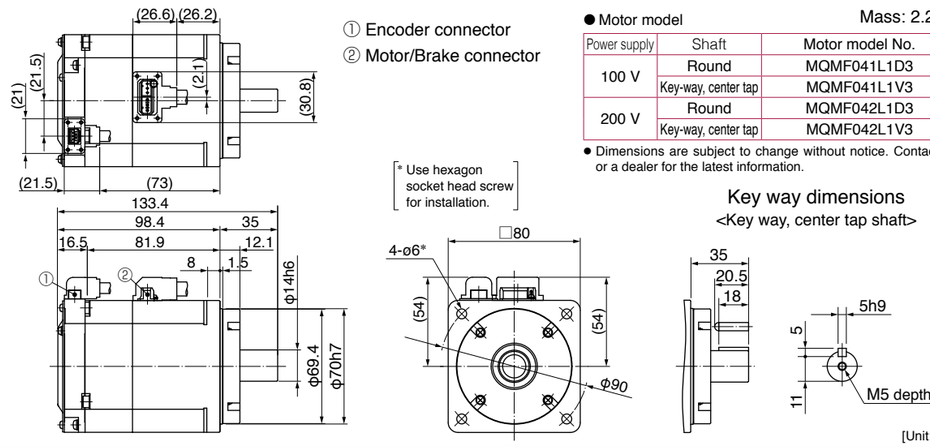
Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1D1
	Key-way, center tap	MQMF041L1V1
200 V	Round	MQMF042L1D1
	Key-way, center tap	MQMF042L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

* Use hexagon socket head screw for installation.

● Motor model — Mass: 2.2 kg

Power supply	Shaft	Motor model No.
100 V	Round	MQMF041L1D3
	Key-way, center tap	MQMF041L1V3
200 V	Round	MQMF042L1D3
	Key-way, center tap	MQMF042L1V3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.83, P.84.

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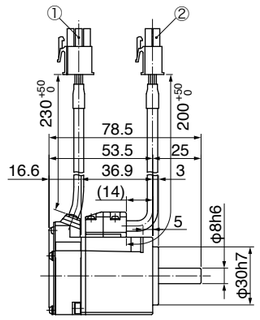
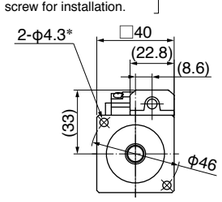
MHMF 50 W

Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

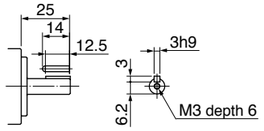
① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Mass: 0.29 kg

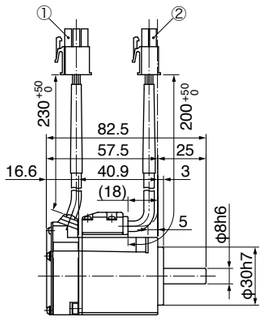
Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1A2
	Key-way, center tap	MHMF5AZL1S2
200 V	Round	MHMF5AZL1A2
	Key-way, center tap	MHMF5AZL1S2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

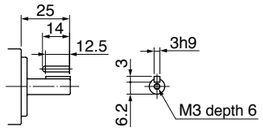
Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.

Key way dimensions
<Key way, center tap shaft>



● Motor model

Mass: 0.31 kg

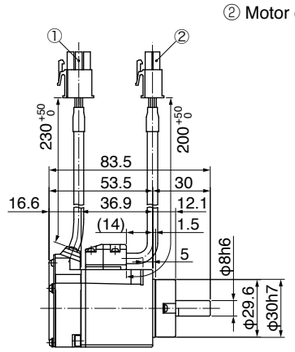
Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1C2
	Key-way, center tap	MHMF5AZL1U2
200 V	Round	MHMF5AZL1C2
	Key-way, center tap	MHMF5AZL1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

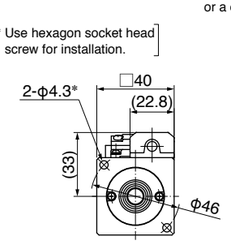
[Unit: mm]

Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

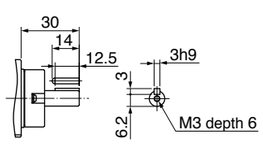
① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Mass: 0.32 kg

Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1C4
	Key-way, center tap	MHMF5AZL1U4
200 V	Round	MHMF5AZL1C4
	Key-way, center tap	MHMF5AZL1U4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.85, P.86.

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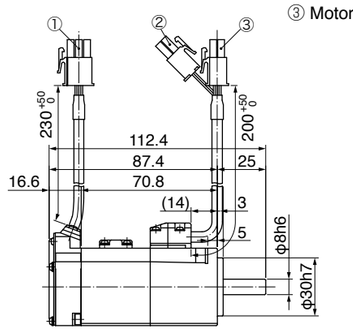
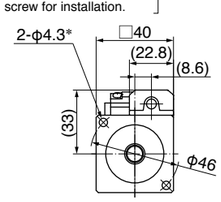
MHMF 50 W

Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

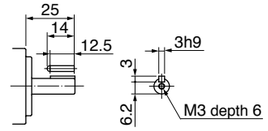
① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Mass: 0.51 kg

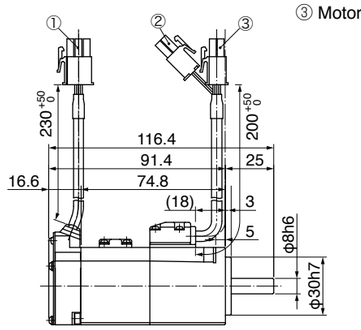
Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1B2
	Key-way, center tap	MHMF5AZL1T2
200 V	Round	MHMF5AZL1B2
	Key-way, center tap	MHMF5AZL1T2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

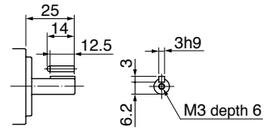
Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.

Key way dimensions
<Key way, center tap shaft>



● Motor model

Mass: 0.53 kg

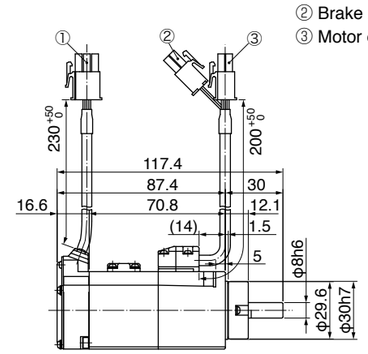
Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1D2
	Key-way, center tap	MHMF5AZL1V2
200 V	Round	MHMF5AZL1D2
	Key-way, center tap	MHMF5AZL1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

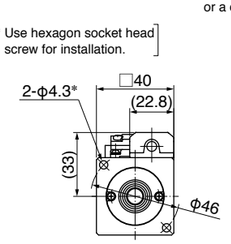
[Unit: mm]

Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

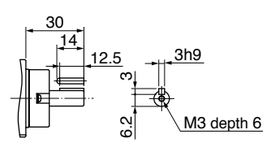
① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Mass: 0.54 kg

Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1D4
	Key-way, center tap	MHMF5AZL1V4
200 V	Round	MHMF5AZL1D4
	Key-way, center tap	MHMF5AZL1V4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.85, P.86.

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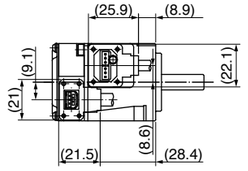
MHMF 50 W

Connector type (IP67) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



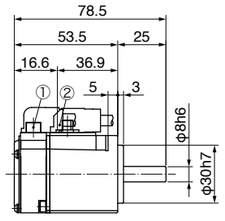
① Encoder connector
② Motor connector

Mass: 0.29 kg

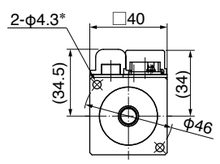
● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1A1
	Key-way, center tap	MHMF5AZL1S1
200 V	Round	MHMF5AZL1A1
	Key-way, center tap	MHMF5AZL1S1

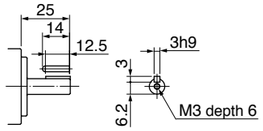
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]

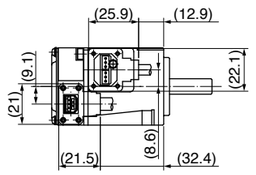


Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · without brake · with oil seal · Round shaft/ Key way, center tap shaft



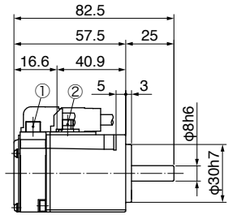
① Encoder connector
② Motor connector

Mass: 0.31 kg

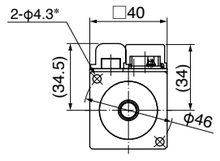
● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1C1
	Key-way, center tap	MHMF5AZL1U1
200 V	Round	MHMF5AZL1C1
	Key-way, center tap	MHMF5AZL1U1

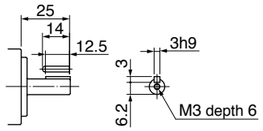
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]

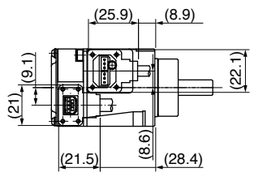


Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



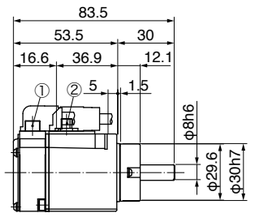
① Encoder connector
② Motor connector

Mass: 0.32 kg

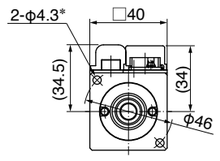
● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1C3
	Key-way, center tap	MHMF5AZL1U3
200 V	Round	MHMF5AZL1C3
	Key-way, center tap	MHMF5AZL1U3

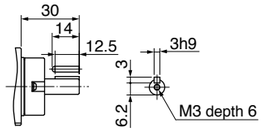
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.85, P.86.

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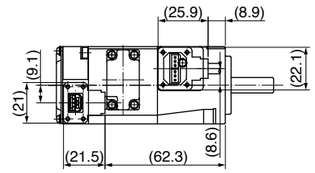
MHMF 50 W

Connector type (IP67) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



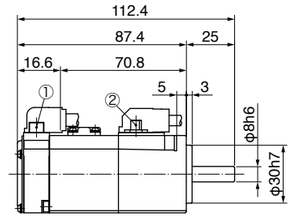
① Encoder connector
② Motor/Brake connector

Mass: 0.51 kg

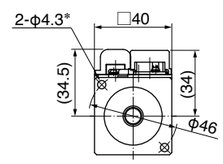
● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1B1
	Key-way, center tap	MHMF5AZL1T1
200 V	Round	MHMF5AZL1B1
	Key-way, center tap	MHMF5AZL1T1

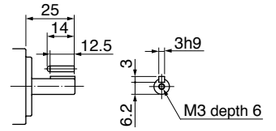
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]

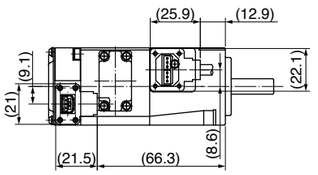


Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · with brake · with oil seal · Round shaft/ Key way, center tap shaft



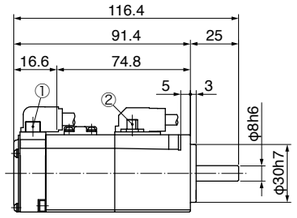
① Encoder connector
② Motor/Brake connector

Mass: 0.53 kg

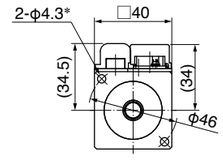
● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1D1
	Key-way, center tap	MHMF5AZL1V1
200 V	Round	MHMF5AZL1D1
	Key-way, center tap	MHMF5AZL1V1

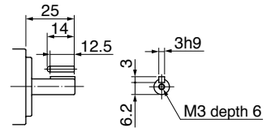
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]

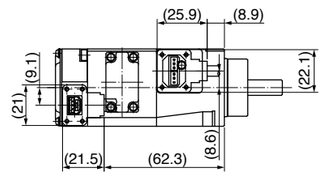


Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



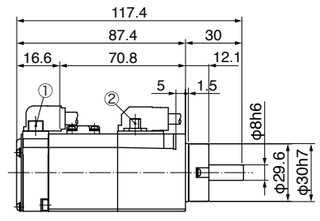
① Encoder connector
② Motor/Brake connector

Mass: 0.54 kg

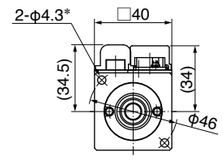
● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF5AZL1D3
	Key-way, center tap	MHMF5AZL1V3
200 V	Round	MHMF5AZL1D3
	Key-way, center tap	MHMF5AZL1V3

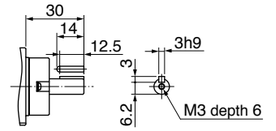
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.85, P.86.

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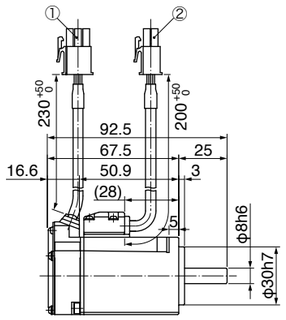
MHMF 100 W

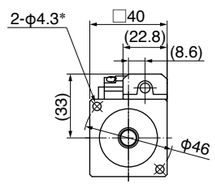
Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.40 kg

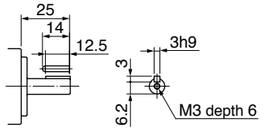
① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1A2
	Key-way, center tap	MHMF011L1S2
200 V	Round	MHMF012L1A2
	Key-way, center tap	MHMF012L1S2

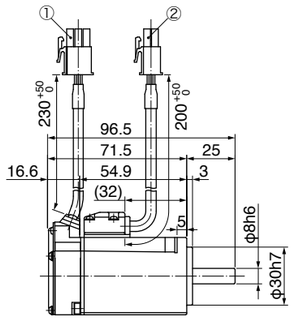
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

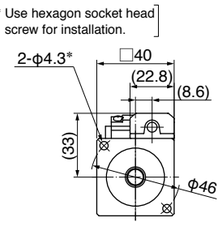
Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.42 kg

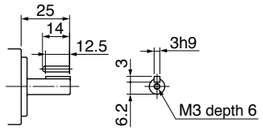
① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1C2
	Key-way, center tap	MHMF011L1U2
200 V	Round	MHMF012L1C2
	Key-way, center tap	MHMF012L1U2

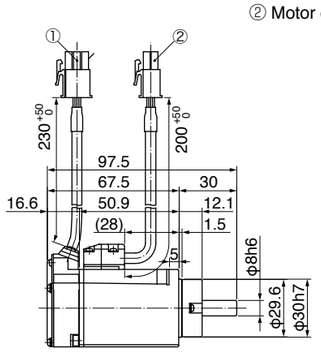
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

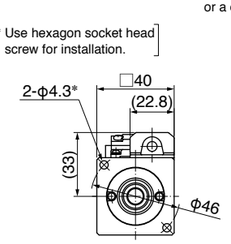
Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.43 kg

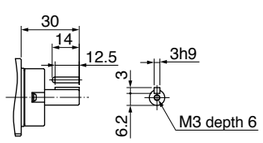
① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1C4
	Key-way, center tap	MHMF011L1U4
200 V	Round	MHMF012L1C4
	Key-way, center tap	MHMF012L1U4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.87, P.88.

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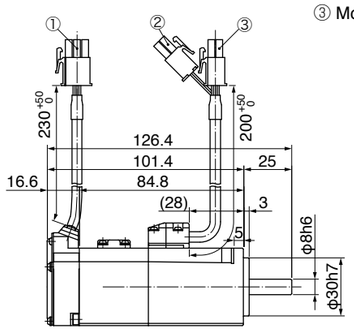
MHMF 100 W

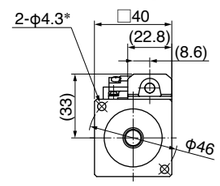
Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.62 kg

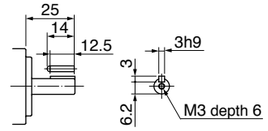
① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1B2
	Key-way, center tap	MHMF011L1T2
200 V	Round	MHMF012L1B2
	Key-way, center tap	MHMF012L1T2

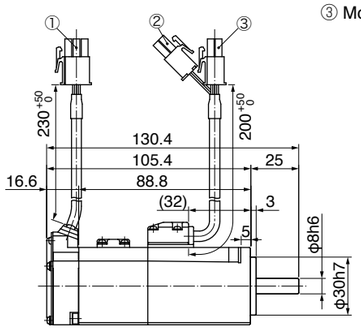
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

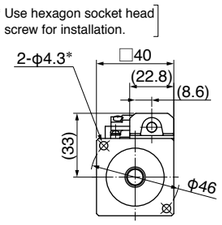
Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.64 kg

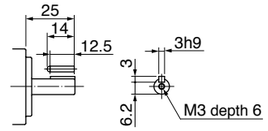
① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1D2
	Key-way, center tap	MHMF011L1V2
200 V	Round	MHMF012L1D2
	Key-way, center tap	MHMF012L1V2

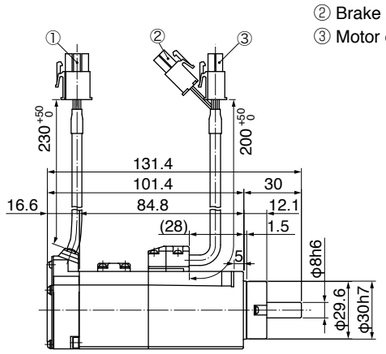
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

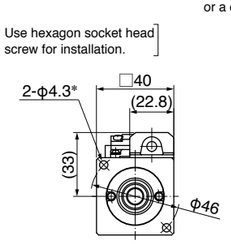
Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.65 kg

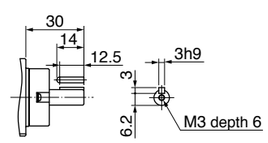
① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1D4
	Key-way, center tap	MHMF011L1V4
200 V	Round	MHMF012L1D4
	Key-way, center tap	MHMF012L1V4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.87, P.88.

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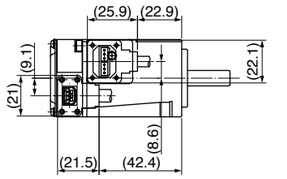
MHMF 100 W

Connector type (IP67) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



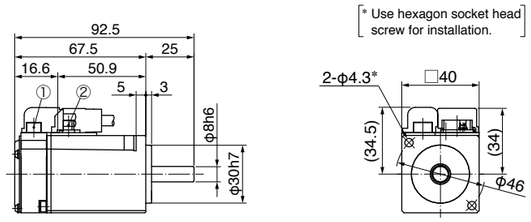
① Encoder connector
② Motor connector

Mass: 0.40 kg

● Motor model

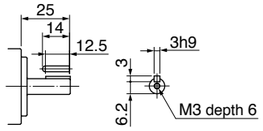
Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1A1
	Key-way, center tap	MHMF011L1S1
200 V	Round	MHMF012L1A1
	Key-way, center tap	MHMF012L1S1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



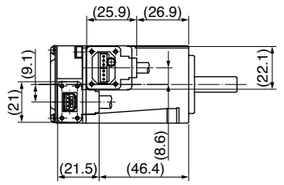
[* Use hexagon socket head screw for installation.]

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · without brake · with oil seal · Round shaft/ Key way, center tap shaft



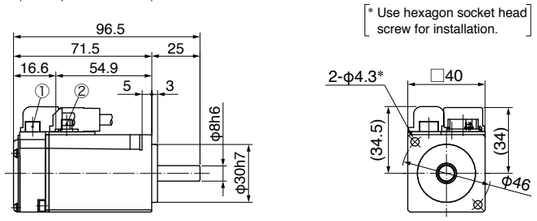
① Encoder connector
② Motor connector

Mass: 0.42 kg

● Motor model

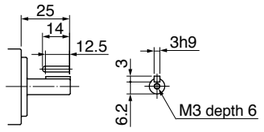
Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1C1
	Key-way, center tap	MHMF011L1U1
200 V	Round	MHMF012L1C1
	Key-way, center tap	MHMF012L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



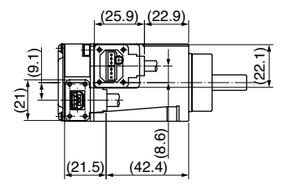
[* Use hexagon socket head screw for installation.]

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



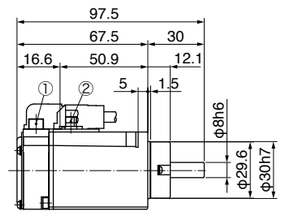
① Encoder connector
② Motor connector

Mass: 0.43 kg

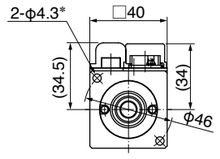
● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1C3
	Key-way, center tap	MHMF011L1U3
200 V	Round	MHMF012L1C3
	Key-way, center tap	MHMF012L1U3

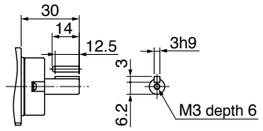
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.87, P.88.

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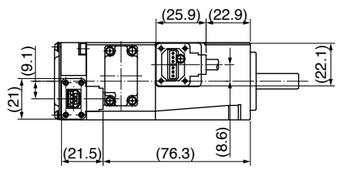
MHMF 100 W

Connector type (IP67) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



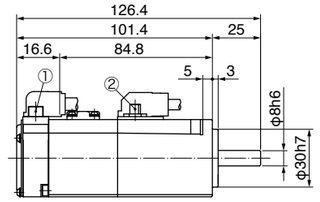
① Encoder connector
② Motor/Brake connector

Mass: 0.62 kg

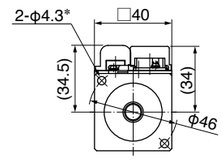
● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1B1
	Key-way, center tap	MHMF011L1T1
200 V	Round	MHMF012L1B1
	Key-way, center tap	MHMF012L1T1

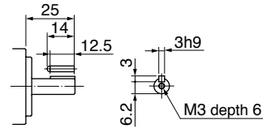
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]

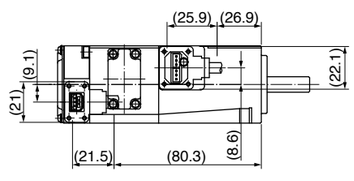


Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · with brake · with oil seal · Round shaft/ Key way, center tap shaft



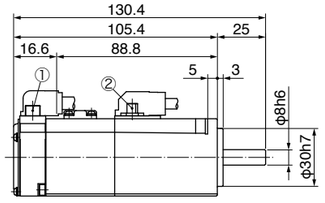
① Encoder connector
② Motor/Brake connector

Mass: 0.64 kg

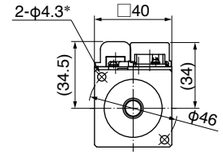
● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1D1
	Key-way, center tap	MHMF011L1V1
200 V	Round	MHMF012L1D1
	Key-way, center tap	MHMF012L1V1

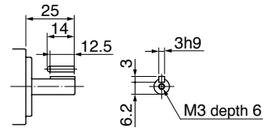
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]

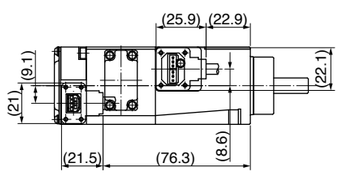


Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Connector type (IP67) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



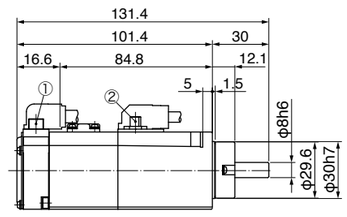
① Encoder connector
② Motor/Brake connector

Mass: 0.65 kg

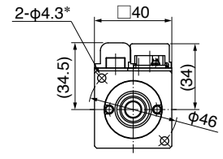
● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF011L1D3
	Key-way, center tap	MHMF011L1V3
200 V	Round	MHMF012L1D3
	Key-way, center tap	MHMF012L1V3

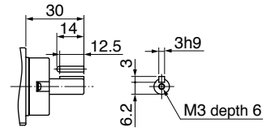
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.87, P.88.

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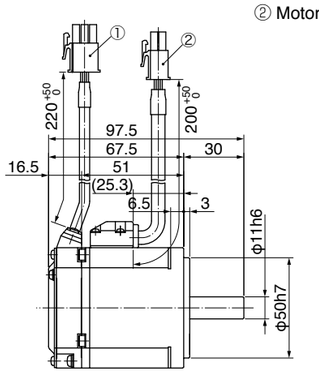
MHMF 200 W

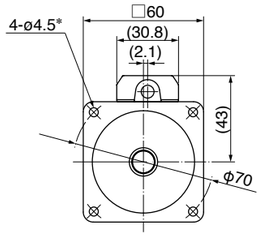
Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.75 kg

① Encoder connector
② Motor connector



[Use hexagon socket head screw for installation.

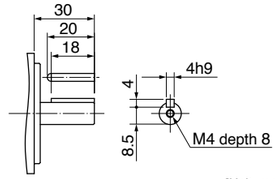


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1A2
	Key-way, center tap	MHMF021L1S2
200 V	Round	MHMF022L1A2
	Key-way, center tap	MHMF022L1S2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

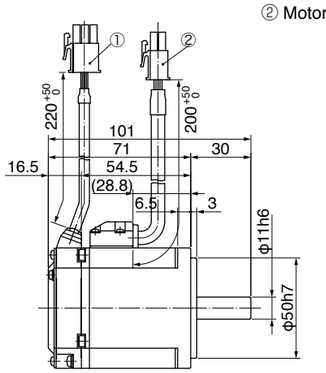


[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.78 kg

① Encoder connector
② Motor connector



[Use hexagon socket head screw for installation.

● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1C2
	Key-way, center tap	MHMF021L1U2
200 V	Round	MHMF022L1C2
	Key-way, center tap	MHMF022L1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

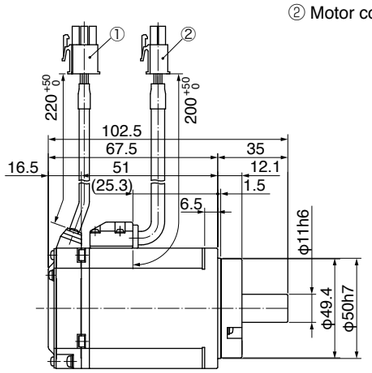
Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

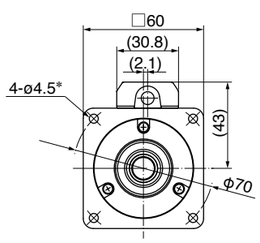
Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.81 kg

① Encoder connector
② Motor connector



[Use hexagon socket head screw for installation.

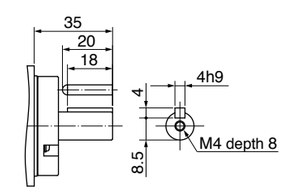


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1C4
	Key-way, center tap	MHMF021L1U4
200 V	Round	MHMF022L1C4
	Key-way, center tap	MHMF022L1U4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.89, P.90.

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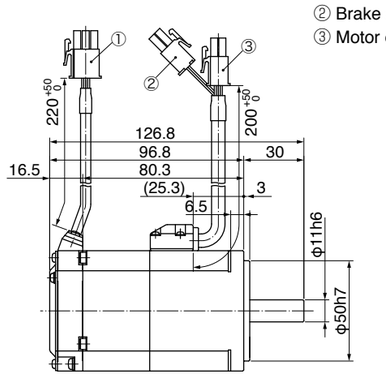
MHMF 200 W

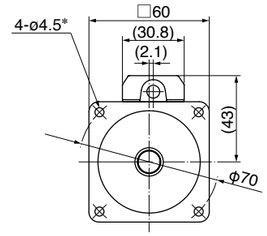
Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.1 kg

① Encoder connector
② Brake connector
③ Motor connector



[Use hexagon socket head screw for installation.

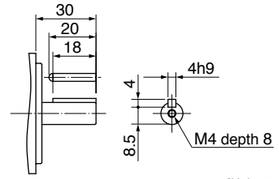


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1B2
	Key-way, center tap	MHMF021L1T2
200 V	Round	MHMF022L1B2
	Key-way, center tap	MHMF022L1T2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

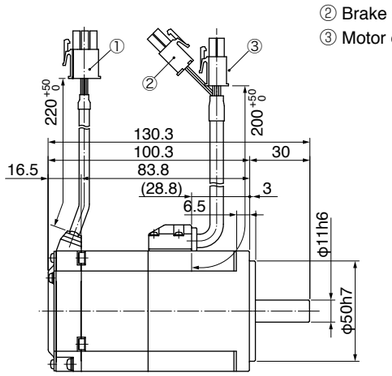


[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.2 kg

① Encoder connector
② Brake connector
③ Motor connector



[Use hexagon socket head screw for installation.

● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1D2
	Key-way, center tap	MHMF021L1V2
200 V	Round	MHMF022L1D2
	Key-way, center tap	MHMF022L1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

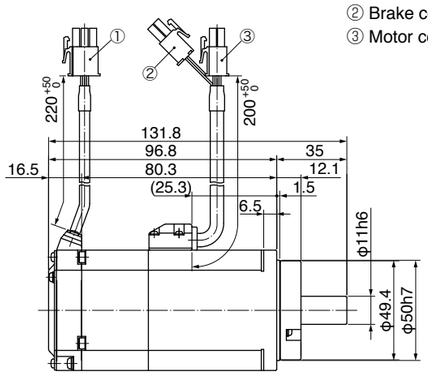
Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

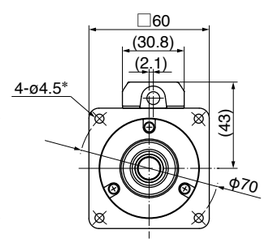
Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.2 kg

① Encoder connector
② Brake connector
③ Motor connector



[Use hexagon socket head screw for installation.

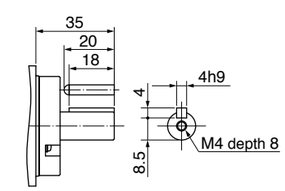


● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1D4
	Key-way, center tap	MHMF021L1V4
200 V	Round	MHMF022L1D4
	Key-way, center tap	MHMF022L1V4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.89, P.90.

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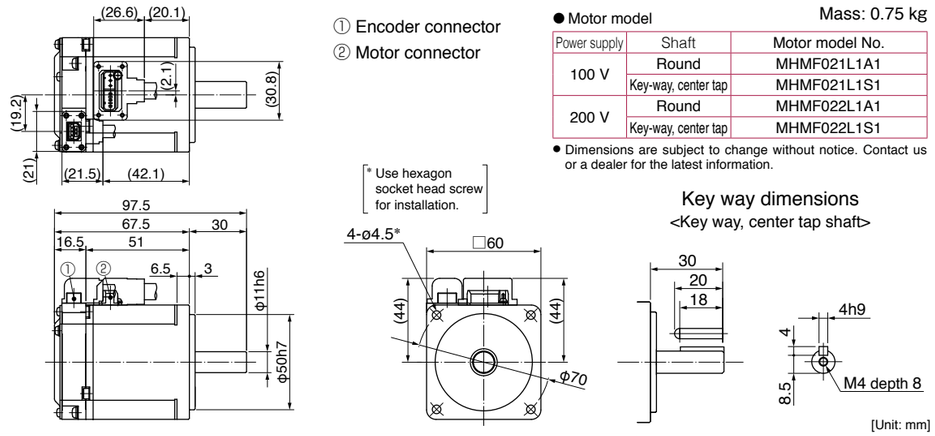
MHMF 200 W

Connector type (IP67) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

● Motor model — Mass: 0.75 kg

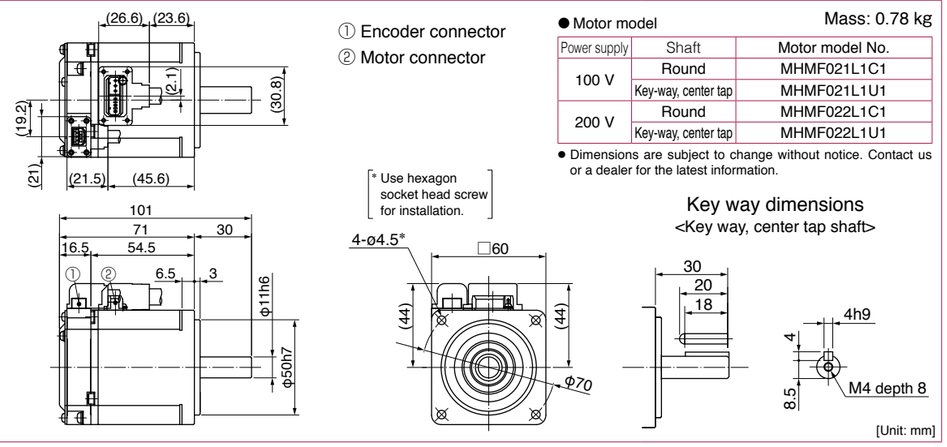
Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1A1
	Key-way, center tap	MHMF021L1S1
200 V	Round	MHMF022L1A1
	Key-way, center tap	MHMF022L1S1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · without brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

● Motor model — Mass: 0.78 kg

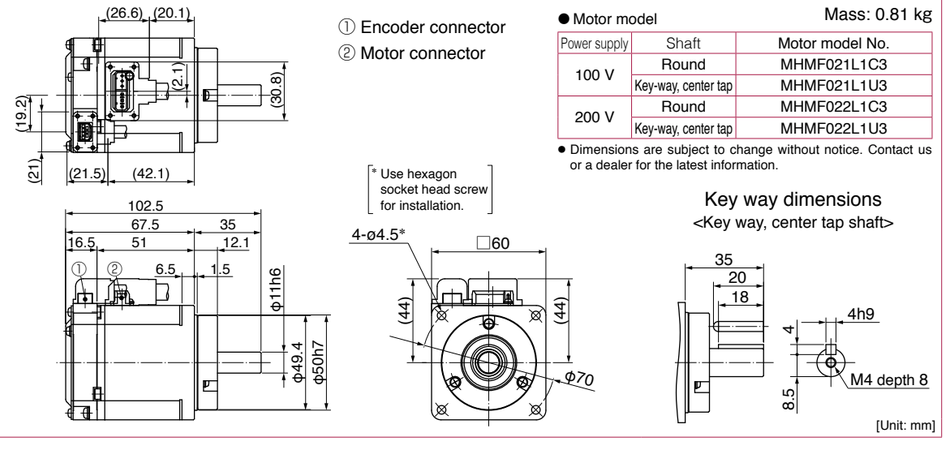
Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1C1
	Key-way, center tap	MHMF021L1U1
200 V	Round	MHMF022L1C1
	Key-way, center tap	MHMF022L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

● Motor model — Mass: 0.81 kg

Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1C3
	Key-way, center tap	MHMF021L1U3
200 V	Round	MHMF022L1C3
	Key-way, center tap	MHMF022L1U3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.89, P.90.

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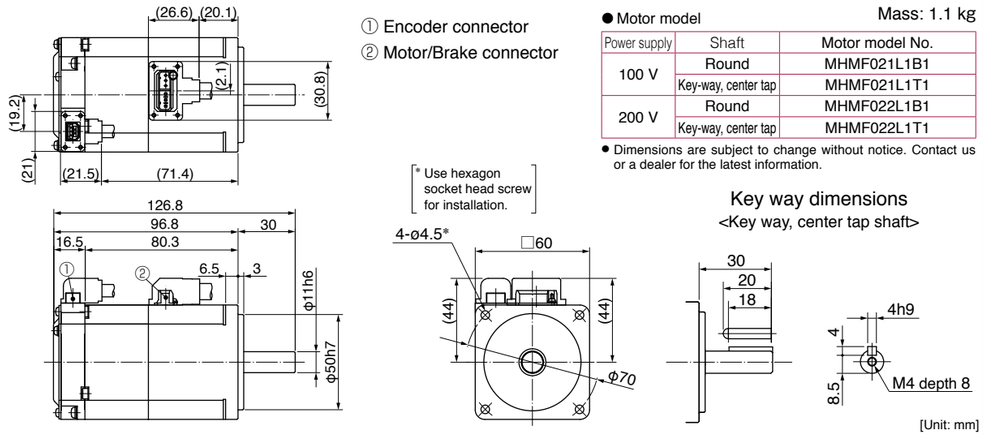
MHMF 200 W

Connector type (IP67) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 1.1 kg

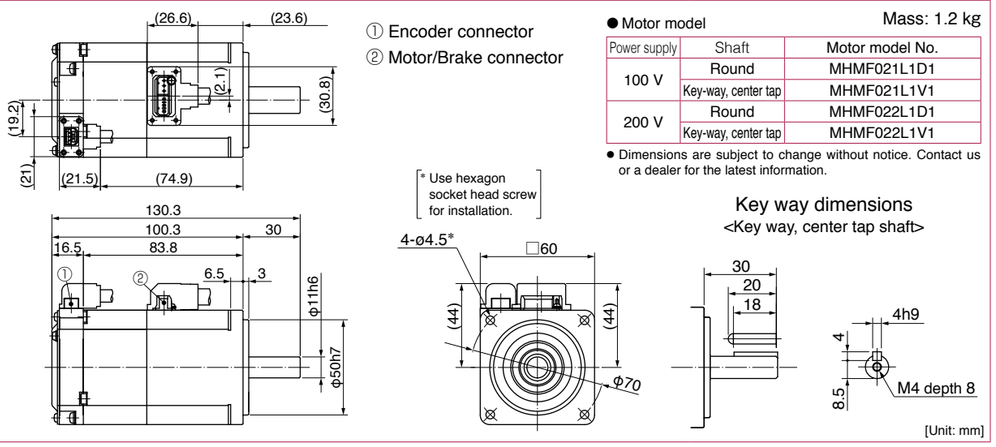
Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1B1
	Key-way, center tap	MHMF021L1T1
200 V	Round	MHMF022L1B1
	Key-way, center tap	MHMF022L1T1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · with brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 1.2 kg

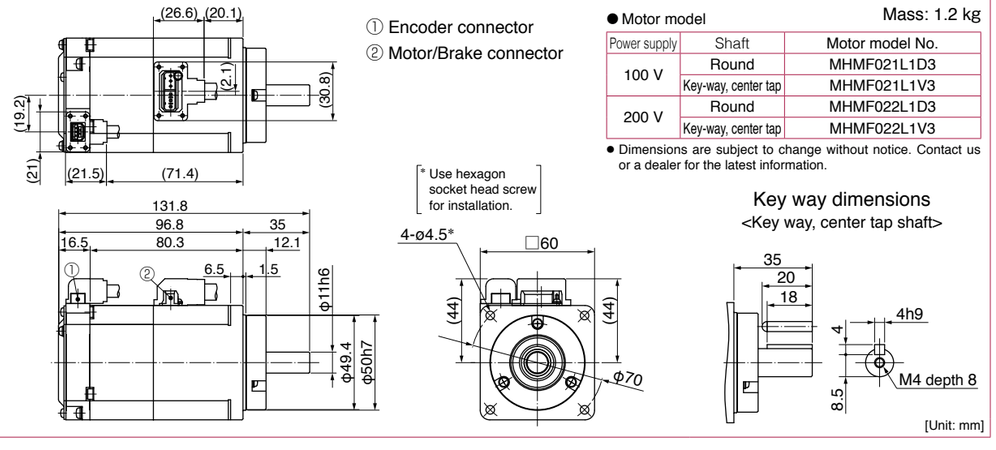
Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1D1
	Key-way, center tap	MHMF021L1V1
200 V	Round	MHMF022L1D1
	Key-way, center tap	MHMF022L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 1.2 kg

Power supply	Shaft	Motor model No.
100 V	Round	MHMF021L1D3
	Key-way, center tap	MHMF021L1V3
200 V	Round	MHMF022L1D3
	Key-way, center tap	MHMF022L1V3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.89, P.90.

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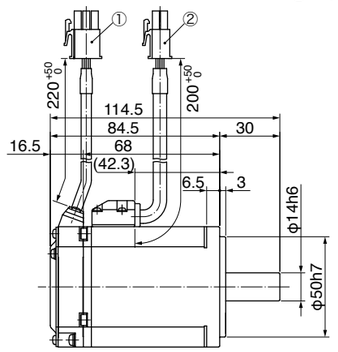
MHMF 400 W

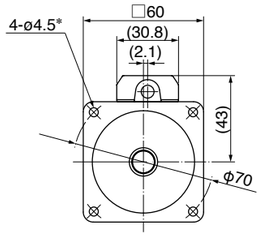
Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.1 kg

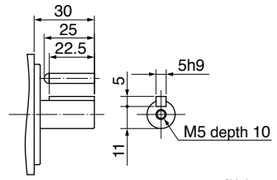
① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1A2
	Key-way, center tap	MHMF041L1S2
200 V	Round	MHMF042L1A2
	Key-way, center tap	MHMF042L1S2

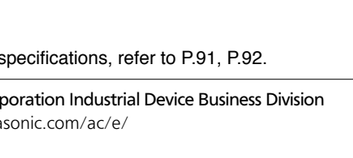
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

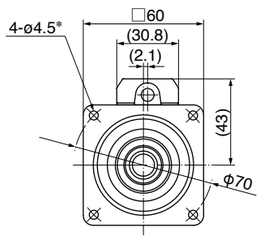
Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.2 kg

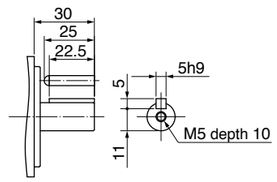
① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1C2
	Key-way, center tap	MHMF041L1U2
200 V	Round	MHMF042L1C2
	Key-way, center tap	MHMF042L1U2

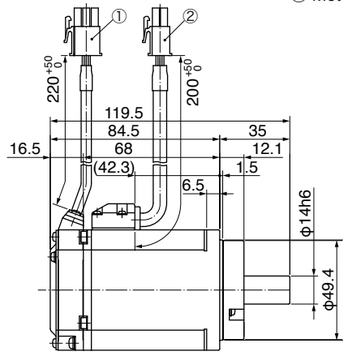
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

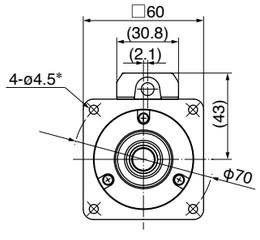
Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.2 kg

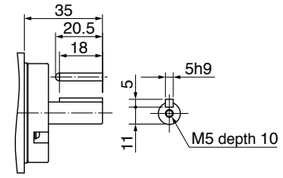
① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1C4
	Key-way, center tap	MHMF041L1U4
200 V	Round	MHMF042L1C4
	Key-way, center tap	MHMF042L1U4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.91, P.92.

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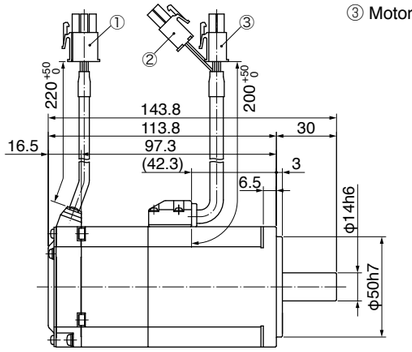
MHMF 400 W

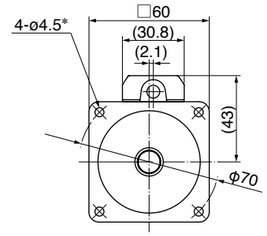
Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.5 kg

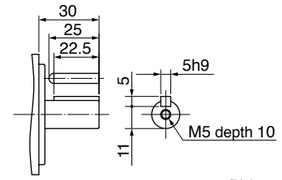
① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1B2
	Key-way, center tap	MHMF041L1T2
200 V	Round	MHMF042L1B2
	Key-way, center tap	MHMF042L1T2

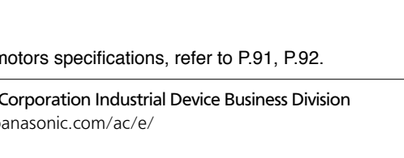
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

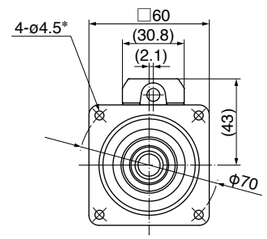
Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.6 kg

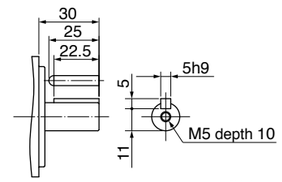
① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1D2
	Key-way, center tap	MHMF041L1V2
200 V	Round	MHMF042L1D2
	Key-way, center tap	MHMF042L1V2

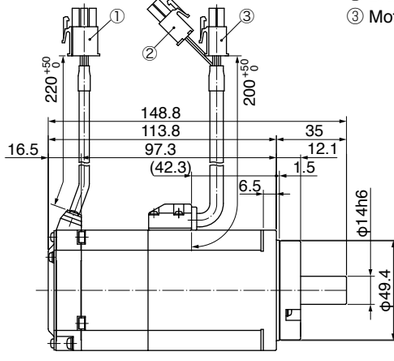
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

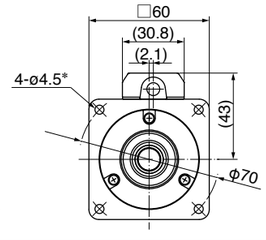
Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 1.6 kg

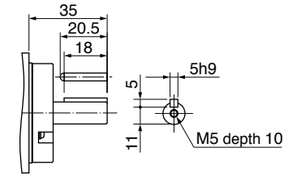
① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1D4
	Key-way, center tap	MHMF041L1V4
200 V	Round	MHMF042L1D4
	Key-way, center tap	MHMF042L1V4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.91, P.92.

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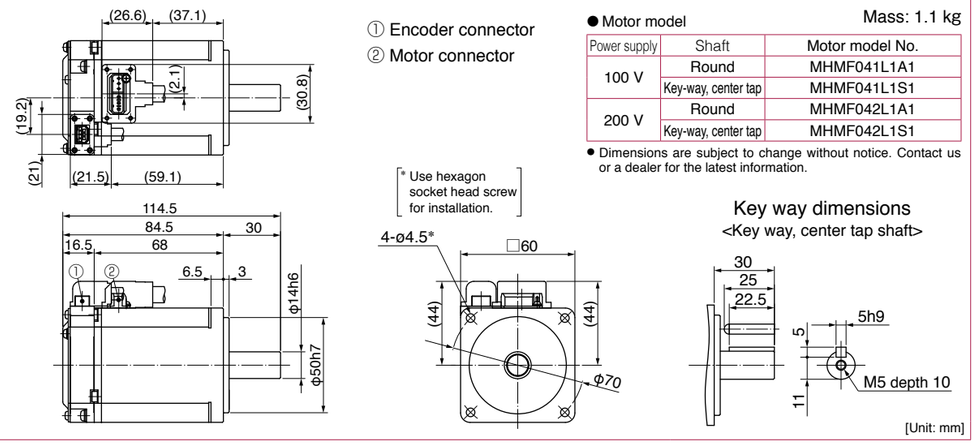
MHMF 400 W

Connector type (IP67) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

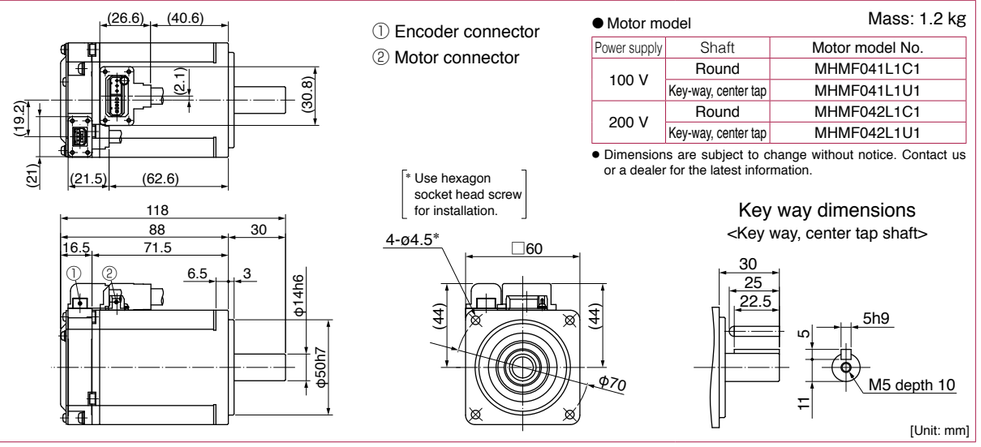
● Motor model — Mass: 1.1 kg

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1A1
	Key-way, center tap	MHMF041L1S1
200 V	Round	MHMF042L1A1
	Key-way, center tap	MHMF042L1S1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Connector type (IP67) · without brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

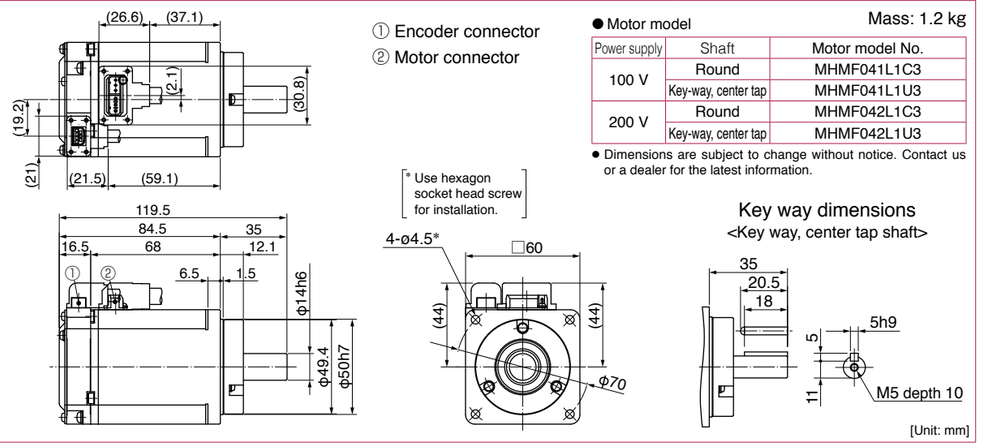
● Motor model — Mass: 1.2 kg

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1C1
	Key-way, center tap	MHMF041L1U1
200 V	Round	MHMF042L1C1
	Key-way, center tap	MHMF042L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Connector type (IP67) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

● Motor model — Mass: 1.2 kg

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1C3
	Key-way, center tap	MHMF041L1U3
200 V	Round	MHMF042L1C3
	Key-way, center tap	MHMF042L1U3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.91, P.92.

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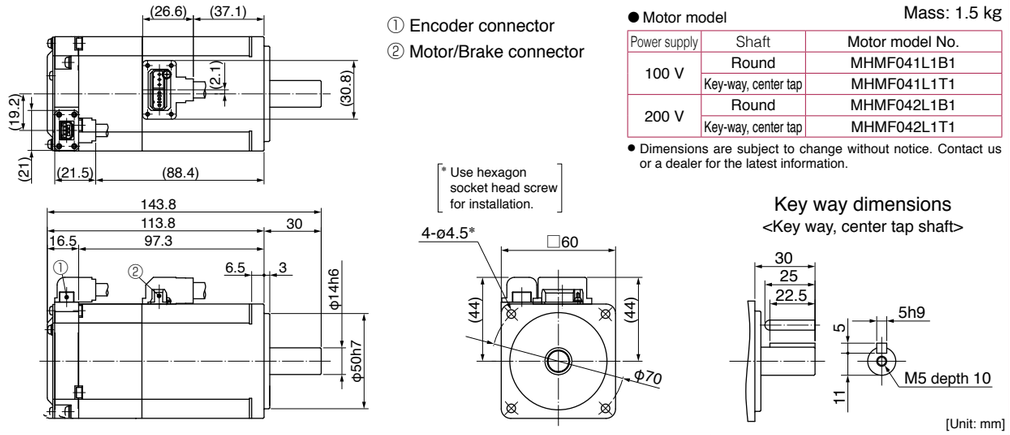
MHMF 400 W

Connector type (IP67) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

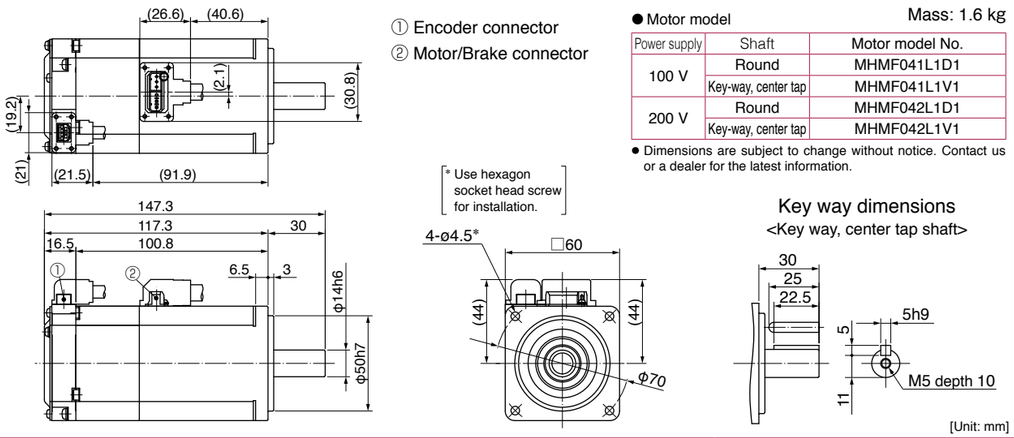
● Motor model — Mass: 1.5 kg

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1B1
	Key-way, center tap	MHMF041L1T1
200 V	Round	MHMF042L1B1
	Key-way, center tap	MHMF042L1T1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Connector type (IP67) · with brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

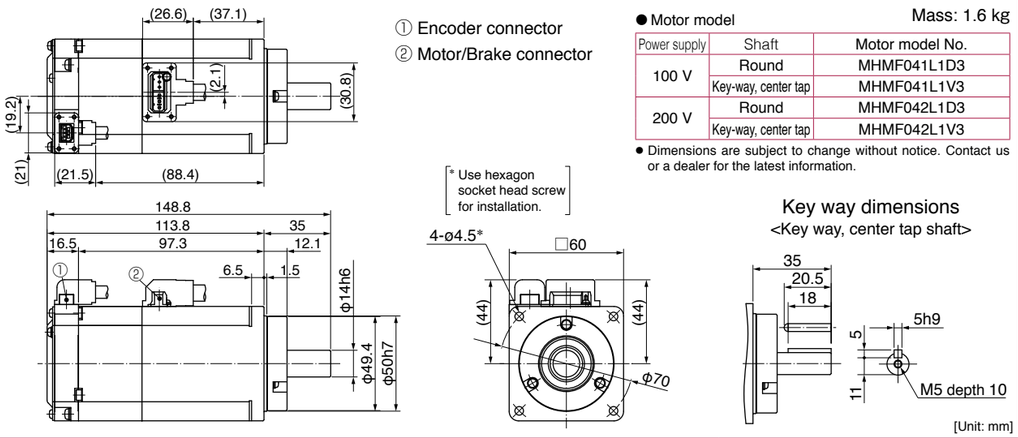
● Motor model — Mass: 1.6 kg

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1D1
	Key-way, center tap	MHMF041L1V1
200 V	Round	MHMF042L1D1
	Key-way, center tap	MHMF042L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Connector type (IP67) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 1.6 kg

Power supply	Shaft	Motor model No.
100 V	Round	MHMF041L1D3
	Key-way, center tap	MHMF041L1V3
200 V	Round	MHMF042L1D3
	Key-way, center tap	MHMF042L1V3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.91, P.92.

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MHMF 750 W

Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

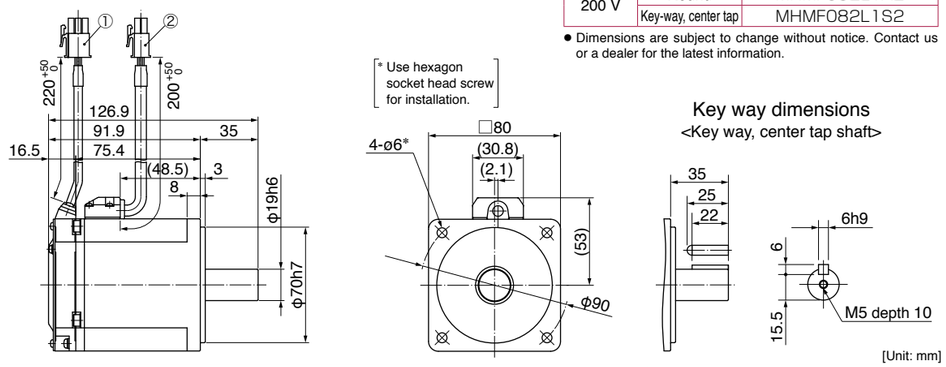
① Encoder connector
② Motor connector

Mass: 2.2 kg

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1A2
	Key-way, center tap	MHMF082L1S2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

① Encoder connector
② Motor connector

Mass: 2.3 kg

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1C2
	Key-way, center tap	MHMF082L1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

① Encoder connector
② Motor connector

Mass: 2.4 kg

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1C4
	Key-way, center tap	MHMF082L1U4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.93.

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MHMF 750 W

Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

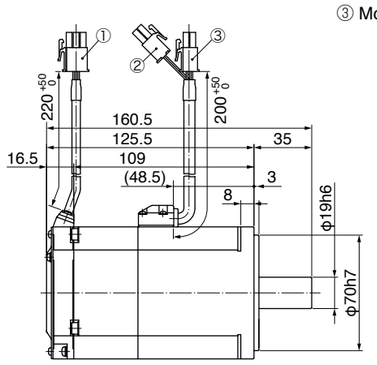
① Encoder connector
② Brake connector
③ Motor connector

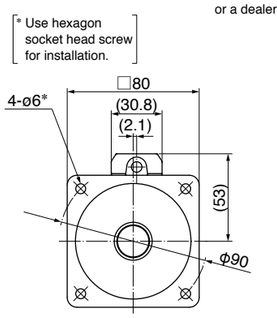
Mass: 2.9 kg

● Motor model

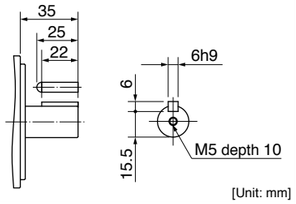
Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1B2
	Key-way, center tap	MHMF082L1T2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.





Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

① Encoder connector
② Brake connector
③ Motor connector

Mass: 3.0 kg

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1D2
	Key-way, center tap	MHMF082L1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

① Encoder connector
② Brake connector
③ Motor connector

Mass: 3.1 kg

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1D4
	Key-way, center tap	MHMF082L1V4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.93.

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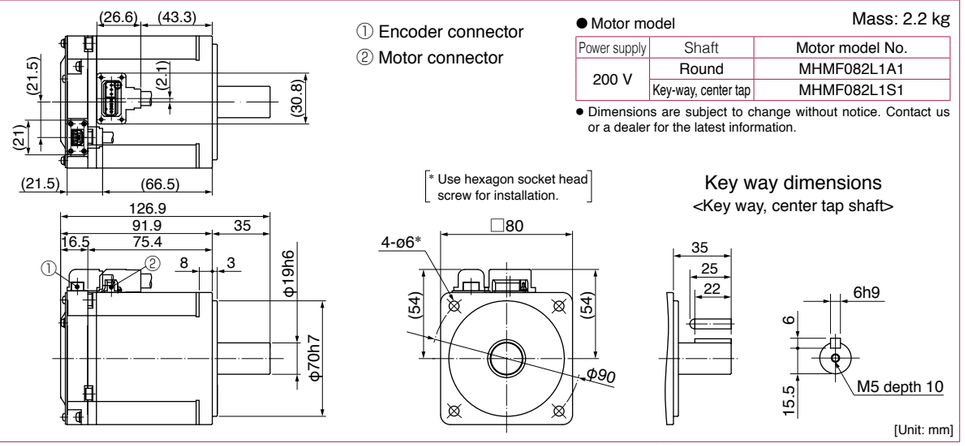
MHMF 750 W

Connector type (IP67) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

● Motor model — Mass: 2.2 kg

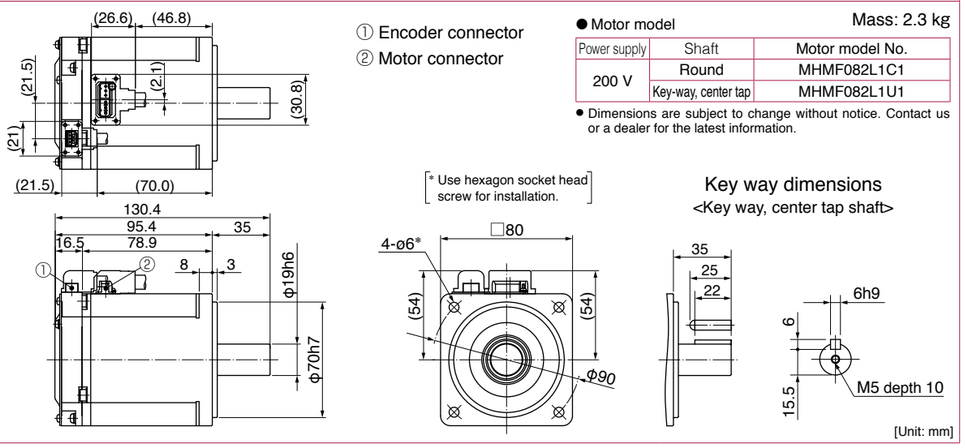
Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1A1
	Key-way, center tap	MHMF082L1S1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · without brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

● Motor model — Mass: 2.3 kg

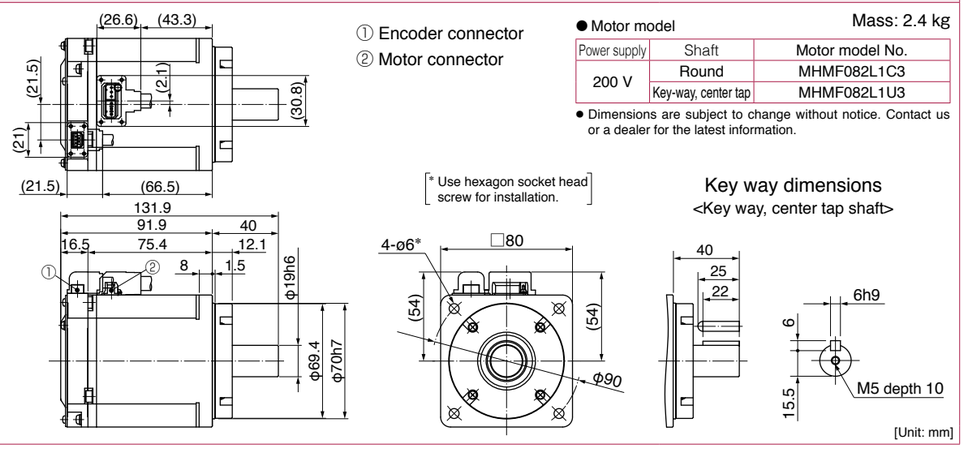
Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1C1
	Key-way, center tap	MHMF082L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 2.4 kg

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1C3
	Key-way, center tap	MHMF082L1U3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.93.

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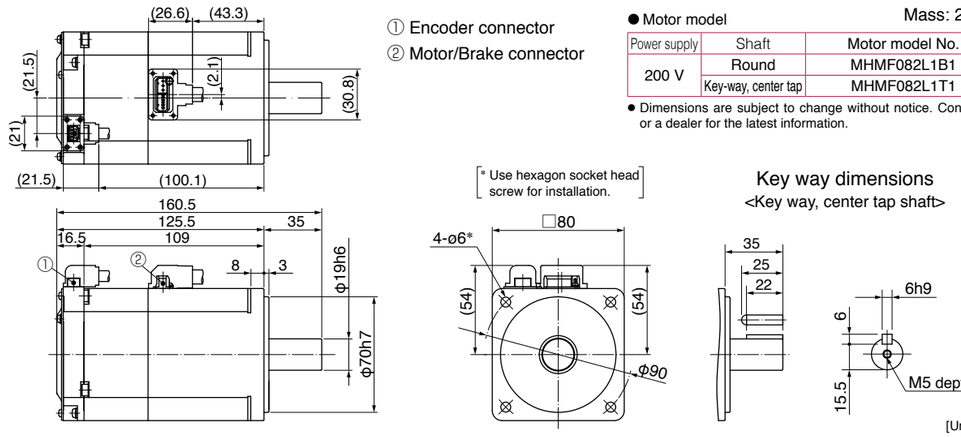
MHMF 750 W

Connector type (IP67) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 2.9 kg

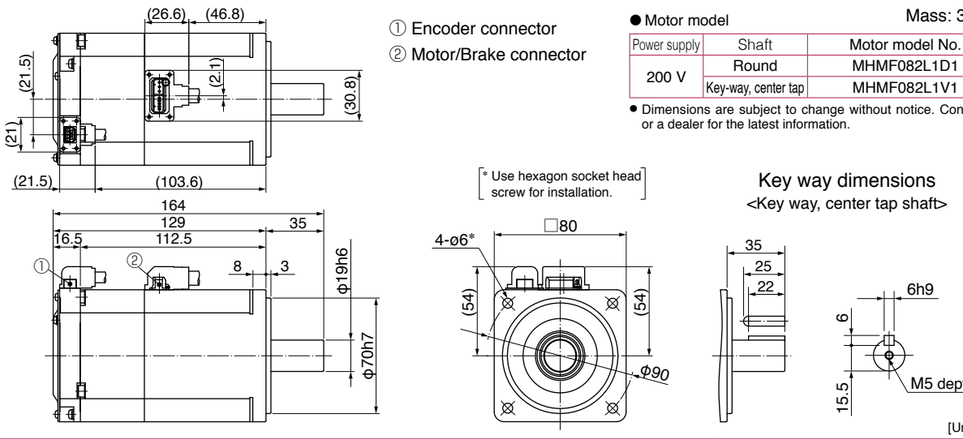
Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1B1
	Key-way, center tap	MHMF082L1T1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · with brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 3.0 kg

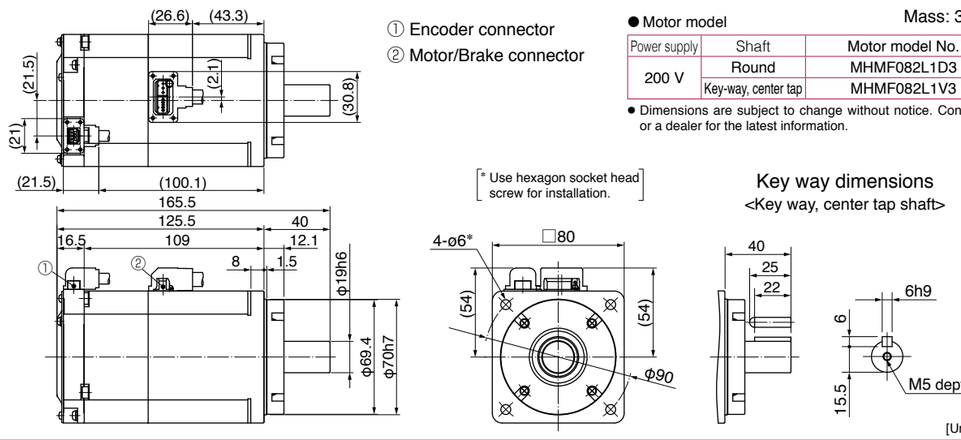
Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1D1
	Key-way, center tap	MHMF082L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Connector type (IP67) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 3.1 kg

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1D3
	Key-way, center tap	MHMF082L1V3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.93.

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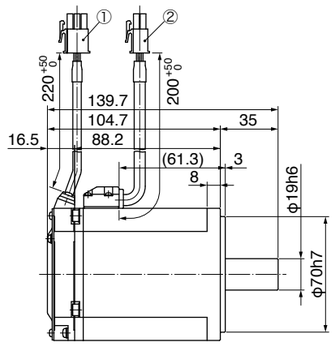
MHMF 1000 W

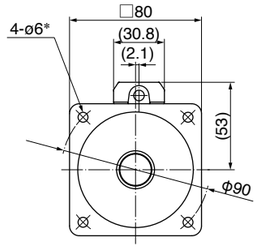
Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 2.7 kg

① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]

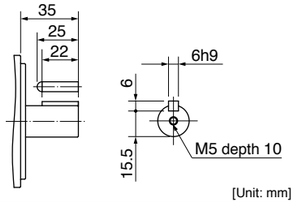


● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1A2
	Key-way, center tap	MHMF092L1S2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

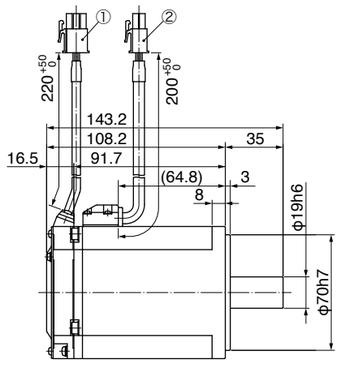


[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 2.8 kg

① Encoder connector
② Motor connector



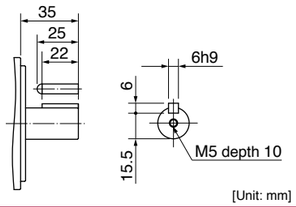
[* Use hexagon socket head screw for installation.]

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1C2
	Key-way, center tap	MHMF092L1U2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

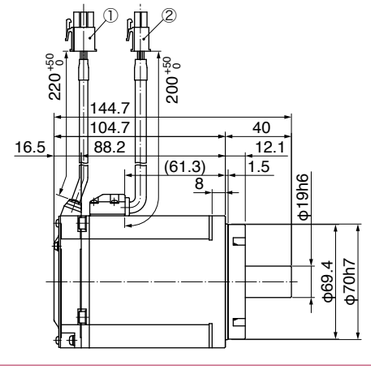


[Unit: mm]

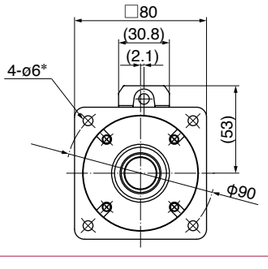
Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 2.9 kg

① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]

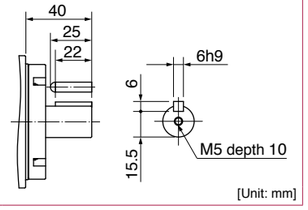


● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1C4
	Key-way, center tap	MHMF092L1U4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.94.

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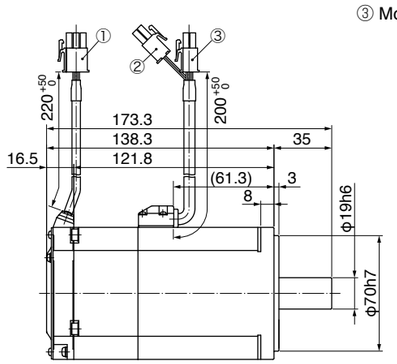
MHMF 1000 W

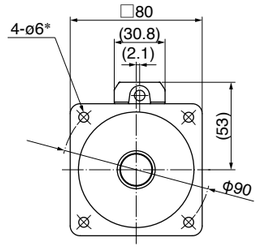
Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 3.4 kg

① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]

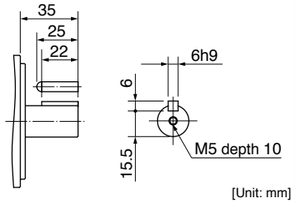


● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1B2
	Key-way, center tap	MHMF092L1T2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

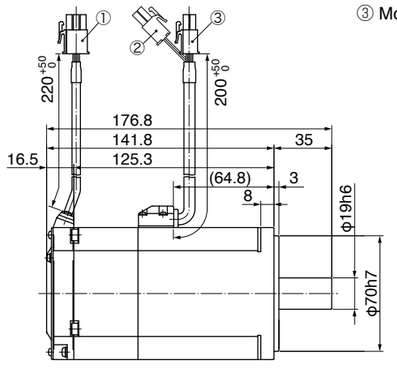


[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 3.5 kg

① Encoder connector
② Brake connector
③ Motor connector



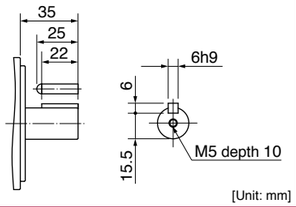
[* Use hexagon socket head screw for installation.]

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1D2
	Key-way, center tap	MHMF092L1V2

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

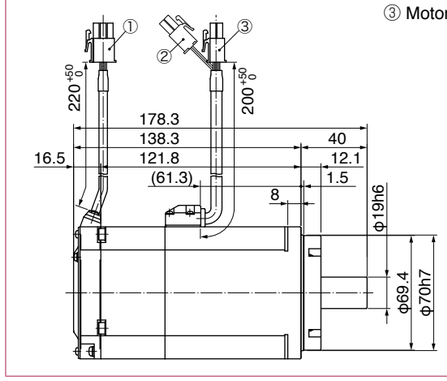


[Unit: mm]

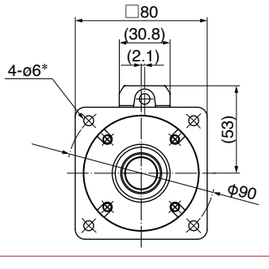
Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 3.6 kg

① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]

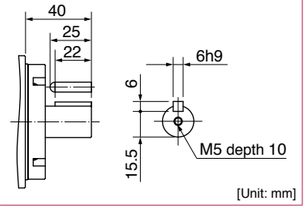


● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1D4
	Key-way, center tap	MHMF092L1V4

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.94.

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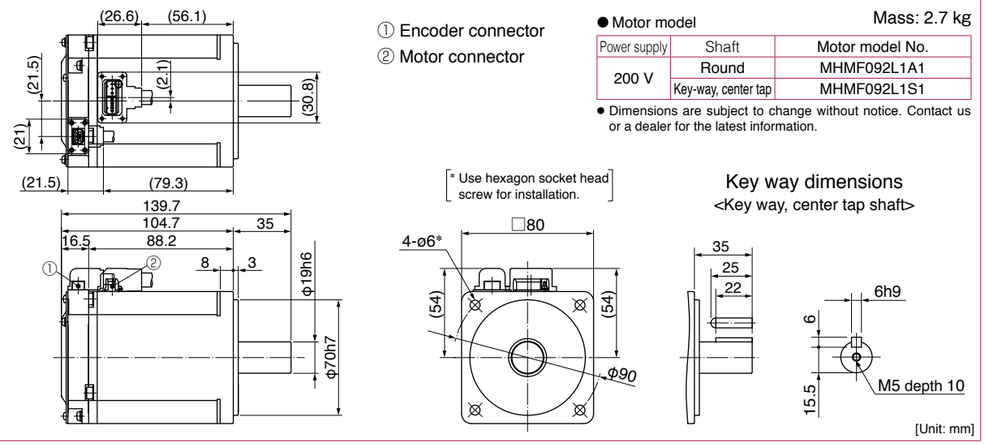
MHMF 1000 W

Connector type (IP67) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

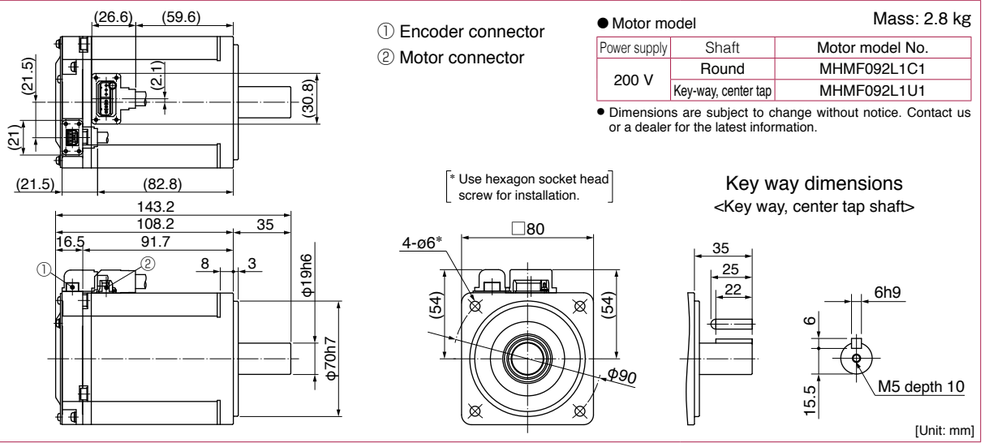
● Motor model — Mass: 2.7 kg

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1A1
	Key-way, center tap	MHMF092L1S1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Connector type (IP67) · without brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

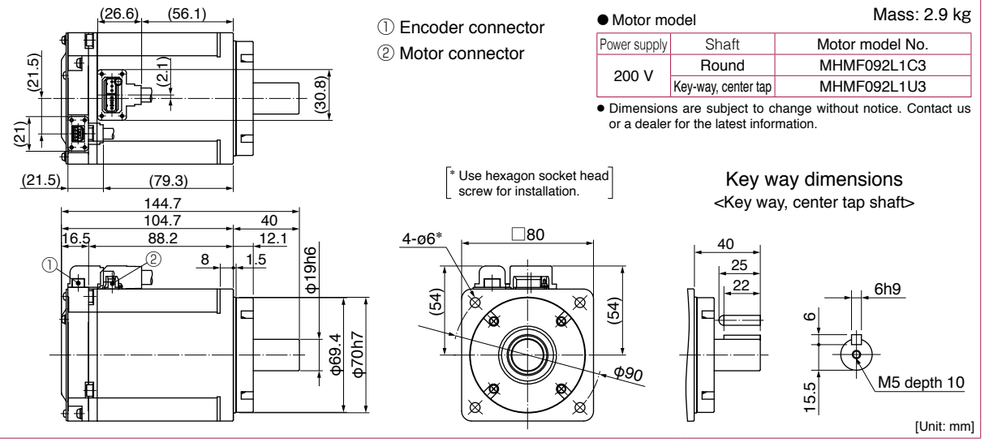
● Motor model — Mass: 2.8 kg

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1C1
	Key-way, center tap	MHMF092L1U1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Connector type (IP67) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor connector

● Motor model — Mass: 2.9 kg

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1C3
	Key-way, center tap	MHMF092L1U3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.94.

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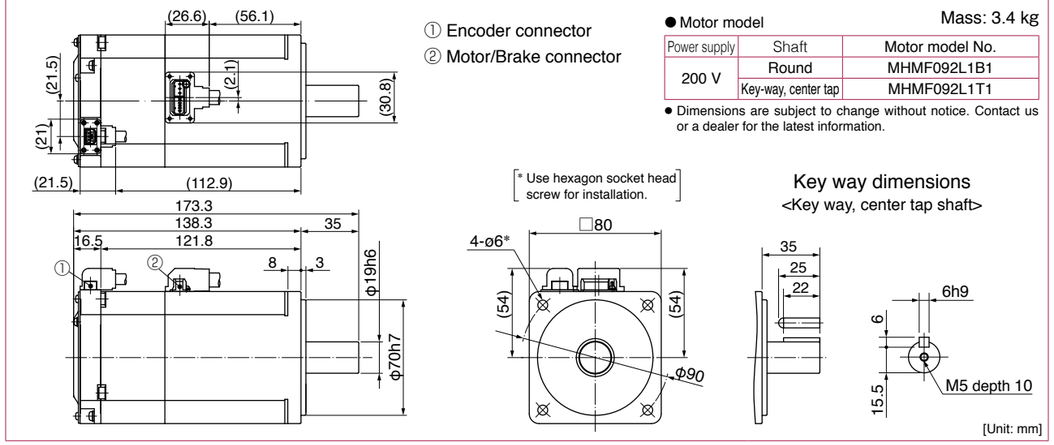
MHMF 1000 W

Connector type (IP67) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

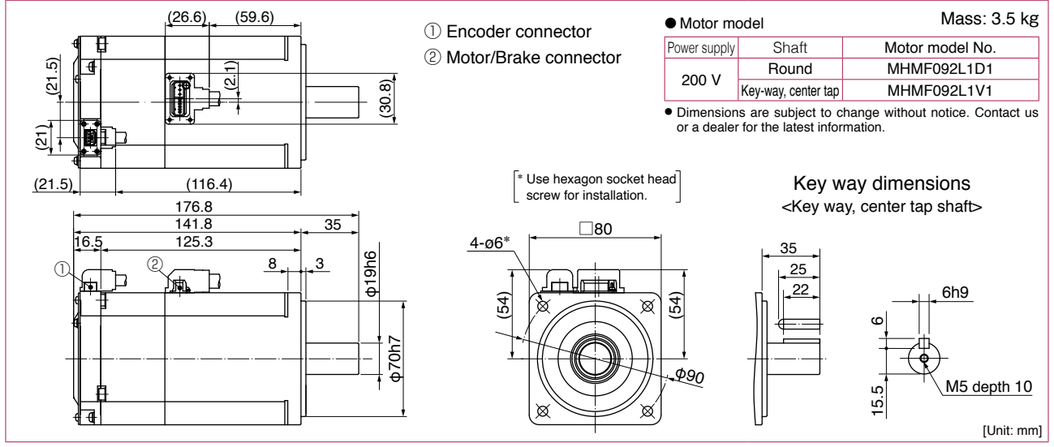
● Motor model — Mass: 3.4 kg

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1B1
	Key-way, center tap	MHMF092L1T1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Connector type (IP67) · with brake · with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

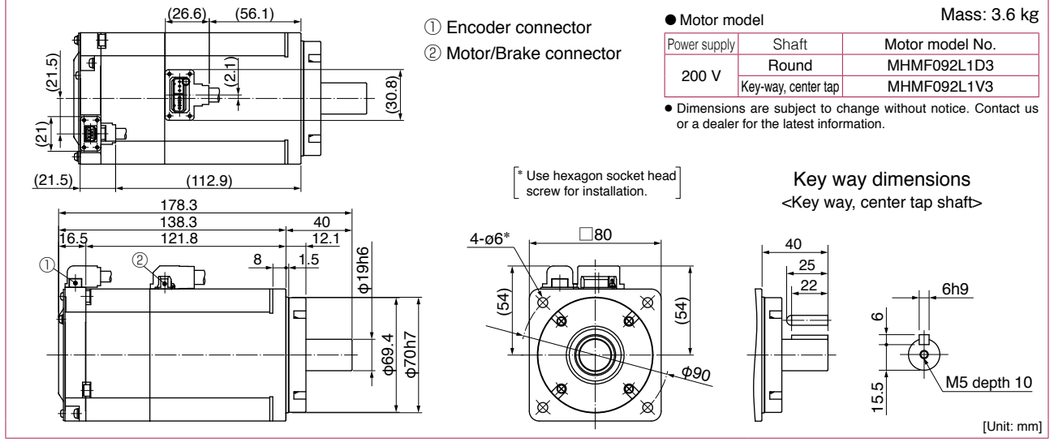
● Motor model — Mass: 3.5 kg

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1D1
	Key-way, center tap	MHMF092L1V1

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Connector type (IP67) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft



① Encoder connector
② Motor/Brake connector

● Motor model — Mass: 3.6 kg

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1D3
	Key-way, center tap	MHMF092L1V3

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.94.

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MHMF 1.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

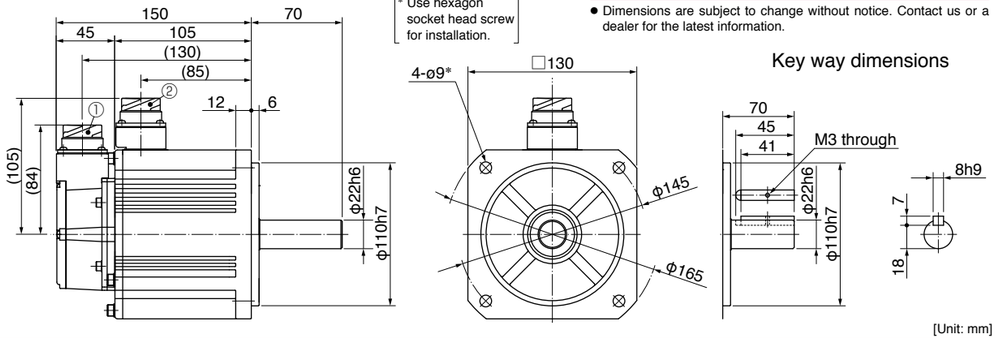
① Encoder connector (Large size JL10)
② Motor connector

Mass: 6.1 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF102L1C6	MHMF102L1C8
	Key-way	MHMF102L1G6	MHMF102L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

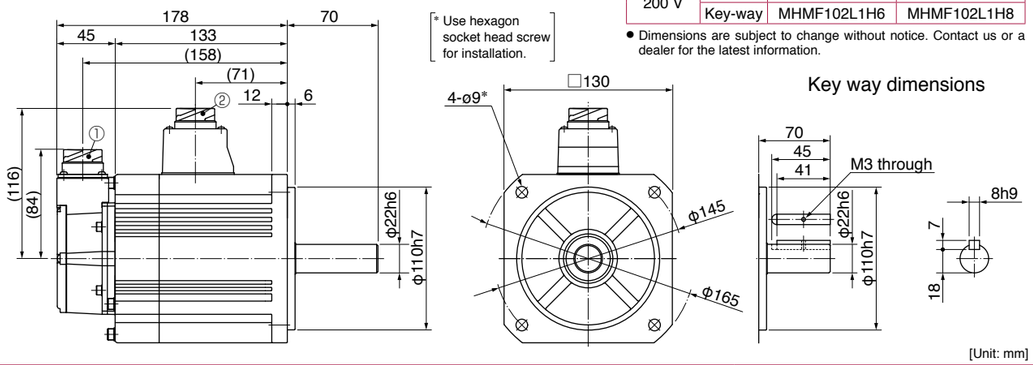
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 7.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF102L1D6	MHMF102L1D8
	Key-way	MHMF102L1H6	MHMF102L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

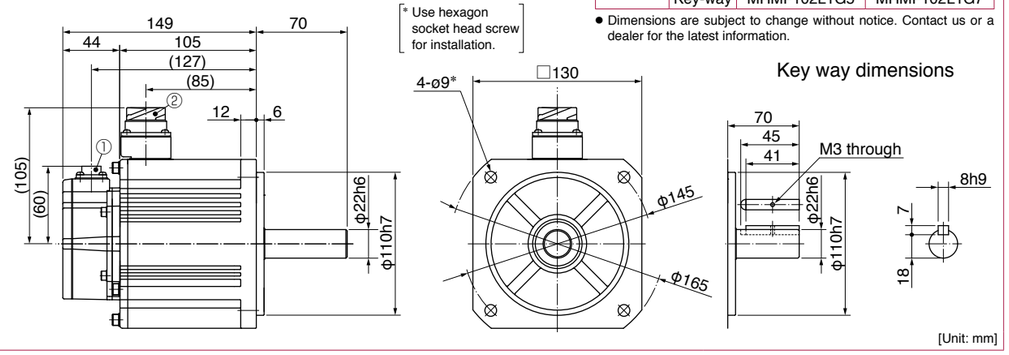
① Encoder connector (Small size JN2)
② Motor connector

Mass: 6.1 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF102L1C5	MHMF102L1C7
	Key-way	MHMF102L1G5	MHMF102L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.95.

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MHMF 1.0 kW

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

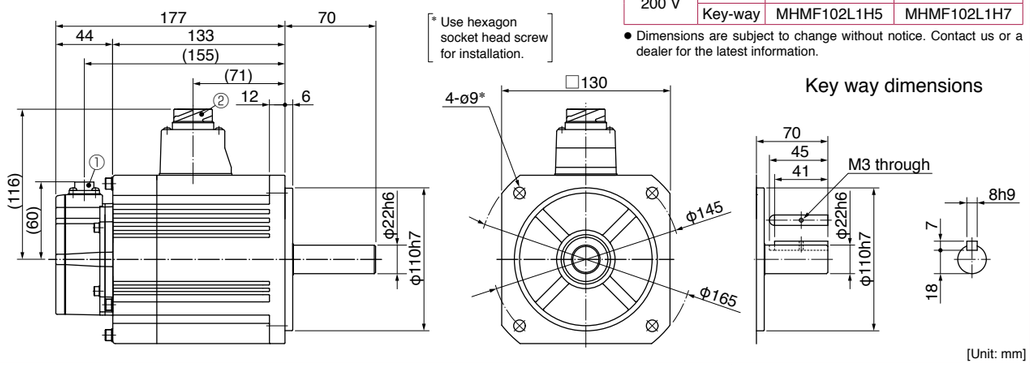
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 7.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF102L1D5	MHMF102L1D7
	Key-way	MHMF102L1H5	MHMF102L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MHMF 1.5 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

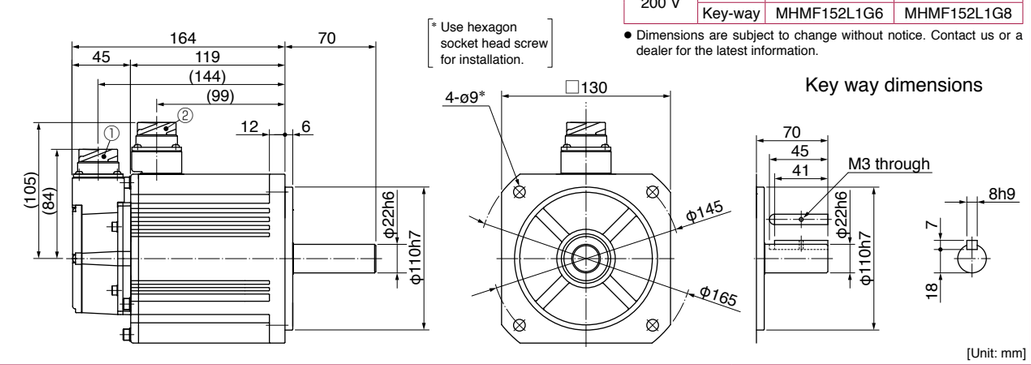
① Encoder connector (Large size JL10)
② Motor connector

Mass: 7.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF152L1C6	MHMF152L1C8
	Key-way	MHMF152L1G6	MHMF152L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

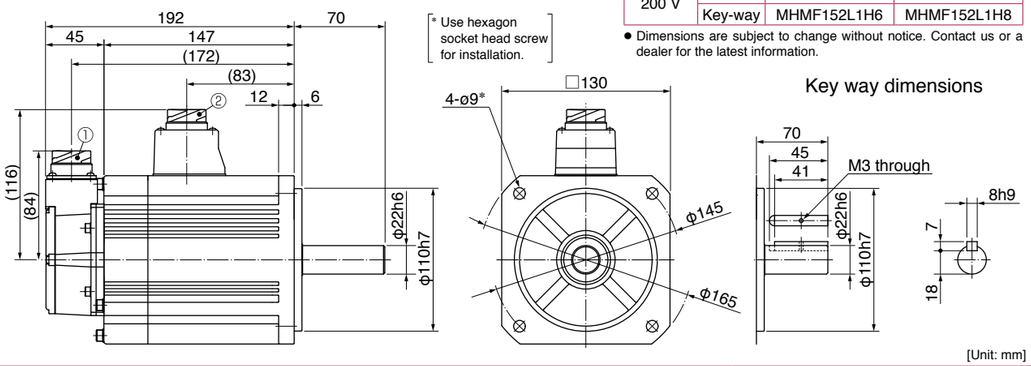
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 9.2 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF152L1D6	MHMF152L1D8
	Key-way	MHMF152L1H6	MHMF152L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.95, P.96.

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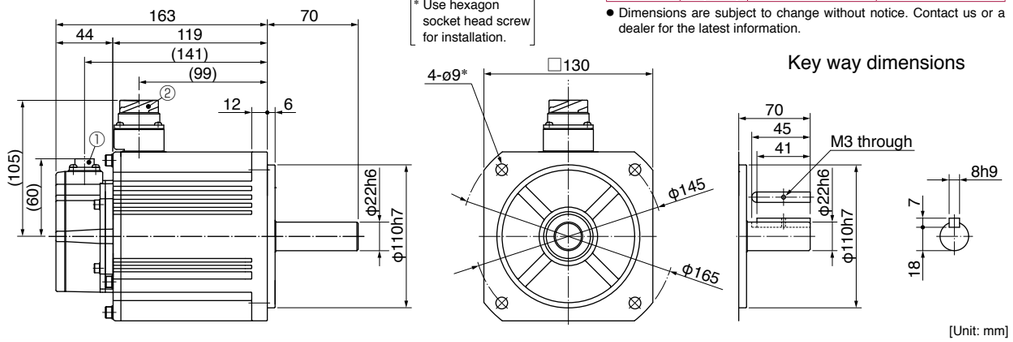
MHMF 1.5 kW

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor connector



● Motor model — Mass: 7.7 kg

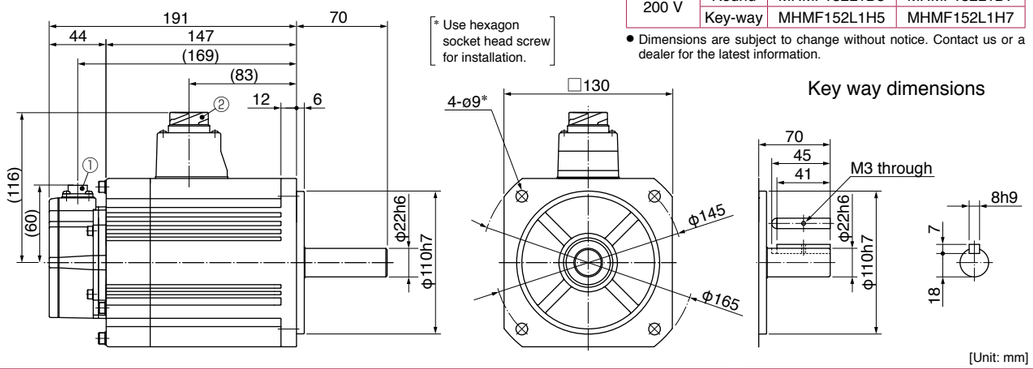
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF152L1C5	MHMF152L1C7
	Key-way	MHMF152L1G5	MHMF152L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor/Brake connector



● Motor model — Mass: 9.2 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF152L1D5	MHMF152L1D7
	Key-way	MHMF152L1H5	MHMF152L1H7

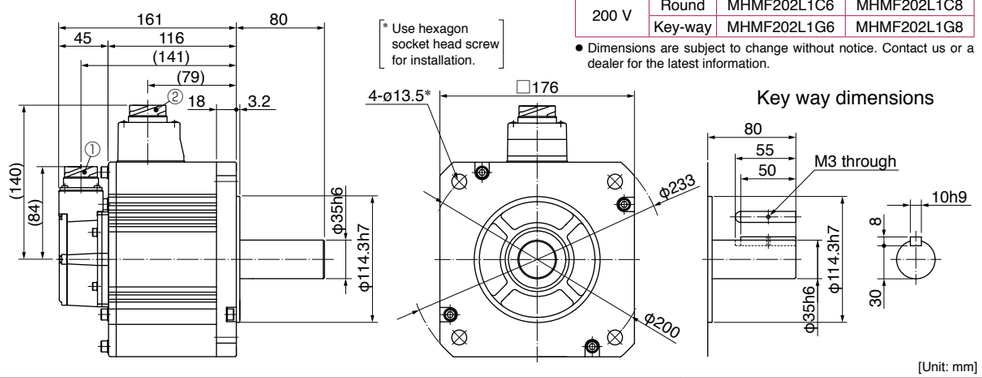
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MHMF 2.0 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model — Mass: 11.3 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF202L1C6	MHMF202L1C8
	Key-way	MHMF202L1G6	MHMF202L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.96, P.97.

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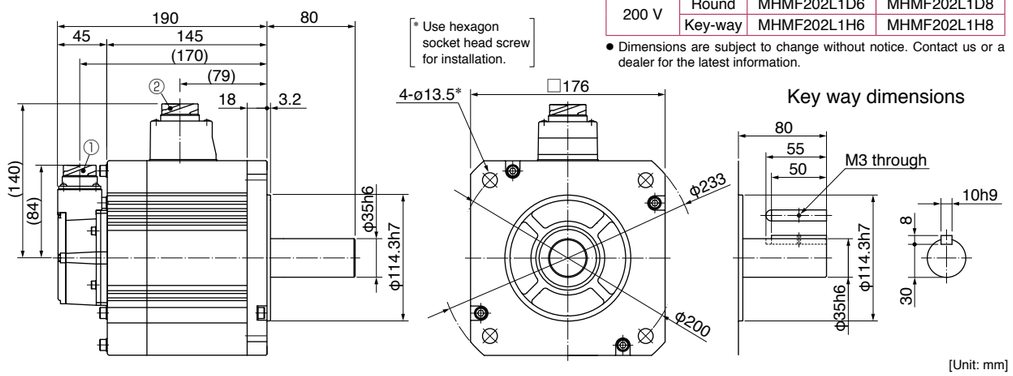
MHMF 2.0 kW

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model — Mass: 14.6 kg

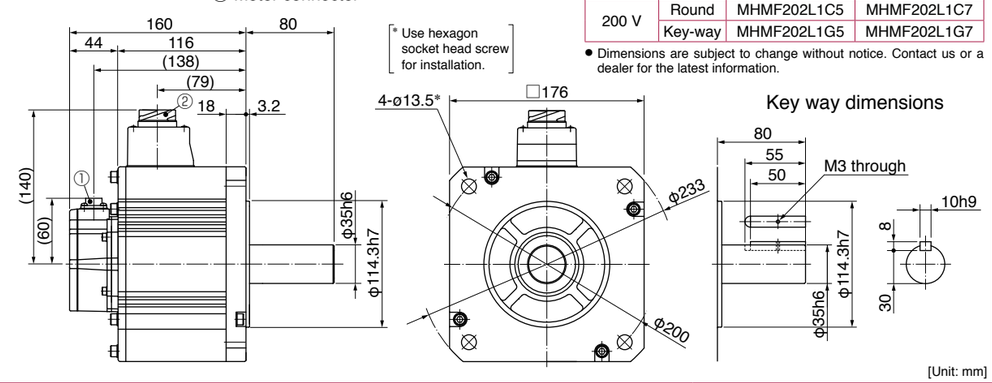
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF202L1D6	MHMF202L1D8
	Key-way	MHMF202L1H6	MHMF202L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor connector



● Motor model — Mass: 11.3 kg

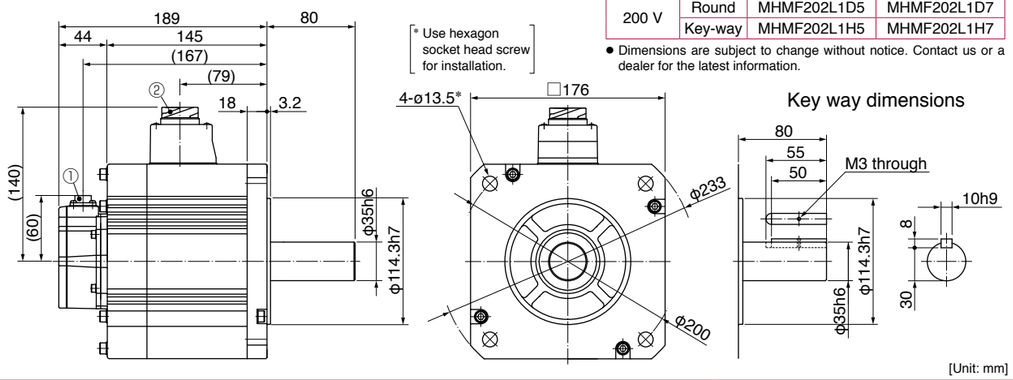
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF202L1C5	MHMF202L1C7
	Key-way	MHMF202L1G5	MHMF202L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor/Brake connector



● Motor model — Mass: 14.6 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF202L1D5	MHMF202L1D7
	Key-way	MHMF202L1H5	MHMF202L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.97.

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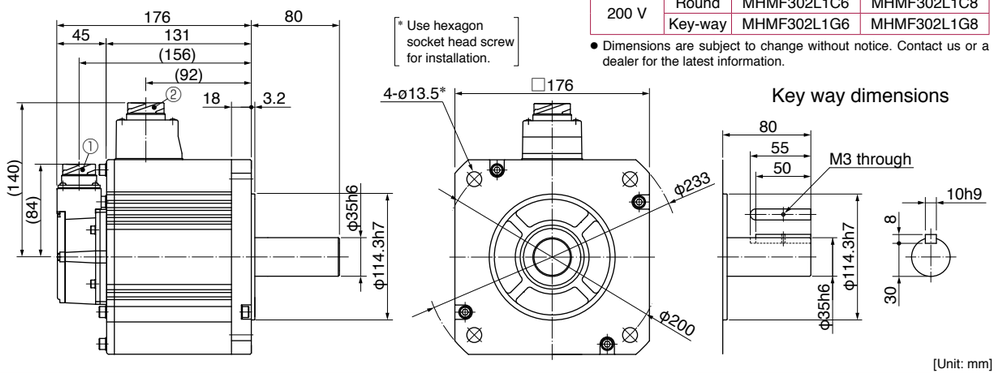
MHMF 3.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model — Mass: 13.8 kg

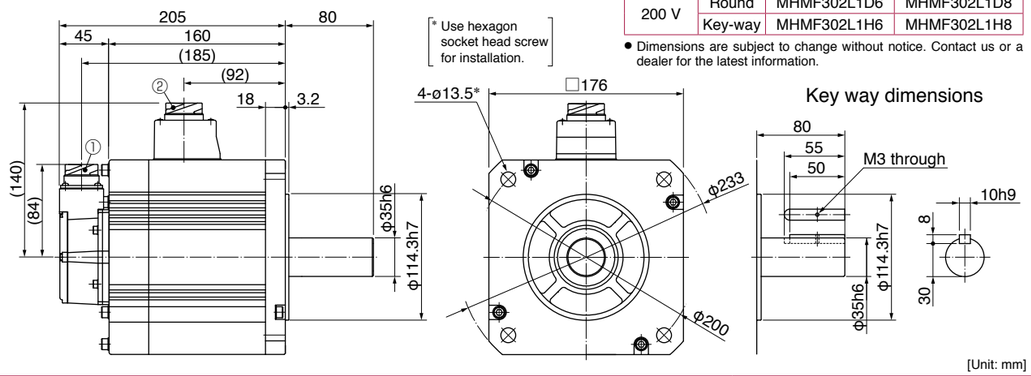
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF302L1C6	MHMF302L1C8
	Key-way	MHMF302L1G6	MHMF302L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model — Mass: 17.2 kg

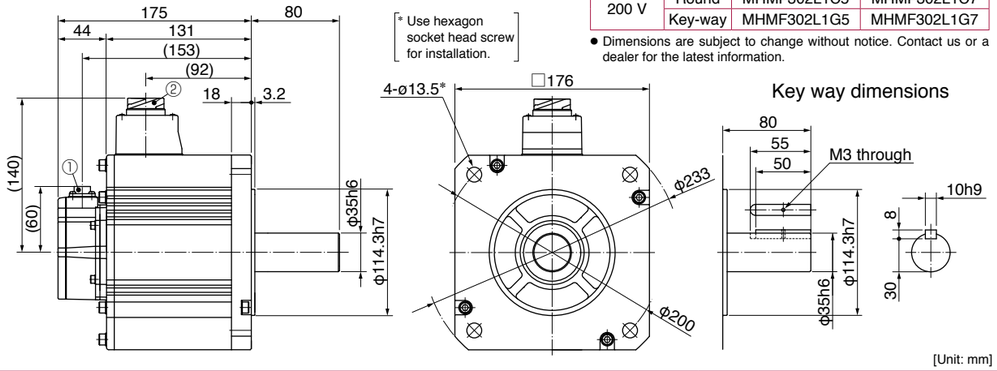
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF302L1D6	MHMF302L1D8
	Key-way	MHMF302L1H6	MHMF302L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor connector



● Motor model — Mass: 13.8 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF302L1C5	MHMF302L1C7
	Key-way	MHMF302L1G5	MHMF302L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.98.

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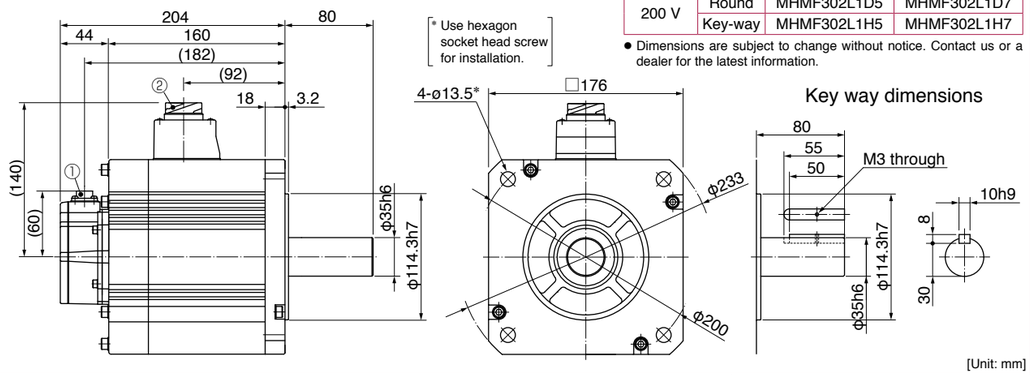
MHMF 3.0 kW

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor/Brake connector



● Motor model — Mass: 17.2 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF302L1D5	MHMF302L1D7
	Key-way	MHMF302L1H5	MHMF302L1H7

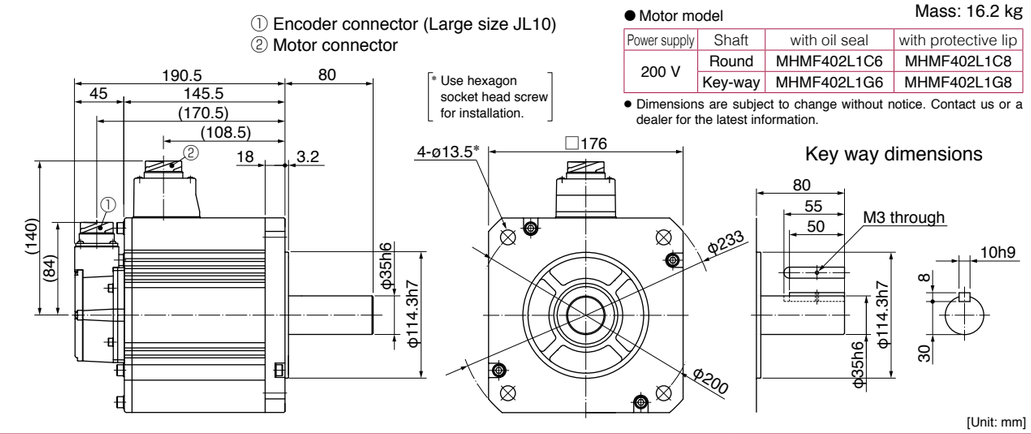
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MHMF 4.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model — Mass: 16.2 kg

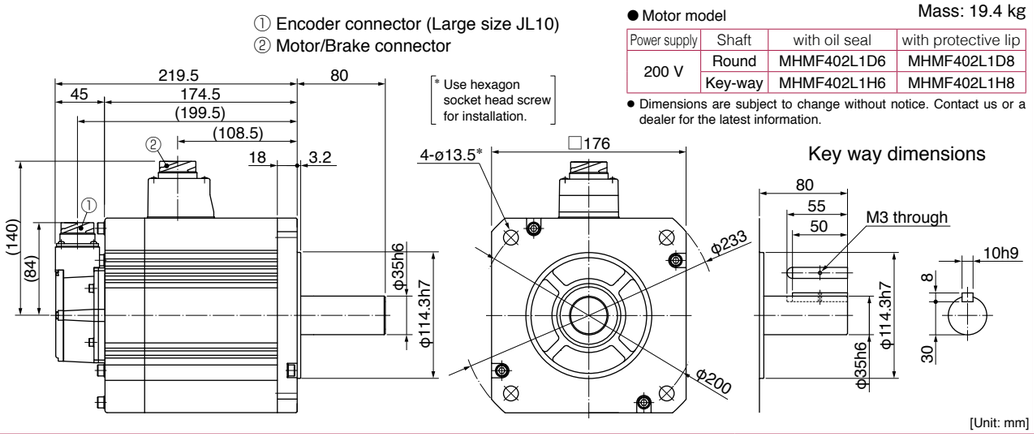
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF402L1C6	MHMF402L1C8
	Key-way	MHMF402L1G6	MHMF402L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model — Mass: 19.4 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF402L1D6	MHMF402L1D8
	Key-way	MHMF402L1H6	MHMF402L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.98, P.99.

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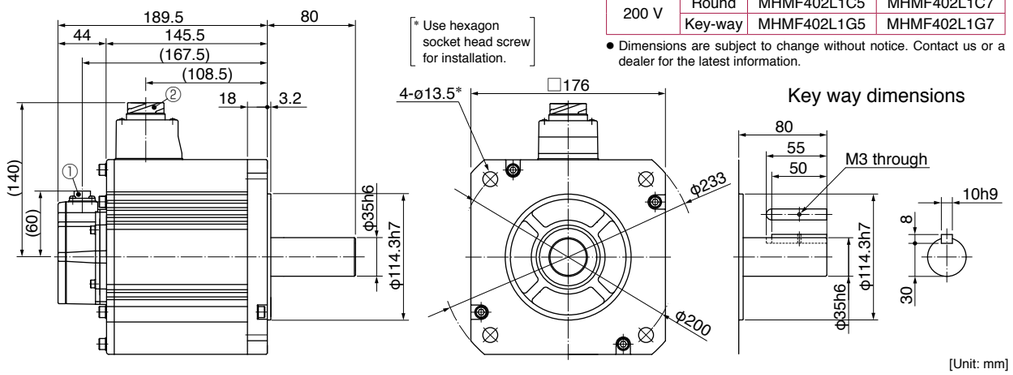
MHMF 4.0 kW

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft



● Motor model

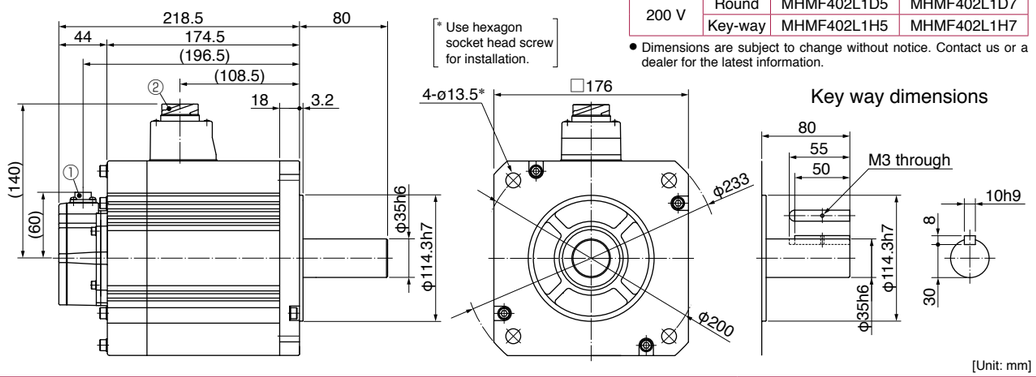
Mass: 16.2 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF402L1C5	MHMF402L1C7
	Key-way	MHMF402L1G5	MHMF402L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft



● Motor model

Mass: 19.4 kg

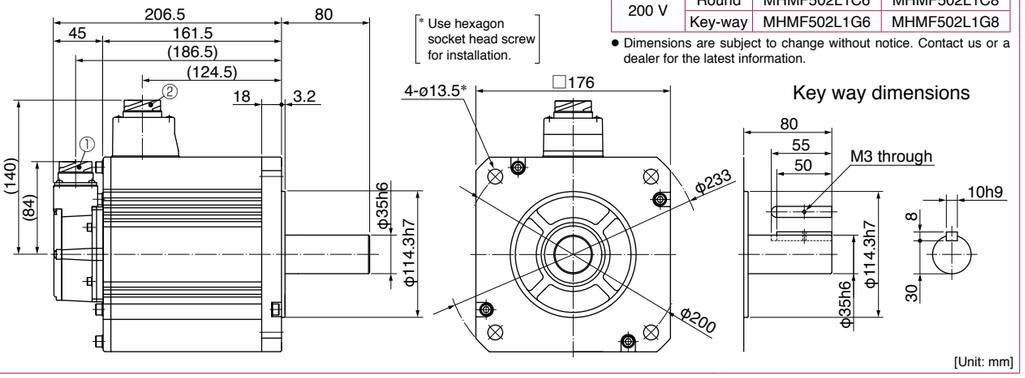
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF402L1D5	MHMF402L1D7
	Key-way	MHMF402L1H5	MHMF402L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MHMF 5.0 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft



● Motor model

Mass: 19.6 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF502L1C6	MHMF502L1C8
	Key-way	MHMF502L1G6	MHMF502L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.99, P.100.

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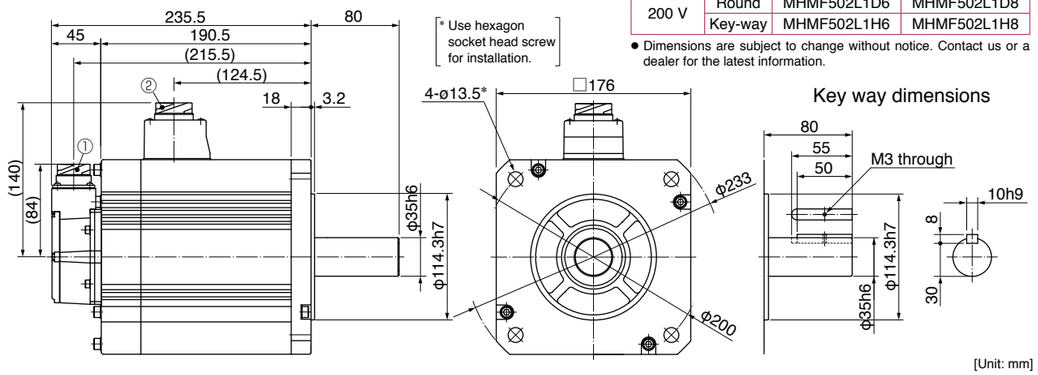
MHMF 5.0 kW

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft



● Motor model

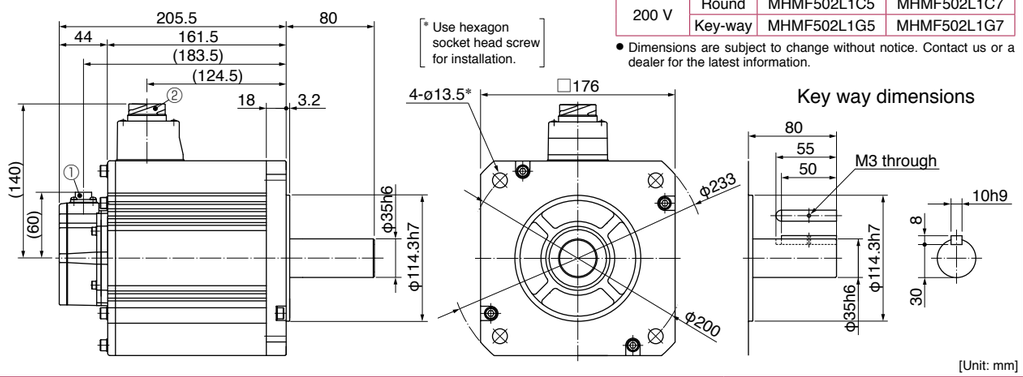
Mass: 22.8 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF502L1D6	MHMF502L1D8
	Key-way	MHMF502L1H6	MHMF502L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft



● Motor model

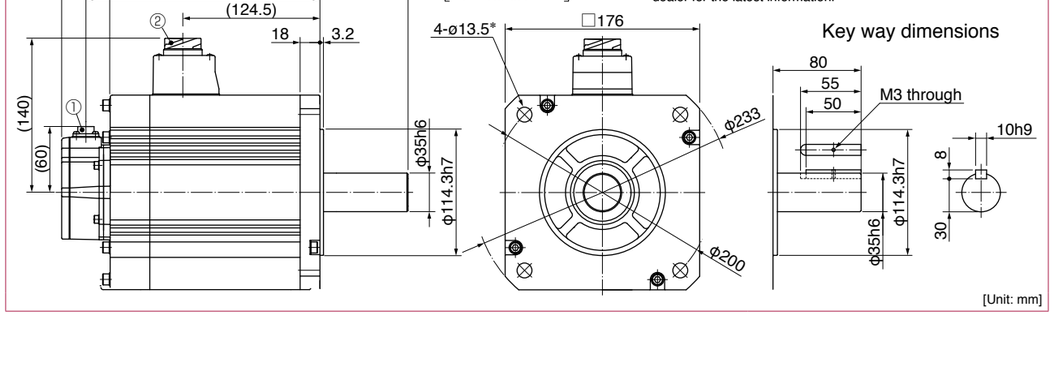
Mass: 19.6 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF502L1C5	MHMF502L1C7
	Key-way	MHMF502L1G5	MHMF502L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft



● Motor model

Mass: 22.8 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF502L1D5	MHMF502L1D7
	Key-way	MHMF502L1H5	MHMF502L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.100.

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MHMF 7.5 kW

Large size connector (JL10) type · without brake · with oil seal · Key way shaft/ Round shaft

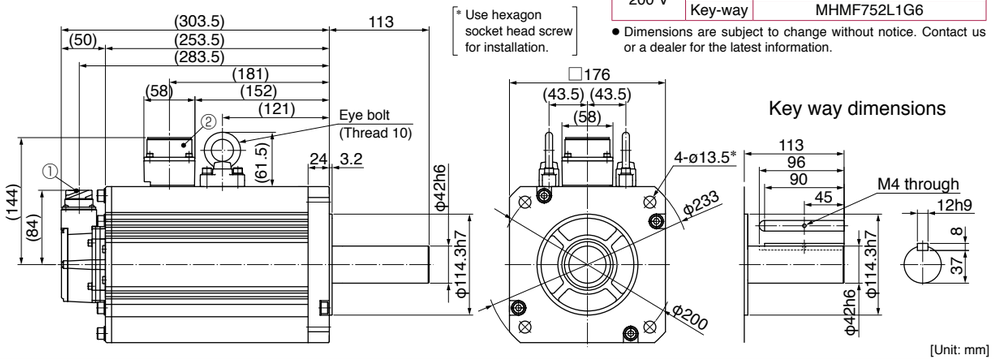
① Encoder connector (Large size JL10)
② Motor connector

Mass: 34.8 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MHMF752L1C6
	Key-way	MHMF752L1G6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type · with brake · with oil seal · Key way shaft/ Round shaft

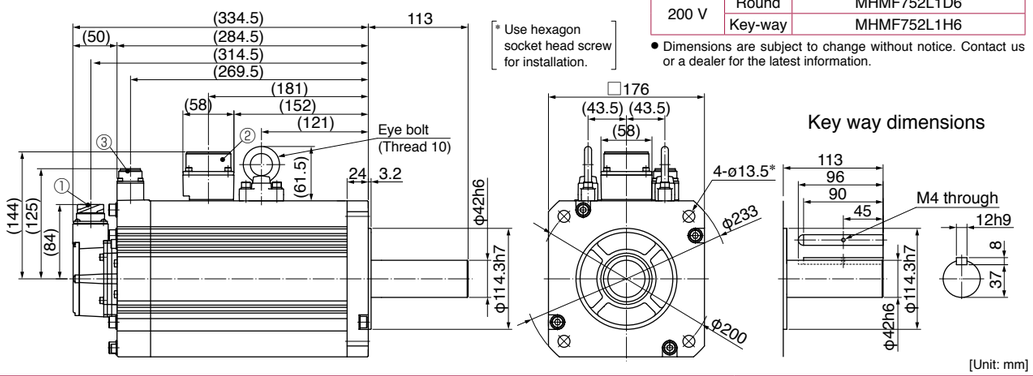
① Encoder connector (Large size JL10)
② Motor connector ③ Brake connector

Mass: 38.9 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MHMF752L1D6
	Key-way	MHMF752L1H6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · without brake · with oil seal · Key way shaft/ Round shaft

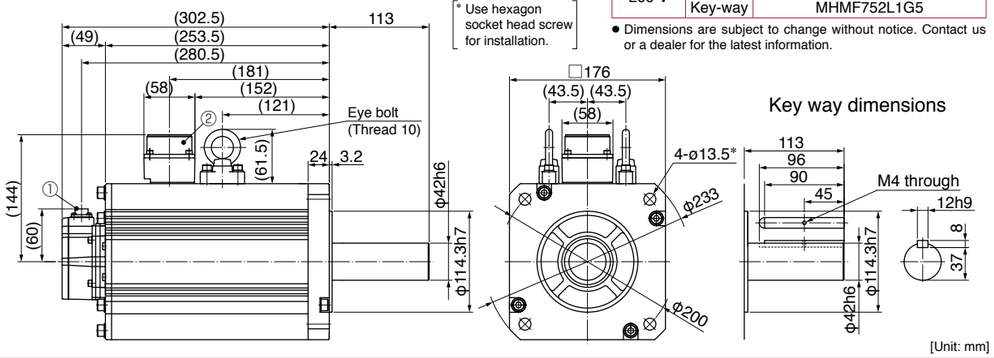
① Encoder connector (Small size JN2)
② Motor connector

Mass: 34.8 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MHMF752L1C5
	Key-way	MHMF752L1G5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.101.

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MHMF 7.5 kW

Small size connector (JN2) type · with brake · with oil seal · Key way shaft/ Round shaft

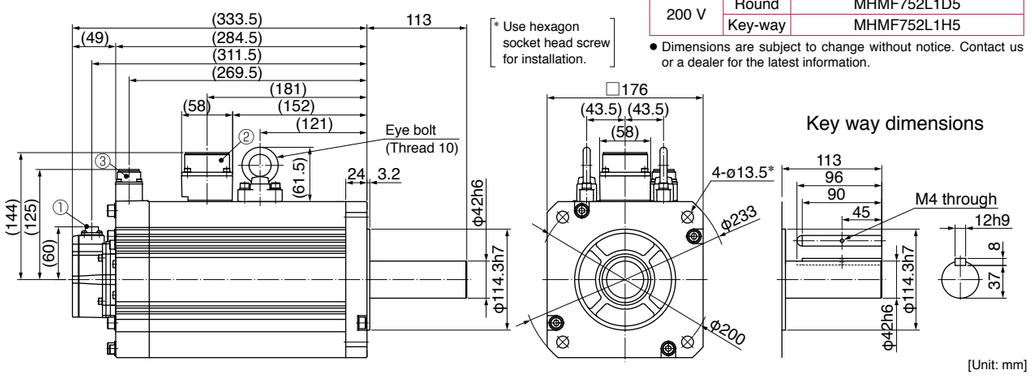
① Encoder connector (Small size JN2)
② Motor connector ③ Brake connector

Mass: 38.9 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MHMF752L1D5
	Key-way	MHMF752L1H5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MDMF 1.0 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

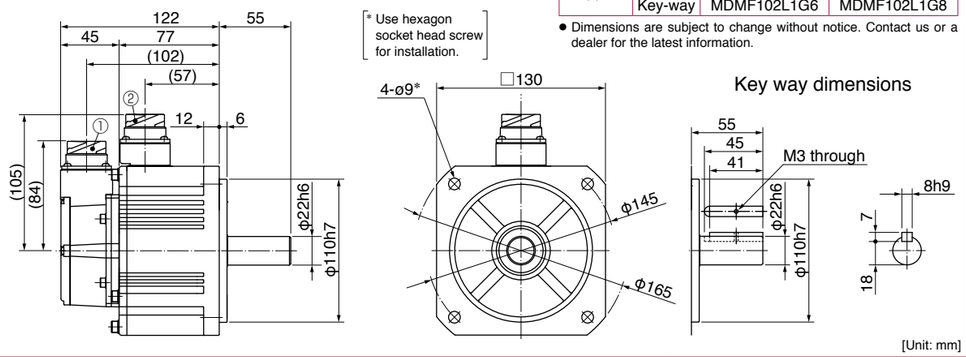
① Encoder connector (Large size JL10)
② Motor connector

Mass: 4.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF102L1C6	MDMF102L1C8
	Key-way	MDMF102L1G6	MDMF102L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

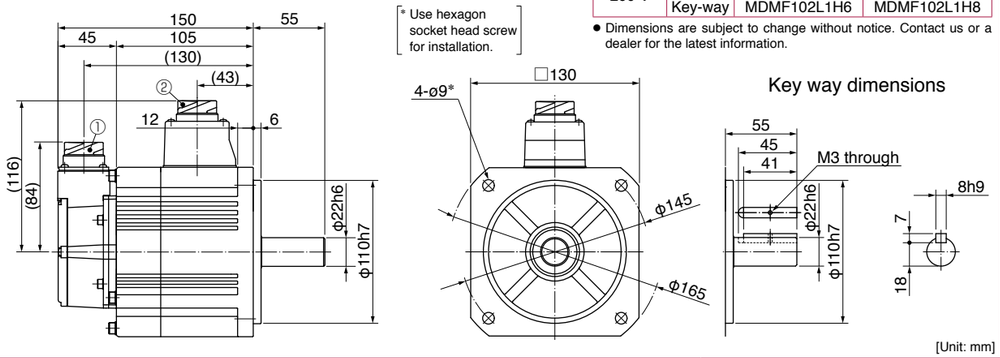
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 6.1 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF102L1D6	MDMF102L1D8
	Key-way	MDMF102L1H6	MDMF102L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.101, P.102.

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MDMF 1.0 kW

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

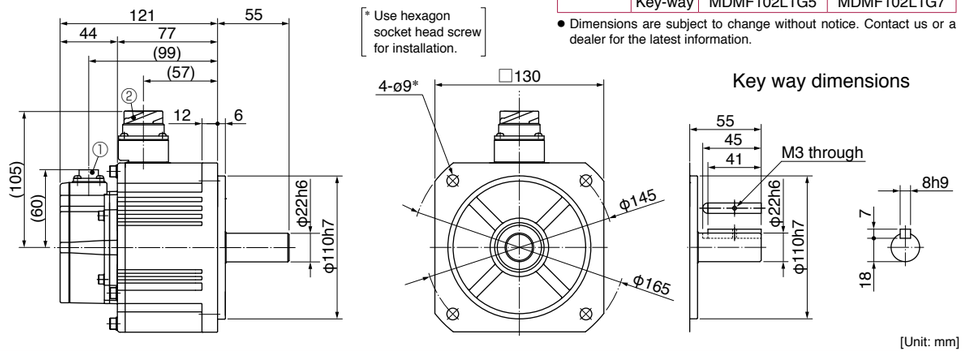
① Encoder connector (Small size JN2)
② Motor connector

Mass: 4.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF102L1C5	MDMF102L1C7
	Key-way	MDMF102L1G5	MDMF102L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

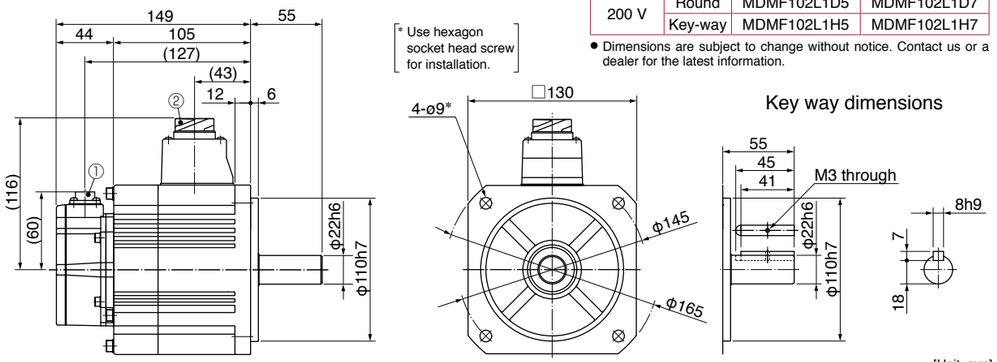
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 6.1 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF102L1D5	MDMF102L1D7
	Key-way	MDMF102L1H5	MDMF102L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MDMF 1.5 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

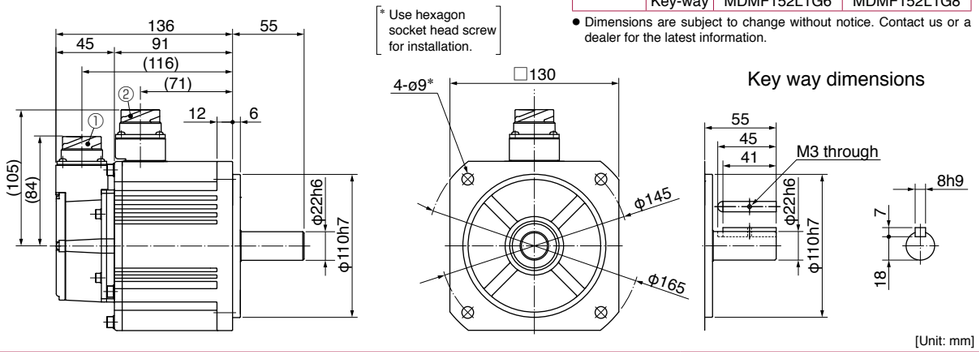
① Encoder connector (Large size JL10)
② Motor connector

Mass: 5.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF152L1C6	MDMF152L1C8
	Key-way	MDMF152L1G6	MDMF152L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.102, P.103.

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MDMF 1.5 kW

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

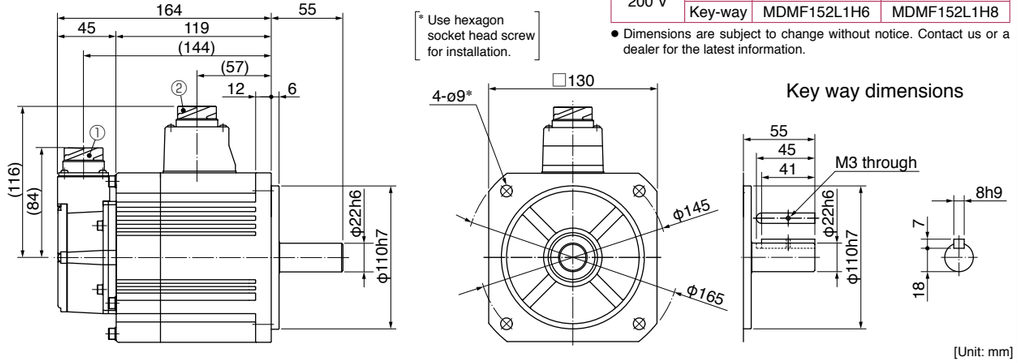
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 7.2 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF152L1D6	MDMF152L1D8
	Key-way	MDMF152L1H6	MDMF152L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

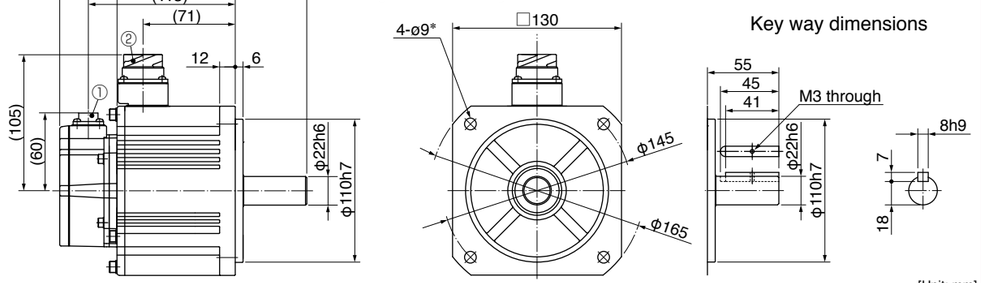
① Encoder connector (Small size JN2)
② Motor connector

Mass: 5.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF152L1C5	MDMF152L1C7
	Key-way	MDMF152L1G5	MDMF152L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

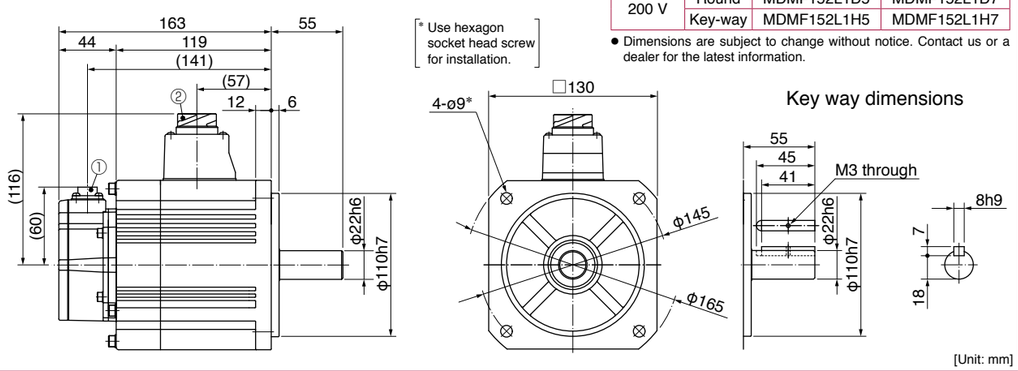
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 7.2 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF152L1D5	MDMF152L1D7
	Key-way	MDMF152L1H5	MDMF152L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.103.

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MDMF 2.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

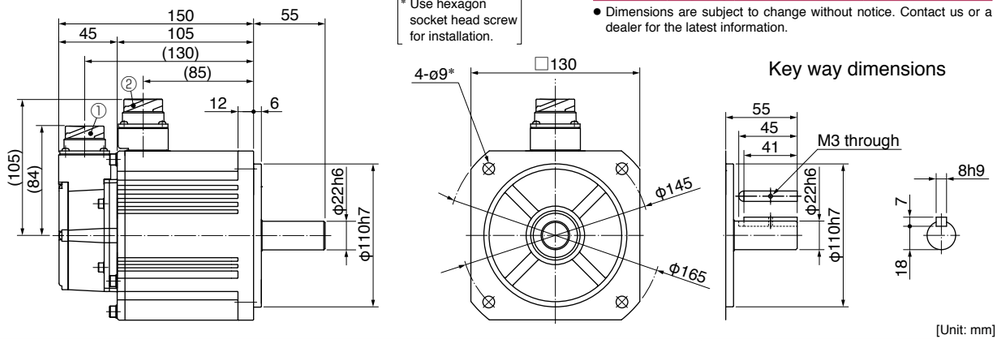
① Encoder connector (Large size JL10)
② Motor connector

Mass: 6.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF202L1C6	MDMF202L1C8
	Key-way	MDMF202L1G6	MDMF202L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

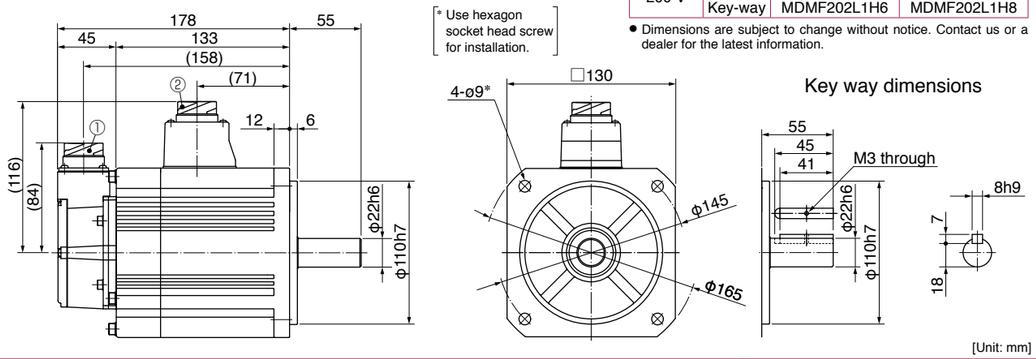
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 8.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF202L1D6	MDMF202L1D8
	Key-way	MDMF202L1H6	MDMF202L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

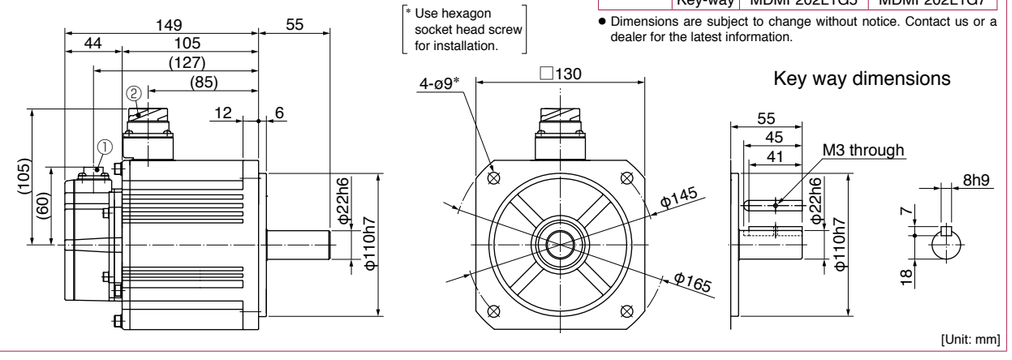
① Encoder connector (Small size JN2)
② Motor connector

Mass: 6.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF202L1C5	MDMF202L1C7
	Key-way	MDMF202L1G5	MDMF202L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.104.

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MDMF 2.0 kW

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

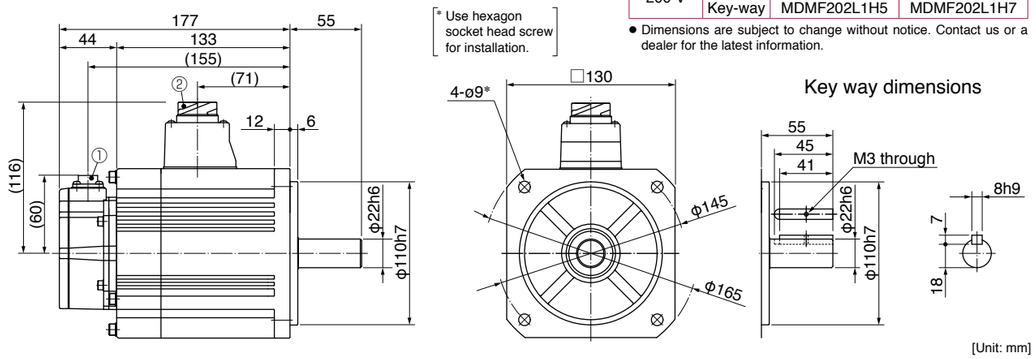
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 8.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF202L1D5	MDMF202L1D7
	Key-way	MDMF202L1H5	MDMF202L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MDMF 3.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

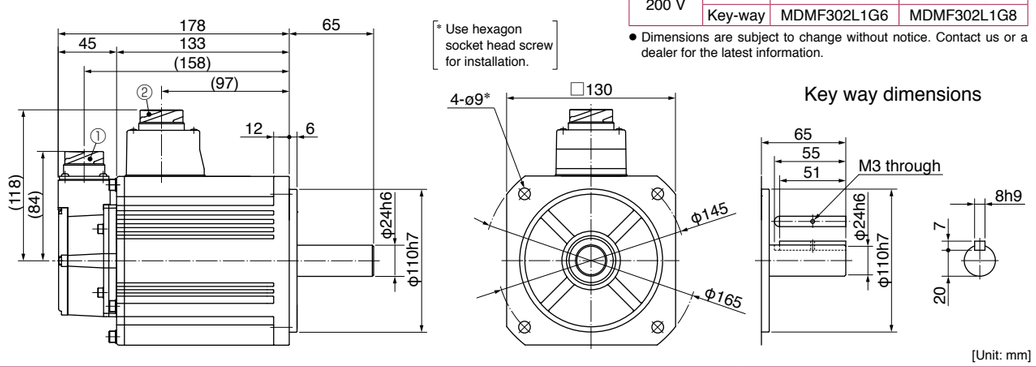
① Encoder connector (Large size JL10)
② Motor connector

Mass: 9.3 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF302L1C6	MDMF302L1C8
	Key-way	MDMF302L1G6	MDMF302L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

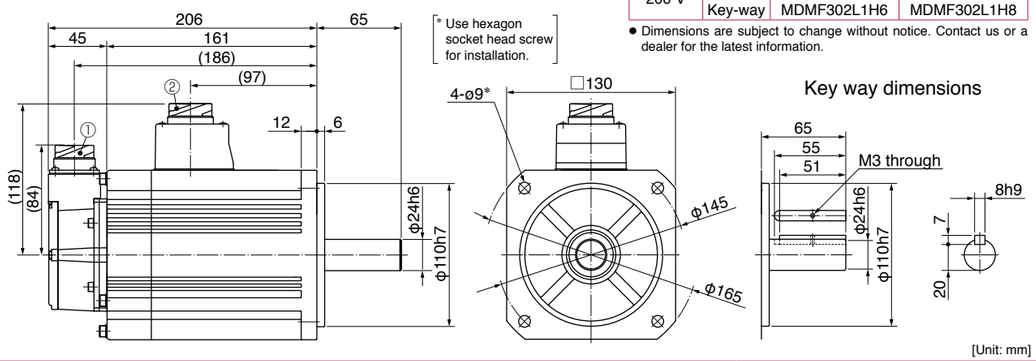
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 10.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF302L1D6	MDMF302L1D8
	Key-way	MDMF302L1H6	MDMF302L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.104, P.105.

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MDMF 3.0 kW

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

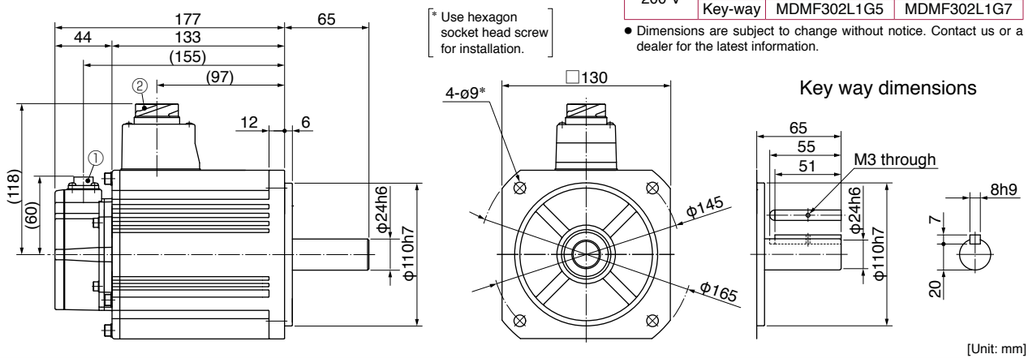
① Encoder connector (Small size JN2)
② Motor connector

Mass: 9.3 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF302L1C5	MDMF302L1C7
	Key-way	MDMF302L1G5	MDMF302L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

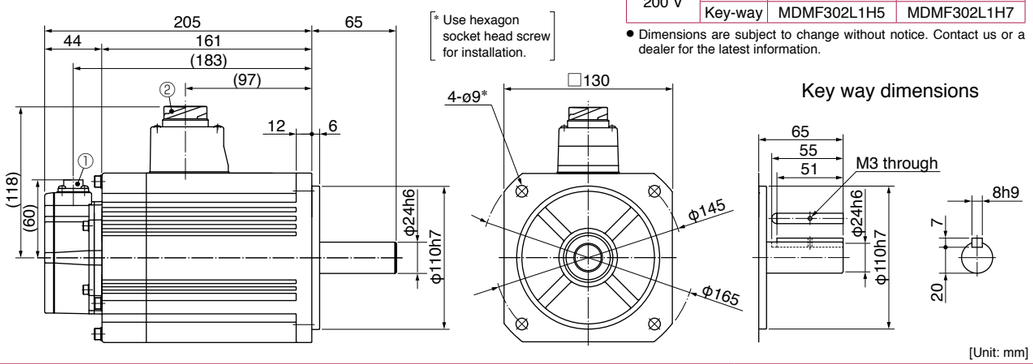
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 10.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF302L1D5	MDMF302L1D7
	Key-way	MDMF302L1H5	MDMF302L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MDMF 4.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

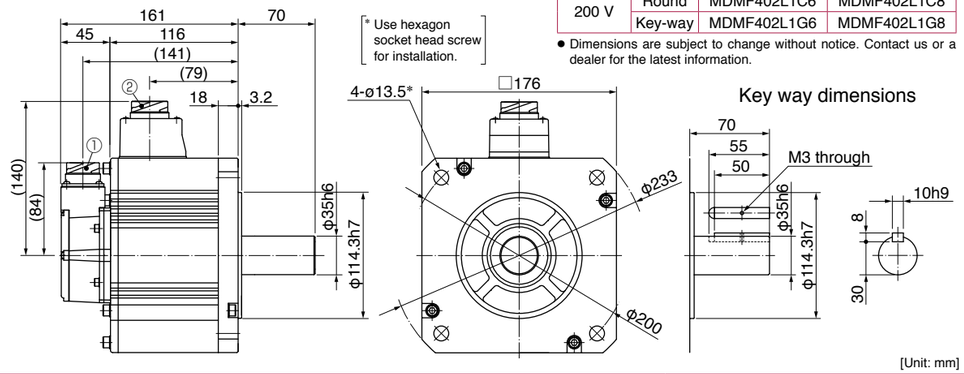
① Encoder connector (Large size JL10)
② Motor connector

Mass: 13.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF402L1C6	MDMF402L1C8
	Key-way	MDMF402L1G6	MDMF402L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.105, P.106.

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MDMF 4.0 kW

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

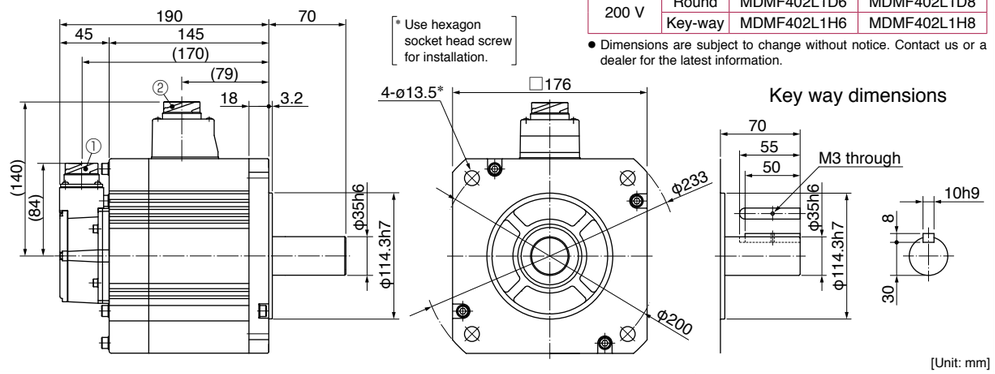
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 16.8 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF402L1D6	MDMF402L1D8
	Key-way	MDMF402L1H6	MDMF402L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

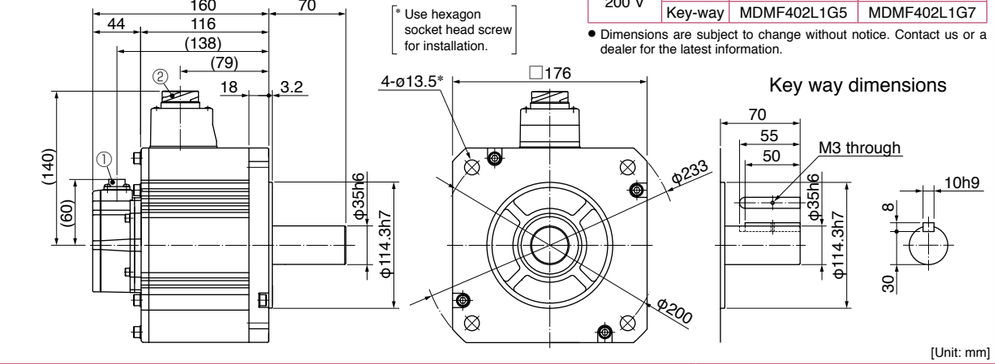
① Encoder connector (Small size JN2)
② Motor connector

Mass: 13.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF402L1C5	MDMF402L1C7
	Key-way	MDMF402L1G5	MDMF402L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

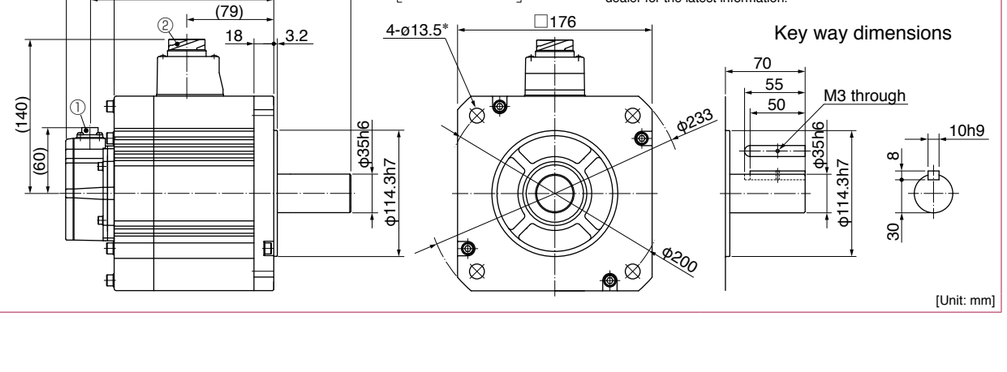
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 16.8 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF402L1D5	MDMF402L1D7
	Key-way	MDMF402L1H5	MDMF402L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.106.

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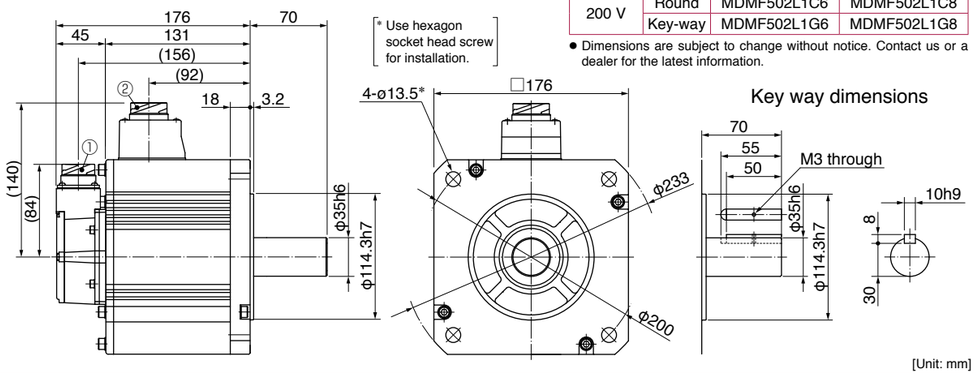
MDMF 5.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model

Mass: 15.6 kg

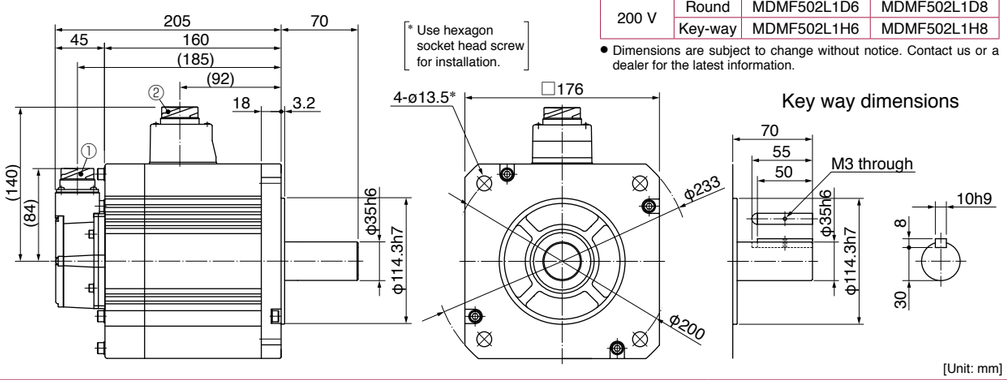
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF502L1C6	MDMF502L1C8
	Key-way	MDMF502L1G6	MDMF502L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model

Mass: 19.0 kg

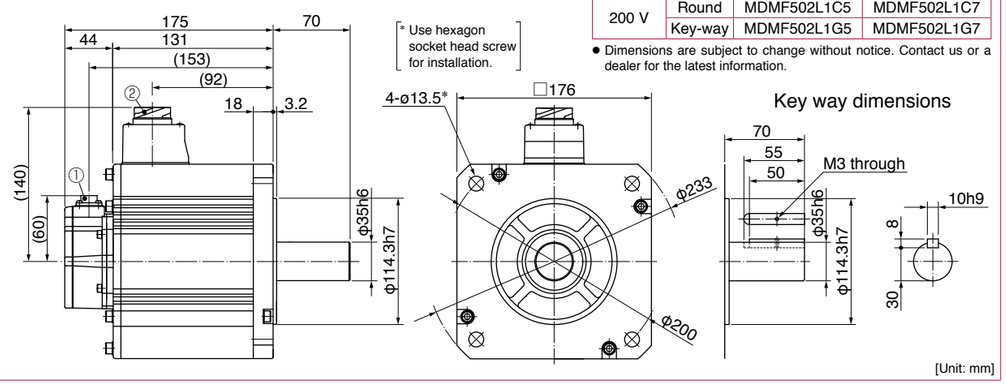
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF502L1D6	MDMF502L1D8
	Key-way	MDMF502L1H6	MDMF502L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor connector



● Motor model

Mass: 15.6 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF502L1C5	MDMF502L1C7
	Key-way	MDMF502L1G5	MDMF502L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.107.

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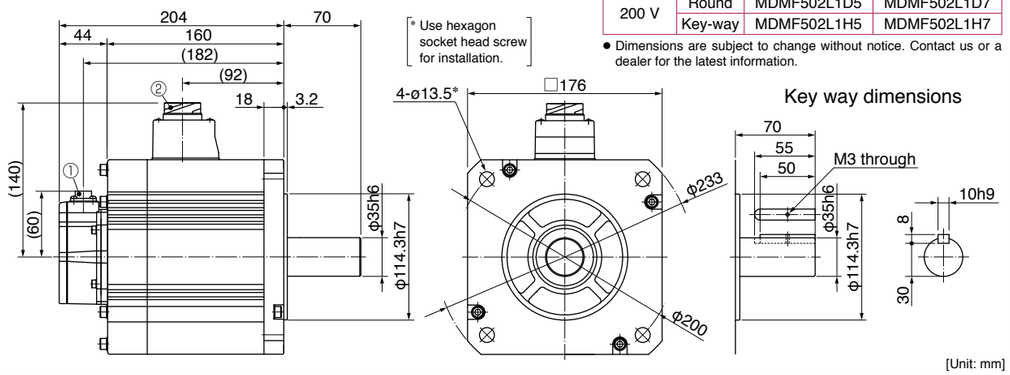
MDMF 5.0 kW

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor/Brake connector



● Motor model

Mass: 19.0 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF502L1D5	MDMF502L1D7
	Key-way	MDMF502L1H5	MDMF502L1H7

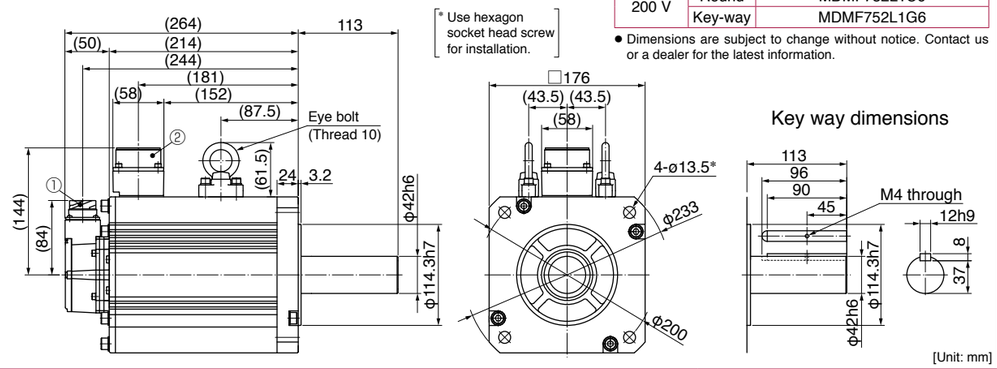
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MDMF 7.5 kW

Large size connector (JL10) type ・ without brake ・ with oil seal ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model

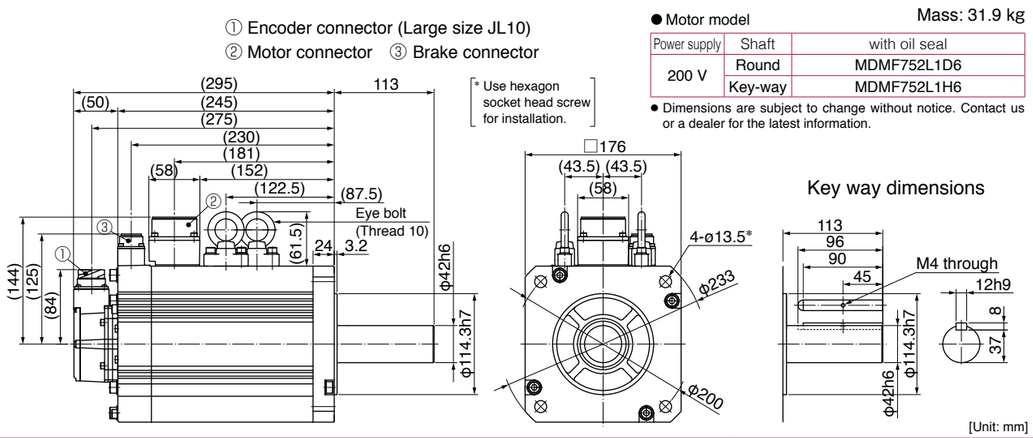
Mass: 27.8 kg

Power supply	Shaft	with oil seal
200 V	Round	MDMF752L1C6
	Key-way	MDMF752L1G6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Large size connector (JL10) type ・ with brake ・ with oil seal ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector ③ Brake connector



● Motor model

Mass: 31.9 kg

Power supply	Shaft	with oil seal
200 V	Round	MDMF752L1D6
	Key-way	MDMF752L1H6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.107, P.108.

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MDMF 7.5 kW

Small size connector (JN2) type · without brake · with oil seal · Key way shaft/ Round shaft

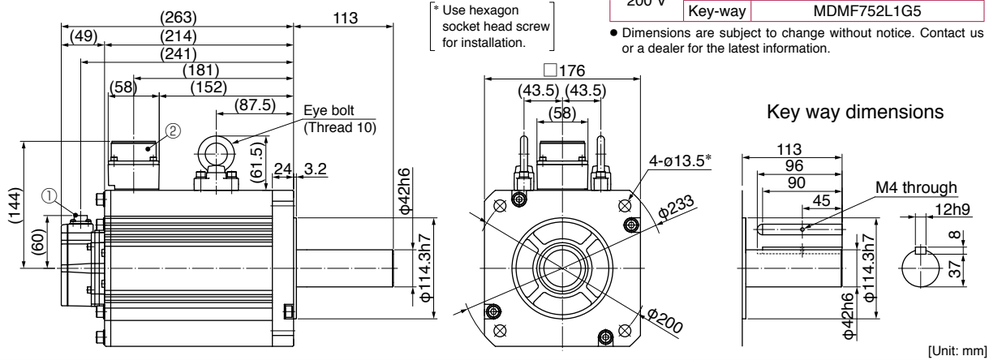
① Encoder connector (Small size JN2)
② Motor connector

Mass: 27.8 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMF752L1C5
	Key-way	MDMF752L1G5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal · Key way shaft/ Round shaft

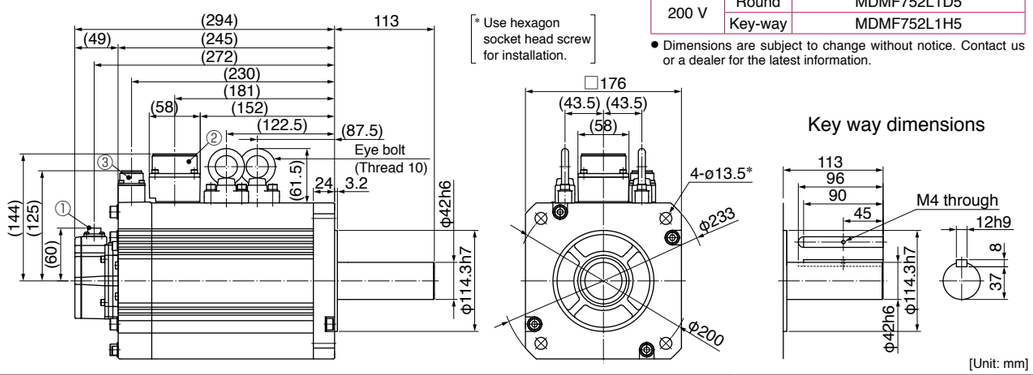
① Encoder connector (Small size JN2)
② Motor connector ③ Brake connector

Mass: 31.9 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMF752L1D5
	Key-way	MDMF752L1H5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MDMF 11.0 kW

Large size connector (JL10) type · without brake · with oil seal · Key way shaft/ Round shaft

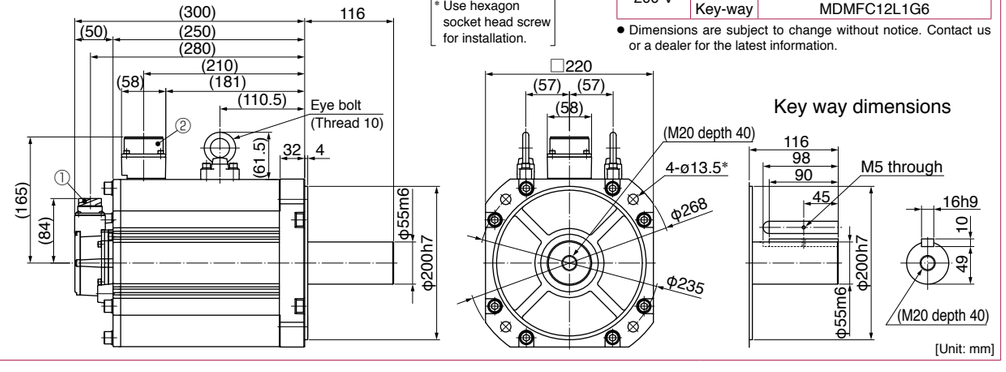
① Encoder connector (Large size JL10)
② Motor connector

Mass: 48.5 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMFC12L1C6
	Key-way	MDMFC12L1G6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.108, P.109.

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MDMF 11.0 kW

Large size connector (JL10) type · with brake · with oil seal · Key way shaft/ Round shaft

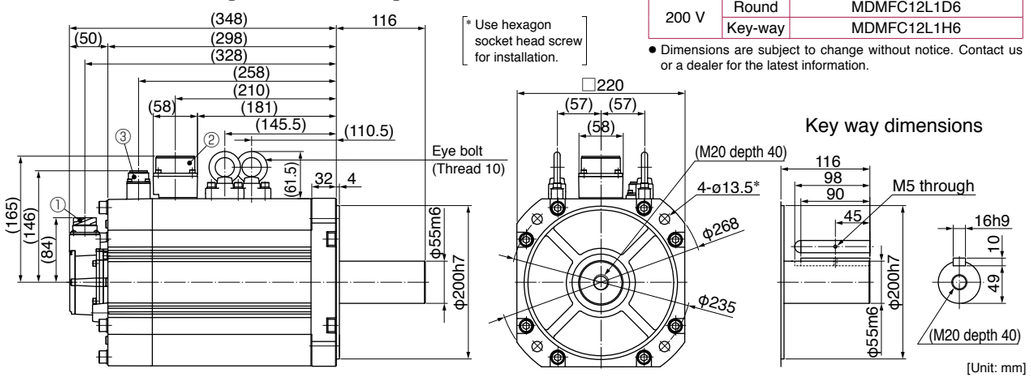
① Encoder connector (Large size JL10)
② Motor connector ③ Brake connector

Mass: 54.5 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMFC12L1D6
	Key-way	MDMFC12L1H6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · without brake · with oil seal · Key way shaft/ Round shaft

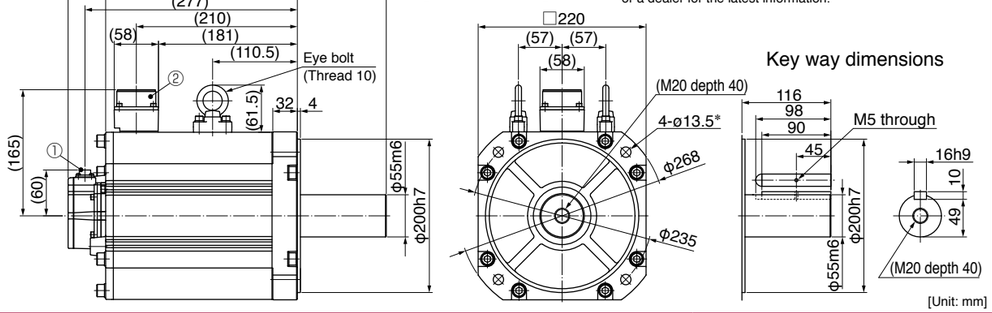
① Encoder connector (Small size JN2)
② Motor connector

Mass: 48.5 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMFC12L1C5
	Key-way	MDMFC12L1G5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal · Key way shaft/ Round shaft

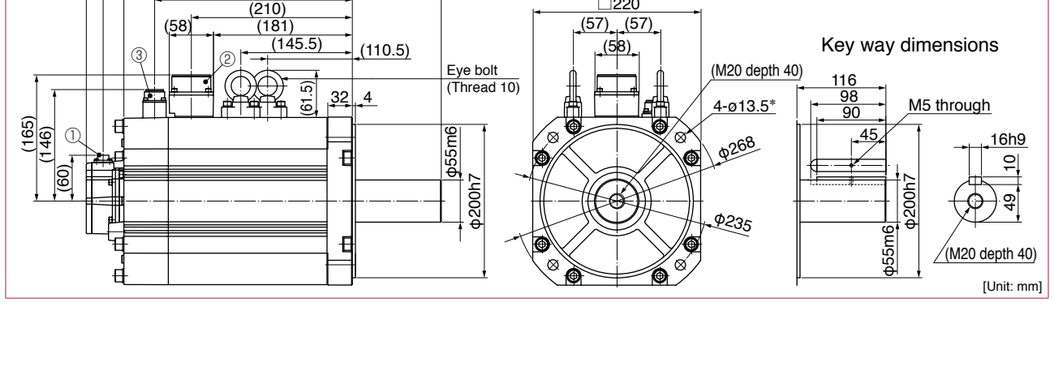
① Encoder connector (Small size JN2)
② Motor connector ③ Brake connector

Mass: 54.5 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMFC12L1D5
	Key-way	MDMFC12L1H5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.109.

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MDMF 15.0 kW

Large size connector (JL10) type · without brake · with oil seal · Key way shaft/ Round shaft

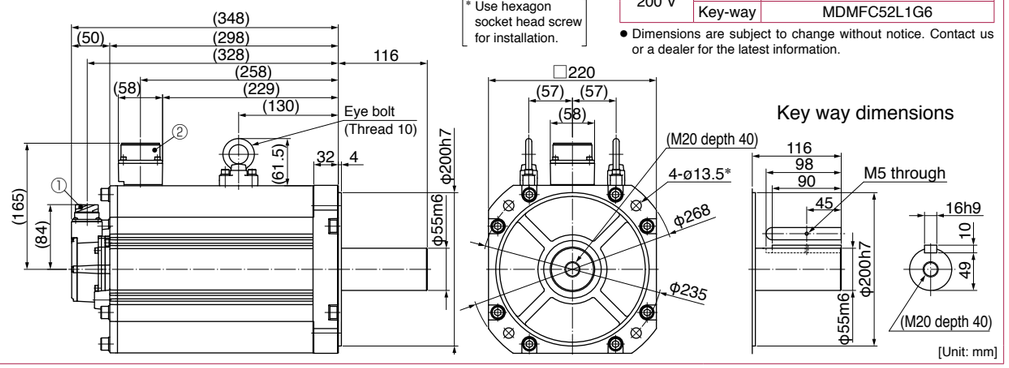
① Encoder connector (Large size JL10)
② Motor connector

Mass: 60.3 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMFC52L1C6
	Key-way	MDMFC52L1G6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type · with brake · with oil seal · Key way shaft/ Round shaft

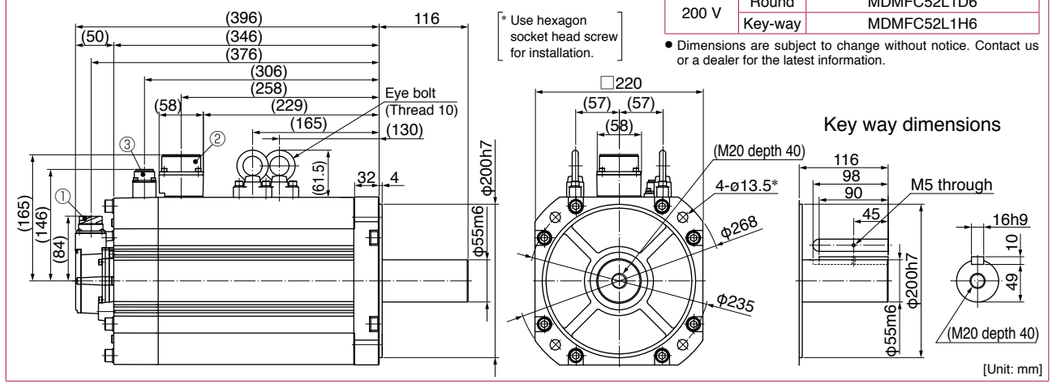
① Encoder connector (Large size JL10)
② Motor connector ③ Brake connector

Mass: 66.5 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMFC52L1D6
	Key-way	MDMFC52L1H6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · without brake · with oil seal · Key way shaft/ Round shaft

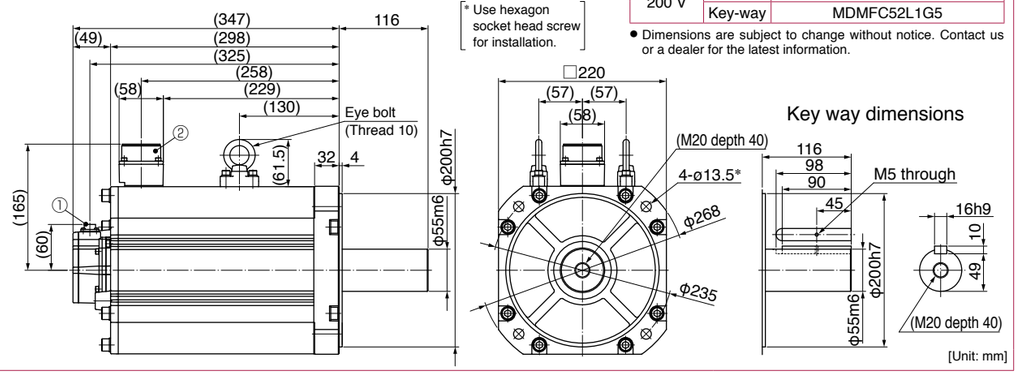
① Encoder connector (Small size JN2)
② Motor connector

Mass: 60.3 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMFC52L1C5
	Key-way	MDMFC52L1G5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.110.

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MDMF 15.0 kW

Small size connector (JN2) type · with brake · with oil seal · Key way shaft/ Round shaft

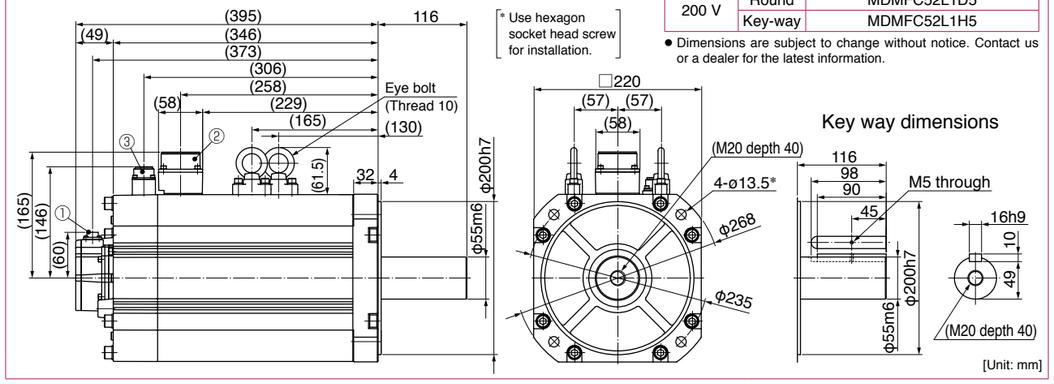
① Encoder connector (Small size JN2)
② Motor connector ③ Brake connector

Mass: 66.5 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMFC52L1D5
	Key-way	MDMFC52L1H5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MDMF 22.0 kW

Large size connector (JL10) type · without brake · with oil seal · Key way shaft/ Round shaft

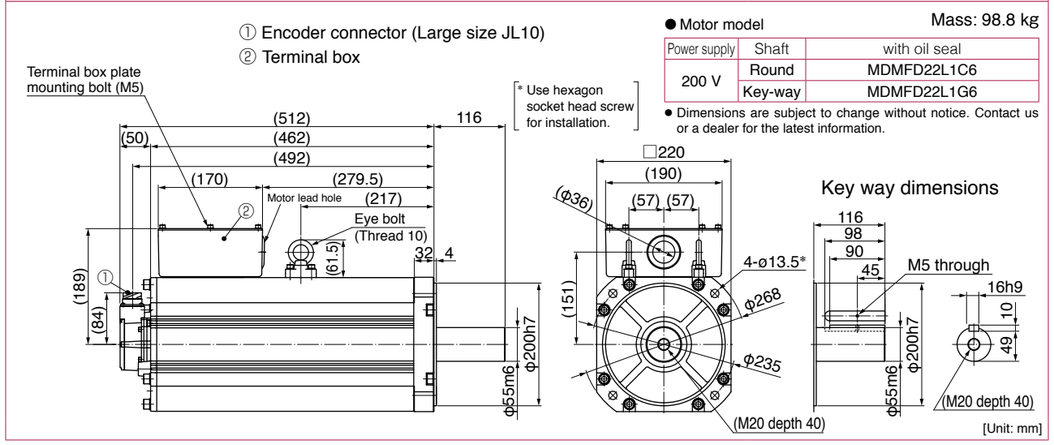
① Encoder connector (Large size JL10)
② Terminal box

Mass: 98.8 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMFD22L1C6
	Key-way	MDMFD22L1G6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type · with brake · with oil seal · Key way shaft/ Round shaft

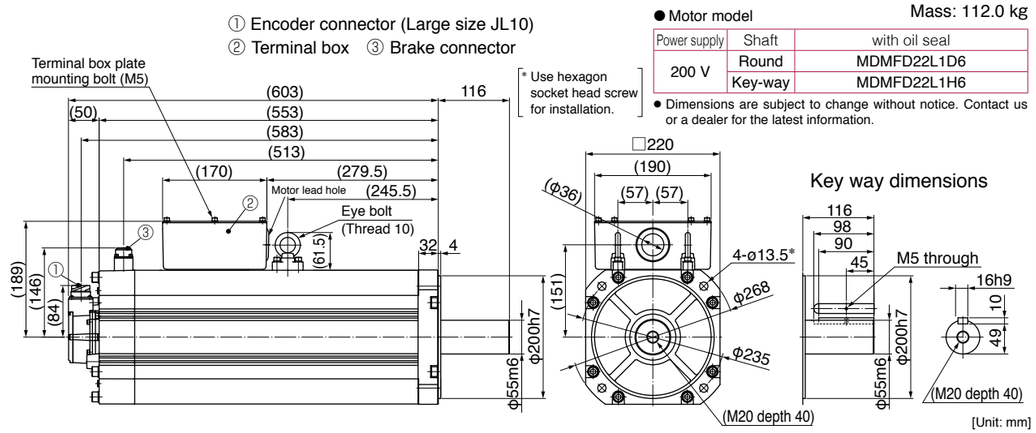
① Encoder connector (Large size JL10)
② Terminal box ③ Brake connector

Mass: 112.0 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMFD22L1D6
	Key-way	MDMFD22L1H6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.110, P.111.

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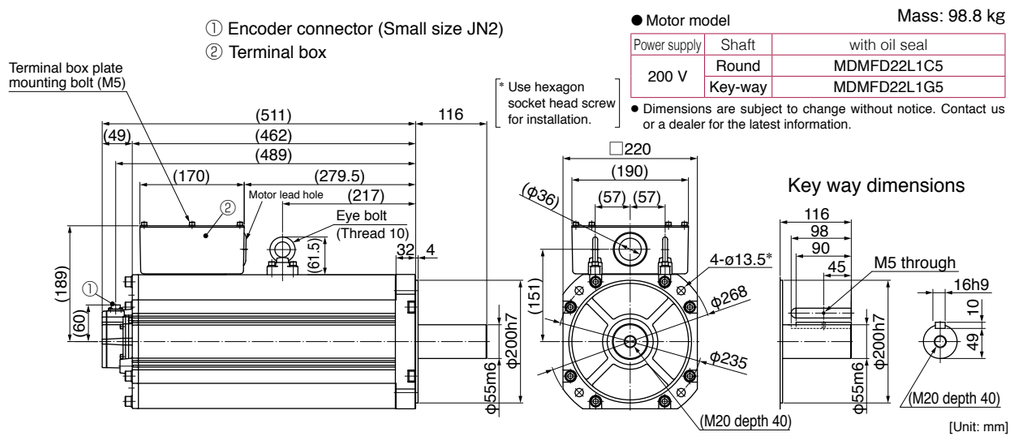
MDMF 22.0 kW

Small size connector (JN2) type · without brake · with oil seal · Key way shaft/ Round shaft



● Motor model

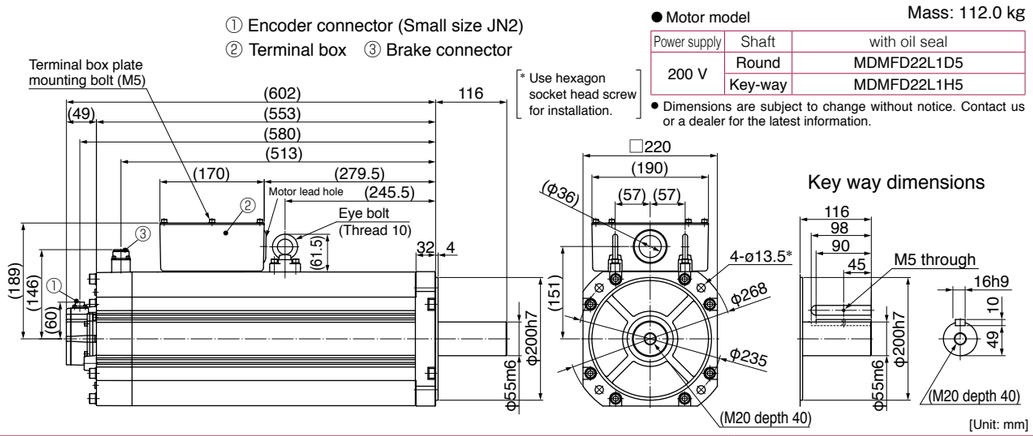
Mass: 98.8 kg

Power supply	Shaft	with oil seal
200 V	Round	MDMFD22L1C5
	Key-way	MDMFD22L1G5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal · Key way shaft/ Round shaft



● Motor model

Mass: 112.0 kg

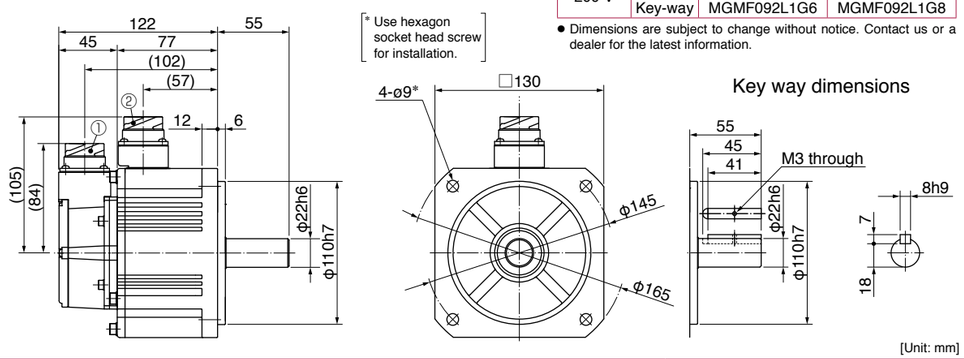
Power supply	Shaft	with oil seal
200 V	Round	MDMFD22L1D5
	Key-way	MDMFD22L1H5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MGMF 0.85 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft



● Motor model

Mass: 4.6 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF092L1C6	MGMF092L1C8
	Key-way	MGMF092L1G6	MGMF092L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.111, P.112.

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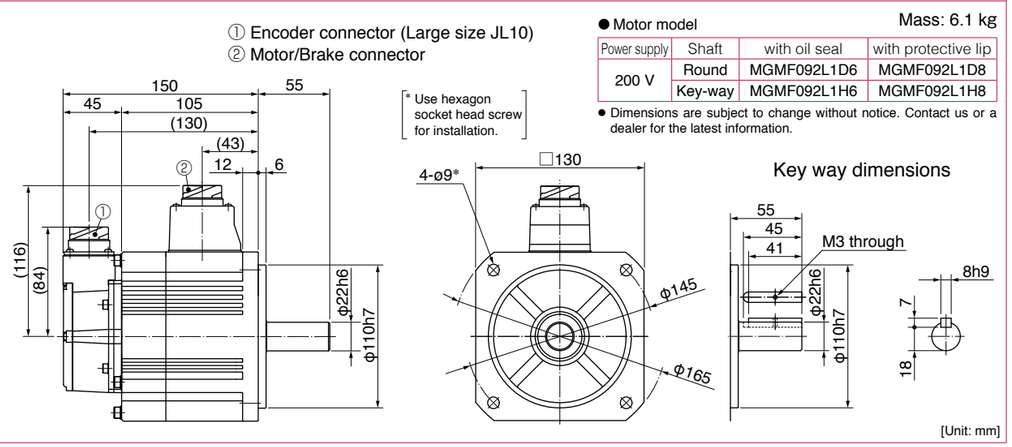
MGMF 0.85 kW

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft



● Motor model

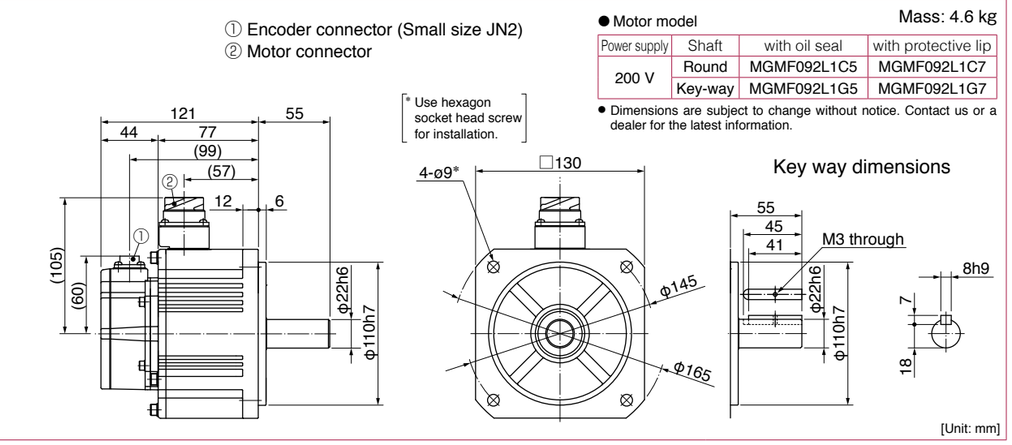
Mass: 6.1 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF092L1D6	MGMF092L1D8
	Key-way	MGMF092L1H6	MGMF092L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft



● Motor model

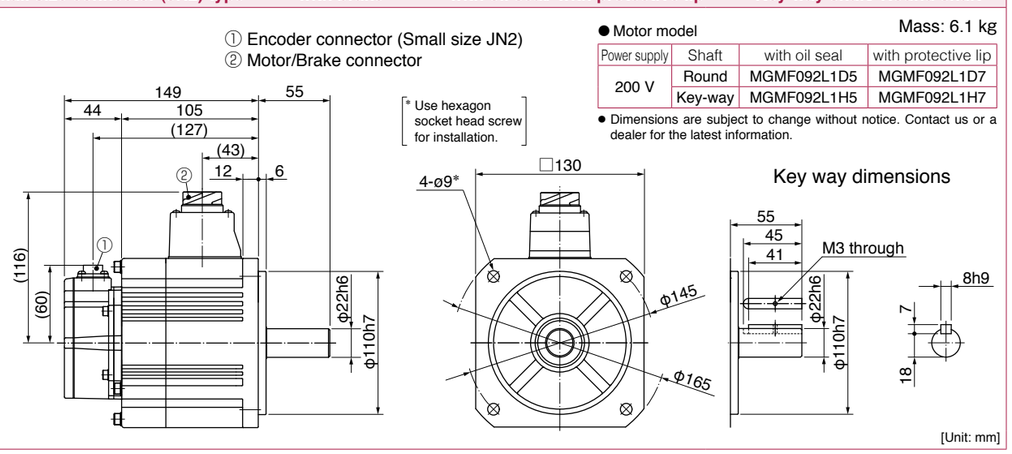
Mass: 4.6 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF092L1C5	MGMF092L1C7
	Key-way	MGMF092L1G5	MGMF092L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft



● Motor model

Mass: 6.1 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF092L1D5	MGMF092L1D7
	Key-way	MGMF092L1H5	MGMF092L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.112.

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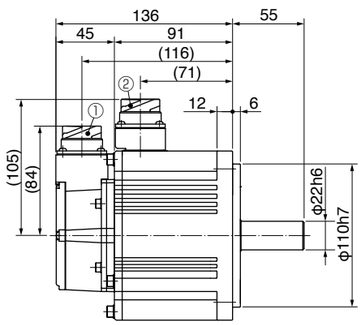
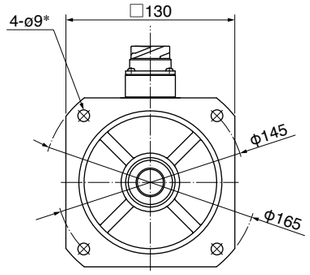
MGMF 1.3 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

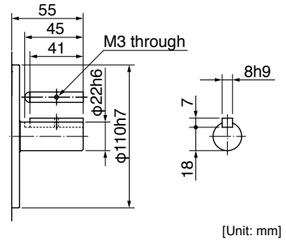
① Encoder connector (Large size JL10)
② Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions



● Motor model

Mass: 5.7 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF132L1C6	MGMF132L1C8
	Key-way	MGMF132L1G6	MGMF132L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector

* Use hexagon socket head screw for installation.

Key way dimensions

● Motor model

Mass: 7.5 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF132L1D6	MGMF132L1D8
	Key-way	MGMF132L1H6	MGMF132L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor connector

* Use hexagon socket head screw for installation.

Key way dimensions

● Motor model

Mass: 5.7 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF132L1C5	MGMF132L1C7
	Key-way	MGMF132L1G5	MGMF132L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.113.

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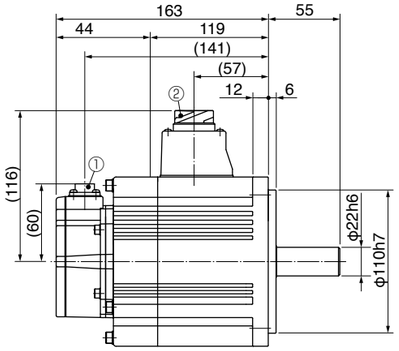
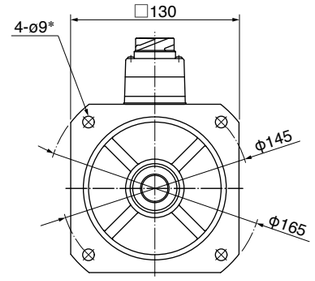
MGMF 1.3 kW

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

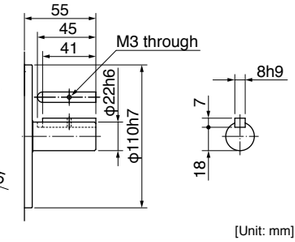
① Encoder connector (Small size JN2)
② Motor/Brake connector



* Use hexagon socket head screw for installation.



Key way dimensions



● Motor model

Mass: 7.5 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF132L1D5	MGMF132L1D7
	Key-way	MGMF132L1H5	MGMF132L1H7

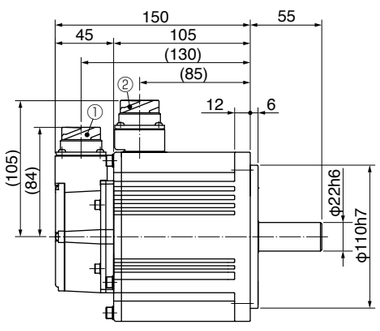
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

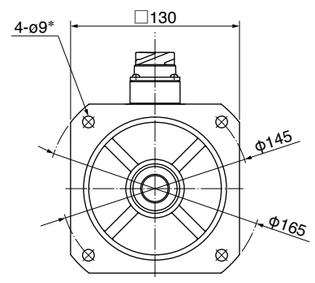
MGMF 1.8 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

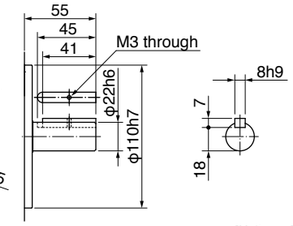
① Encoder connector (Large size JL10)
② Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions



● Motor model

Mass: 6.9 kg

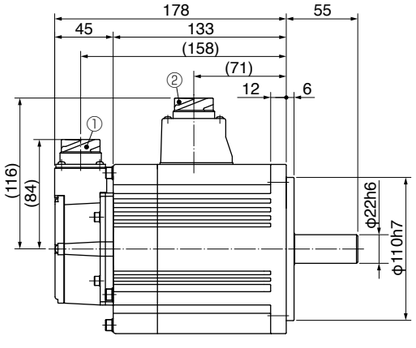
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF182L1C6	MGMF182L1C8
	Key-way	MGMF182L1G6	MGMF182L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

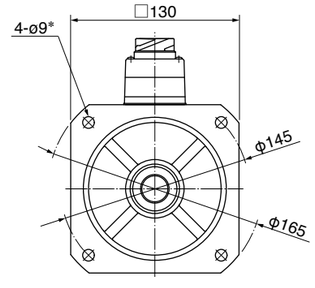
[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

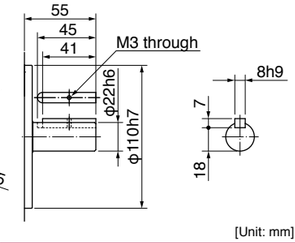
① Encoder connector (Large size JL10)
② Motor/Brake connector



* Use hexagon socket head screw for installation.



Key way dimensions



● Motor model

Mass: 8.4 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF182L1D6	MGMF182L1D8
	Key-way	MGMF182L1H6	MGMF182L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.113, P.114.

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MGMF 1.8 kW

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

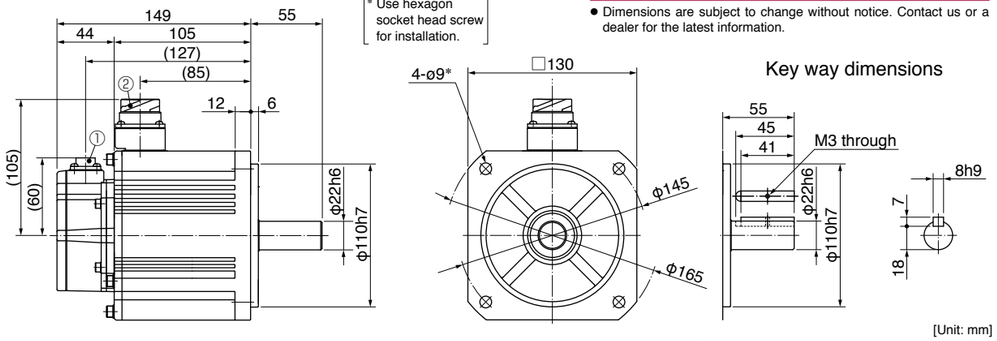
① Encoder connector (Small size JN2)
② Motor connector

Mass: 6.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF182L1C5	MGMF182L1C7
	Key-way	MGMF182L1G5	MGMF182L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

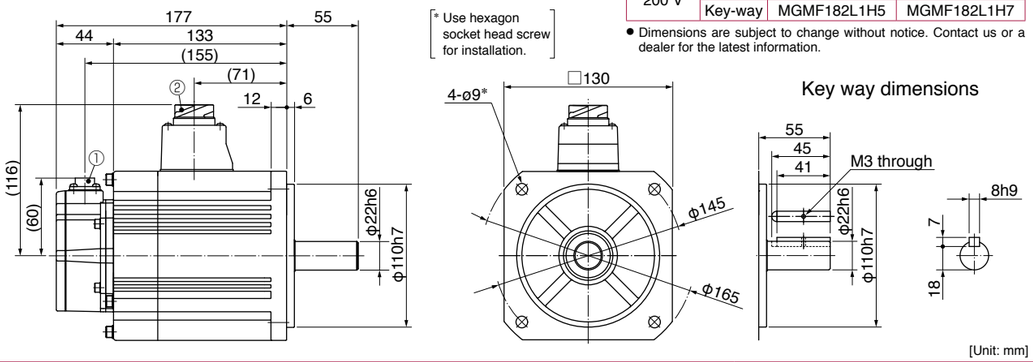
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 8.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF182L1D5	MGMF182L1D7
	Key-way	MGMF182L1H5	MGMF182L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MGMF 2.4 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

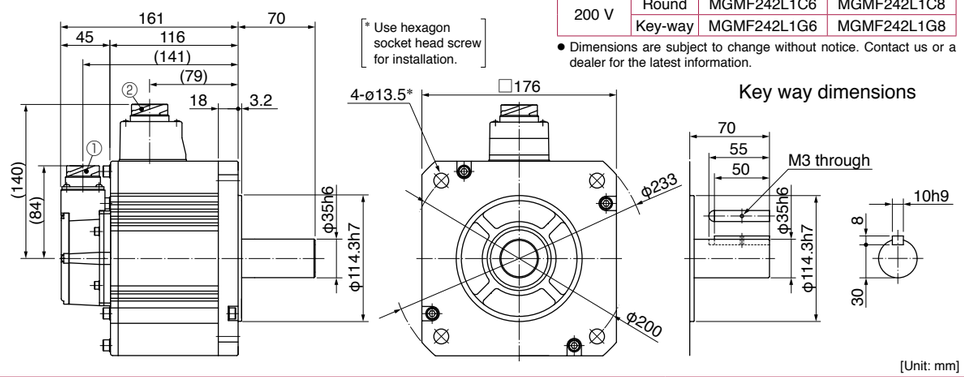
① Encoder connector (Large size JL10)
② Motor connector

Mass: 13.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF242L1C6	MGMF242L1C8
	Key-way	MGMF242L1G6	MGMF242L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.114, P.115.

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MGMF 2.4 kW

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

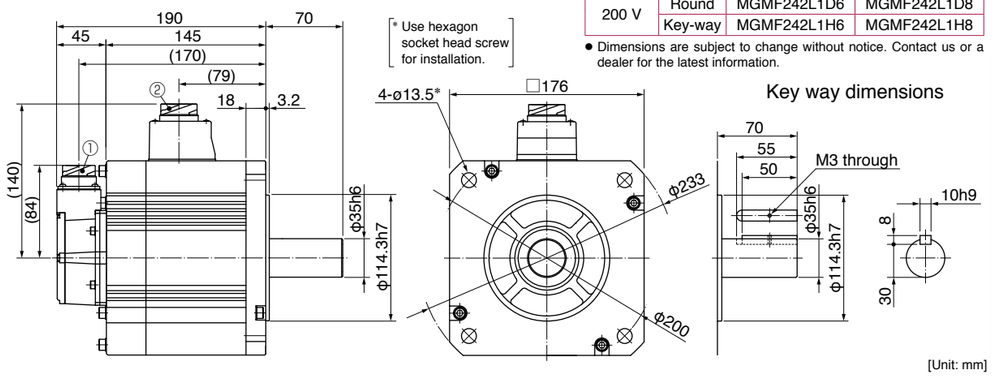
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 16.8 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF242L1D6	MGMF242L1D8
	Key-way	MGMF242L1H6	MGMF242L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

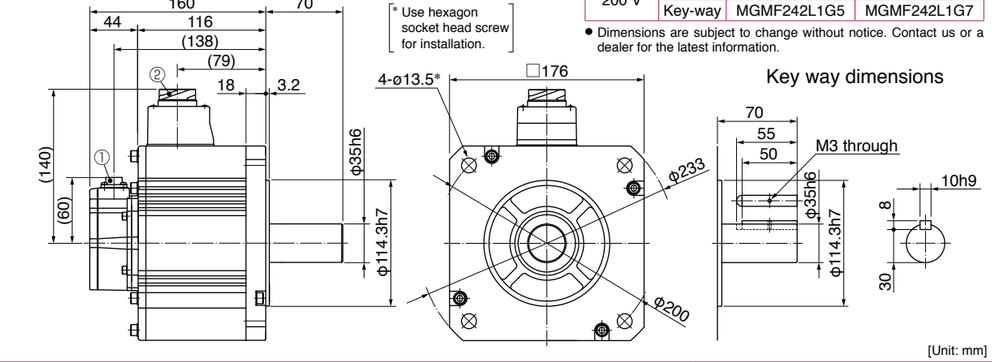
① Encoder connector (Small size JN2)
② Motor connector

Mass: 13.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF242L1C5	MGMF242L1C7
	Key-way	MGMF242L1G5	MGMF242L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

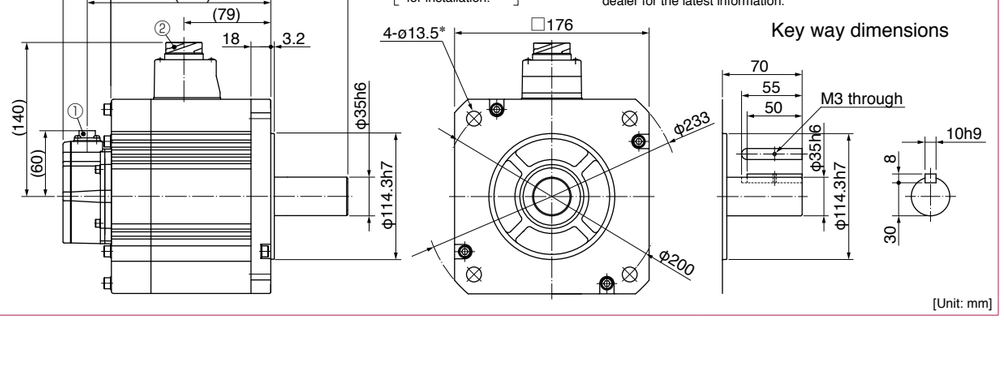
① Encoder connector (Small size JN2)
② Motor/Brake connector

Mass: 16.8 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF242L1D5	MGMF242L1D7
	Key-way	MGMF242L1H5	MGMF242L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.115.

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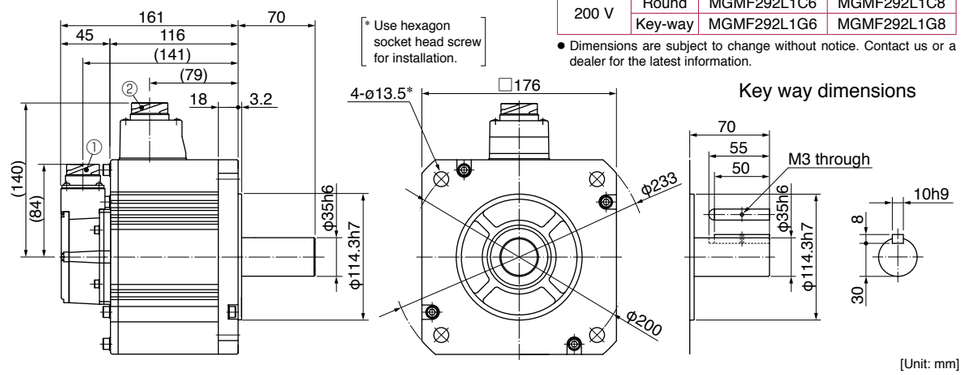
MGMF 2.9 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model

Mass: 13.4 kg

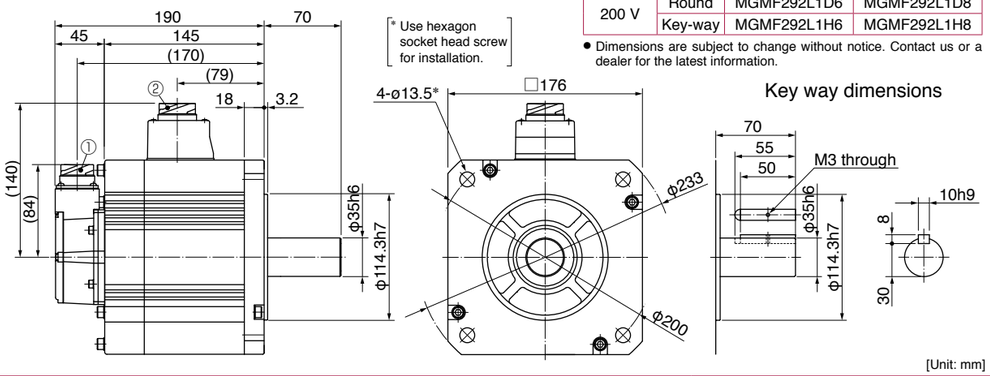
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF292L1C6	MGMF292L1C8
	Key-way	MGMF292L1G6	MGMF292L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model

Mass: 16.8 kg

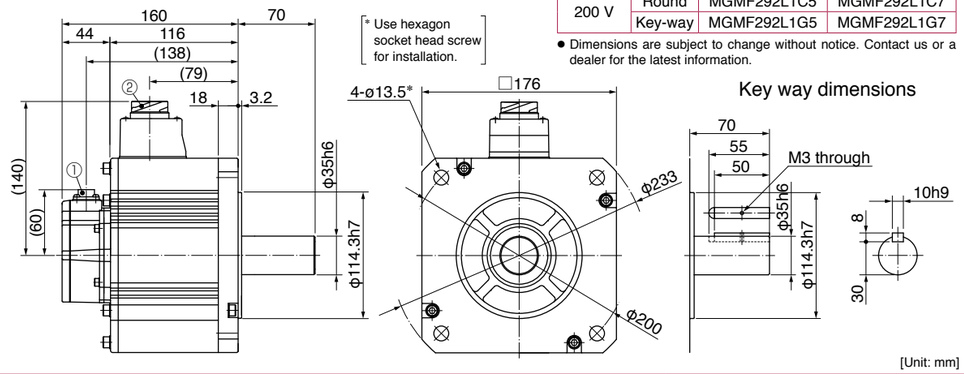
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF292L1D6	MGMF292L1D8
	Key-way	MGMF292L1H6	MGMF292L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Small size connector (JN2) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor connector



● Motor model

Mass: 13.4 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF292L1C5	MGMF292L1C7
	Key-way	MGMF292L1G5	MGMF292L1G7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.116.

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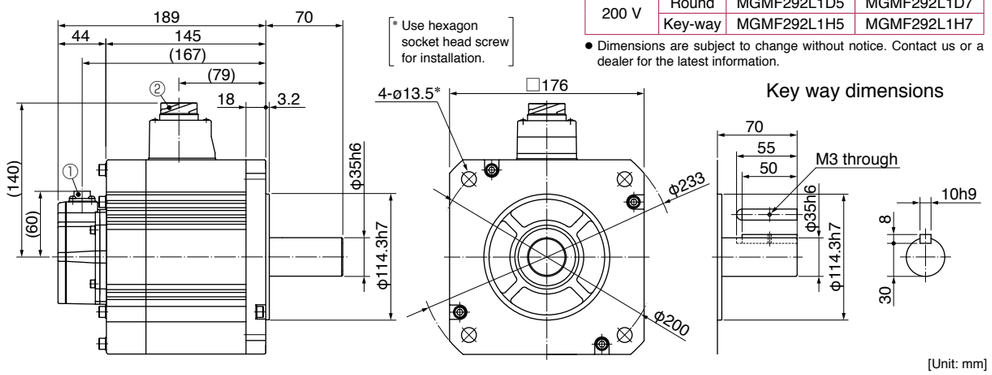
MGMF 2.9 kW

Small size connector (JN2) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor/Brake connector



● Motor model

Mass: 16.8 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF292L1D5	MGMF292L1D7
	Key-way	MGMF292L1H5	MGMF292L1H7

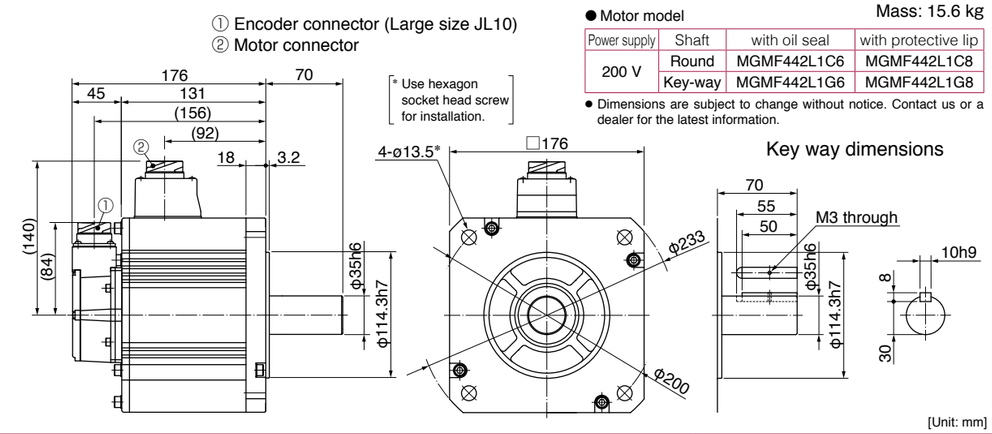
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MGMF 4.4 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model

Mass: 15.6 kg

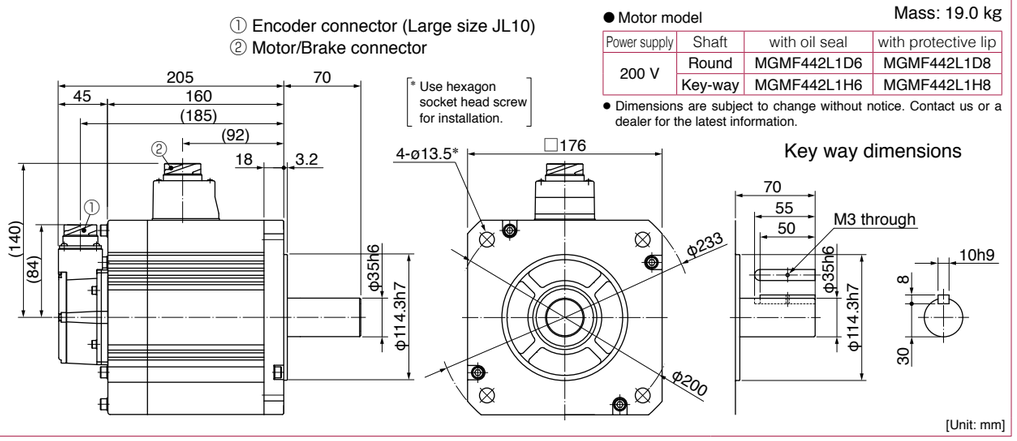
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF442L1C6	MGMF442L1C8
	Key-way	MGMF442L1G6	MGMF442L1G8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model

Mass: 19.0 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF442L1D6	MGMF442L1D8
	Key-way	MGMF442L1H6	MGMF442L1H8

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.116, P.117.

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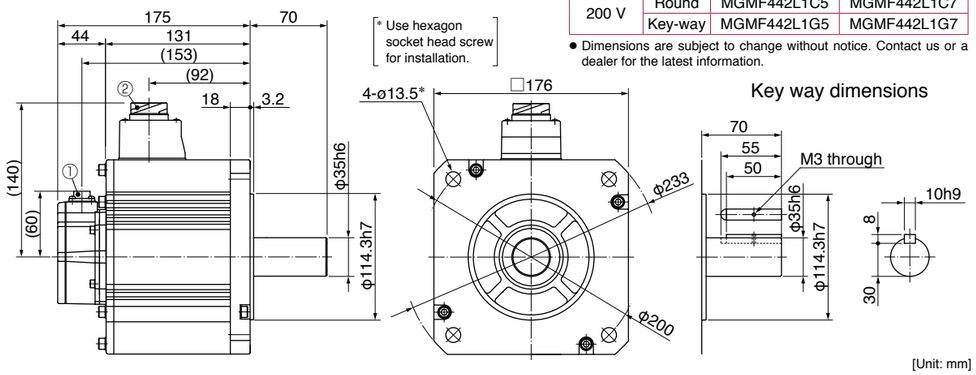
MGMF 4.4 kW

Small size connector (JN2) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor connector



* Use hexagon socket head screw for installation.

Mass: 15.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF442L1C5	MGMF442L1C7
	Key-way	MGMF442L1G5	MGMF442L1G7

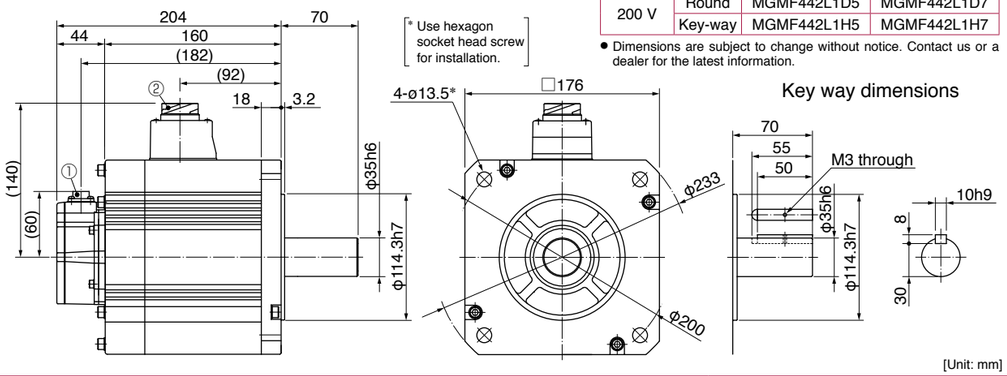
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions

[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor/Brake connector



* Use hexagon socket head screw for installation.

Mass: 19.0 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF442L1D5	MGMF442L1D7
	Key-way	MGMF442L1H5	MGMF442L1H7

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

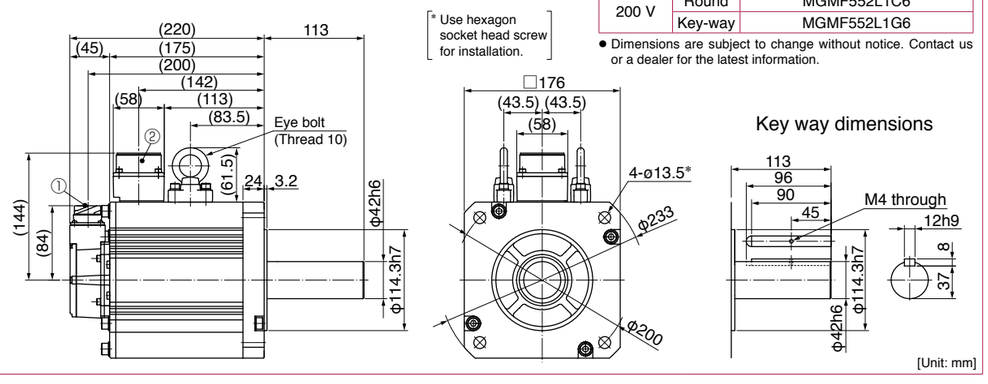
Key way dimensions

[Unit: mm]

MGMF 5.5 kW

Large size connector (JL10) type · without brake · with oil seal · Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



* Use hexagon socket head screw for installation.

Mass: 21.3 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MGMF552L1C6
	Key-way	MGMF552L1G6

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions

[Unit: mm]

* For motors specifications, refer to P.117, P.118.

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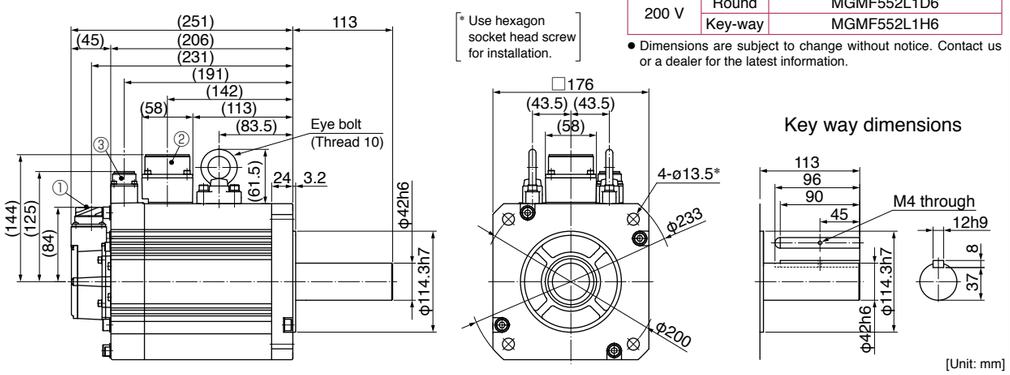
MGMF 5.5 kW

Large size connector (JL10) type · with brake · with oil seal · Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector ③ Brake connector



* Use hexagon socket head screw for installation.

Mass: 25.4 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MGMF552L1D6
	Key-way	MGMF552L1H6

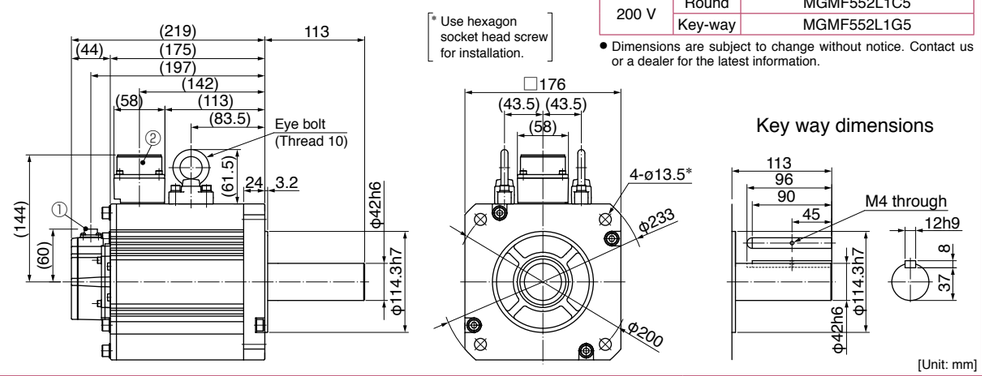
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions

[Unit: mm]

Small size connector (JN2) type · without brake · with oil seal · Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor connector



* Use hexagon socket head screw for installation.

Mass: 21.3 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MGMF552L1C5
	Key-way	MGMF552L1G5

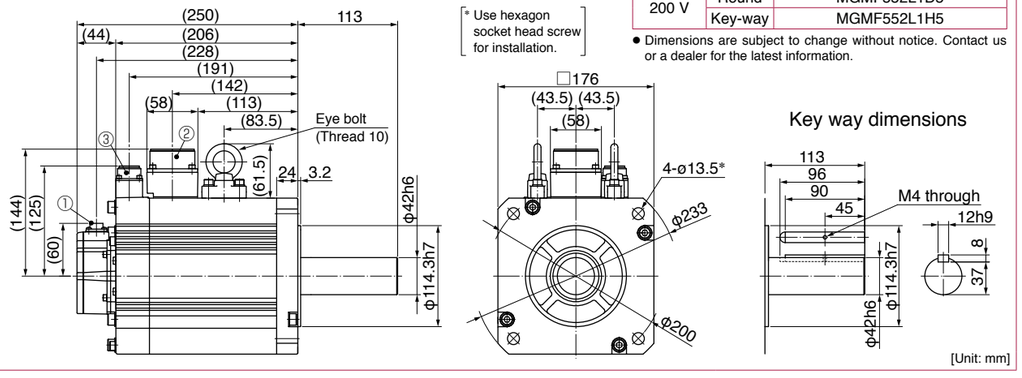
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions

[Unit: mm]

Small size connector (JN2) type · with brake · with oil seal · Key way shaft/ Round shaft

① Encoder connector (Small size JN2)
② Motor connector ③ Brake connector



* Use hexagon socket head screw for installation.

Mass: 25.4 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MGMF552L1D5
	Key-way	MGMF552L1H5

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions

[Unit: mm]

* For motors specifications, refer to P.118.

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Features

- Line-up IP67 motor: 1.0 kW to 7.5 kW
- Max speed: 6500r/min (MHMF 50 W to 400 W)
- Low inertia (MSMF) to High inertia (MHMF).
- Low cogging torque: Rated torque ratio 0.5 % (typical value).
- 23-bit absolute encoder (8388608 pulse).

Motor Lineup

80 mm sq. or less

MSMF
Low inertia

Max. speed : 6000 r/min
Rated speed : 3000 r/min
Rated output :
50 W to 1000 W
Enclosure:
IP65: Leadwire type

MQMF
(Flat type)
Middle inertia

Max. speed : 6500 r/min
Rated speed : 3000 r/min
Rated output :
100 W to 400 W
Enclosure:
IP65: Leadwire type

MHMF
High inertia

Max. speed :
6500 r/min
6000 r/min (750 W,1000 W)
Rated speed : 3000 r/min
Rated output :
50 W to 1000 W
Enclosure:
IP65: Leadwire type

100 mm sq. or more

MSMF
Low inertia

Max. speed : 5000 r/min
4500 r/min (4.0 kW,5.0 kW)
Rated speed : 3000 r/min
Rated output : 1.0 kW to 5.0 kW
Enclosure : IP67

MDMF
Middle inertia

Max. speed : 3000 r/min
Rated speed : 2000 r/min
: 1500 r/min (7.5 kW)
Rated output : 1.0 kW to 7.5 kW
Enclosure : IP67

MGMF
(Low speed/ High torque type)
Middle inertia

Max. speed : 3000 r/min
Rated speed : 1500 r/min
Rated output : 0.85 kW to 5.5 kW
Enclosure : IP67

MHMF
High inertia

Max. speed : 3000 r/min
Rated speed : 2000 r/min
: 1500 r/min (7.5 kW)
Rated output : 1.0 kW to 7.5 kW
Enclosure : IP67

Special Order Product Motor Contents

MSMF (200 V)
50 W to 5.0 kW P.211

MQMF (200 V)
100 W to 400 W P.223

MHMF (200 V)
50 W to 7.5 kW P.226

MDMF (200 V)
1.0 kW to 7.5 kW P.239

MGMF (200 V)
0.85 kW to 5.5 kW P.246

Dimensions
MSMF
(50 W to 1000 W) P.253
MSMF
(1.0 kW to 5.0 kW).....P.257
MQMF
(100 W to 400 W) P.261
MHMF
(50 W to 1000 W) P.267
MHMF
(1.0 kW to 7.5 kW).....P.279
MDMF
(1.0 kW to 7.5 kW).....P.283
MGMF
(0.85 kW to 5.5kW).....P.288

Motor Specification Description
Environmental Conditions... P.303
Notes on [Motor specification] page..... P.303
Permissible Load at Output Shaft..... P.304
Built-in Holding Brake..... P.305

<Cautions> Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Refer to P.205 to P.210 for motor and driver combinations. * For combination of elements of model number, refer to Index P.448.

Servo Motor "Oil seal with protective lip" option is not available for motors above 7.5 kW.

M S M | F | 5 A | Z | L | 1 | A 2 | * — Special specifications
① ② ③ ④ ⑤ ⑥ ⑦

① Type

Symbol	Type
MSM	Low inertia (50 W to 5.0 kW)
MQM	Middle inertia (100 W to 400 W)
MDM	Middle inertia (1.0 kW to 7.5 kW)
MGM	Middle inertia (0.85 kW to 5.5 kW)
MHM	High inertia (50 W to 7.5 kW)

② Series

Symbol	Series name
F	A6 Family

③ Motor rated output

Symbol	Rated output	Symbol	Rated output
5A	50 W	18	1.8 kW
01	100 W	20	2.0 kW
02	200 W	24	2.4 kW
04	400 W	29	2.9 kW
08	750 W	30	3.0 kW
09	0.85 kW, (130 mm sq.) 1000 W (80 mm sq.)	40	4.0 kW
		44	4.4 kW
10	1.0 kW	50	5.0 kW
13	1.3 kW	55	5.5 kW
15	1.5 kW	75	7.5 kW

④ Voltage specifications

Symbol	Specifications
2	200 V
Z	100 V/200 V common (50 W only)

⑤ Rotary encoder specifications

Symbol	Format	Pulse counts	Resolution	Wires
L	Absolute	23-bit	8388608	7

<Note>
When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

⑥ Design order

Symbol	Specifications
1	Standard

⑦ Motor specifications: 80 mm sq. or less Leadwire type IP65
MSMF 50 W to 1000 W

Symbol		Shaft		Holding brake		Oil seal	
		Round	Key-way, center tap	without	with	without	with
A	2	●		●		●	
B	2	●			●	●	
C	2	●		●			●
D	2	●			●		●
S	2		●	●		●	
T	2		●		●	●	
U	2		●	●			●
V	2		●		●		●

⑦ Motor specifications: 80 mm sq. or less Leadwire type IP65
MHMF 50 W to 1000 W, MQMF 100 W to 400 W

Symbol		Shaft		Holding brake		Oil seal		
		Round	Key-way, center tap	without	with	without	with	With protective lip
A	2	●		●		●		
B	2	●			●	●		
C	2	●		●			●	
C	4	●		●				●
D	2	●			●		●	
D	4	●			●			●
S	2		●	●		●		
T	2		●		●	●		
U	2		●	●			●	
U	4		●	●				●
V	2		●		●		●	
V	4		●		●			●

⑦ Motor specifications: 100 mm sq. or more Encoder connector : JL10 IP67
MSMF, MHMF, MDMF, MGMF

Symbol		Shaft		Holding brake		Oil seal	
		Round	Key-way	without	with	with	With protective lip
C	6	●		●		●	
C	8	●		●			●
D	6	●			●	●	
D	8	●			●		●
G	6		●	●		●	
G	8		●	●			●
H	6		●		●	●	
H	8		●		●		●

* Encoder connector JL10: Also applicable to screwed type

Servo Driver "Basic" and "RS485 communication" types are not available for G-Frame drivers.

M A D | L | N | 1 | 5 | S | E | * * * — Special specifications
① ② ③ ④ ⑤ ⑥ ⑦

① Frame symbol

Symbol	Frame	Symbol	Frame
MAD	A-Frame	MED	E-Frame
MBD	B-Frame	MFD	F-Frame
MCD	C-Frame	MGD	G-Frame
MDD	D-Frame		

② Series

Symbol	Series name
L	A6 Family

③ Safety Function

Symbol	Specifications
N	without the safety function
T	with the safety function

④ Max. current rating

Symbol	Current rating	Symbol	Current rating
0	6 A	8	60 A
1	8 A	9	80 A
2	12 A	A	100 A
3	22 A	B	120 A
4	24 A	C	160 A
5	40 A		

⑤ Supply voltage specifications

Symbol	Specifications
3	3-phase 200 V
5	Single/3-phase 200 V

⑥ I/f specifications

Symbol (specification)
S (Analog/Pulse)

⑦ Classification of type

Symbol	Specification
E	Basic type (Pulse train only)
F	Multi fanction type (Pulse, analog, full-closed)
G	RS485 communication type (Pulse train only)

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Table of Part Numbers and Options: 80 mm sq. or less 50 W to 1000 W

Motor						Driver			Power capacity (at rated load) (kVA)		Optional parts							
Motor series		Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions (page)	A6SF series Multi function type (Pulse, analog, full-closed)	A6 G series RS485 communication / A6 SE series Basic (Pulse signal input) Note)2, Note)4	Frame			Encoder Cable Note)3		Motor Cable Note)3		Brake Cable Note)3	External Regenerative Resistor	Reactor (Single phase / 3-phase)	Noise Filter (Single phase / 3-phase)
											23-bit Absolute		without Brake	with Brake				
											Use in the absolute system (with battery box) Note)5	Use in the Incremental system (without battery box)						
											Fixed cable		Movable cable		Movable cable			
Low inertia	MSMF (Leadwire type) 3000 r/min IP65	Single phase/ 3-phase 200 V	50	MSMF5AZL1 □ 2M	211 253	MADLT05SF	MADLN05S◇	A-frame ★	Approx.	0.5	MFECA 0＊＊0EAE (For fixed)	MFECA 0＊＊0EAD (For fixed)	MFMCA 0＊＊0EED		MFMCB 0＊＊0GET Note)6	DV0P4281	DV0P227 / DV0P220	DV0P4170 / DV0PM20042
			100	MSMF012L1 □ 2M	212 253	MADLT05SF	MADLN05S◇											
			200	MSMF022L1 □ 2M	213 254	MADLT15SF	MADLN15S◇									DV0P4283		
			400	MSMF042L1 □ 2M	214 255	MBDLT25SF	MBDLN25S◇	B-frame ★	Approx.	0.9							DV0P228 / DV0P220	DV0PM20042
			750	MSMF082L1 □ 2M	215 255	MCDLT35SF	MCDLN35S◇	C-frame	Approx.	1.8								
			1000	MSMF092L1 □ 2M	216 256	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.4						DV0P4284	DV0P228 / DV0P222	DV0P4220
Middle inertia Flat type	MQMF (Leadwire type) 3000 r/min IP65	Single phase/ 3-phase 200 V	100	MQMF012L1 □ 2M MQMF012L1 □ 4M	223 261	MADLT05SF	MADLN05S◇	A-frame ★	Approx.	0.5	MFECA 0＊＊0EAE (For fixed)	MFECA 0＊＊0EAD (For fixed)	MFMCA 0＊＊0EED		MFMCB 0＊＊0GET Note)6	DV0P4281	DV0P227 / DV0P220	DV0P4170 / DV0PM20042
			200	MQMF022L1 □ 2M MQMF022L1 □ 4M	224 263	MADLT15SF	MADLN15S◇									DV0P4283		
			400	MQMF042L1 □ 2M MQMF042L1 □ 4M	225 265	MBDLT25SF	MBDLN25S◇	B-frame ★	Approx.	0.9							DV0P228 / DV0P220	
High inertia	MHMF (Leadwire type) 3000 r/min IP65	Single phase/ 3-phase 200 V	50	MHMF5AZL1 □ 2M MHMF5AZL1 □ 4M	226 267	MADLT05SF	MADLN05S◇	A-frame ★	Approx.	0.5	MFECA 0＊＊0EAE (For fixed)	MFECA 0＊＊0EAD (For fixed)	MFMCA 0＊＊0EED		MFMCB 0＊＊0GET Note)6	DV0P4281	DV0P227 / DV0P220	DV0P4170 / DV0PM20042
			100	MHMF012L1 □ 2M MHMF012L1 □ 4M	227 269	MADLT05SF	MADLN05S◇									DV0P4283		
			200	MHMF022L1 □ 2M MHMF022L1 □ 4M	228 271	MADLT15SF	MADLN15S◇											
			400	MHMF042L1 □ 2M MHMF042L1 □ 4M	229 273	MBDLT25SF	MBDLN25S◇	B-frame ★	Approx.	0.9							DV0P228 / DV0P220	DV0PM20042
			750	MHMF082L1 □ 2M MHMF082L1 □ 4M	230 275	MCDLT35SF	MCDLN35S◇	C-frame	Approx.	1.8								
			1000	MHMF092L1 □ 2M MHMF092L1 □ 4M	231 277	MDDLT55SF	MDDLN55S◇	D-frame	Approx.	2.4						DV0P4284	DV0P228 / DV0P222	DV0P4220

★: Frame-A and B drivers are not equipped with regenerative resistors.When regeneration occurs, please prepare an optional external regenerative resistor.

Note)1 □ : Represents the motor specifications. (refer to “Model designation” P.204.)

Note)2 ◇ : Represents the driver specifications. (refer to “Model designation” P.204.)

Note)3 ＊＊ : Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030EAE

Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.

Note)5 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number “DV0P2990” separately.

Note)6 Brake cable and motor cable are required for the motor with brake.

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Table of Part Numbers and Options: 100 mm sq. or more 0.85 kW to 5.0 kW

IP67 motor Encoder connector (Large size JL10) type

Motor						Driver			Power capacity (at rated load) (kVA)		Optional parts ▶ refer to P.306						
Motor series		Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions (page)	A6 SF series Multi function type (Pulse, analog, full-closed)	A6 SG series RS485 communication / A6 SE series Basic (Pulse signal input) Note)2, Note)4	Frame			Encoder Cable Note)3,5 JL10 (Large size) (One-touch lock type / N/MS screwed type)		Motor Cable Note)3,5 JL10 (One-touch lock type / JL04 screwed type)		External Regenerative Resistor	Reactor (Single phase / 3-phase)	Noise Filter
											23-bit Absolute						
											Use in the absolute system (with battery box) Note)7	Use in the Incremental system (without battery box)	without Brake	with Brake			
											Fixed cable		Movable cable				
Low inertia	MSMF Large size JL10 type 3000 r/min IP67	Single phase/ 3-phase 200 V	1000	MSMF102L1 □ 6M MSMF102L1 □ 8M	217 257	MDDLT55SF	MDDLN55S◇	D-frame	Approx.	2.4	MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P222	DV0P4220
			1500	MSMF152L1 □ 6M MSMF152L1 □ 8M	218 257	MDDLT55SF	MDDLN55S◇		Approx.	2.9						DV0PM20047 / DV0P222	
		3-phase 200 V	2000	MSMF202L1 □ 6M MSMF202L1 □ 8M	219 258	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.8					DV0P4285 Note)6	DV0P223	DV0PM20043
			3000	MSMF302L1 □ 6M MSMF302L1 □ 8M	220 259	MFDLTA3SF	MFDLNA3S◇	F-frame	Approx.	5.2			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P224	DV0P3410
			4000	MSMF402L1 □ 6M MSMF402L1 □ 8M	221 259	MFDLTB3SF	MFDLNB3S◇		Approx.	6.5						DV0P225	
			5000	MSMF502L1 □ 6M MSMF502L1 □ 8M	222 260	MFDLTB3SF	MFDLNB3S◇		Approx.	7.8							
Middle inertia	MDMF Large size JL10 type 2000 r/min IP67	Single phase/ 3-phase 200 V	1000	MDMF102L1 □ 6M MDMF102L1 □ 8M	239 283	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.4	MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P222	DV0P4220
			1500	MDMF152L1 □ 6M MDMF152L1 □ 8M	240 284	MDDLT55SF	MDDLN55S◇		Approx.	2.9						DV0PM20047 / DV0P222	
		3-phase 200 V	2000	MDMF202L1 □ 6M MDMF202L1 □ 8M	241 285	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.8					DV0P4285 Note)6	DV0P223	DV0PM20043
			3000	MDMF302L1 □ 6M MDMF302L1 □ 8M	242 285	MFDLTA3SF	MFDLNA3S◇	F-frame	Approx.	5.2			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P224	DV0P3410
			4000	MDMF402L1 □ 6M MDMF402L1 □ 8M	243 286	MFDLTB3SF	MFDLNB3S◇		Approx.	6.5						DV0P225	
			5000	MDMF502L1 □ 6M MDMF502L1 □ 8M	245 287	MFDLTB3SF	MFDLNB3S◇		Approx.	7.8							
	MGMF Large size JL10 type (Low speed/ High torque type) 1500 r/min IP67	Single phase/ 3-phase 200 V	850	MGMF092L1 □ 6M MGMF092L1 □ 8M	246 288	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.0	MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P221	DV0P4220
			1300	MGMF132L1 □ 6M MGMF132L1 □ 8M	247 289	MDDLT55SF	MDDLN55S◇		Approx.	2.6						DV0PM20047 / DV0P222	
		3-phase 200 V	1800	MGMF182L1 □ 6M MGMF182L1 □ 8M	248 289	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.4			MFMCE 0＊＊3EUT / MFMCE 0＊＊3ECT	MFMCD 0＊＊3FUT / MFMCD 0＊＊3FCT	DV0P4285	DV0P223	DV0PM20043
			2400	MGMF242L1 □ 6M MGMF242L1 □ 8M	249 290	MEDLT93SF	MEDLN93S◇		Approx.	4.5						DV0P224	
			2900	MGMF292L1 □ 6M MGMF292L1 □ 8M	250 291	MFDLTB3SF	MFDLNB3S◇	F-frame	Approx.	5.0			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P3410	
			4400	MGMF442L1 □ 6M MGMF442L1 □ 8M	251 291	MFDLTB3SF	MFDLNB3S◇		Approx.	7.0						DV0P225	
High inertia	MHMF Large size JL10 type 2000 r/min IP67	Single phase/ 3-phase 200 V	1000	MHMF102L1 □ 6M MHMF102L1 □ 8M	232 279	MDDLT45SF	MDDLN45S◇	D-frame	Approx.	2.4	MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	MFMCD 0＊＊2EUD / MFMCD 0＊＊2ECD	MFMCA 0＊＊2FUD / MFMCA 0＊＊2FCD	DV0P4284	DV0P228 / DV0P222	DV0P4220
			1500	MHMF152L1 □ 6M MHMF152L1 □ 8M	233 279	MDDLT55SF	MDDLN55S◇		Approx.	2.9						DV0PM20047 / DV0P222	
		3-phase 200 V	2000	MHMF202L1 □ 6M MHMF202L1 □ 8M	234 280	MEDLT83SF	MEDLN83S◇	E-frame	Approx.	3.8			MFMCE 0＊＊2EUD / MFMCE 0＊＊2ECD	MFMCE 0＊＊2FUD / MFMCE 0＊＊2FCD	DV0P4285 Note)6	DV0P223	DV0PM20043
			3000	MHMF302L1 □ 6M MHMF302L1 □ 8M	235 281	MFDLTA3SF	MFDLNA3S◇	F-frame	Approx.	5.2			MFMCA 0＊＊3EUT / MFMCA 0＊＊3ECT	MFMCA 0＊＊3FUT / MFMCA 0＊＊3FCT	DV0P4285 ×2 in parallel	DV0P224	DV0P3410
			4000	MHMF402L1 □ 6M MHMF402L1 □ 8M	236 281	MFDLTB3SF	MFDLNB3S◇		Approx.	6.5						DV0P225	
			5000	MHMF502L1 □ 6M MHMF502L1 □ 8M	237 282	MFDLTB3SF	MFDLNB3S◇		Approx.	7.8							

Note)1 □ : Represents the motor specifications. (refer to “Model designation” P.204.)

Note)2 ◇ : Represents the driver specifications. (refer to “Model designation” P.204.)

Note)3 ＊＊ : Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030EPE

Note)4 Because A6SE series driver (dedicated for position control) does not support the absolute system specification, only incremental system can be used in combination.

Note)5 Use of JL10 type encoder cables and motor cables enable one-touch lock connections. Conventional screwed type N/MS and JL04V type cables can also be used.

Note)6 For other possible combinations, refer to P.343.

Note)7 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number “DV0P2990” separately.

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Table of Part Numbers and Options: 176 mm sq. or more 5.5 kW to 7.5 kW

IP67 motor Encoder connector (Large size JL10) type

Motor						Driver					Optional parts ▶ refer to P.306					
Motor series		Power supply	Output (W)	Part No. Note)1	Rating/ Spec. Dimensions (page)	A6SF series Multi function type (Pulse, analog, full-closed)	A6SG series RS485 communication / A6SE series Basic (Pulse signal input)	Frame	Power capacity (at rated load) (kVA)		Encoder Cable Note)2,3 JL10 (Large size) (One-touch lock type / N/MS screwed type) 23-bit Absolute		Motor Cable Note)6		External Regenerative Resistor	Reactor (Single phase / 3-phase)	Noise Filter
											Use in the absolute system (with battery box) Note)4	Use in the Incremental system (without battery box)	without Brake	with Brake			
											Fixed cable						
Middle inertia	MDMF Large size JL10 type 1500 r/min IP67	3-phase 200 V	7500	MDMF752L1 □ 6M	245 287	MGDLTC3SF	—	G-frame	Approx. 11		MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	Note)6	Note)6	DV0P4285 ×3 in parallel	— Note)5	HF3080C-SZA (Recommended components) P.413
	MGMF Large size JL10 type (Low speed/High torque type) 1500 r/min IP67	3-phase 200 V	5500	MGMF552L1 □ 6M	252 292	MGDLTC3SF	—	G-frame	Approx. 8.5		MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	Note)6	Note)6	DV0P4285 ×3 in parallel	— Note)5	HF3080C-SZA (Recommended components) P.413
High inertia	MHMF Large size JL10 type 1500 r/min IP67	3-phase 200 V	7500	MHMF752L1 □ 6M	238 283	MGDLTC3SF	—	G-frame	Approx. 11		MFECA 0＊＊0EPE / MFECA 0＊＊0ESE	MFECA 0＊＊0EPD / MFECA 0＊＊0ESD	Note)6	Note)6	DV0P4285 ×3 in parallel	— Note)5	HF3080C-SZA (Recommended components) P.413

■ About dynamic brake

G frame is built in / external, H frame is external

Built-in / {external} The standard of the dynamic brake resistance's capability is up to three consecutive emergency stops from the rated speed at the maximum allowable inertia (load inertia moment ratio 10 times the rotor inertia moment). If it is used under more conditions, the resistance may be broken and the dynamic brake may not operate.

Recommended resistance: 1.2 Ω 400 W or more × 3 pieces

For inquiries: Iwaki Musen Kenkyusho Co.,Ltd. Tel: +81-44-833-4311

■ Connector kit (option) Component parts Note)6

Motor	Driver		Option No. Connector Kit for motor, encoder connection	Encoder Cable		Motor Cable		Brake Cable	
	Frame	Connection terminal		Motor side	Driver side	Motor side	Driver side	Motor side	Power supply for brake
MDMF 7.5 kW MGMF 5.5 kW MHMF 7.5 kW	G	M5	DV0PM20107	Large size connector One-touch lock type	For Connector X6	Connector Screwed type	(to be supplied by customer) M5 Round terminal	not included	(to be supplied by customer)
			DV0PM20108					Connector Screwed type	
			DV0PM20111	Large size connector Screwed type				not included	
			DV0PM20112					Connector Screwed type	

Note)1 □ : Represents the motor specifications. (refer to “Model designation” P.204.)

Note)2 ＊＊ : Represents the cable length (03/3 m, 05/5 m, 10/10 m, 20/20 m). Example. 3 m/MFECA0030ETE

Note)3 Use of JL10 type encoder cables and motor cables enable one-touch lock connections. Conventional screwed type N/MS and JL04V type cables can also be used.

Note)4 Please note that a battery is not supplied together with 23-bit absolute encoder cable (with battery box). Please buy the battery part number “DV0P2990” separately.

Note)5 Please prepare reactor for customer.

Note)6 We recommend purchasing an optional connector kit.

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Special Order Product | 200 V **MSMF 50 W** [Low inertia 38 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP65		MSMF5AZL1□□M
Applicable driver	Model No.	Multifunction type	MADLT05SF
		RS485 communication type *2	MADLN05SG
		Basic type *2	MADLN05SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	50
Rated torque		(N·m)	0.16
Continuous stall torque		(N·m)	0.16
Momentary Max. peak torque		(N·m)	0.48
Rated current		(A(rms))	1.1
Max. current		(A(o-p))	4.7
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4281		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.026
	With brake		0.029
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

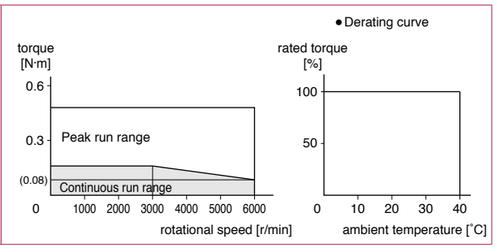
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88.0
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

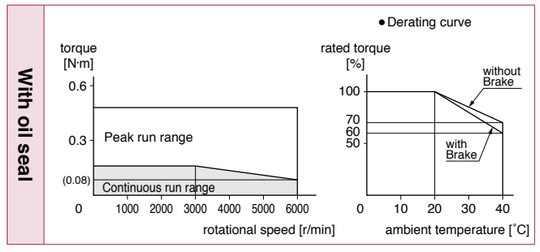
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.253		—	P.253		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP65		MSMF012L1□□M
Applicable driver	Model No.	Multifunction type	MADLT05SF
		RS485 communication type *2	MADLN05SG
		Basic type *2	MADLN05SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	100
Rated torque		(N·m)	0.32
Continuous stall torque		(N·m)	0.32
Momentary Max. peak torque		(N·m)	0.95
Rated current		(A(rms))	1.1
Max. current		(A(o-p))	4.7
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4281		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.048
	With brake		0.051
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.294 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

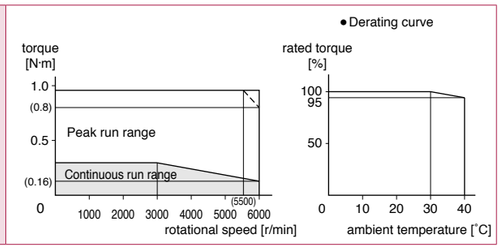
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88.0
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

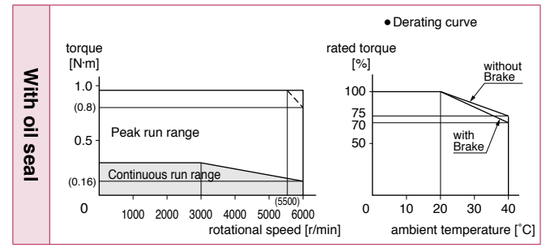
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.253		—	P.254		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product | 200 V **MSMF 200 W** [Low inertia 60 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP65		MSMF022L1□□M
Applicable driver	Model No.	Multifunction type	MADLT15SF
		RS485 communication type *2	MADLN15SG
		Basic type *2	MADLN15SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	200
Rated torque		(N·m)	0.64
Continuous stall torque		(N·m)	0.64
Momentary Max. peak torque		(N·m)	1.91
Rated current		(A(rms))	1.5
Max. current		(A(o-p))	6.5
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.14
	With brake		0.17
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

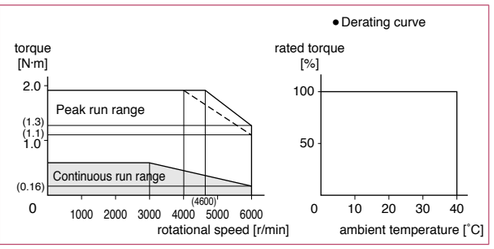
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98.0

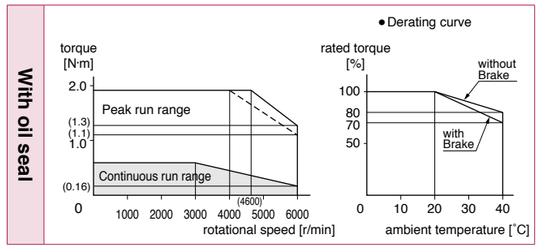
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.254		—	P.254		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Specifications

			AC200 V
Motor model *1	IP65		MSMF042L1□□M
Applicable driver	Model No.	Multifunction type	MBDLT25SF
		RS485 communication type *2	MBDLN25SG
		Basic type *2	MBDLN25SE
	Frame symbol		B-frame
Power supply capacity		(kVA)	0.9
Rated output		(W)	400
Rated torque		(N·m)	1.27
Continuous stall torque		(N·m)	1.27
Momentary Max. peak torque		(N·m)	3.82
Rated current		(A(rms))	2.4
Max. current		(A(o-p))	10.2
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.27
	With brake		0.30
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.27 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

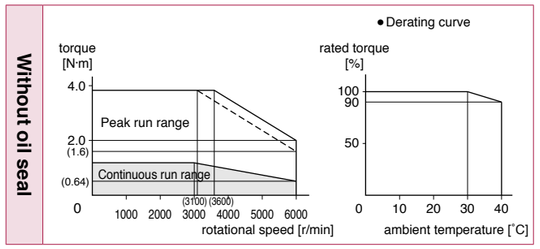
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98.0

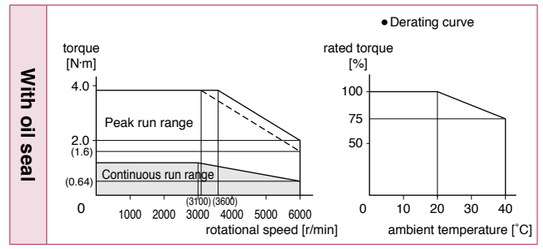
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.255		—	P.255		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Special Order Product | 200 V **MSMF 750 W** [Low inertia 80 mm sq.]

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Specifications

			AC200 V
Motor model *1	IP65		MSMF082L1□□M
Applicable driver	Model No.	Multifunction type	MCDLT35SF
		RS485 communication type *2	MCDLN35SG
		Basic type *2	MCDLN35SE
	Frame symbol		C-frame
Power supply capacity		(kVA)	1.8
Rated output		(W)	750
Rated torque		(N·m)	2.39
Continuous stall torque		(N·m)	2.39
Momentary Max. peak torque		(N·m)	7.16
Rated current		(A(rms))	4.1
Max. current		(A(o-p))	17.4
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.96
	With brake		1.06
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	2.45 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±1.2

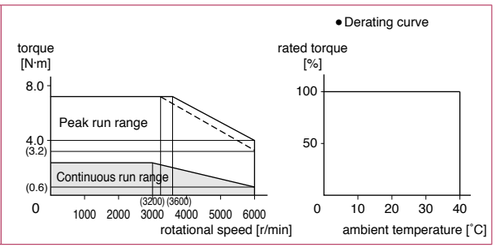
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During operation	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

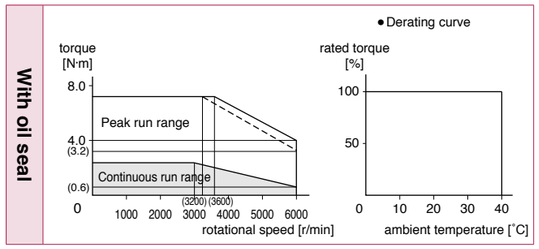
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.255		—	P.256		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Special Order Product | 200 V **MSMF 1000 W** [Low inertia 80 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP65		MSMF092L1□□M
Applicable driver	Model No.	Multifunction type	MDDLT45SF
		RS485 communication type *2	MDDLN45SG
		Basic type *2	MDDLN45SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.4
Rated output		(W)	1000
Rated torque		(N·m)	3.18
Continuous stall torque		(N·m)	3.18
Momentary Max. peak torque		(N·m)	9.55
Rated current		(A(rms))	5.7
Max. current		(A(o-p))	24.2
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		1.26
	With brake		1.36
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	3.80 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

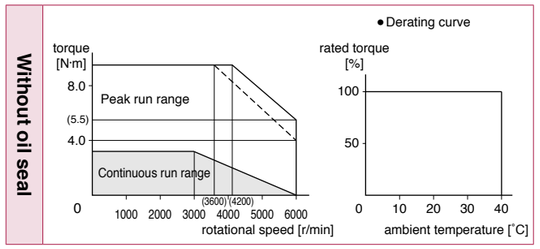
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During operation	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

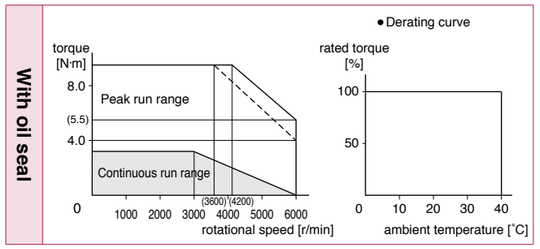
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.256		—	P.256		—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Special Order Product 200 V **MSMF 1.0 kW** [Low inertia 100 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MSMF102L1□□M
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.4
Rated output		(W)	1000
Rated torque		(N·m)	3.18
Continuous stall torque		(N·m)	3.82
Momentary Max. peak torque		(N·m)	9.55
Rated current		(A(rms))	6.6
Max. current		(A(o-p))	28
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	5000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		2.15
	With brake		2.47
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

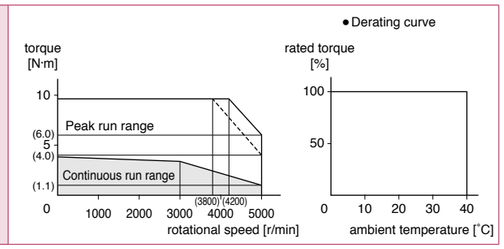
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.257		—	P.257	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Special Order Product 200 V **MSMF 1.5 kW** [Low inertia 100 mm sq.]

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Specifications

			AC200 V
Motor model *1	IP67		MSMF152L1□□M
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.9
Rated output		(W)	1500
Rated torque		(N·m)	4.77
Continuous stall torque		(N·m)	5.72
Momentary Max. peak torque		(N·m)	14.3
Rated current		(A(rms))	8.2
Max. current		(A(o-p))	35
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	5000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		3.10
	With brake		3.45
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

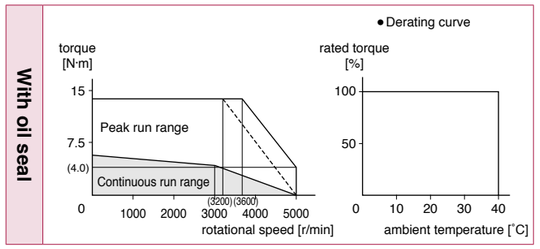
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.257		—	P.258	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Special Order Product 200 V MSMF 2.0 kW [Low inertia 100 mm sq.]

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Specifications

			AC200 V
Motor model *1	IP67		MSMF202L1□□M
Applicable driver	Model No.	Multifunction type	MEDLT83SF
		RS485 communication type *2	MEDLN83SG
		Basic type *2	MEDLN83SE
	Frame symbol		E-frame
Power supply capacity		(kVA)	3.8
Rated output		(W)	2000
Rated torque		(N·m)	6.37
Continuous stall torque		(N·m)	7.64
Momentary Max. peak torque		(N·m)	19.1
Rated current		(A(rms))	11.3
Max. current		(A(o-p))	48
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	5000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		4.06
	With brake		4.41
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	8.0 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

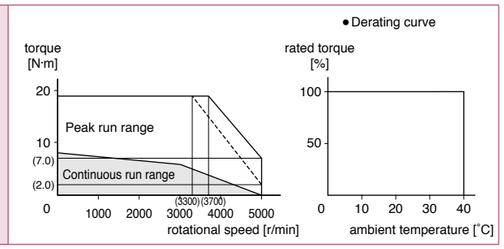
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.258		—	P.258	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Specifications

			AC200 V
Motor model *1	IP67		MSMF302L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTA3SF
		RS485 communication type *2	MFDLNA3SG
		Basic type *2	MFDLNA3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	5.2
Rated output		(W)	3000
Rated torque		(N·m)	9.55
Continuous stall torque		(N·m)	11.0
Momentary Max. peak torque		(N·m)	28.6
Rated current		(A(rms))	18.1
Max. current		(A(o-p))	77
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	5000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		7.04
	With brake		7.38
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	12.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	15 or less
Exciting current (DC) (A)	0.81
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

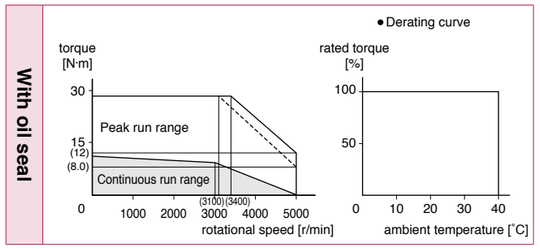
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.259		—	P.259	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product 200 V **MSMF 4.0 kW** [Low inertia 130 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MSMF402L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	6.5
Rated output		(W)	4000
Rated torque		(N·m)	12.7
Continuous stall torque		(N·m)	15.2
Momentary Max. peak torque		(N·m)	38.2
Rated current		(A(rms))	19.6
Max. current		(A(o-p))	83
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	4500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		14.4
	With brake		15.6
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	16.2 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

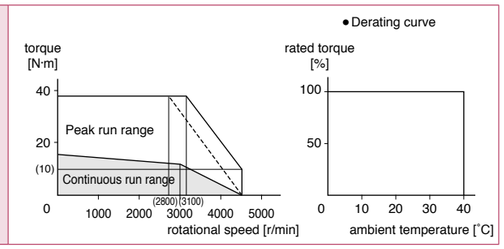
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.259		—	P.260	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Specifications

			AC200 V
Motor model *1	IP67		MSMF502L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	7.8
Rated output		(W)	5000
Rated torque		(N·m)	15.9
Continuous stall torque		(N·m)	19.1
Momentary Max. peak torque		(N·m)	47.7
Rated current		(A(rms))	24.0
Max. current		(A(o-p))	102
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	4500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		19.0
	With brake		20.2
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	22.0 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

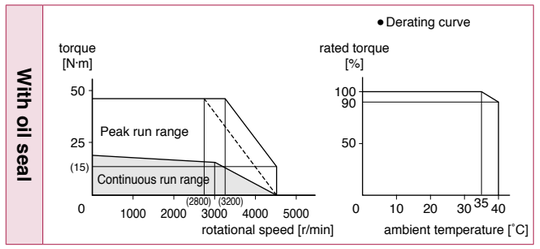
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.260		—	P.260	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product | 200 V **MQMF 100 W** [Middle inertia Flat type 60 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP65		MQMF012L1□□M
Applicable driver	Model No.	Multifunction type	MADLT05SF
		RS485 communication type *2	MADLN05SG
		Basic type *2	MADLN05SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	100
Rated torque		(N·m)	0.32
Continuous stall torque		(N·m)	0.33
Momentary Max. peak torque		(N·m)	1.11
Rated current		(A(rms))	1.1
Max. current		(A(o-p))	5.5
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4281		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.15
	With brake		0.18
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.39 or more
Engaging time (ms)	15 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

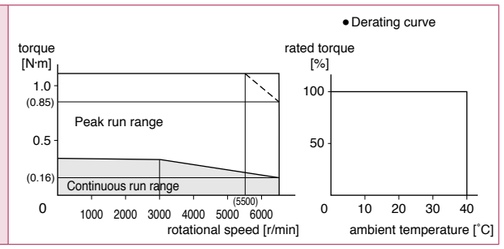
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

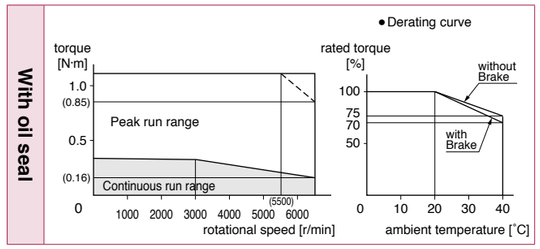
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.261	P.261	P.261	P.262	P.262	P.262

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Specifications

			AC200 V
Motor model *1	IP65		MQMF022L1□□M
Applicable driver	Model No.	Multifunction type	MADLT15SF
		RS485 communication type *2	MADLN15SG
		Basic type *2	MADLN15SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	200
Rated torque		(N·m)	0.64
Continuous stall torque		(N·m)	0.76
Momentary Max. peak torque		(N·m)	2.23
Rated current		(A(rms))	1.4
Max. current		(A(o-p))	6.9
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.50
	With brake		0.59
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

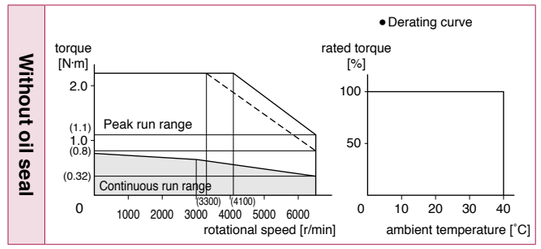
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

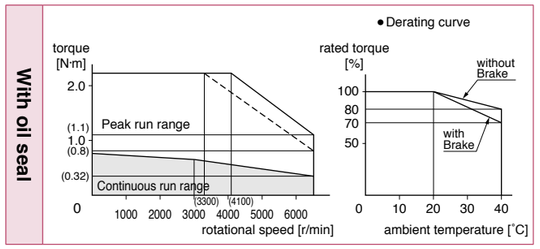
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.263	P.263	P.263	P.264	P.264	P.264

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product | 200 V **MQMF 400 W** [Middle inertia Flat type 80 mm sq.]

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Specifications

			AC200 V
Motor model *1	IP65		MQMF042L1□□M
Applicable driver	Model No.	Multifunction type	MBDLT25SF
		RS485 communication type *2	MBDLN25SG
		Basic type *2	MBDLN25SE
	Frame symbol		B-frame
Power supply capacity		(kVA)	0.9
Rated output		(W)	400
Rated torque		(N·m)	1.27
Continuous stall torque		(N·m)	1.40
Momentary Max. peak torque		(N·m)	4.46
Rated current		(A(rms))	2.1
Max. current		(A(o-p))	10.4
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.98
	With brake		1.06
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

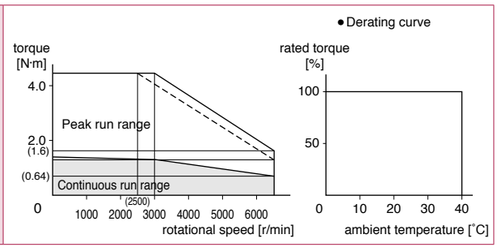
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

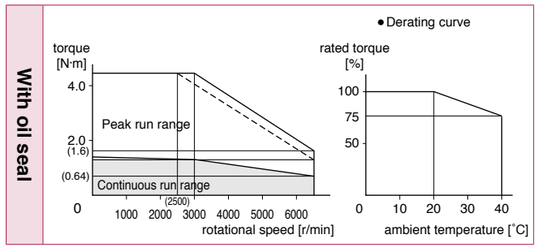
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.265	P.265	P.265	P.266	P.266	P.266

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product | 200 V **MHMF 50 W** [High inertia 40 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP65		MHMF5AZL1□□M
Applicable driver	Model No.	Multifunction type	MADLT05SF
		RS485 communication type *2	MADLN05SG
		Basic type *2	MADLN05SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	50
Rated torque		(N·m)	0.16
Continuous stall torque		(N·m)	0.18
Momentary Max. peak torque		(N·m)	0.56
Rated current		(A(rms))	1.1
Max. current		(A(o-p))	5.5
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4281		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.038
	With brake		0.042
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

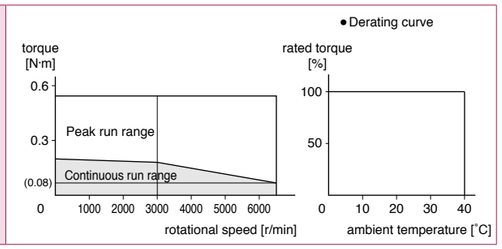
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	49

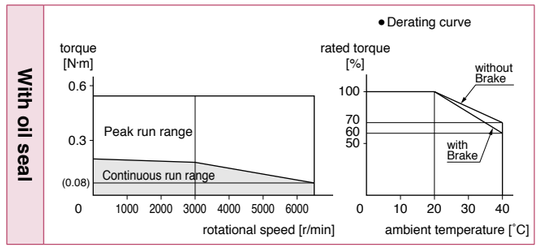
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.267	P.267	P.267	P.268	P.268	P.268

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Special Order Product 200 V MHMF 100 W [High inertia 40 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP65		MHMF012L1□□M
Applicable driver	Model No.	Multifunction type	MADLT05SF
		RS485 communication type *2	MADLN05SG
		Basic type *2	MADLN05SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	100
Rated torque		(N·m)	0.32
Continuous stall torque		(N·m)	0.33
Momentary Max. peak torque		(N·m)	1.11
Rated current		(A(rms))	1.1
Max. current		(A(o-p))	5.5
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4281		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.071
	With brake		0.074
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	0.38 or more
Engaging time (ms)	35 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.30
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

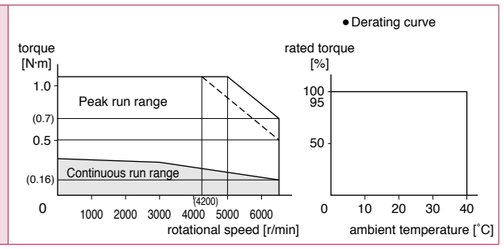
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	147
	Thrust load A-direction (N)	88
	Thrust load B-direction (N)	117.6
During operation	Radial load P-direction (N)	68.6
	Thrust load A, B-direction (N)	58.8

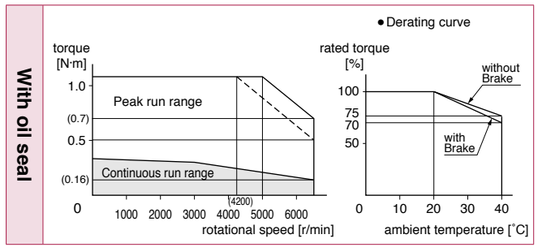
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.269	P.269	P.269	P.270	P.270	P.270

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Specifications

			AC200 V
Motor model *1	IP65		MHMF022L1□□M
Applicable driver	Model No.	Multifunction type	MADLT15SF
		RS485 communication type *2	MADLN15SG
		Basic type *2	MADLN15SE
	Frame symbol		A-frame
Power supply capacity		(kVA)	0.5
Rated output		(W)	200
Rated torque		(N·m)	0.64
Continuous stall torque		(N·m)	0.76
Momentary Max. peak torque		(N·m)	2.23
Rated current		(A(rms))	1.4
Max. current		(A(o-p))	6.9
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.29
	With brake		0.31
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

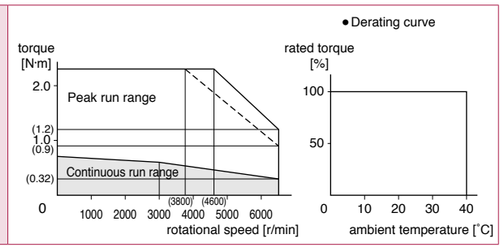
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

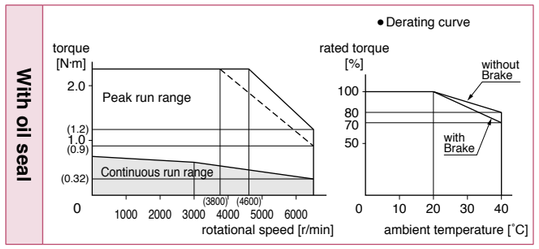
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.271	P.271	P.271	P.272	P.272	P.272

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Special Order Product | 200 V **MHMF 400 W** [High inertia 60 mm sq.]

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Specifications

			AC200 V
Motor model *1	IP65		MHMF042L1□□M
Applicable driver	Model No.	Multifunction type	MBDLT25SF
		RS485 communication type *2	MBDLN25SG
		Basic type *2	MBDLN25SE
	Frame symbol		B-frame
Power supply capacity		(kVA)	0.9
Rated output		(W)	400
Rated torque		(N·m)	1.27
Continuous stall torque		(N·m)	1.40
Momentary Max. peak torque		(N·m)	4.46
Rated current		(A(rms))	2.1
Max. current		(A(o-p))	10.4
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6500
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		0.56
	With brake		0.58
Recommended moment of inertia ratio of the load and the rotor Note)3			30 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	1.6 or more
Engaging time (ms)	50 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.36
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

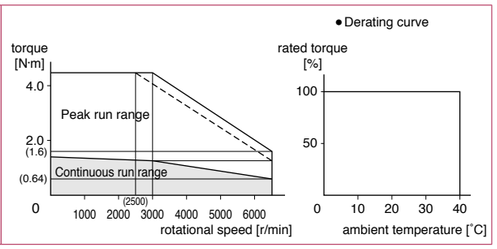
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	392
	Thrust load A-direction (N)	147
	Thrust load B-direction (N)	196
During operation	Radial load P-direction (N)	245
	Thrust load A, B-direction (N)	98

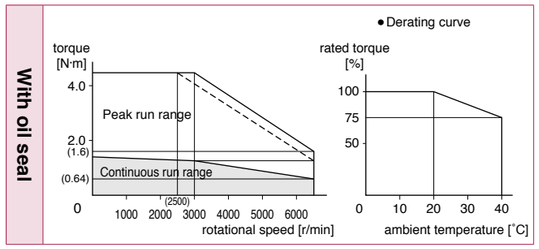
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.57.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.273	P.273	P.273	P.274	P.274	P.274

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product | 200 V **MHMF 750 W** [High inertia 80 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP65		MHMF082L1□□M
Applicable driver	Model No.	Multifunction type	MCDLT35SF
		RS485 communication type *2	MCDLN35SG
		Basic type *2	MCDLN35SE
	Frame symbol		C-frame
Power supply capacity		(kVA)	1.8
Rated output		(W)	750
Rated torque		(N·m)	2.39
Continuous stall torque		(N·m)	2.86
Momentary Max. peak torque		(N·m)	8.36
Rated current		(A(rms))	3.8
Max. current		(A(o-p))	18.8
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4283		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		1.56
	With brake		1.66
Recommended moment of inertia ratio of the load and the rotor Note)3			20 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	3.8 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

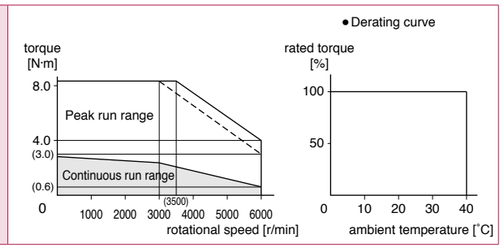
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During operation	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

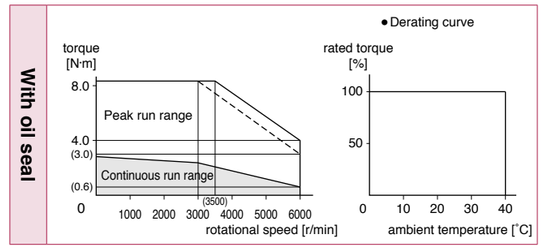
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.275	P.275	P.275	P.276	P.276	P.276

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product 200 V MHMF 1000 W [High inertia 80 mm sq.]

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Specifications

			AC200 V
Motor model *1	IP65		MHMF092L1□□M
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.4
Rated output		(W)	1000
Rated torque		(N·m)	3.18
Continuous stall torque		(N·m)	3.34
Momentary Max. peak torque		(N·m)	11.1
Rated current		(A(rms))	5.7
Max. current		(A(o-p))	28.2
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	3000
Max. rotational speed		(r/min)	6000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		2.03
	With brake		2.13
Recommended moment of inertia ratio of the load and the rotor Note)3			15 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	3.8 or more
Engaging time (ms)	70 or less
Releasing time (ms) Note)4	20 or less
Exciting current (DC) (A)	0.42
Releasing voltage (DC) (V)	1 or more
Exciting voltage (DC) (V)	24±2.4

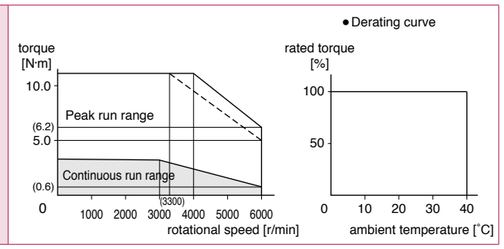
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	686
	Thrust load A-direction (N)	294
	Thrust load B-direction (N)	392
During operation	Radial load P-direction (N)	392
	Thrust load A, B-direction (N)	147

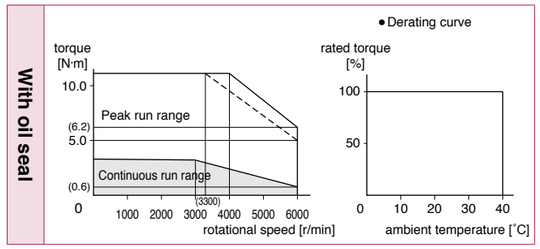
• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

Without oil seal



With oil seal



Dimensions

Motor specifications	Round shaft/ Key way, center tap shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Leadwire type (IP65)	P.277	P.277	P.277	P.278	P.278	P.278

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Special Order Product 200 V MHMF 1.0 kW [High inertia 130 mm sq.]

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Specifications

			AC200 V
Motor model *1	IP67		MHMF102L1□□M
Applicable driver	Model No.	Multifunction type	MDDLT45SF
		RS485 communication type *2	MDDLN45SG
		Basic type *2	MDDLN45SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.4
Rated output		(W)	1000
Rated torque		(N·m)	4.77
Continuous stall torque		(N·m)	5.25
Momentary Max. peak torque		(N·m)	14.3
Rated current		(A(rms))	5.2
Max. current		(A(o-p))	22
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		22.9
	With brake		24.1
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

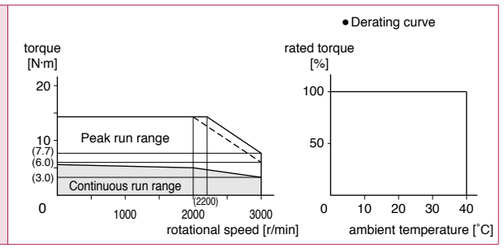
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.279		—	P.279	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product 200 V MHMF 1.5 kW [High inertia 130 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MHMF152L1□□M
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.9
Rated output		(W)	1500
Rated torque		(N·m)	7.16
Continuous stall torque		(N·m)	7.52
Momentary Max. peak torque		(N·m)	21.5
Rated current		(A(rms))	8.0
Max. current		(A(o-p))	34
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		33.4
	With brake		34.6
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

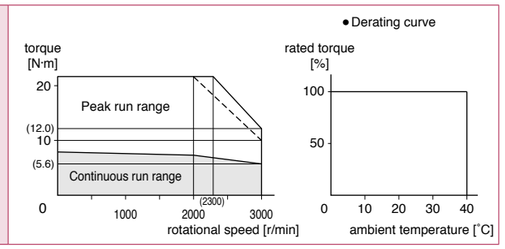
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.279		—	P.280	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Specifications

			AC200 V
Motor model *1	IP67		MHMF202L1□□M
Applicable driver	Model No.	Multifunction type	MEDLT83SF
		RS485 communication type *2	MEDLN83SG
		Basic type *2	MEDLN83SE
	Frame symbol		E-frame
Power supply capacity		(kVA)	3.8
Rated output		(W)	2000
Rated torque		(N·m)	9.55
Continuous stall torque		(N·m)	11.5
Momentary Max. peak torque		(N·m)	28.6
Rated current		(A(rms))	12.5
Max. current		(A(o-p))	53
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		55.7
	With brake		61.0
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

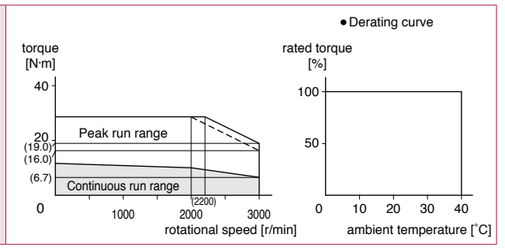
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.280		—	P.280	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product 200 V MHMF 3.0 kW [High inertia 176 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MHMF302L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTA3SF
		RS485 communication type *2	MFDLNA3SG
		Basic type *2	MFDLNA3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	5.2
Rated output		(W)	3000
Rated torque		(N·m)	14.3
Continuous stall torque		(N·m)	17.2
Momentary Max. peak torque		(N·m)	43.0
Rated current		(A(rms))	17.0
Max. current		(A(o-p))	72
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		85.3
	With brake		90.7
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

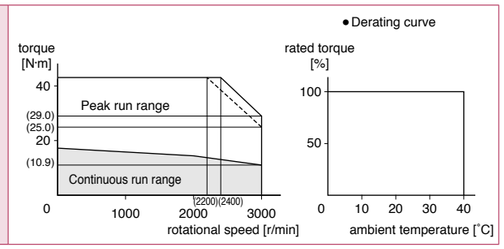
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.281		—	P.281	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Specifications

			AC200 V
Motor model *1	IP67		MHMF402L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	6.5
Rated output		(W)	4000
Rated torque		(N·m)	19.1
Continuous stall torque		(N·m)	22.0
Momentary Max. peak torque		(N·m)	57.3
Rated current		(A(rms))	20
Max. current		(A(o-p))	85
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		104
	With brake		110
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

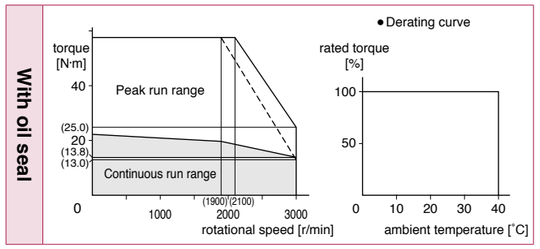
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.281		—	P.282	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Special Order Product 200 V MHMF 5.0 kW [High inertia 176 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MHMF502L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	7.8
Rated output		(W)	5000
Rated torque		(N·m)	23.9
Continuous stall torque		(N·m)	26.3
Momentary Max. peak torque		(N·m)	71.6
Rated current		(A(rms))	23.3
Max. current		(A(o-p))	99
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		146
	With brake		151
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

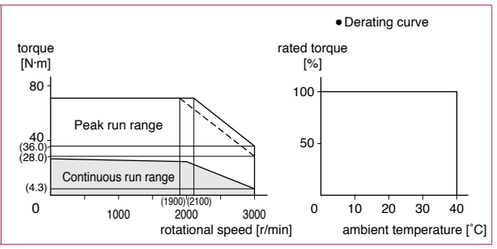
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.282		—	P.282	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Specifications

			AC200 V
Motor model *1	IP67		MHMF752L1□□M
Applicable driver	Model No.	Multifunction type	MGDLTC3SF
		RS485 communication type *2	—
		Basic type *2	—
	Frame symbol		G-frame
Power supply capacity		(kVA)	11
Rated output		(W)	7500
Rated torque		(N·m)	47.8
Continuous stall torque		(N·m)	47.8
Momentary Max. peak torque		(N·m)	125
Rated current		(A(rms))	40.2
Max. current		(A(o-p))	154
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×3		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		272
	With brake		279
Recommended moment of inertia ratio of the load and the rotor Note)3			5 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	63.0 or more
Engaging time (ms)	200 or less
Releasing time (ms) Note)4	80 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

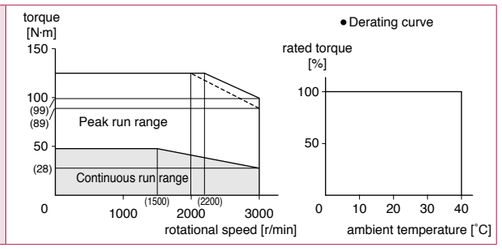
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	2058
	Thrust load A-direction (N)	980
	Thrust load B-direction (N)	1176
During operation	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.60.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.283	—	—	P.283	—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product 200 V MDMF 1.0 kW [Middle inertia 130 mm sq.]

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Specifications

			AC200 V
Motor model *1	IP67		MDMF102L1□□M
Applicable driver	Model No.	Multifunction type	MDDLT45SF
		RS485 communication type *2	MDDLN45SG
		Basic type *2	MDDLN45SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.4
Rated output		(W)	1000
Rated torque		(N·m)	4.77
Continuous stall torque		(N·m)	5.25
Momentary Max. peak torque		(N·m)	14.3
Rated current		(A(rms))	5.2
Max. current		(A(o-p))	22
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		6.18
	With brake		7.40
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

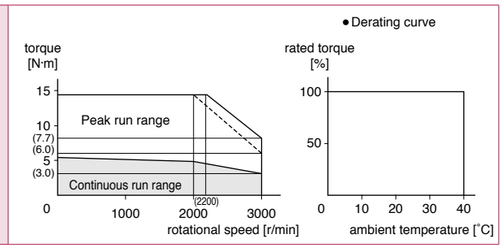
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.283		—	P.284	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
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Specifications

			AC200 V
Motor model *1	IP67		MDMF152L1□□M
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.9
Rated output		(W)	1500
Rated torque		(N·m)	7.16
Continuous stall torque		(N·m)	7.52
Momentary Max. peak torque		(N·m)	21.5
Rated current		(A(rms))	8.0
Max. current		(A(o-p))	34
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		9.16
	With brake		10.4
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

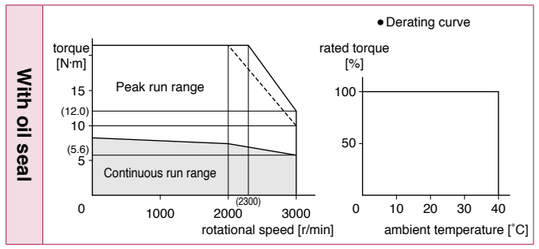
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.284		—	P.284	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product 200 V MDMF 2.0 kW [Middle inertia 130 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MDMF202L1□□M
Applicable driver	Model No.	Multifunction type	MEDLT83SF
		RS485 communication type *2	MEDLN83SG
		Basic type *2	MEDLN83SE
	Frame symbol		E-frame
Power supply capacity		(kVA)	3.8
Rated output		(W)	2000
Rated torque		(N·m)	9.55
Continuous stall torque		(N·m)	10.0
Momentary Max. peak torque		(N·m)	28.6
Rated current		(A(rms))	9.9
Max. current		(A(o-p))	42
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		12.1
	With brake		13.3
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

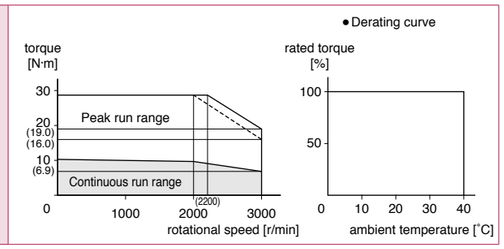
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	490
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.285		—	P.285	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Specifications

			AC200 V
Motor model *1	IP67		MDMF302L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTA3SF
		RS485 communication type *2	MFDLNA3SG
		Basic type *2	MFDLNA3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	5.2
Rated output		(W)	3000
Rated torque		(N·m)	14.3
Continuous stall torque		(N·m)	15.0
Momentary Max. peak torque		(N·m)	43.0
Rated current		(A(rms))	16.4
Max. current		(A(o-p))	70
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		18.6
	With brake		19.6
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	22.0 or more
Engaging time (ms)	110 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.90
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

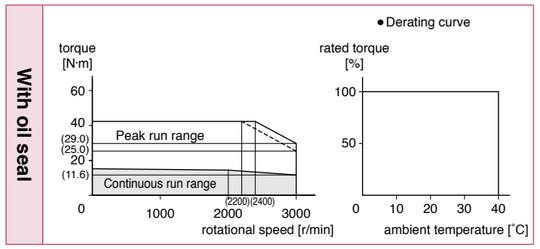
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.285		—	P.286	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product 200 V MDMF 4.0 kW [Middle inertia 176 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MDMF402L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	6.5
Rated output		(W)	4000
Rated torque		(N·m)	19.1
Continuous stall torque		(N·m)	22.0
Momentary Max. peak torque		(N·m)	57.3
Rated current		(A(rms))	20.0
Max. current		(A(o-p))	85
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		46.9
	With brake		52.3
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

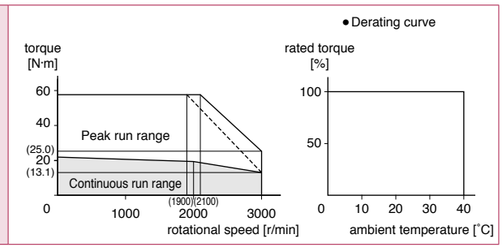
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.286		—	P.286	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Specifications

			AC200 V
Motor model *1	IP67		MDMF502L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	7.8
Rated output		(W)	5000
Rated torque		(N·m)	23.9
Continuous stall torque		(N·m)	26.3
Momentary Max. peak torque		(N·m)	71.6
Rated current		(A(rms))	23.3
Max. current		(A(o-p))	99
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	2000
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		58.2
	With brake		63.0
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

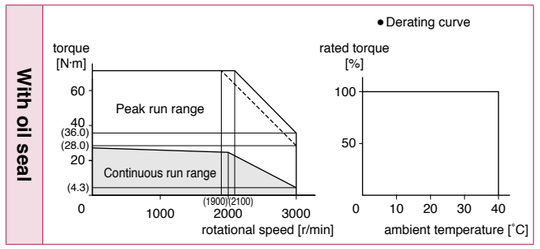
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	784
	Thrust load A, B-direction (N)	343

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.287		—	P.287	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product 200 V MDMF 7.5 kW [Middle inertia 176 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MDMF752L1□□M
Applicable driver	Model No.	Multifunction type	MGDLTC3SF
		RS485 communication type *2	—
		Basic type *2	—
	Frame symbol		G-frame
Power supply capacity		(kVA)	11
Rated output		(W)	7500
Rated torque		(N·m)	47.8
Continuous stall torque		(N·m)	47.8
Momentary Max. peak torque		(N·m)	125
Rated current		(A(rms))	40.2
Max. current		(A(o-p))	154
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×3		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		122
	With brake		127
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	63.0 or more
Engaging time (ms)	200 or less
Releasing time (ms) Note)4	80 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

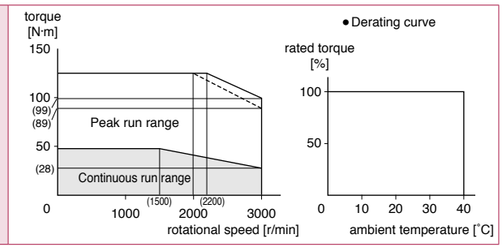
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	2058
	Thrust load A-direction (N)	980
	Thrust load B-direction (N)	1176
During operation	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.60.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.287	—	—	P.288	—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Specifications

			AC200 V
Motor model *1	IP67		MGMF092L1□□M
Applicable driver	Model No.	Multifunction type	MDDLT45SF
		RS485 communication type *2	MDDLN45SG
		Basic type *2	MDDLN45SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.0
Rated output		(W)	850
Rated torque		(N·m)	5.41
Continuous stall torque		(N·m)	5.41
Momentary Max. peak torque		(N·m)	14.3
Rated current		(A(rms))	5.9
Max. current		(A(o-p))	22
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		6.18
	With brake		7.40
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

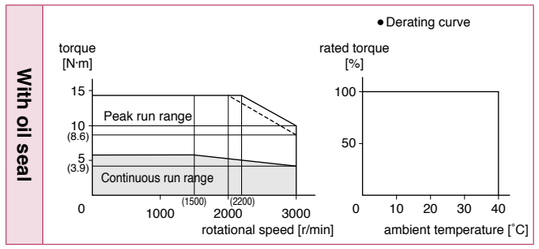
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	686
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.288		—	P.288	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product | 200 V | **MGMF 1.3 kW** [Middle inertia Low speed/ High torque type 130 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MGMF132L1□□M
Applicable driver	Model No.	Multifunction type	MDDLT55SF
		RS485 communication type *2	MDDLN55SG
		Basic type *2	MDDLN55SE
	Frame symbol		D-frame
Power supply capacity		(kVA)	2.6
Rated output		(W)	1300
Rated torque		(N·m)	8.28
Continuous stall torque		(N·m)	8.28
Momentary Max. peak torque		(N·m)	23.3
Rated current		(A(rms))	9.3
Max. current		(A(o-p))	37
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4284		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		9.16
	With brake		10.4
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

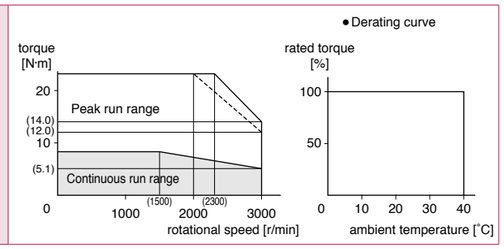
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	686
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.58.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.289		—	P.289	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product | 200 V | **MGMF 1.8 kW** [Middle inertia Low speed/ High torque type 130 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MGMF182L1□□M
Applicable driver	Model No.	Multifunction type	MEDLT83SF
		RS485 communication type *2	MEDLN83SG
		Basic type *2	MEDLN83SE
	Frame symbol		E-frame
Power supply capacity		(kVA)	3.4
Rated output		(W)	1800
Rated torque		(N·m)	11.5
Continuous stall torque		(N·m)	11.5
Momentary Max. peak torque		(N·m)	28.7
Rated current		(A(rms))	11.8
Max. current		(A(o-p))	42
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake		12.1
	With brake		13.3
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	13.7 or more
Engaging time (ms)	100 or less
Releasing time (ms) Note)4	50 or less
Exciting current (DC) (A)	0.79
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

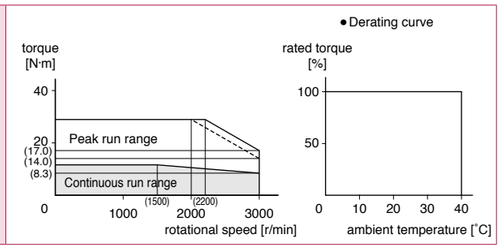
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	980
	Thrust load A-direction (N)	588
	Thrust load B-direction (N)	686
During operation	Radial load P-direction (N)	686
	Thrust load A, B-direction (N)	196

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.289		—	P.290	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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Special Order Product 200 V MGMF 2.4 kW [Middle inertia Low speed/ High torque type 176 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MGMF242L1□□M
Applicable driver	Model No.	Multifunction type	MEDLT93SF
		RS485 communication type *2	MEDLN93SG
		Basic type *2	MEDLN93SE
	Frame symbol		E-frame
Power supply capacity		(kVA)	4.5
Rated output		(W)	2400
Rated torque		(N·m)	15.3
Continuous stall torque		(N·m)	15.3
Momentary Max. peak torque		(N·m)	45.2
Rated current		(A(rms))	16.0
Max. current		(A(o-p))	67
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		46.9
	With brake		52.3
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

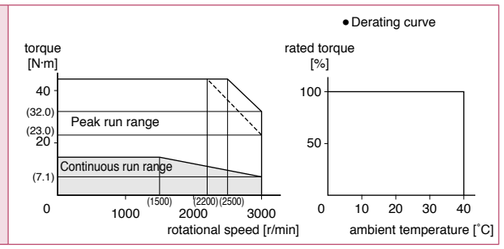
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.290		—	P.290	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
Please avoid the motor, or equipment containing the motor to be distributed to Japan, or other regions through Japan.

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• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MGMF292L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	5.0
Rated output		(W)	2900
Rated torque		(N·m)	18.5
Continuous stall torque		(N·m)	18.5
Momentary Max. peak torque		(N·m)	45.2
Rated current		(A(rms))	19.3
Max. current		(A(o-p))	67
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		46.9
	With brake		52.3
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	25.0 or more
Engaging time (ms)	80 or less
Releasing time (ms) Note)4	25 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

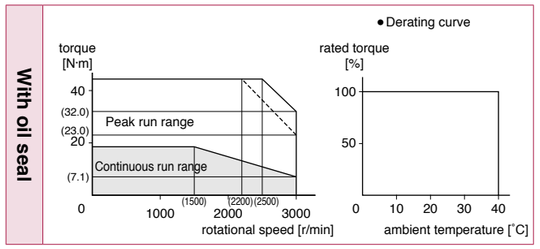
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.291		—	P.291	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Special Order Product 200 V MGMF 4.4 kW [Middle inertia Low speed/ High torque type 176 mm sq.]

• Please contact us for more information.

Specifications

			AC200 V
Motor model *1	IP67		MGMF442L1□□M
Applicable driver	Model No.	Multifunction type	MFDLTB3SF
		RS485 communication type *2	MFDLNB3SG
		Basic type *2	MFDLNB3SE
	Frame symbol		F-frame
Power supply capacity		(kVA)	7.0
Rated output		(W)	4400
Rated torque		(N·m)	28.0
Continuous stall torque		(N·m)	28.0
Momentary Max. peak torque		(N·m)	70.0
Rated current		(A(rms))	27.2
Max. current		(A(o-p))	96
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×2		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		58.2
	With brake		63.0
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	44.1 or more
Engaging time (ms)	150 or less
Releasing time (ms) Note)4	30 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

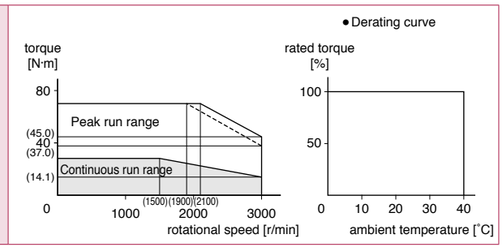
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	1666
	Thrust load A-direction (N)	784
	Thrust load B-direction (N)	980
During operation	Radial load P-direction (N)	1470
	Thrust load A, B-direction (N)	490

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.59.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.291		—	P.292	

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
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Specifications

			AC200 V
Motor model *1	IP67		MGMF552L1□□M
Applicable driver	Model No.	Multifunction type	MGDLTC3SF
		RS485 communication type *2	—
		Basic type *2	—
	Frame symbol		G-frame
Power supply capacity		(kVA)	8.5
Rated output		(W)	5500
Rated torque		(N·m)	35.0
Continuous stall torque		(N·m)	35.0
Momentary Max. peak torque		(N·m)	102
Rated current		(A(rms))	39.8
Max. current		(A(o-p))	164
Regenerative brake frequency (times/min) Note)1	Without option		No limit Note)2
	DV0P4285×3		No limit Note)2
Rated rotational speed		(r/min)	1500
Max. rotational speed		(r/min)	3000
Moment of inertia of rotor (×10^{-4} kg·m^2)	Without brake		83.0
	With brake		88.0
Recommended moment of inertia ratio of the load and the rotor Note)3			10 times or less
Rotary encoder specifications *3			23-bit Absolute
	Resolution per single turn		8388608

• Brake specifications (For details, refer to P.305)

(This brake will be released when it is energized. Do not use this for braking the motor in motion.)

Static friction torque (N·m)	63.0 or more
Engaging time (ms)	200 or less
Releasing time (ms) Note)4	80 or less
Exciting current (DC) (A)	1.29
Releasing voltage (DC) (V)	2 or more
Exciting voltage (DC) (V)	24±2.4

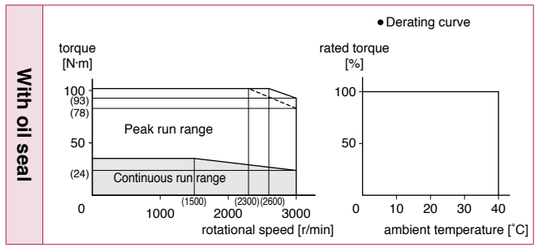
• Permissible load (For details, refer to P.304)

During assembly	Radial load P-direction (N)	2058
	Thrust load A-direction (N)	980
	Thrust load B-direction (N)	1176
During operation	Radial load P-direction (N)	1176
	Thrust load A, B-direction (N)	490

• For details of Note)1 to Note)4, refer to P.303.
• Dimensions of Driver, refer to P.60.
*1 □□ in the motor part number represents the motor specifications.
*2 Basic type and RS485 communication type are "Position control type". Detail of model designation, refer to P.204.
*3 When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

Torque characteristics (at AC200 V of power voltage <Dotted line represents the torque at 10 % less supply voltage.>)

With oil seal



Dimensions

Motor specifications	Key way shaft/ Round shaft					
	without brake			with brake		
	without oil seal	with oil seal	with protective lip/ with oil seal	without oil seal	with oil seal	with protective lip/ with oil seal
Encoder connector Large size (JL10) type	—	P.292	—	—	P.292	—

<Cautions> Reduce the moment of inertia ratio if high speed response operation is required.
Dimensions are subject to change without notice. Contact us or a dealer for the latest information.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.
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Special Order Product

MSMF 50 W to 100 W

MSMF 50 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

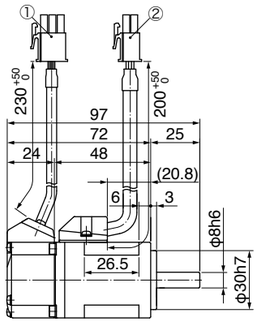
① Encoder connector
② Motor connector

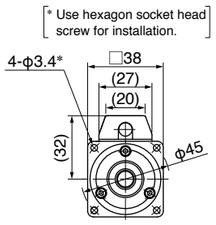
Mass: 0.32 kg

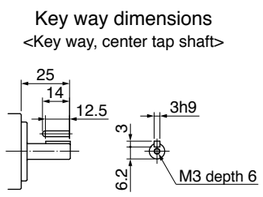
● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF5AZL1A2M	MSMF5AZL1C2M
	Key-way, center tap	MSMF5AZL1S2M	MSMF5AZL1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.







[Unit: mm]

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

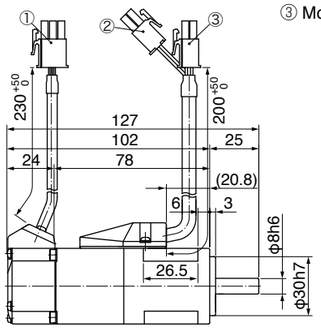
① Encoder connector
② Brake connector
③ Motor connector

Mass: 0.53 kg

● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF5AZL1B2M	MSMF5AZL1D2M
	Key-way, center tap	MSMF5AZL1T2M	MSMF5AZL1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 100 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

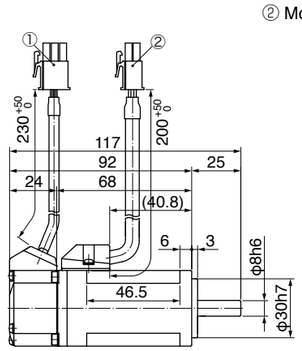
① Encoder connector
② Motor connector

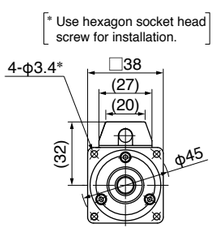
Mass: 0.47 kg

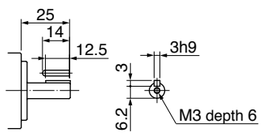
● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF012L1A2M	MSMF012L1C2M
	Key-way, center tap	MSMF012L1S2M	MSMF012L1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.







[Unit: mm]

* For motors specifications, refer to P.211, P.212.

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Special Order Product

MSMF 100 W to 200 W

MSMF 100 W

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

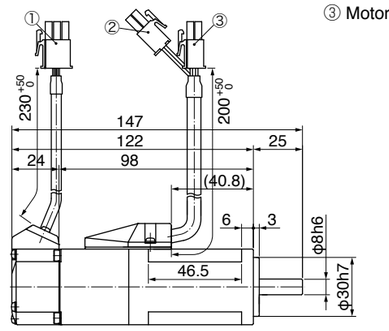
① Encoder connector
② Brake connector
③ Motor connector

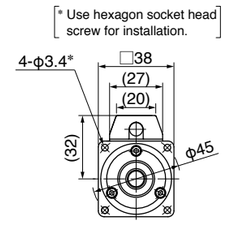
Mass: 0.68 kg

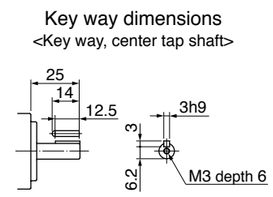
● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF012L1B2M	MSMF012L1D2M
	Key-way, center tap	MSMF012L1T2M	MSMF012L1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.







[Unit: mm]

MSMF 200 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

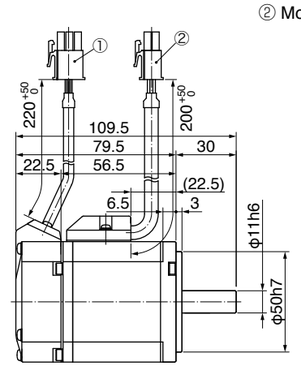
① Encoder connector
② Motor connector

Mass: 0.82 kg

● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF022L1A2M	MSMF022L1C2M
	Key-way, center tap	MSMF022L1S2M	MSMF022L1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

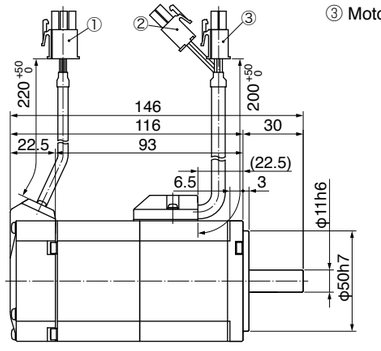
① Encoder connector
② Brake connector
③ Motor connector

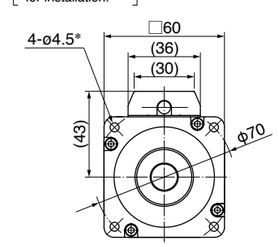
Mass: 1.3 kg

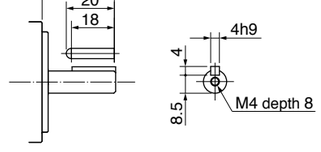
● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF022L1B2M	MSMF022L1D2M
	Key-way, center tap	MSMF022L1T2M	MSMF022L1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.







[Unit: mm]

* For motors specifications, refer to P.212, P.213.

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Special Order Product

MSMF 400 W to 750 W

MSMF 400 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

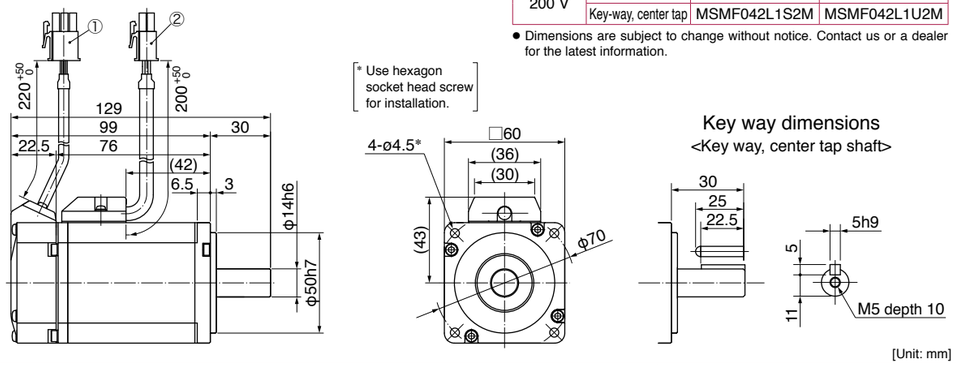
① Encoder connector
② Motor connector

Mass: 1.2 kg

● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF042L1A2M	MSMF042L1C2M
	Key-way, center tap	MSMF042L1S2M	MSMF042L1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

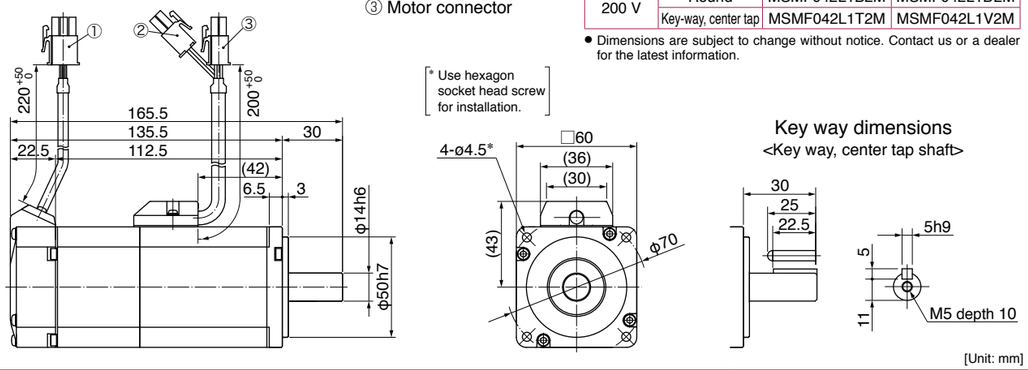
① Encoder connector
② Brake connector
③ Motor connector

Mass: 1.7 kg

● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF042L1B2M	MSMF042L1D2M
	Key-way, center tap	MSMF042L1T2M	MSMF042L1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 750 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

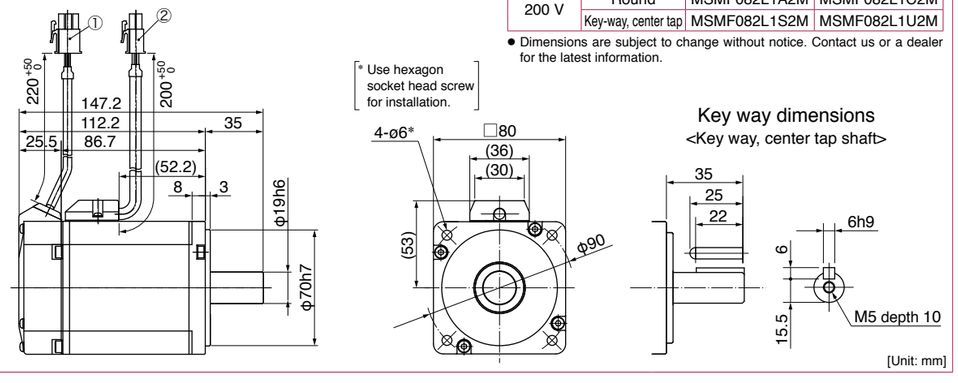
① Encoder connector
② Motor connector

Mass: 2.3 kg

● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF082L1A2M	MSMF082L1C2M
	Key-way, center tap	MSMF082L1S2M	MSMF082L1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.214, P.215.

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Special Order Product

MSMF 750 W to 1000 W

MSMF 750 W

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

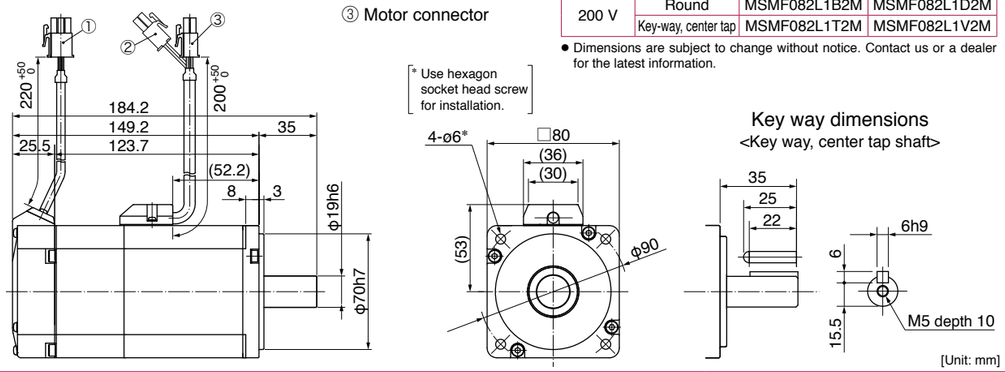
① Encoder connector
② Brake connector
③ Motor connector

Mass: 3.1 kg

● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF082L1B2M	MSMF082L1D2M
	Key-way, center tap	MSMF082L1T2M	MSMF082L1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 1000 W

Leadwire type (IP65) · without brake · without/with oil seal · Round shaft/ Key way, center tap shaft

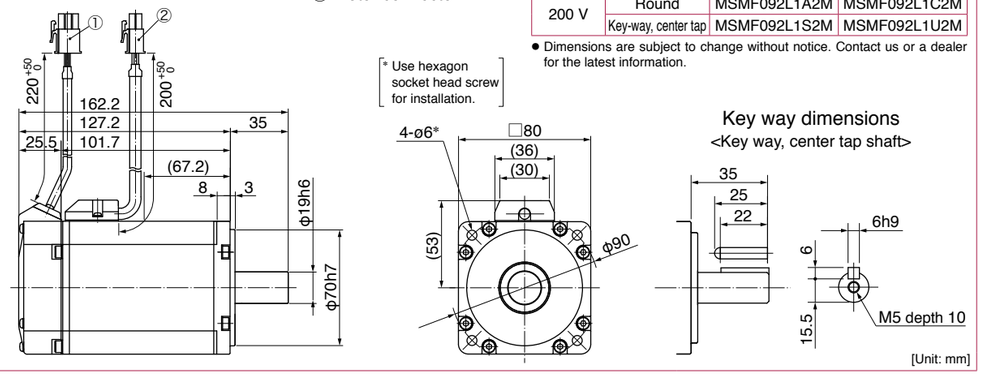
① Encoder connector
② Motor connector

Mass: 2.8 kg

● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF092L1A2M	MSMF092L1C2M
	Key-way, center tap	MSMF092L1S2M	MSMF092L1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Leadwire type (IP65) · with brake · without/with oil seal · Round shaft/ Key way, center tap shaft

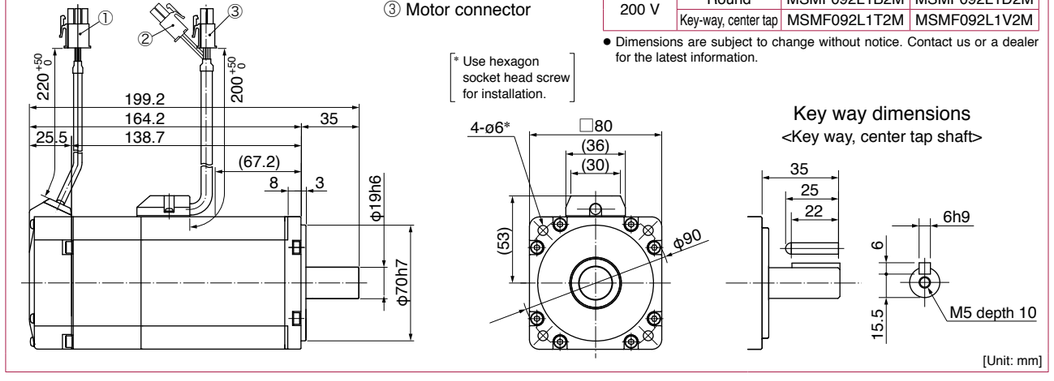
① Encoder connector
② Brake connector
③ Motor connector

Mass: 3.6 kg

● Motor model

Power supply	Shaft	without oil seal	with oil seal
200 V	Round	MSMF092L1B2M	MSMF092L1D2M
	Key-way, center tap	MSMF092L1T2M	MSMF092L1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.215, P.216.

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MSMF 1.0 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

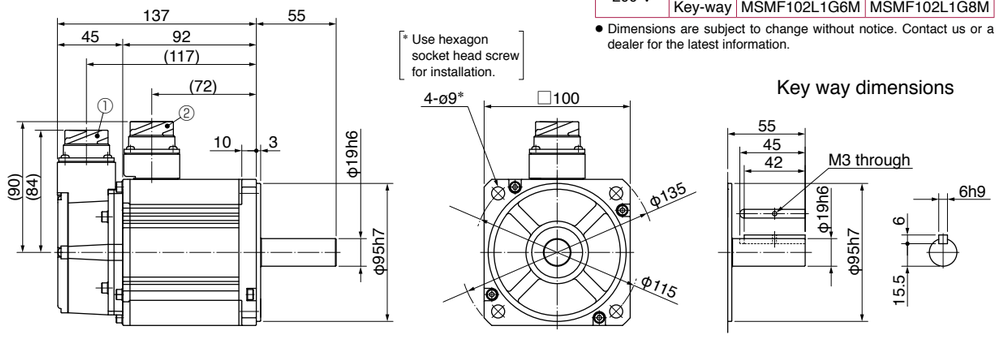
① Encoder connector (Large size JL10)
② Motor connector

Mass: 3.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF102L1C6M	MSMF102L1C8M
	Key-way	MSMF102L1G6M	MSMF102L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

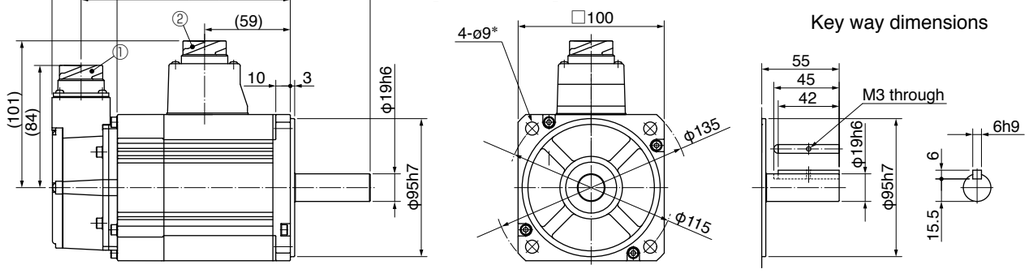
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 4.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF102L1D6M	MSMF102L1D8M
	Key-way	MSMF102L1H6M	MSMF102L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 1.5 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

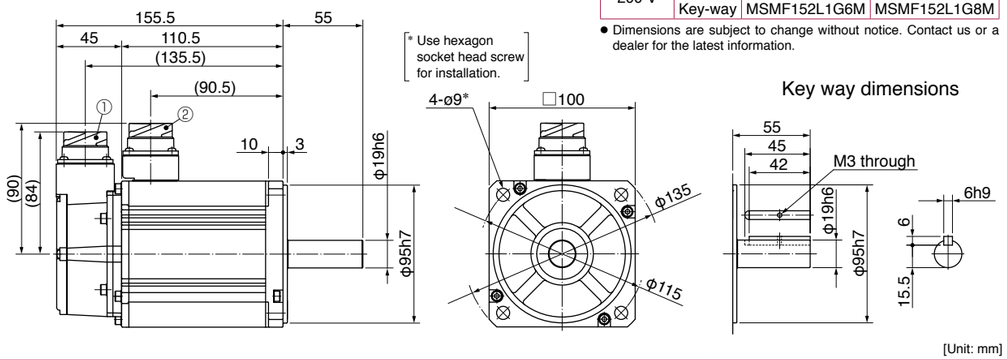
① Encoder connector (Large size JL10)
② Motor connector

Mass: 4.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF152L1C6M	MSMF152L1C8M
	Key-way	MSMF152L1G6M	MSMF152L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.217, P.218.

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MSMF 1.5 kW

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

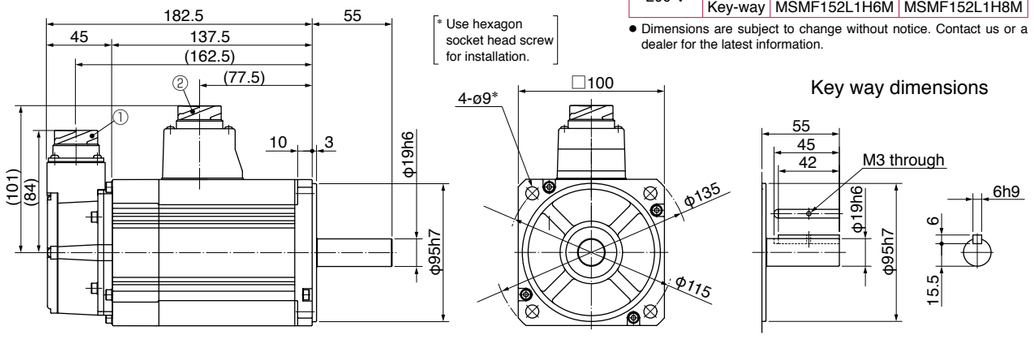
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 5.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF152L1D6M	MSMF152L1D8M
	Key-way	MSMF152L1H6M	MSMF152L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 2.0 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

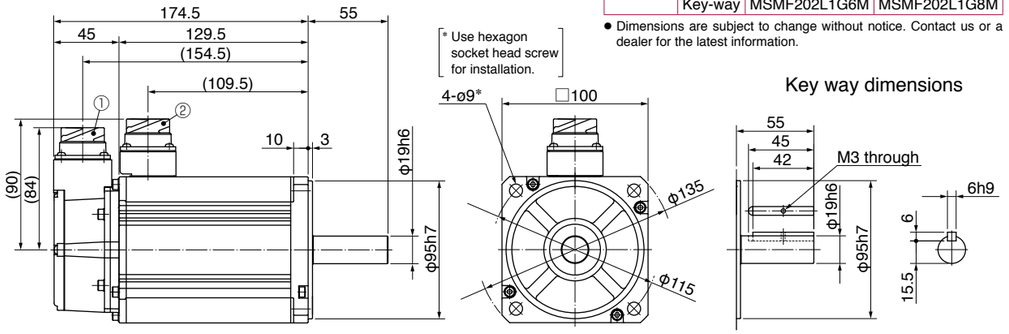
① Encoder connector (Large size JL10)
② Motor connector

Mass: 5.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF202L1C6M	MSMF202L1C8M
	Key-way	MSMF202L1G6M	MSMF202L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

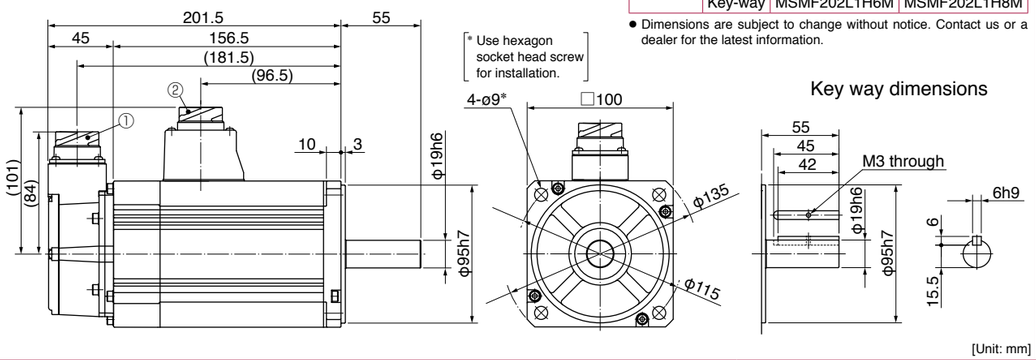
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 6.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF202L1D6M	MSMF202L1D8M
	Key-way	MSMF202L1H6M	MSMF202L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.218, P.219.

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Special Order Product MSMF 3.0 kW to 4.0 kW

MSMF 3.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

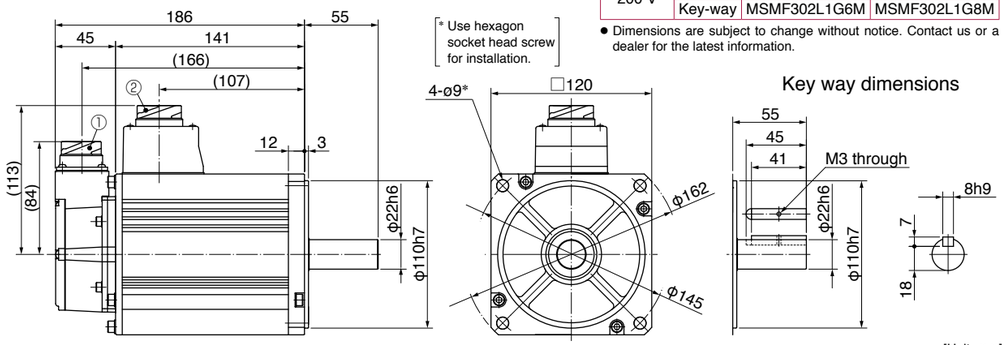
① Encoder connector (Large size JL10)
② Motor connector

Mass: 8.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF302L1C6M	MSMF302L1C8M
	Key-way	MSMF302L1G6M	MSMF302L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

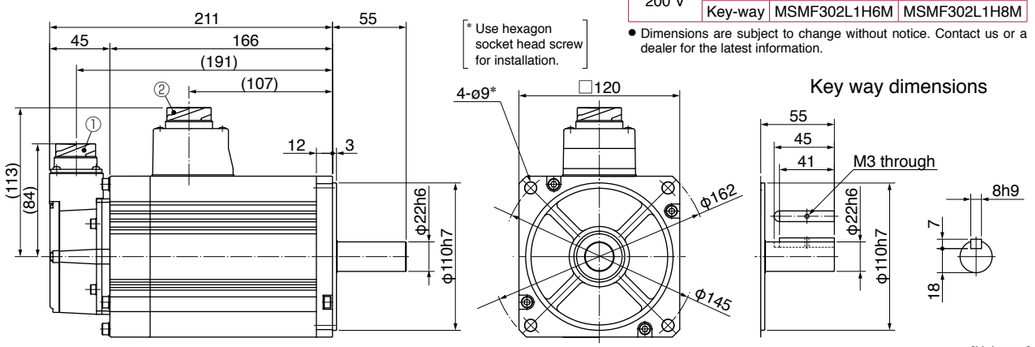
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 9.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF302L1D6M	MSMF302L1D8M
	Key-way	MSMF302L1H6M	MSMF302L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 4.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

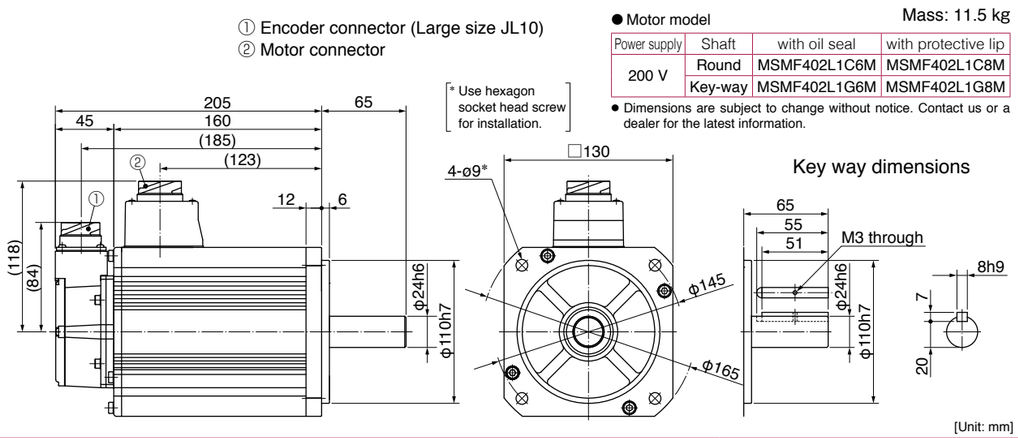
① Encoder connector (Large size JL10)
② Motor connector

Mass: 11.5 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF402L1C6M	MSMF402L1C8M
	Key-way	MSMF402L1G6M	MSMF402L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.220, P.221.

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MSMF 4.0 kW

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

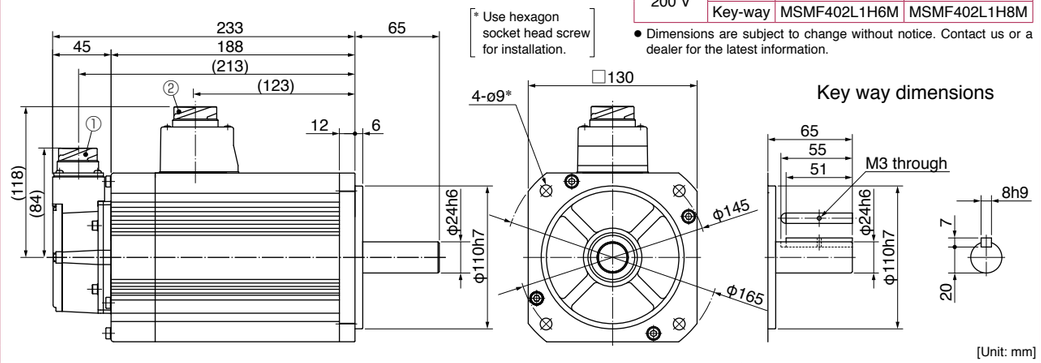
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 13.2 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF402L1D6M	MSMF402L1D8M
	Key-way	MSMF402L1H6M	MSMF402L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MSMF 5.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

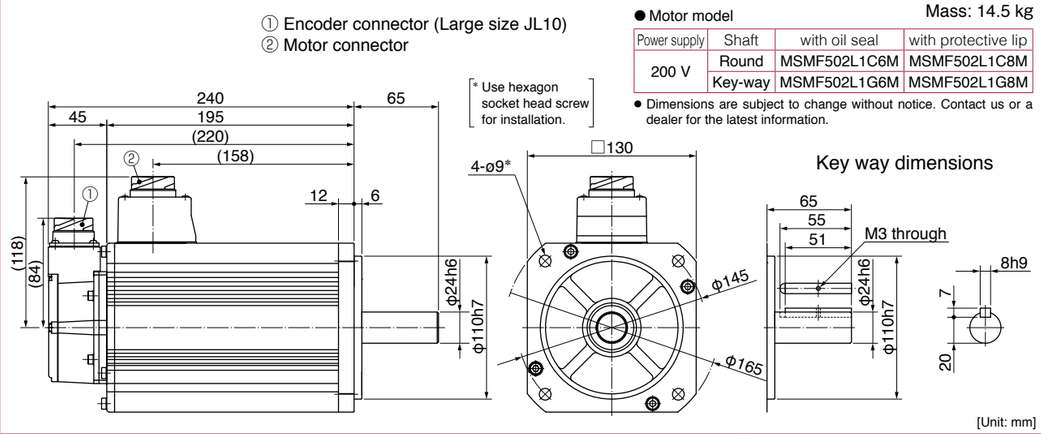
① Encoder connector (Large size JL10)
② Motor connector

Mass: 14.5 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF502L1C6M	MSMF502L1C8M
	Key-way	MSMF502L1G6M	MSMF502L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

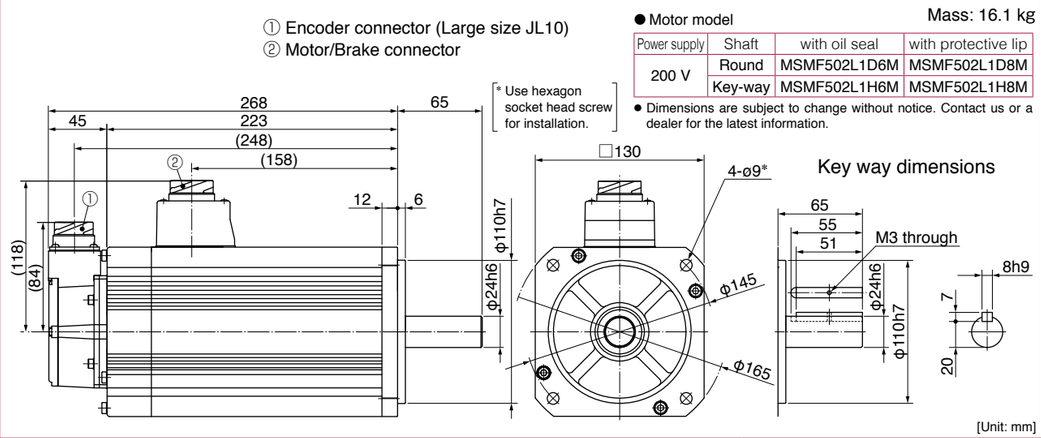
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 16.1 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MSMF502L1D6M	MSMF502L1D8M
	Key-way	MSMF502L1H6M	MSMF502L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.221, P.222.

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MQMF 100 W

Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

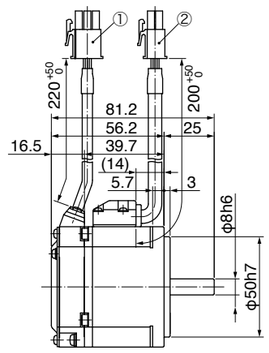
Mass: 0.54 kg

① Encoder connector
② Motor connector

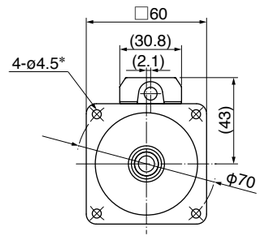
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF012L1A2M
	Key-way, center tap	MQMF012L1S2M

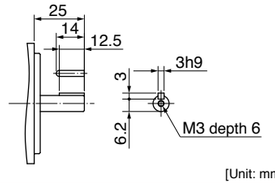
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

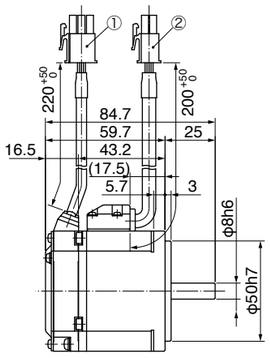
Mass: 0.57 kg

① Encoder connector
② Motor connector

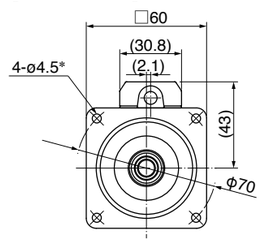
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF012L1C2M
	Key-way, center tap	MQMF012L1U2M

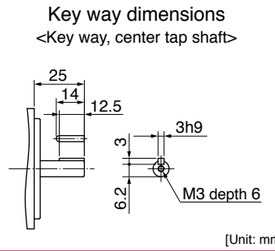
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

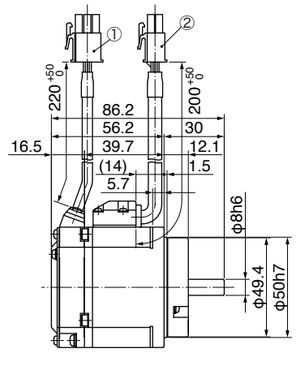
Mass: 0.61 kg

① Encoder connector
② Motor connector

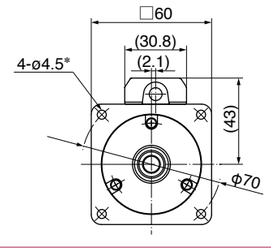
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF012L1C4M
	Key-way, center tap	MQMF012L1U4M

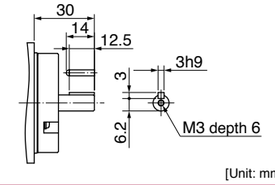
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.223.

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MQMF 100 W

Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

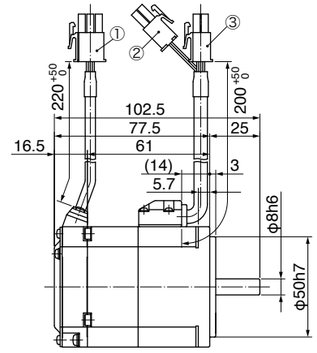
Mass: 0.79 kg

① Encoder connector
② Brake connector
③ Motor connector

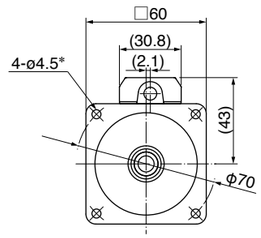
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF012L1B2M
	Key-way, center tap	MQMF012L1T2M

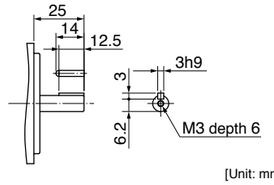
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

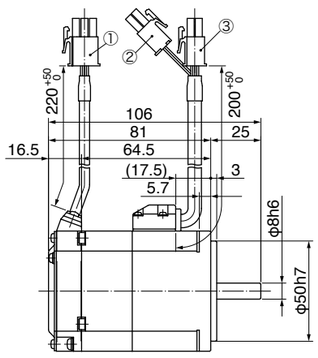
Mass: 0.82 kg

① Encoder connector
② Brake connector
③ Motor connector

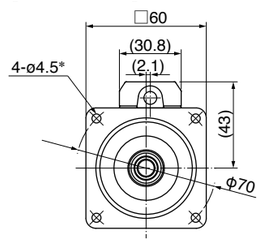
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF012L1D2M
	Key-way, center tap	MQMF012L1V2M

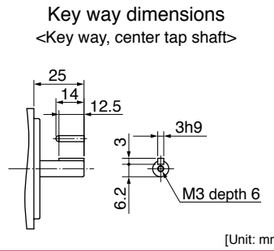
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

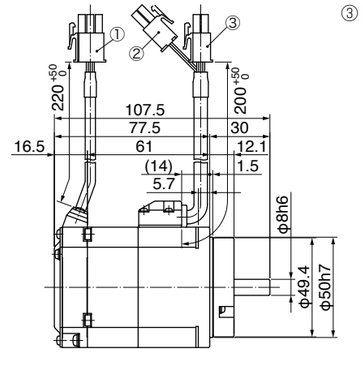
Mass: 0.86 kg

① Encoder connector
② Brake connector
③ Motor connector

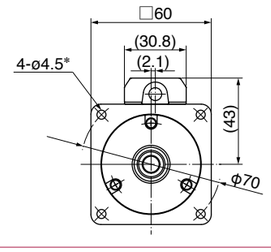
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF012L1D4M
	Key-way, center tap	MQMF012L1V4M

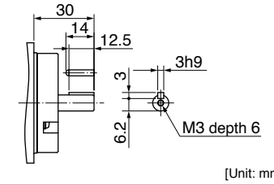
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.223.

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Special Order Product **MQMF 200 W**

MQMF 200 W

Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

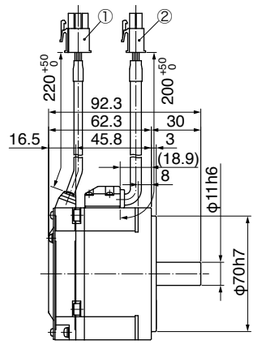
Mass: 1.1 kg

① Encoder connector
② Motor connector

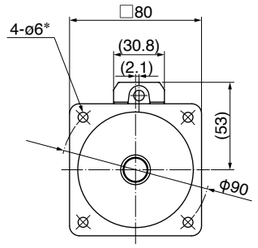
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF022L1A2M
	Key-way, center tap	MQMF022L1S2M

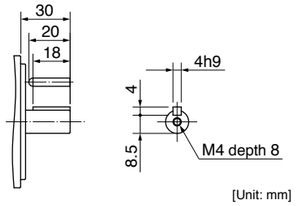
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

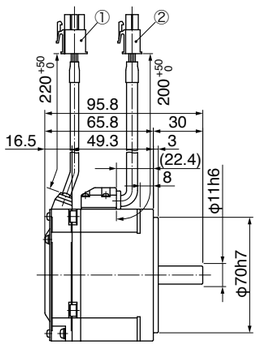
Mass: 1.2 kg

① Encoder connector
② Motor connector

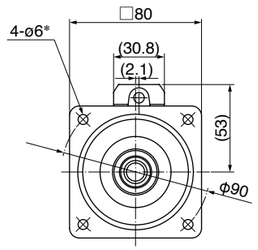
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF022L1C2M
	Key-way, center tap	MQMF022L1U2M

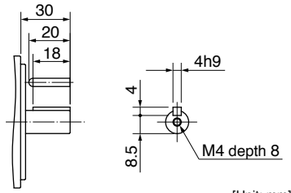
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

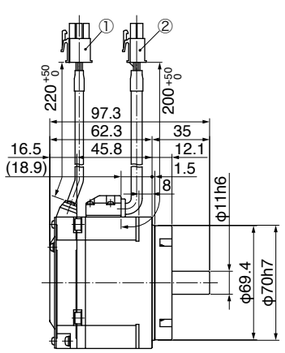
Mass: 1.3 kg

① Encoder connector
② Motor connector

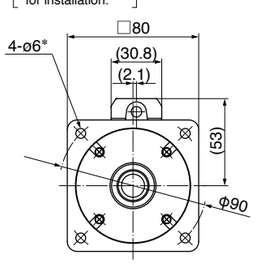
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF022L1C4M
	Key-way, center tap	MQMF022L1U4M

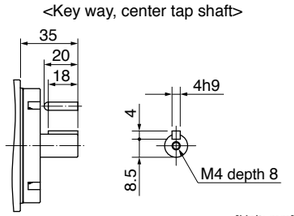
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.224.

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MQMF 200 W

Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

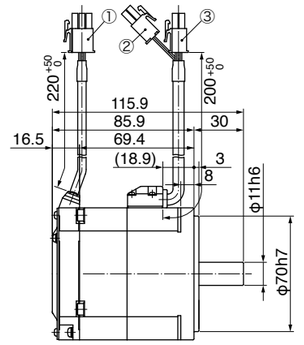
Mass: 1.5 kg

① Encoder connector
② Brake connector
③ Motor connector

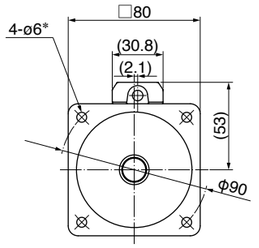
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF022L1B2M
	Key-way, center tap	MQMF022L1T2M

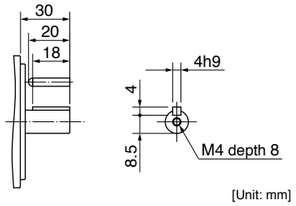
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

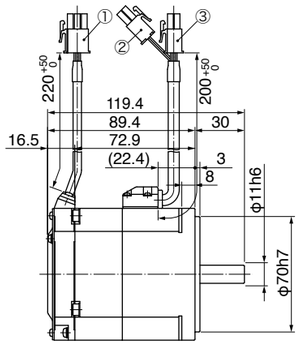
Mass: 1.6 kg

① Encoder connector
② Brake connector
③ Motor connector

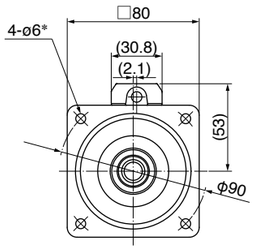
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF022L1D2M
	Key-way, center tap	MQMF022L1V2M

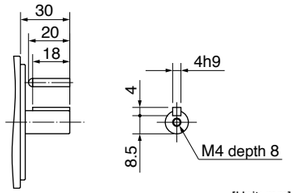
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

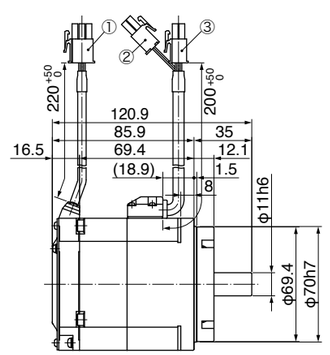
Mass: 1.7 kg

① Encoder connector
② Brake connector
③ Motor connector

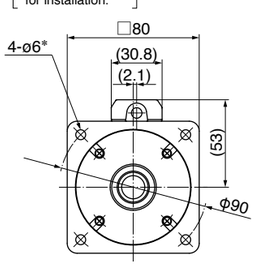
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MQMF022L1D4M
	Key-way, center tap	MQMF022L1V4M

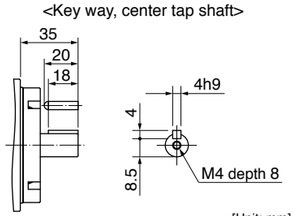
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.224.

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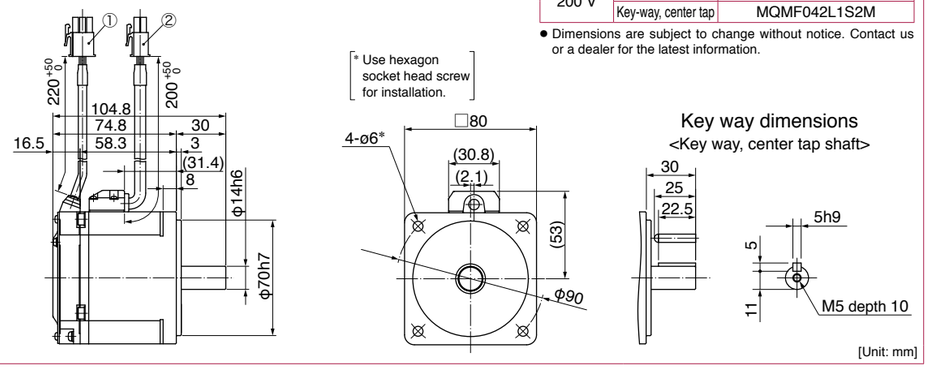
Special Order Product **MQMF 400 W**

MQMF 400 W

Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft



● Motor model — Mass: 1.5 kg

Power supply	Shaft	Motor model No.
200 V	Round	MQMF042L1A2M
	Key-way, center tap	MQMF042L1S2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

● Motor model — Mass: 1.6 kg

Power supply	Shaft	Motor model No.
200 V	Round	MQMF042L1C2M
	Key-way, center tap	MQMF042L1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

● Motor model — Mass: 1.7 kg

Power supply	Shaft	Motor model No.
200 V	Round	MQMF042L1C4M
	Key-way, center tap	MQMF042L1U4M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.225.

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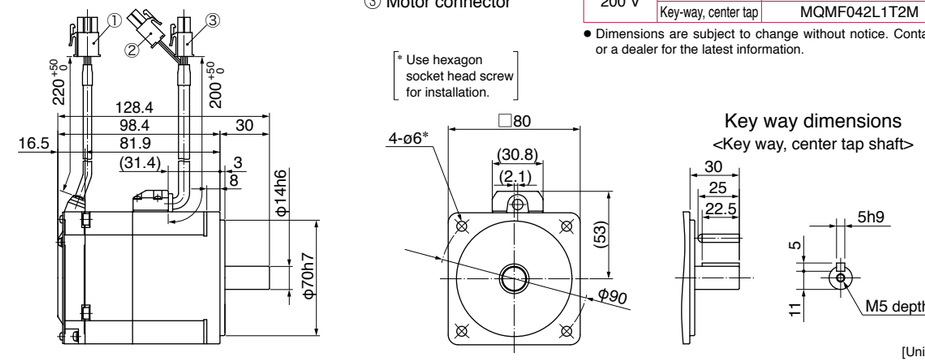
MQMF 400 W

Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft



● Motor model — Mass: 2.0 kg

Power supply	Shaft	Motor model No.
200 V	Round	MQMF042L1B2M
	Key-way, center tap	MQMF042L1T2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

● Motor model — Mass: 2.1 kg

Power supply	Shaft	Motor model No.
200 V	Round	MQMF042L1D2M
	Key-way, center tap	MQMF042L1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

● Motor model — Mass: 2.2 kg

Power supply	Shaft	Motor model No.
200 V	Round	MQMF042L1D4M
	Key-way, center tap	MQMF042L1V4M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.225.

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MHMF 50 W

Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

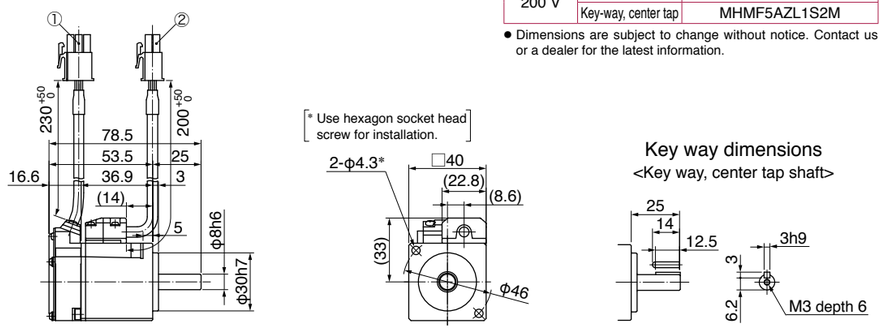
① Encoder connector
② Motor connector

Mass: 0.29 kg

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF5AZL1A2M
	Key-way, center tap	MHMF5AZL1S2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

① Encoder connector
② Motor connector

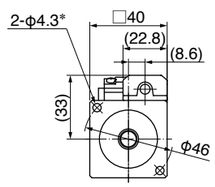
Mass: 0.31 kg

● Motor model

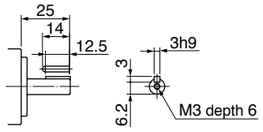
Power supply	Shaft	Motor model No.
200 V	Round	MHMF5AZL1C2M
	Key-way, center tap	MHMF5AZL1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

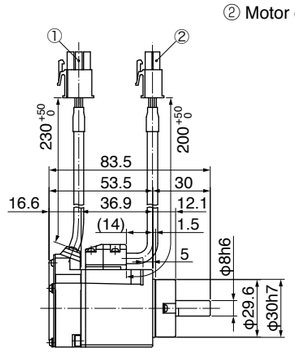
① Encoder connector
② Motor connector

Mass: 0.32 kg

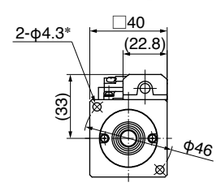
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF5AZL1C4M
	Key-way, center tap	MHMF5AZL1U4M

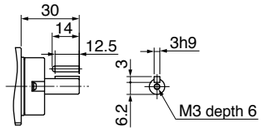
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.226.

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MHMF 50 W

Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

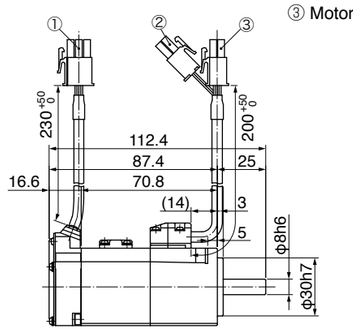
① Encoder connector
② Brake connector
③ Motor connector

Mass: 0.51 kg

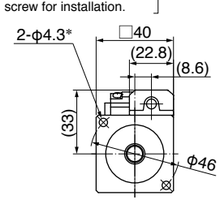
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF5AZL1B2M
	Key-way, center tap	MHMF5AZL1T2M

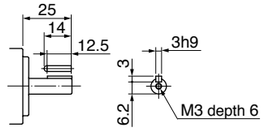
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

① Encoder connector
② Brake connector
③ Motor connector

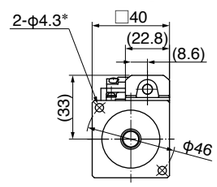
Mass: 0.53 kg

● Motor model

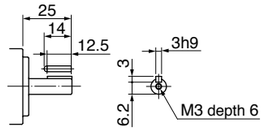
Power supply	Shaft	Motor model No.
200 V	Round	MHMF5AZL1D2M
	Key-way, center tap	MHMF5AZL1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

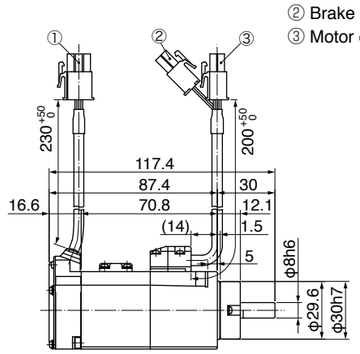
① Encoder connector
② Brake connector
③ Motor connector

Mass: 0.54 kg

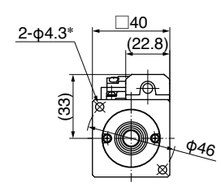
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF5AZL1D4M
	Key-way, center tap	MHMF5AZL1V4M

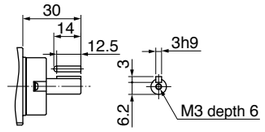
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.226.

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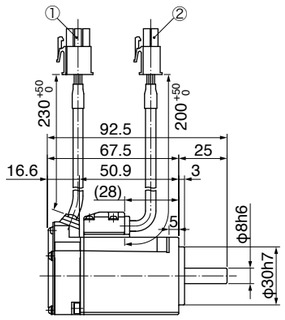
MHMF 100 W

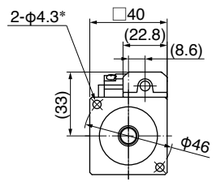
Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.40 kg

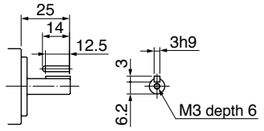
① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF012L1A2M
	Key-way, center tap	MHMF012L1S2M

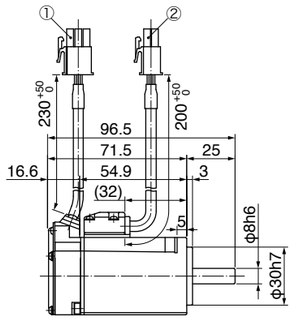
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

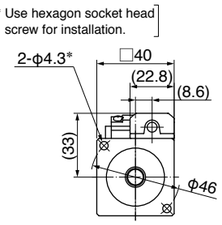
Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.42 kg

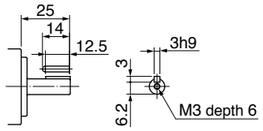
① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF012L1C2M
	Key-way, center tap	MHMF012L1U2M

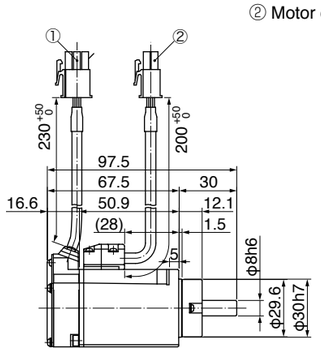
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

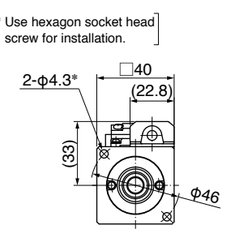
Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.43 kg

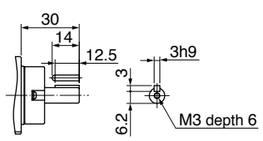
① Encoder connector
② Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF012L1C4M
	Key-way, center tap	MHMF012L1U4M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.227.

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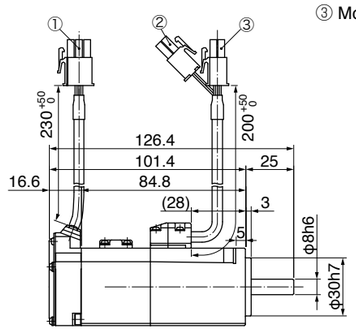
MHMF 100 W

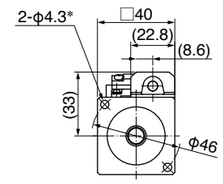
Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.62 kg

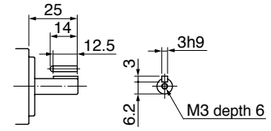
① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF012L1B2M
	Key-way, center tap	MHMF012L1T2M

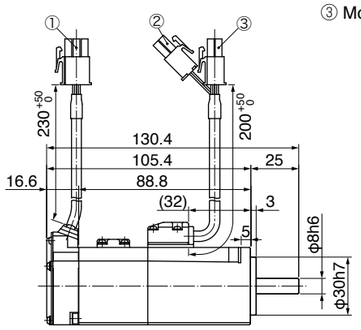
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

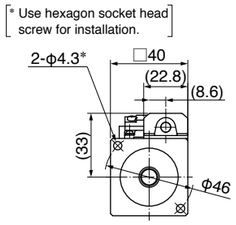
Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.64 kg

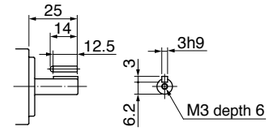
① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF012L1D2M
	Key-way, center tap	MHMF012L1V2M

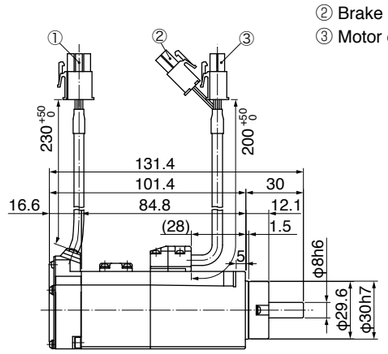
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

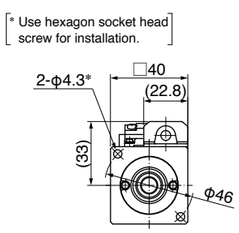
Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 0.65 kg

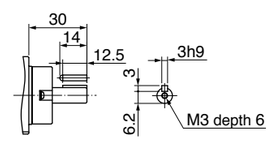
① Encoder connector
② Brake connector
③ Motor connector



* Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF012L1D4M
	Key-way, center tap	MHMF012L1V4M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.227.

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MHMF 200 W

Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

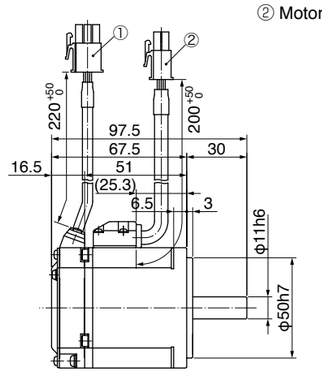
Mass: 0.75 kg

① Encoder connector
② Motor connector

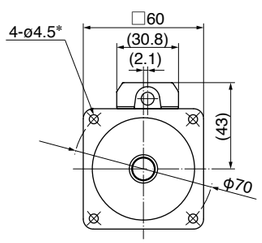
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF022L1A2M
	Key-way, center tap	MHMF022L1S2M

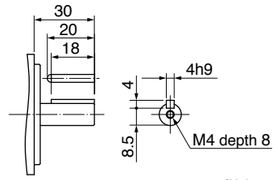
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

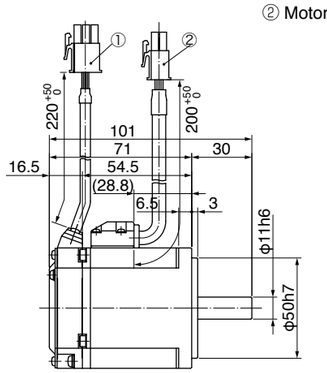
Mass: 0.78 kg

① Encoder connector
② Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF022L1C2M
	Key-way, center tap	MHMF022L1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

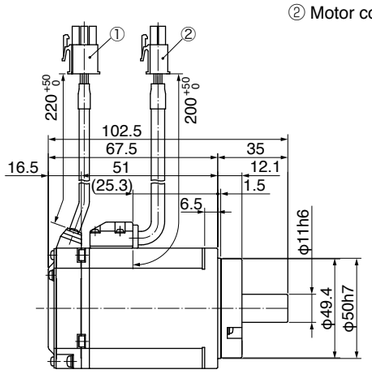
Mass: 0.81 kg

① Encoder connector
② Motor connector

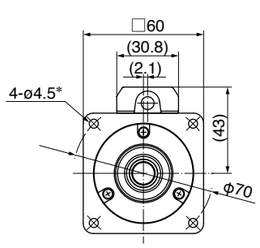
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF022L1C4M
	Key-way, center tap	MHMF022L1U4M

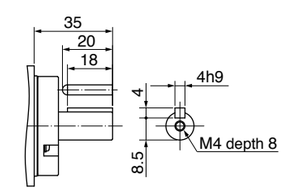
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.228.

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MHMF 200 W

Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

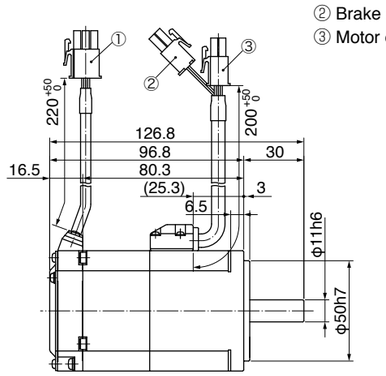
Mass: 1.1 kg

① Encoder connector
② Brake connector
③ Motor connector

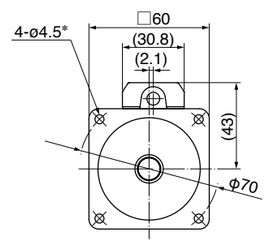
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF022L1B2M
	Key-way, center tap	MHMF022L1T2M

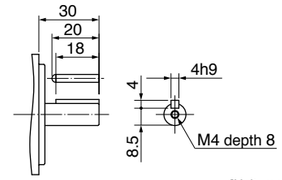
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

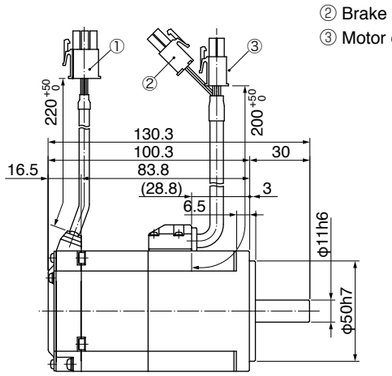
Mass: 1.2 kg

① Encoder connector
② Brake connector
③ Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF022L1D2M
	Key-way, center tap	MHMF022L1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

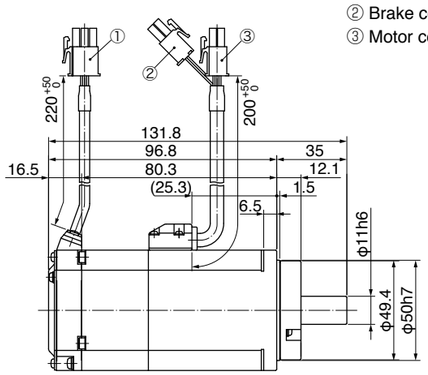
Mass: 1.2 kg

① Encoder connector
② Brake connector
③ Motor connector

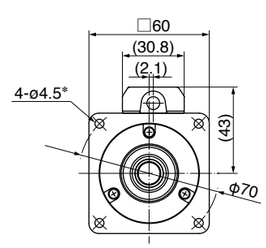
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF022L1D4M
	Key-way, center tap	MHMF022L1V4M

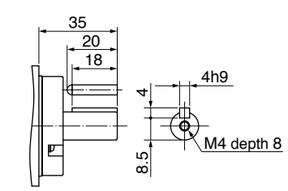
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[* Use hexagon socket head screw for installation.]



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.228.

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MHMF 400 W

Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

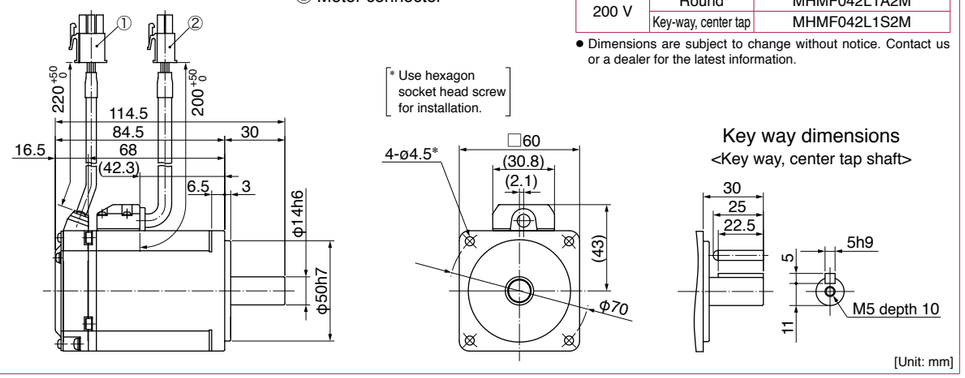
Mass: 1.1 kg

① Encoder connector
② Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF042L1A2M
	Key-way, center tap	MHMF042L1S2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

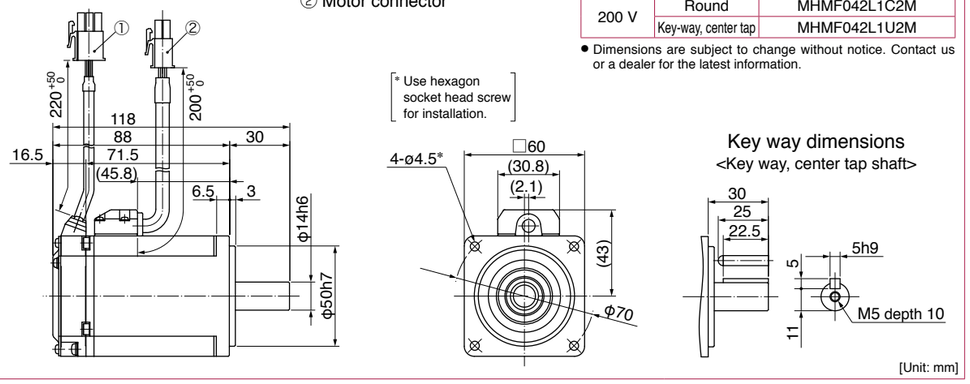
Mass: 1.2 kg

① Encoder connector
② Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF042L1C2M
	Key-way, center tap	MHMF042L1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

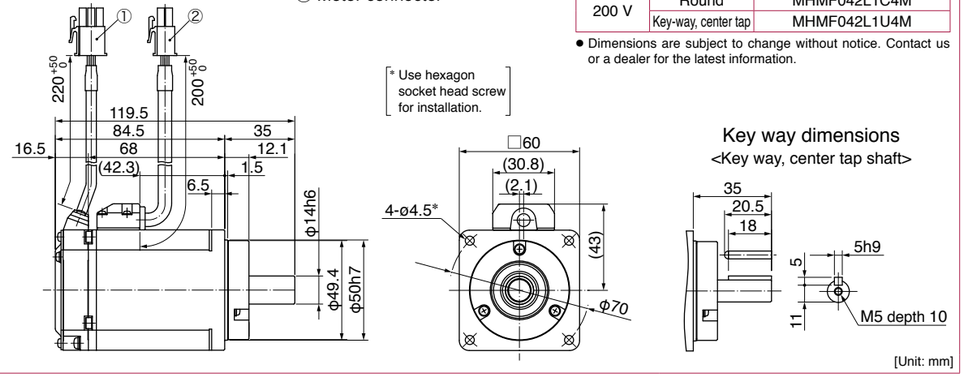
Mass: 1.2 kg

① Encoder connector
② Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF042L1C4M
	Key-way, center tap	MHMF042L1U4M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.229.

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MHMF 400 W

Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

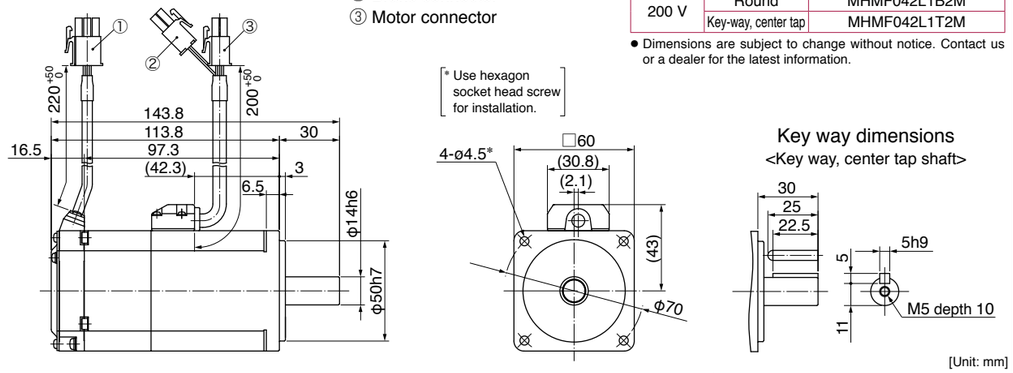
Mass: 1.5 kg

① Encoder connector
② Brake connector
③ Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF042L1B2M
	Key-way, center tap	MHMF042L1T2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

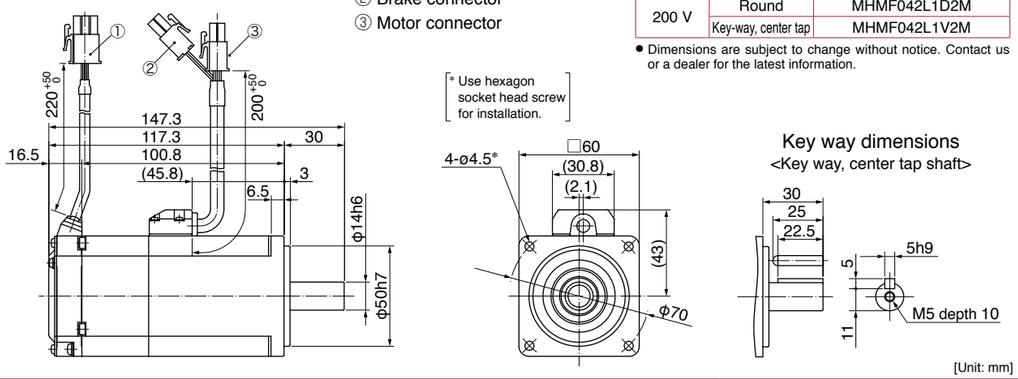
Mass: 1.6 kg

① Encoder connector
② Brake connector
③ Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF042L1D2M
	Key-way, center tap	MHMF042L1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

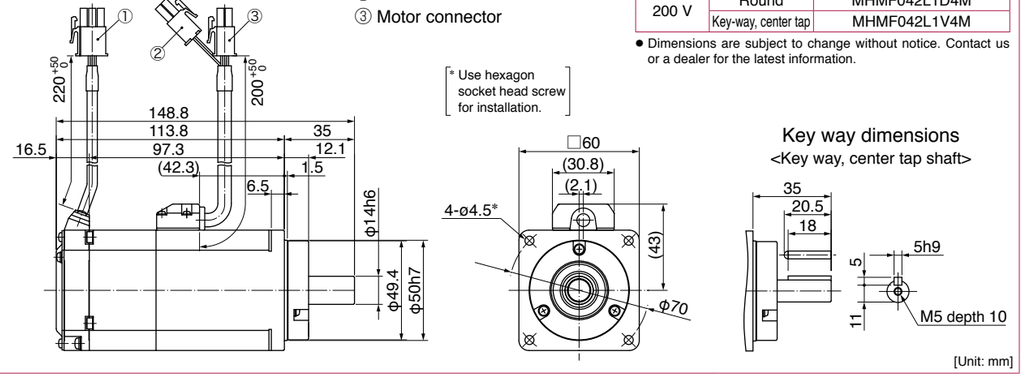
Mass: 1.6 kg

① Encoder connector
② Brake connector
③ Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF042L1D4M
	Key-way, center tap	MHMF042L1V4M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.229.

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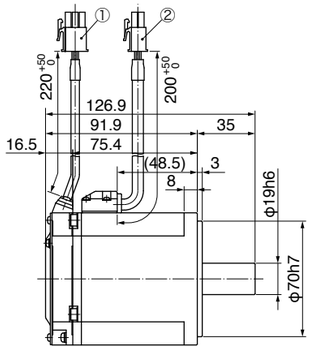
MHMF 750 W

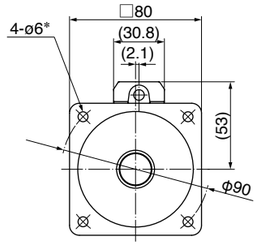
Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 2.2 kg

① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]

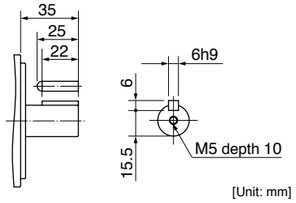


● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1A2M
	Key-way, center tap	MHMF082L1S2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

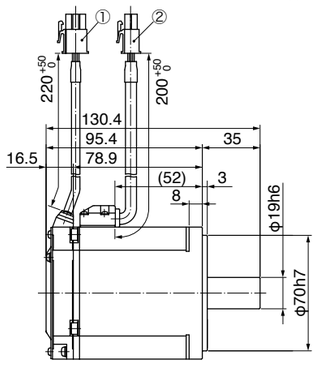


[Unit: mm]

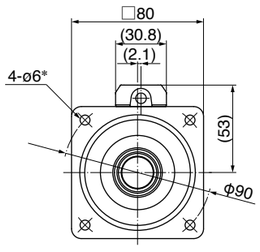
Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 2.3 kg

① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]

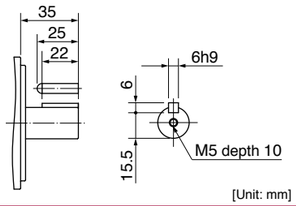


● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1C2M
	Key-way, center tap	MHMF082L1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

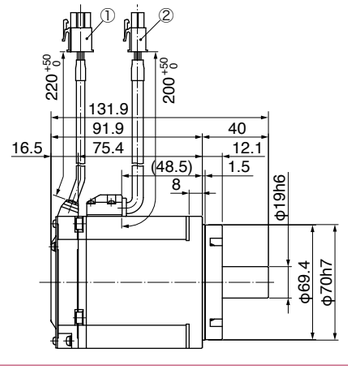


[Unit: mm]

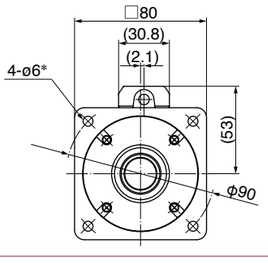
Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 2.4 kg

① Encoder connector
② Motor connector



[* Use hexagon socket head screw for installation.]

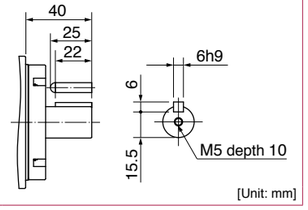


● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1C4M
	Key-way, center tap	MHMF082L1U4M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.230.

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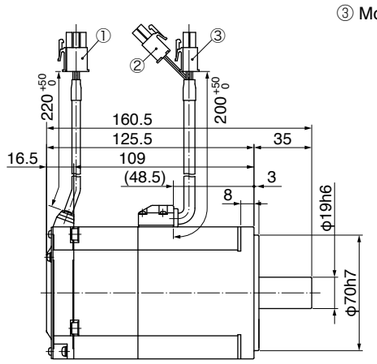
MHMF 750 W

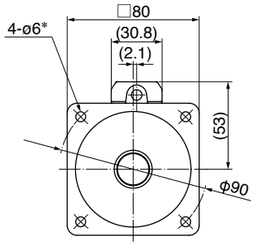
Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

Mass: 2.9 kg

① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]

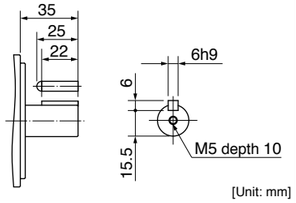


● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1B2M
	Key-way, center tap	MHMF082L1T2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

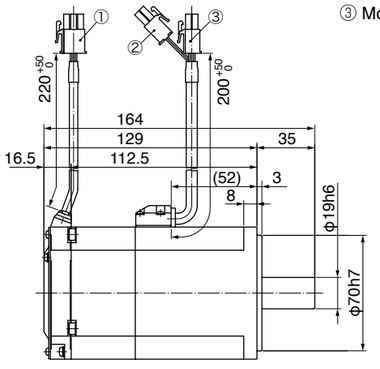


[Unit: mm]

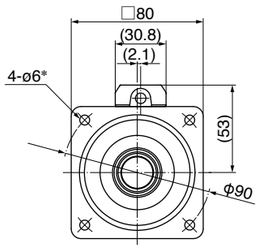
Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 3.0 kg

① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]

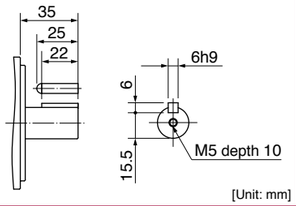


● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1D2M
	Key-way, center tap	MHMF082L1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>

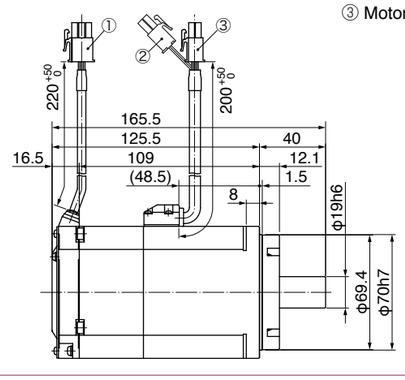


[Unit: mm]

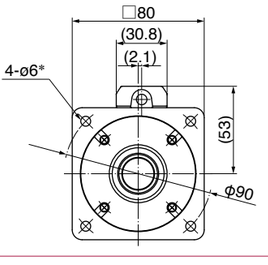
Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 3.1 kg

① Encoder connector
② Brake connector
③ Motor connector



[* Use hexagon socket head screw for installation.]

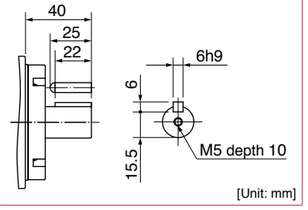


● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF082L1D4M
	Key-way, center tap	MHMF082L1V4M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

* For motors specifications, refer to P.230.

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MHMF 1000 W

Leadwire type (IP65) · without brake · without oil seal · Round shaft/ Key way, center tap shaft

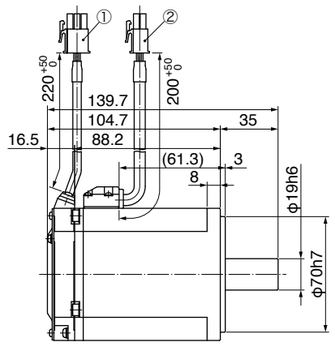
Mass: 2.7 kg

① Encoder connector
② Motor connector

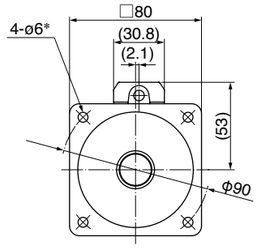
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1A2M
	Key-way, center tap	MHMF092L1S2M

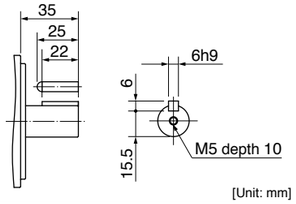
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · without brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 2.8 kg

① Encoder connector
② Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1C2M
	Key-way, center tap	MHMF092L1U2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Use hexagon socket head screw for installation.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Leadwire type (IP65) · without brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 2.9 kg

① Encoder connector
② Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1C4M
	Key-way, center tap	MHMF092L1U4M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Use hexagon socket head screw for installation.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.231.

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MHMF 1000 W

Leadwire type (IP65) · with brake · without oil seal · Round shaft/ Key way, center tap shaft

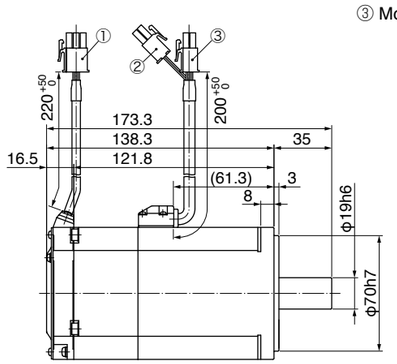
Mass: 3.4 kg

① Encoder connector
② Brake connector
③ Motor connector

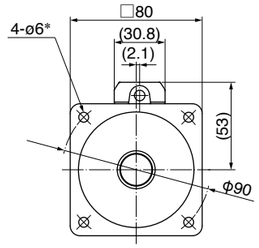
● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1B2M
	Key-way, center tap	MHMF092L1T2M

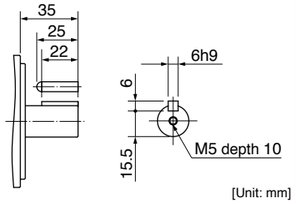
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Use hexagon socket head screw for installation.



Key way dimensions
<Key way, center tap shaft>



[Unit: mm]

Leadwire type (IP65) · with brake · with oil seal · Round shaft/ Key way, center tap shaft

Mass: 3.5 kg

① Encoder connector
② Brake connector
③ Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1D2M
	Key-way, center tap	MHMF092L1V2M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Use hexagon socket head screw for installation.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

Leadwire type (IP65) · with brake · with protective lip/ with oil seal · Round shaft/ Key way, center tap shaft

Mass: 3.6 kg

① Encoder connector
② Brake connector
③ Motor connector

● Motor model

Power supply	Shaft	Motor model No.
200 V	Round	MHMF092L1D4M
	Key-way, center tap	MHMF092L1V4M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Use hexagon socket head screw for installation.

Key way dimensions
<Key way, center tap shaft>

[Unit: mm]

* For motors specifications, refer to P.231.

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Special Order Product

MHMF 1.0 kW to 1.5 kW

MHMF 1.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

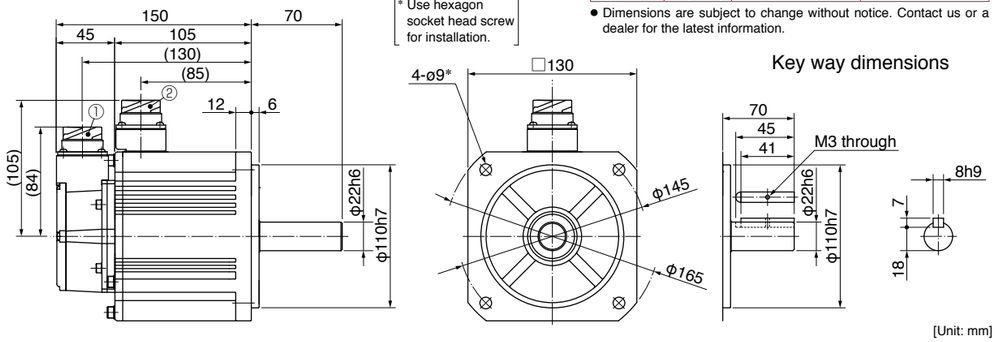
① Encoder connector (Large size JL10)
② Motor connector

Mass: 6.1 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF102L1C6M	MHMF102L1C8M
	Key-way	MHMF102L1G6M	MHMF102L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

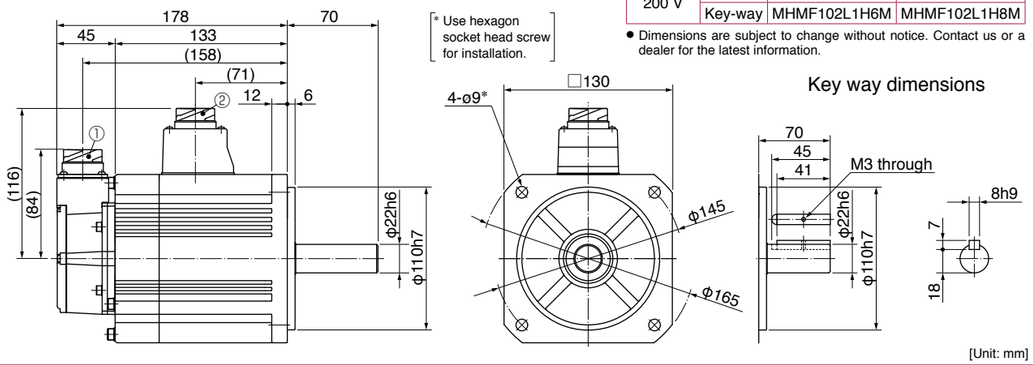
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 7.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF102L1D6M	MHMF102L1D8M
	Key-way	MHMF102L1H6M	MHMF102L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MHMF 1.5 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

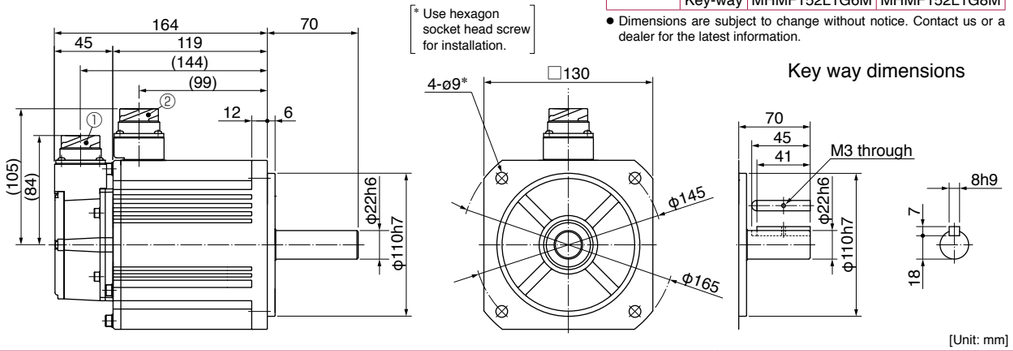
① Encoder connector (Large size JL10)
② Motor connector

Mass: 7.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF152L1C6M	MHMF152L1C8M
	Key-way	MHMF152L1G6M	MHMF152L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.232, P.233.

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Special Order Product

MHMF 1.5 kW to 2.0 kW

MHMF 1.5 kW

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

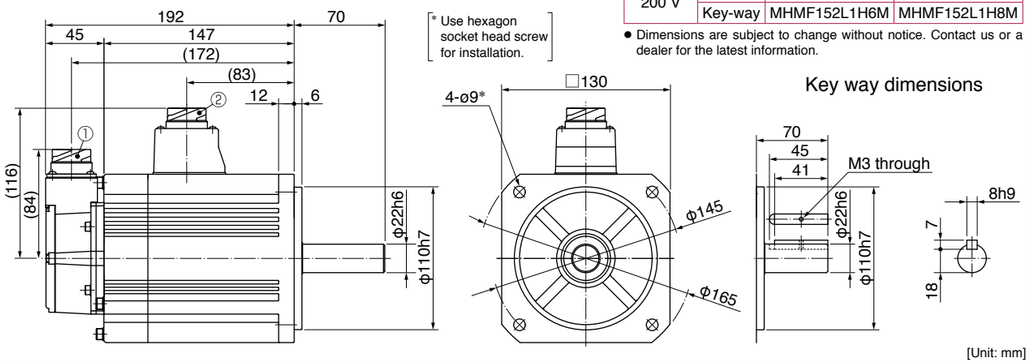
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 9.2 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF152L1D6M	MHMF152L1D8M
	Key-way	MHMF152L1H6M	MHMF152L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MHMF 2.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

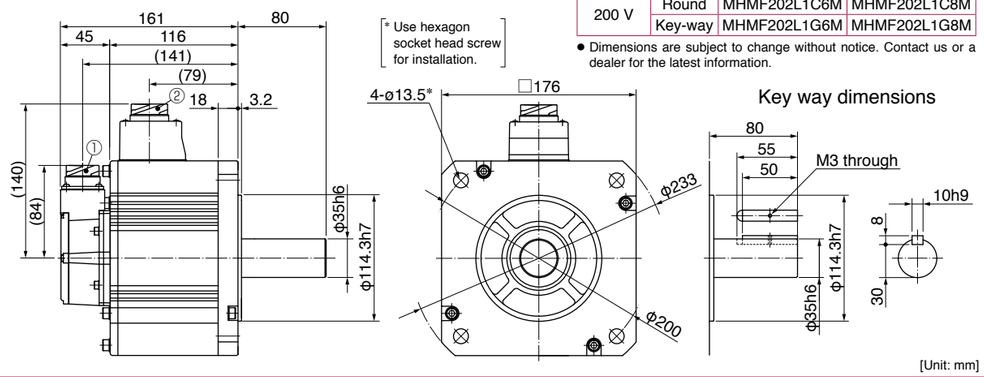
① Encoder connector (Large size JL10)
② Motor connector

Mass: 11.3 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF202L1C6M	MHMF202L1C8M
	Key-way	MHMF202L1G6M	MHMF202L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

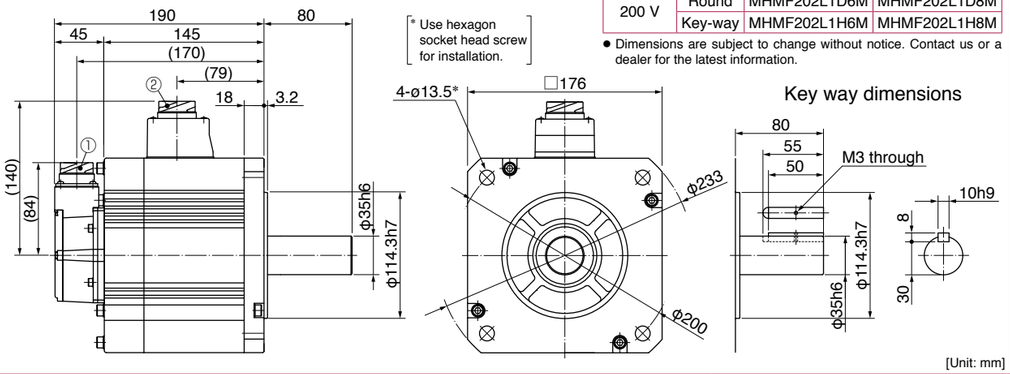
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 14.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF202L1D6M	MHMF202L1D8M
	Key-way	MHMF202L1H6M	MHMF202L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.233, P.234.

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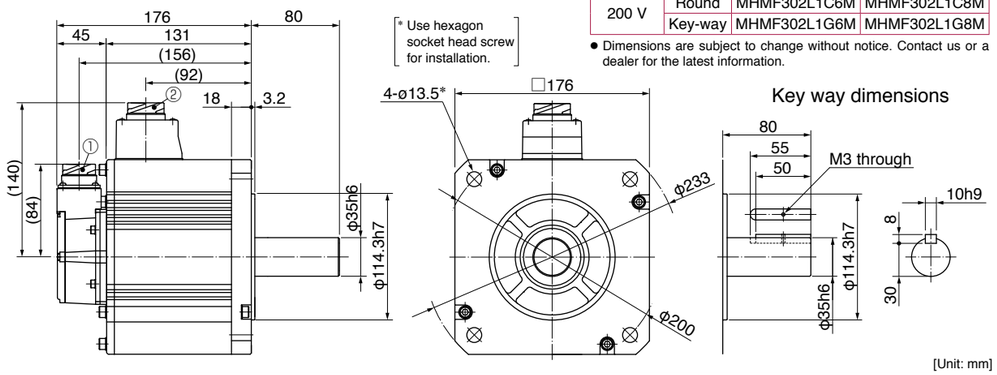
Special Order Product

MHMF 3.0 kW to 4.0 kW

MHMF 3.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model — Mass: 13.8 kg

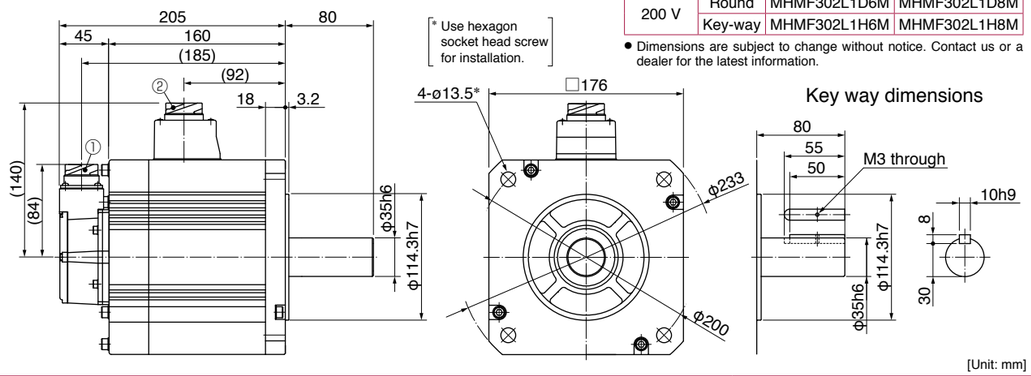
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF302L1C6M	MHMF302L1C8M
	Key-way	MHMF302L1G6M	MHMF302L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model — Mass: 17.2 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF302L1D6M	MHMF302L1D8M
	Key-way	MHMF302L1H6M	MHMF302L1H8M

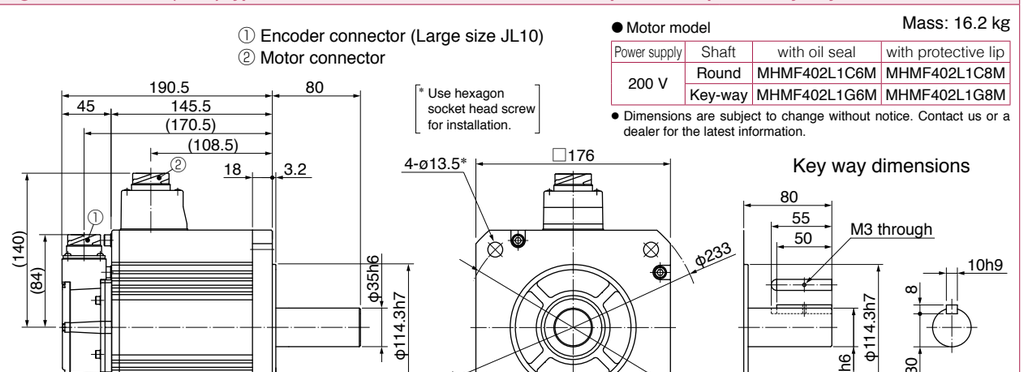
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MHMF 4.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model — Mass: 16.2 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF402L1C6M	MHMF402L1C8M
	Key-way	MHMF402L1G6M	MHMF402L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.235, P.236.

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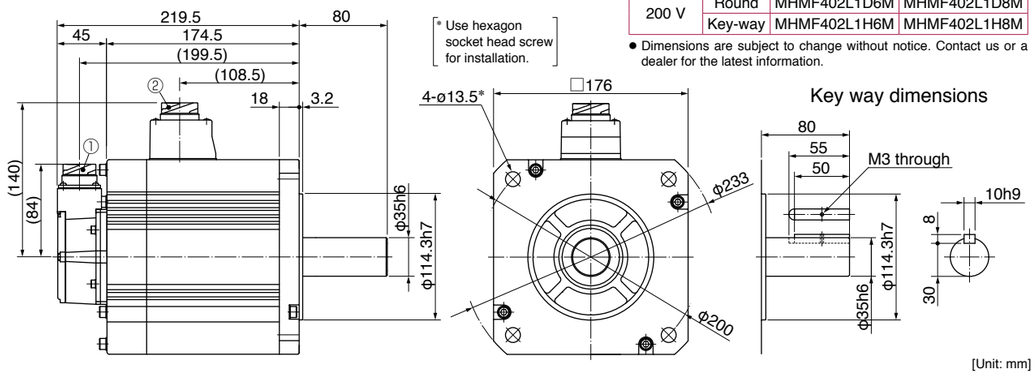
Special Order Product

MHMF 4.0 kW to 5.0 kW

MHMF 4.0 kW

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model — Mass: 19.4 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF402L1D6M	MHMF402L1D8M
	Key-way	MHMF402L1H6M	MHMF402L1H8M

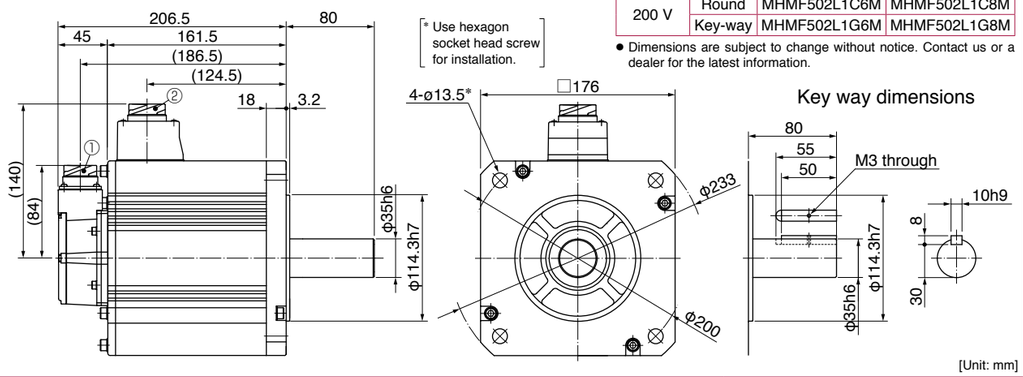
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MHMF 5.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model — Mass: 19.6 kg

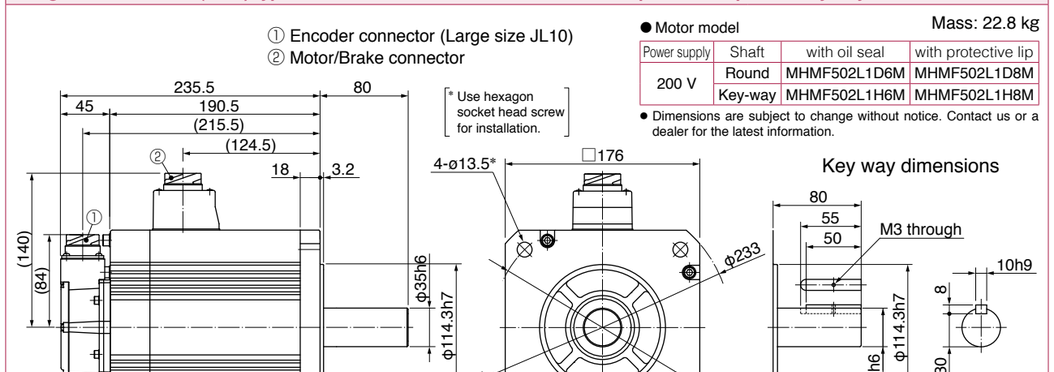
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF502L1C6M	MHMF502L1C8M
	Key-way	MHMF502L1G6M	MHMF502L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model — Mass: 22.8 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MHMF502L1D6M	MHMF502L1D8M
	Key-way	MHMF502L1H6M	MHMF502L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.236, P.237.

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Special Order Product

MHMF 7.5 kW / MDMF 1.0 kW

MHMF 7.5 kW

Large size connector (JL10) type · without brake · with oil seal · Key way shaft/ Round shaft

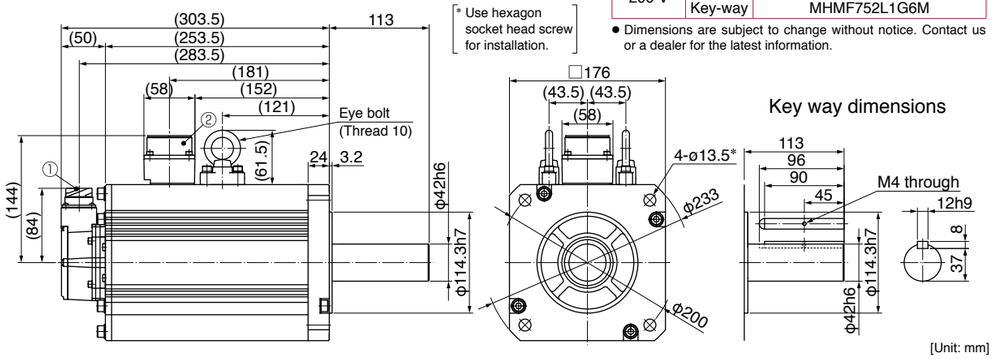
① Encoder connector (Large size JL10)
② Motor connector

Mass: 34.8 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MHMF752L1C6M
	Key-way	MHMF752L1G6M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type · with brake · with oil seal · Key way shaft/ Round shaft

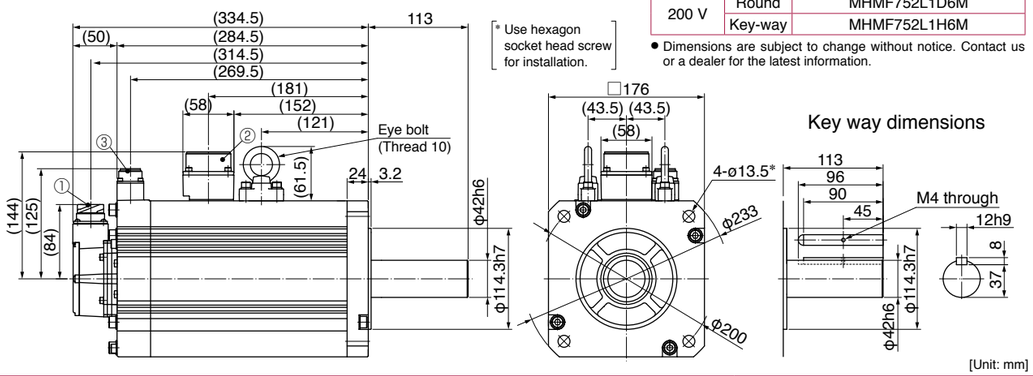
① Encoder connector (Large size JL10)
② Motor connector ③ Brake connector

Mass: 38.9 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MHMF752L1D6M
	Key-way	MHMF752L1H6M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MDMF 1.0 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

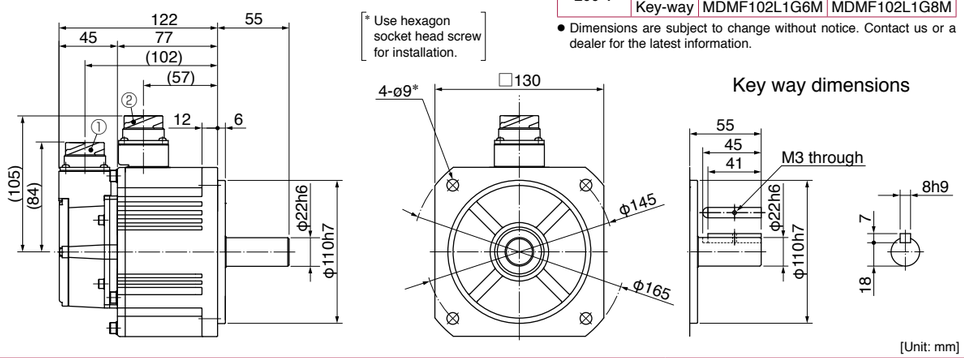
① Encoder connector (Large size JL10)
② Motor connector

Mass: 4.6 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF102L1C6M	MDMF102L1C8M
	Key-way	MDMF102L1G6M	MDMF102L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.238, P.239.

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Special Order Product

MDMF 1.0 kW to 1.5 kW

MDMF 1.0 kW

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

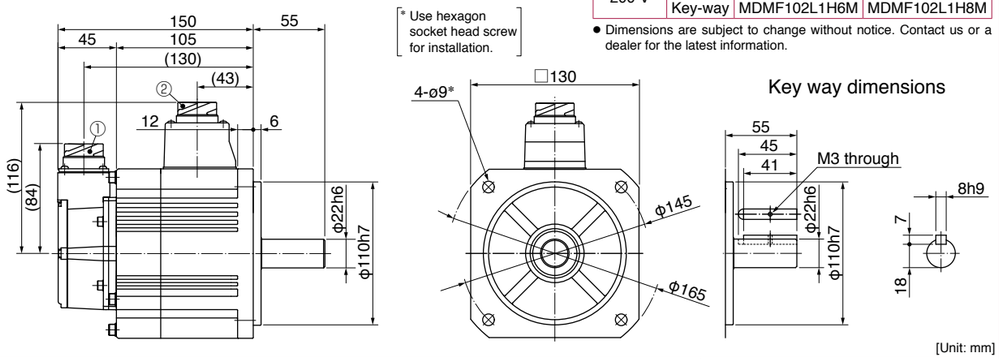
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 6.1 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF102L1D6M	MDMF102L1D8M
	Key-way	MDMF102L1H6M	MDMF102L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MDMF 1.5 kW

Large size connector (JL10) type · without brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

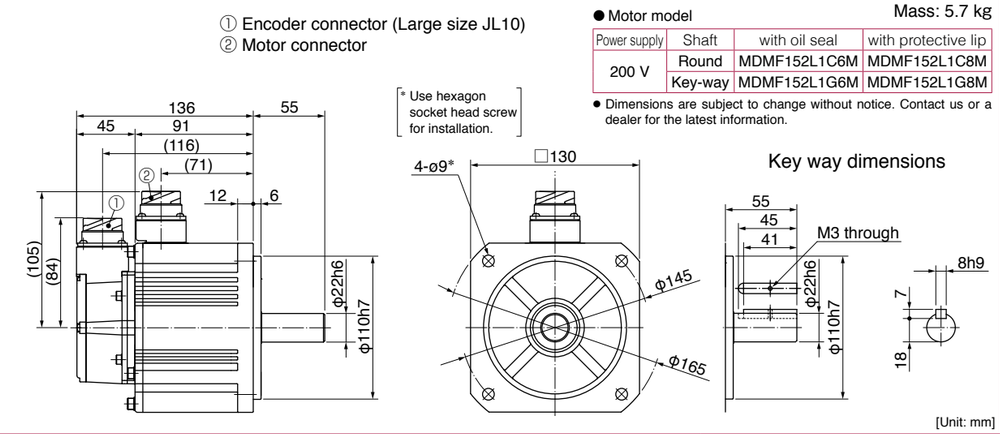
① Encoder connector (Large size JL10)
② Motor connector

Mass: 5.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF152L1C6M	MDMF152L1C8M
	Key-way	MDMF152L1G6M	MDMF152L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type · with brake · with oil seal/ with protective lip · Key way shaft/ Round shaft

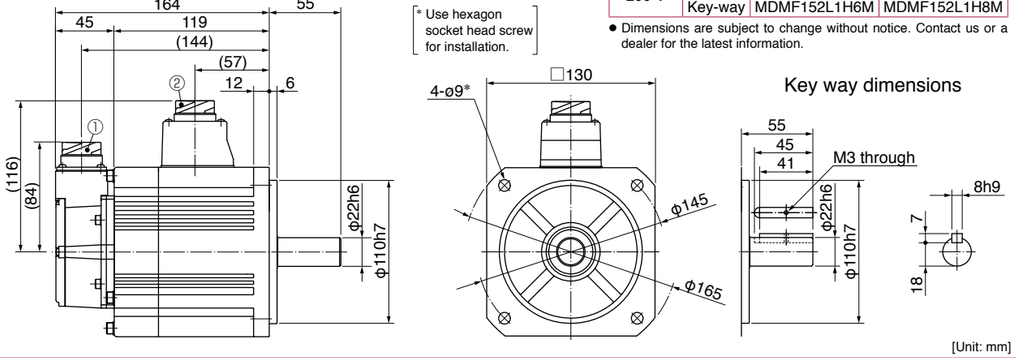
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 7.2 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF152L1D6M	MDMF152L1D8M
	Key-way	MDMF152L1H6M	MDMF152L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.239, P.240.

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Special Order Product

MDMF 2.0 kW to 3.0 kW

MDMF 2.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

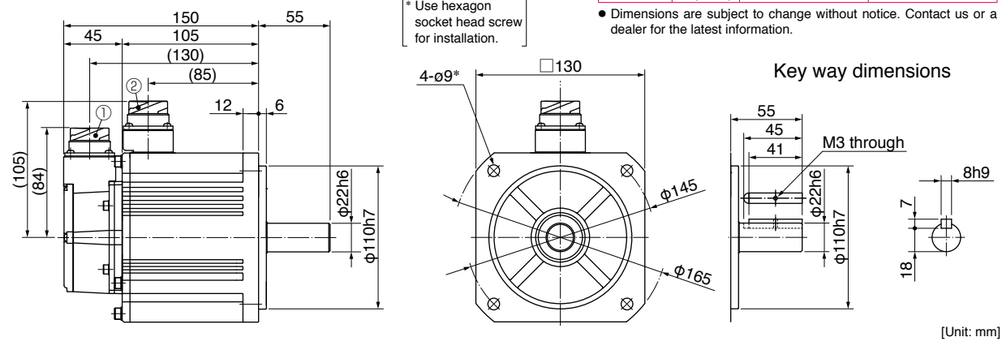
① Encoder connector (Large size JL10)
② Motor connector

Mass: 6.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF202L1C6M	MDMF202L1C8M
	Key-way	MDMF202L1G6M	MDMF202L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

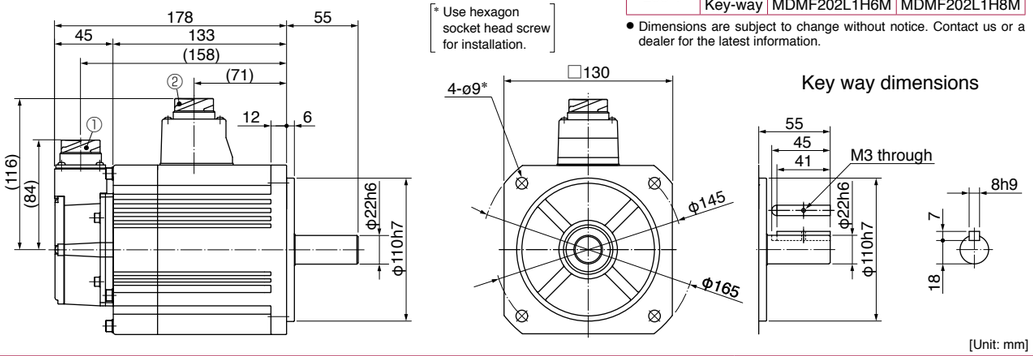
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 8.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF202L1D6M	MDMF202L1D8M
	Key-way	MDMF202L1H6M	MDMF202L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MDMF 3.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

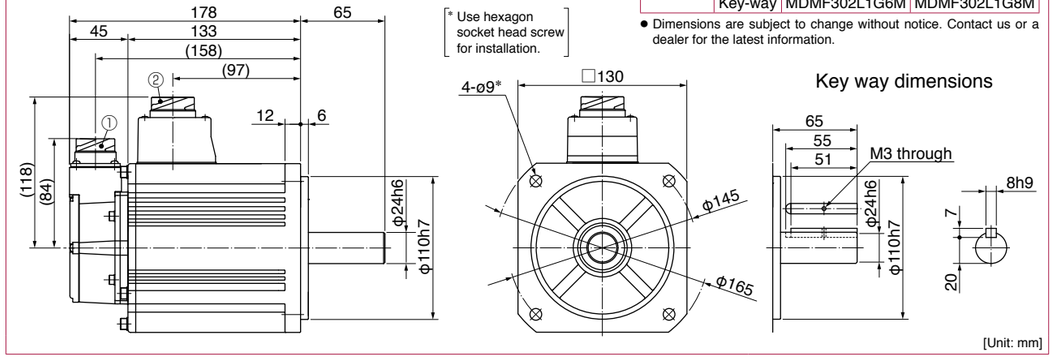
① Encoder connector (Large size JL10)
② Motor connector

Mass: 9.3 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF302L1C6M	MDMF302L1C8M
	Key-way	MDMF302L1G6M	MDMF302L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.241, P.242.

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Special Order Product

MDMF 3.0 kW to 4.0 kW

MDMF 3.0 kW

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

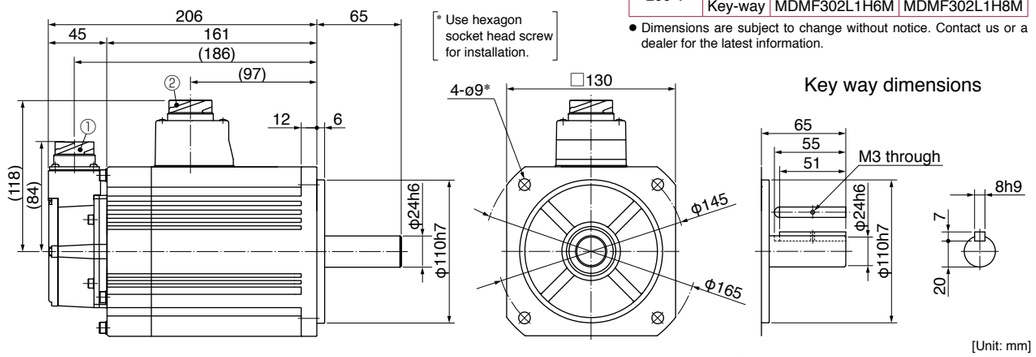
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 10.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF302L1D6M	MDMF302L1D8M
	Key-way	MDMF302L1H6M	MDMF302L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MDMF 4.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

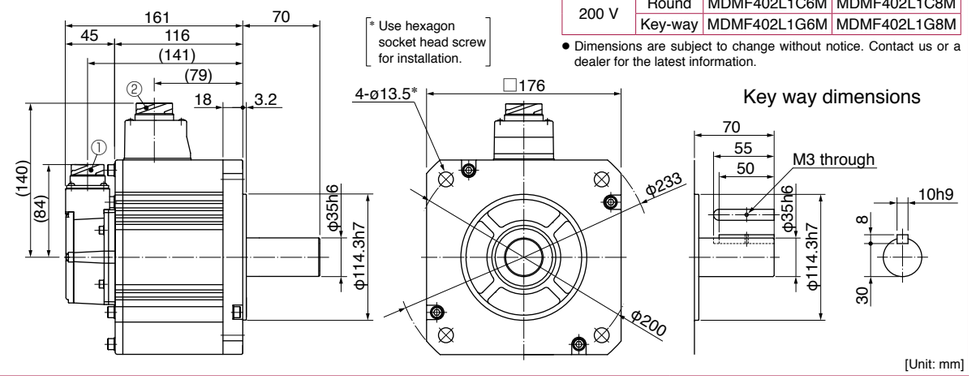
① Encoder connector (Large size JL10)
② Motor connector

Mass: 13.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF402L1C6M	MDMF402L1C8M
	Key-way	MDMF402L1G6M	MDMF402L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

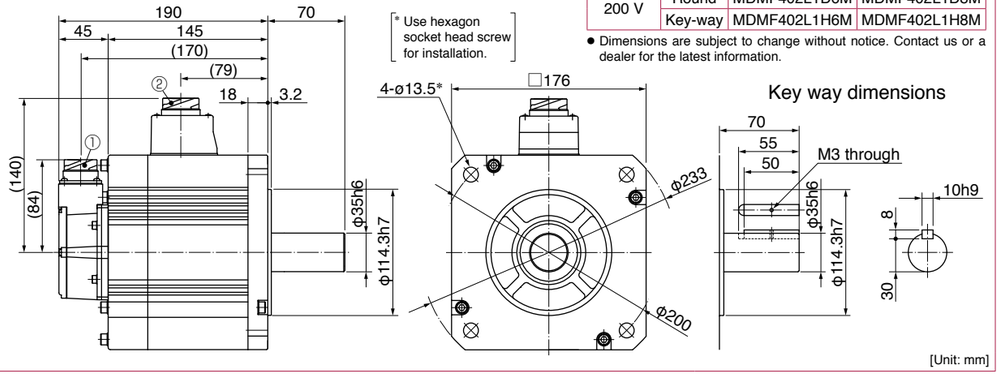
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 16.8 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF402L1D6M	MDMF402L1D8M
	Key-way	MDMF402L1H6M	MDMF402L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.242, P.243.

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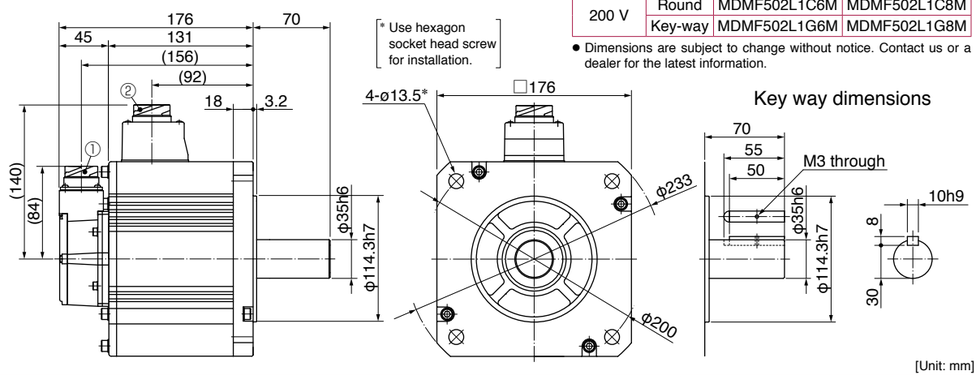
Special Order Product

MDMF 5.0 kW to 7.5 kW

MDMF 5.0 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



Mass: 15.6 kg

● Motor model

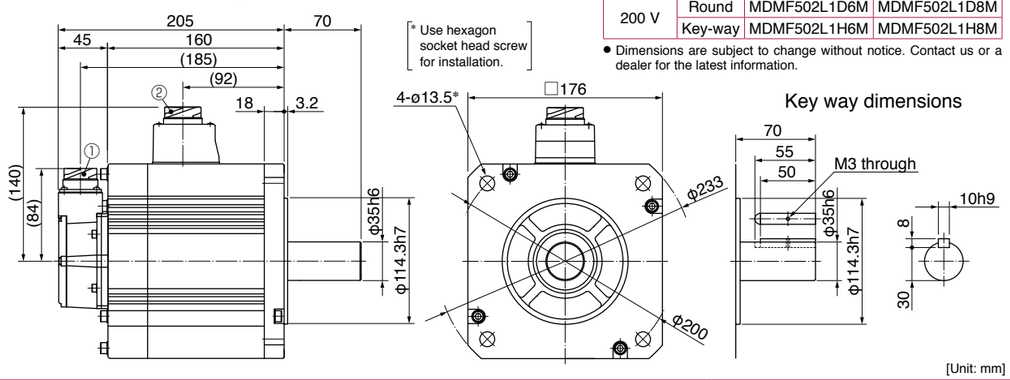
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF502L1C6M	MDMF502L1C8M
	Key-way	MDMF502L1G6M	MDMF502L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



Mass: 19.0 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MDMF502L1D6M	MDMF502L1D8M
	Key-way	MDMF502L1H6M	MDMF502L1H8M

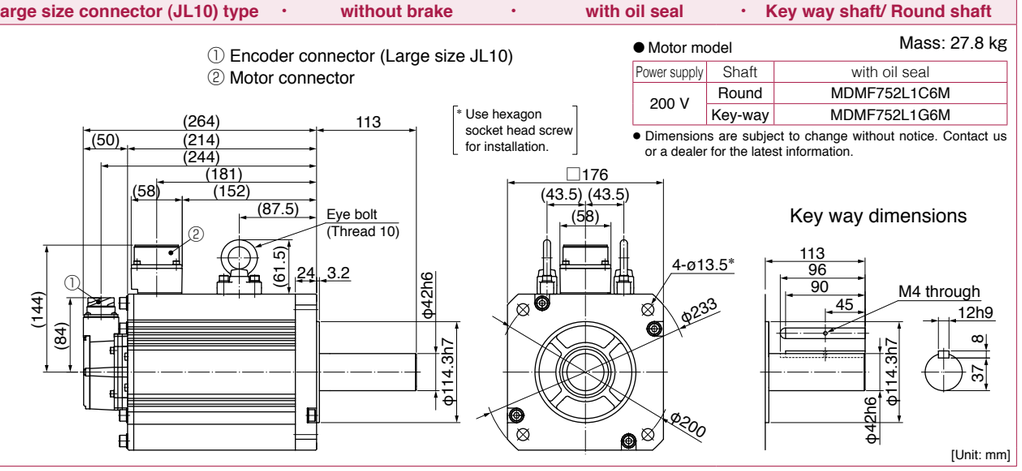
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MDMF 7.5 kW

Large size connector (JL10) type ・ without brake ・ with oil seal ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



Mass: 27.8 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMF752L1C6M
	Key-way	MDMF752L1G6M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.244, P.245.

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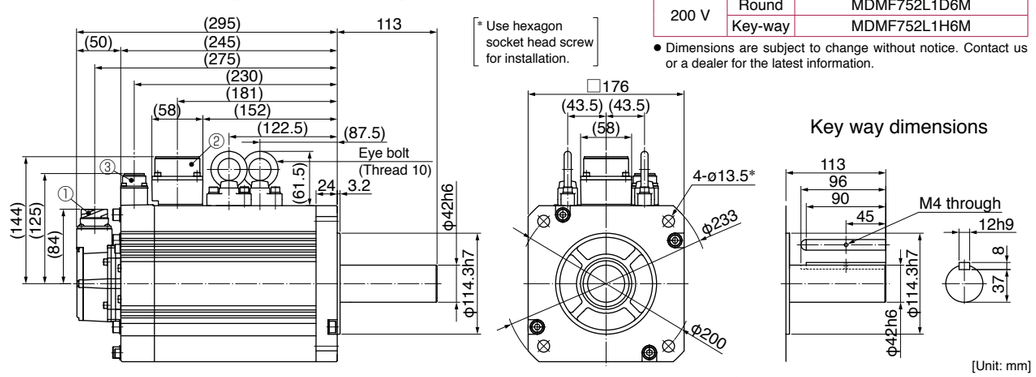
Special Order Product

MDMF 7.5 kW / MGMF 0.85 kW

MDMF 7.5 kW

Large size connector (JL10) type ・ with brake ・ with oil seal ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector ③ Brake connector



Mass: 31.9 kg

● Motor model

Power supply	Shaft	with oil seal
200 V	Round	MDMF752L1D6M
	Key-way	MDMF752L1H6M

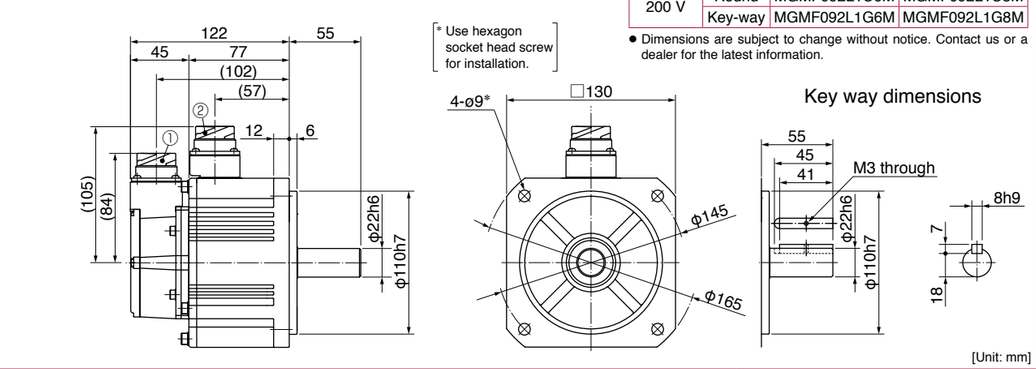
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MGMF 0.85 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



Mass: 4.6 kg

● Motor model

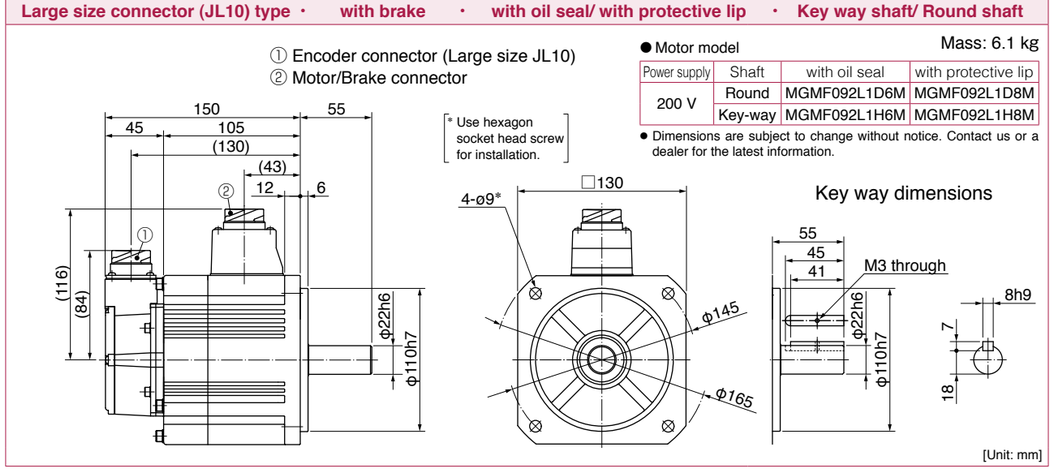
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF092L1C6M	MGMF092L1C8M
	Key-way	MGMF092L1G6M	MGMF092L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



Mass: 6.1 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF092L1D6M	MGMF092L1D8M
	Key-way	MGMF092L1H6M	MGMF092L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.245, P.246.

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MGMF 1.3 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

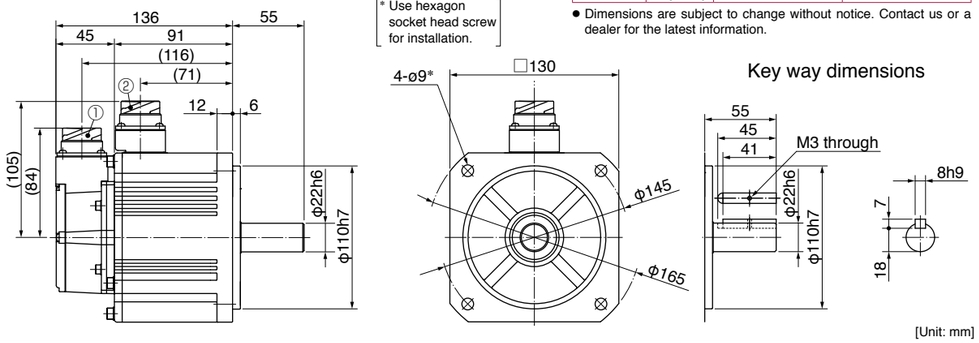
① Encoder connector (Large size JL10)
② Motor connector

Mass: 5.7 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF132L1C6M	MGMF132L1C8M
	Key-way	MGMF132L1G6M	MGMF132L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

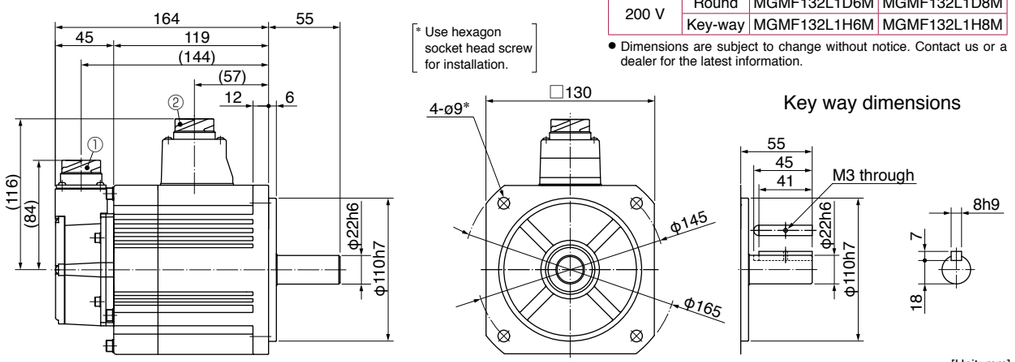
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 7.5 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF132L1D6M	MGMF132L1D8M
	Key-way	MGMF132L1H6M	MGMF132L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MGMF 1.8 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

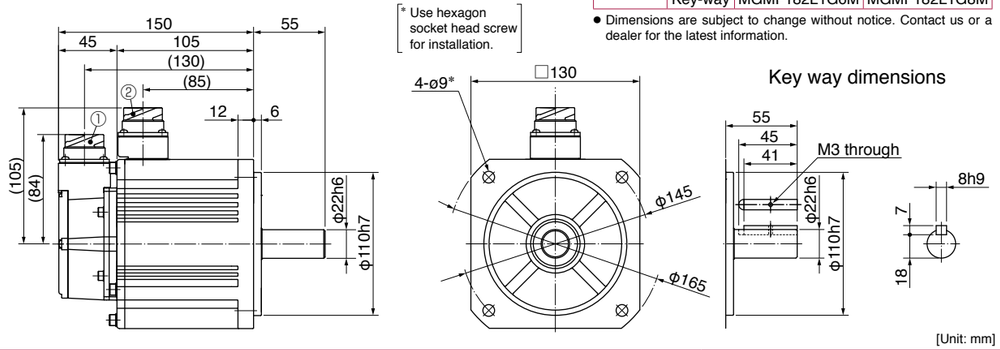
① Encoder connector (Large size JL10)
② Motor connector

Mass: 6.9 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF182L1C6M	MGMF182L1C8M
	Key-way	MGMF182L1G6M	MGMF182L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.247, P.248.

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MGMF 1.8 kW

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

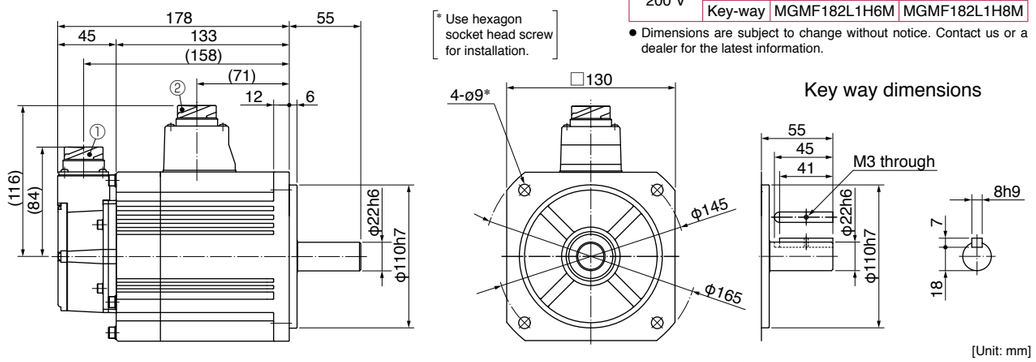
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 8.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF182L1D6M	MGMF182L1D8M
	Key-way	MGMF182L1H6M	MGMF182L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

MGMF 2.4 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

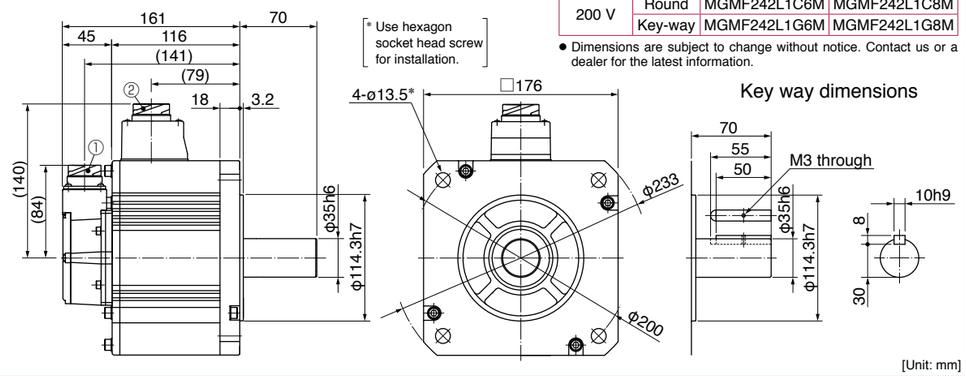
① Encoder connector (Large size JL10)
② Motor connector

Mass: 13.4 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF242L1C6M	MGMF242L1C8M
	Key-way	MGMF242L1G6M	MGMF242L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

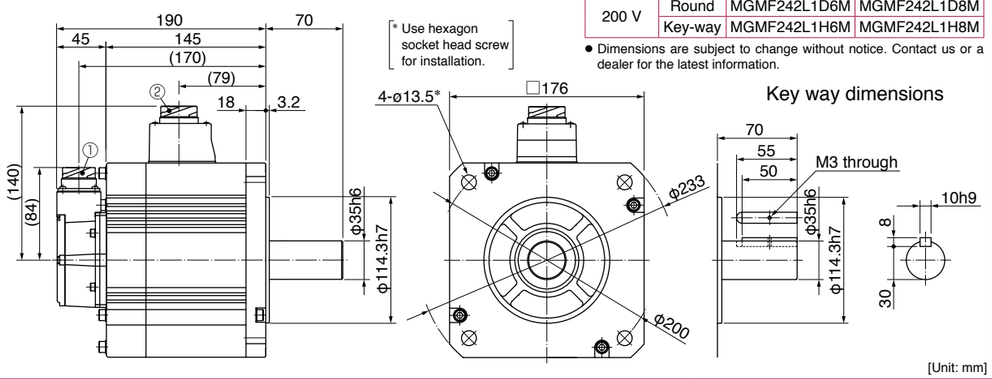
① Encoder connector (Large size JL10)
② Motor/Brake connector

Mass: 16.8 kg

● Motor model

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF242L1D6M	MGMF242L1D8M
	Key-way	MGMF242L1H6M	MGMF242L1H8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



[Unit: mm]

* For motors specifications, refer to P.248, P.249.

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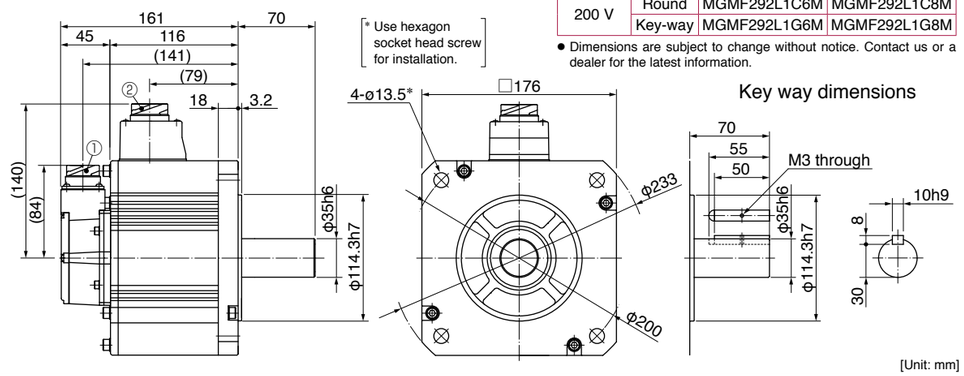
Special Order Product

MGMF 2.9 kW to 4.4 kW

MGMF 2.9 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model

Mass: 13.4 kg

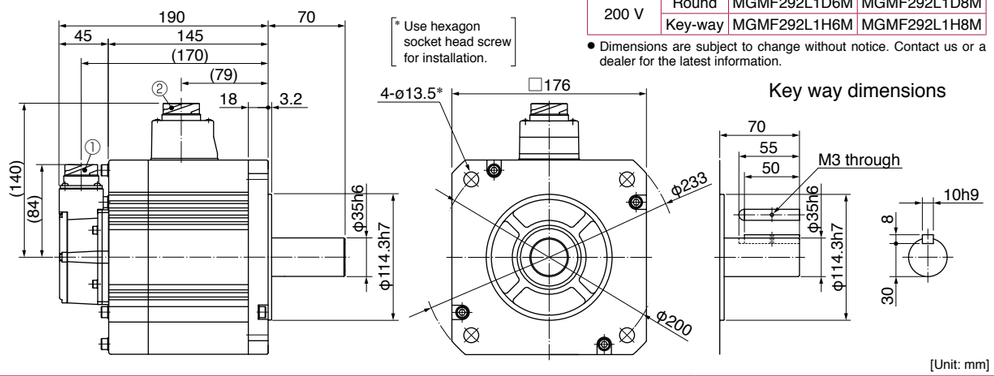
Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF292L1C6M	MGMF292L1C8M
	Key-way	MGMF292L1G6M	MGMF292L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model

Mass: 16.8 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF292L1D6M	MGMF292L1D8M
	Key-way	MGMF292L1H6M	MGMF292L1H8M

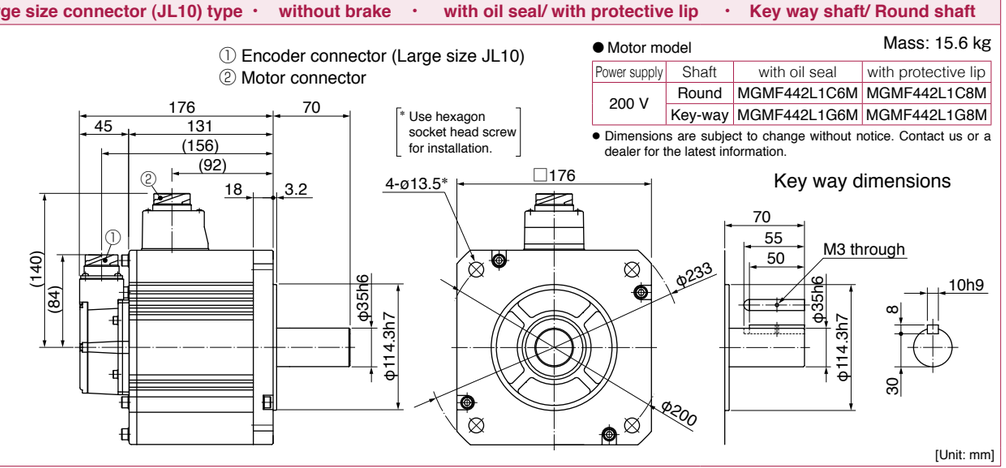
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MGMF 4.4 kW

Large size connector (JL10) type ・ without brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model

Mass: 15.6 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF442L1C6M	MGMF442L1C8M
	Key-way	MGMF442L1G6M	MGMF442L1G8M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.250, P.251.

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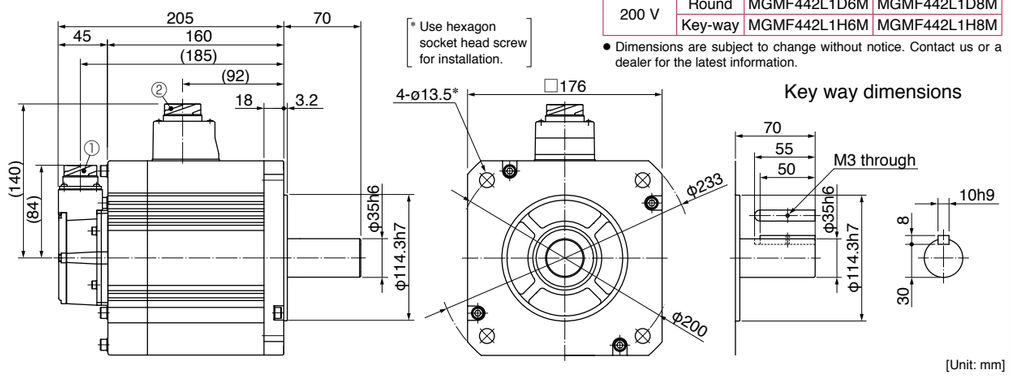
Special Order Product

MGMF 4.4 kW to 5.5 kW

MGMF 4.4 kW

Large size connector (JL10) type ・ with brake ・ with oil seal/ with protective lip ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor/Brake connector



● Motor model

Mass: 19.0 kg

Power supply	Shaft	with oil seal	with protective lip
200 V	Round	MGMF442L1D6M	MGMF442L1D8M
	Key-way	MGMF442L1H6M	MGMF442L1H8M

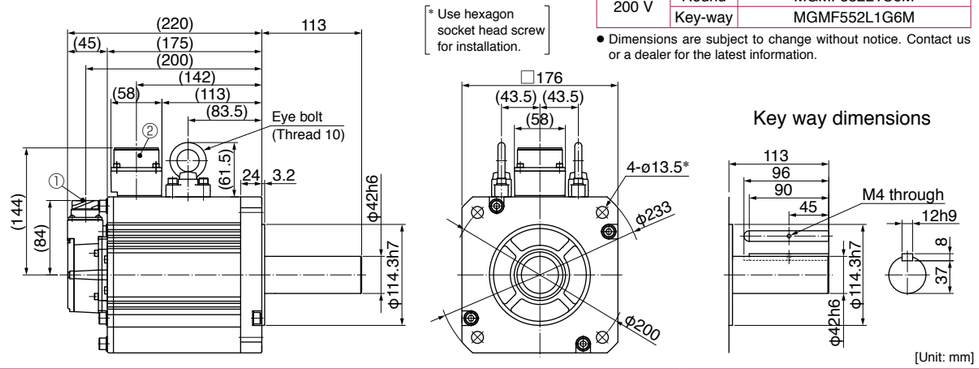
● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

MGMF 5.5 kW

Large size connector (JL10) type ・ without brake ・ with oil seal ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector



● Motor model

Mass: 21.3 kg

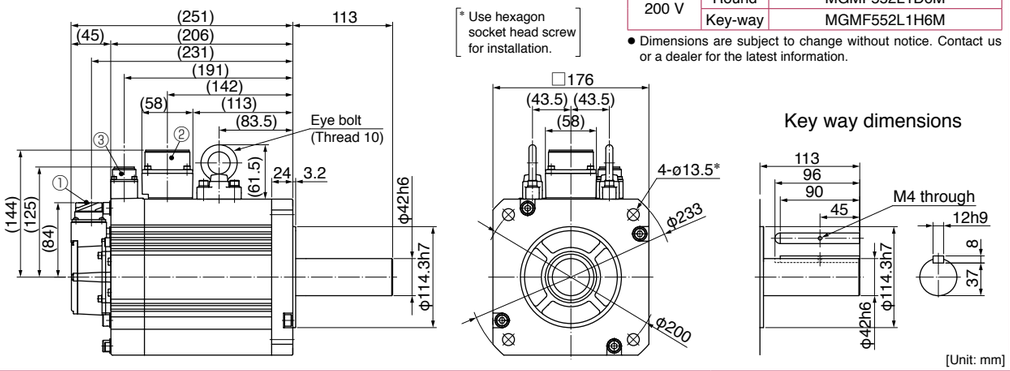
Power supply	Shaft	with oil seal
200 V	Round	MGMF552L1C6M
	Key-way	MGMF552L1G6M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

Large size connector (JL10) type ・ with brake ・ with oil seal ・ Key way shaft/ Round shaft

① Encoder connector (Large size JL10)
② Motor connector ③ Brake connector



● Motor model

Mass: 25.4 kg

Power supply	Shaft	with oil seal
200 V	Round	MGMF552L1D6M
	Key-way	MGMF552L1H6M

● Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

[Unit: mm]

* For motors specifications, refer to P.251, P.252.

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Motor Types with Gear Reducer

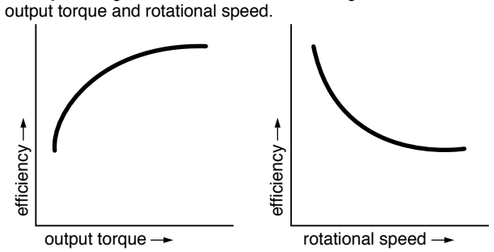
MQMF
100 W to 400 W

MHMF
100 W to 750 W

Reduction ratio	Motor output (W)				Type of reducer
	100	200	400	750	
1/5	●	●	●	●	For high precision
1/9	●	●	●	●	
1/15	●	●	●	●	
1/25	●	●	●	●	

*** MQMF 750 W is not prepared.**
*** MHMF 100 W 1/25, 400 W 1/25 are not prepared.**

Efficiency of the gear reducer show the following inclination in relation to output torque and rotational speed.



Specifications of Motor with Gear Reducer

Items		Specifications
Gear reducer	Backlash	3 minutes or smaller (initial value) at output shaft of the reducer
	Composition of gear	Planetary gear
	Gear efficiency	76 % to 87 %
	Lubrication	Grease lubrication
	Rotational direction at output shaft	Same direction as the motor output shaft
	Mounting method	Flange mounting
	Permissible moment of inertia of the load (conversion to the motor shaft)	10 times or smaller than rotor moment of inertia of the motor
	Enclosure rating	IP44 (at gear reducer)
Environment	Ambient temperature	0 °C to 40 °C (free from freezing)
	Storage temperature	–20 °C to 65 °C (Max.temperature guarantee: 80 °C for 72 hours free from condensation)
	Ambient humidity, Storage humidity	20 %RH to 85 %RH (free from condensation)
	Vibration	Lower than 49 m/s^2 (5G) at runninng, 24.5 m/s^2 (2.5G) at stall
	Impact	Lower than 98 m/s^2 (10G)
	Altitude	Lower than 1000 m

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* For combination of elements of model number, refer to Index P.448.

Model Designation

M Q M F 0 1 1 L 3 1 N

N: Standard

Symbol	Type
MQMF	Middle inertia Flat type 100 W to 400 W
MHMF	High inertia 100 W to 750 W

Symbol	Series
F	A6 Family

Motor rated output

Symbol	Specifications
01	100 W
02	200 W
04	400 W
08	750 W

Voltage specifications

Symbol	Rated output
1	100 V
2	200 V

Motor types with gear reducer

Symbol	Reduction ratio	Motor output (W)				Type of reducer
		100	200	400	750	
1N	1/5	●	●	●	●	For high precision
2N	1/9	●	●	●	●	
3N	1/15	●	●	●	●	
4N	1/25	●	●	●	●	

*** MQMF 750 W is not prepared.**
*** MHMF 100 W 1/25, 400 W 1/25 are not prepared.**

Rotary encoder specifications

Symbol	Format	Pulse counts	Resolution	Wire
L	Absolute	23-bit	8388608	7

<Note>
When using it as an incremental system (not using multi-turn data), do not connect the battery for absolute encoder.

Motor structure

Symbol	Motor I/F	Shaft	Holding brake	
		Key way	without	with
3	Connector	●	●	
4		●		●
7	Leadwire	●	●	
8		●		●

The Combination of the Driver and the Motor

Motor				Driver	
				A6SF series	A6SE series
Motor series	Power supply	Output (W)	Part No.*	Multi fanction type	Basic type
				Pulse, analog, full-closed	Pulse signal input (Incremental only)
MQMF Middle inertia Flat type	Single phase 100 V	100	MQMF011L ☐☐ N	MADLT11SF	MADLN11SE
		200	MQMF021L ☐☐ N	MBDLT21SF	MBDLN21SE
		400	MQMF041L ☐☐ N	MCDLT31SF	MCDLN31SE
	Single phase/ 3-phase 200 V	100	MQMF012L ☐☐ N	MADLT05SF	MADLN05SE
		200	MQMF022L ☐☐ N	MADLT15SF	MADLN15SE
		400	MQMF042L ☐☐ N	MBDLT25SF	MBDLN25SE
MHMF High inertia	Single phase 100 V	100	MHMF011L ☐☐ N	MADLT11SF	MADLN11SE
		200	MHMF021L ☐☐ N	MBDLT21SF	MBDLN21SE
		400	MHMF041L ☐☐ N	MCDLT31SF	MCDLN31SE
	Single phase/ 3-phase 200 V	100	MHMF012L ☐☐ N	MADLT05SF	MADLN05SE
		200	MHMF022L ☐☐ N	MADLT15SF	MADLN15SE
		400	MHMF042L ☐☐ N	MBDLT25SF	MBDLN25SE
		750	MHMF082L ☐☐ N	MCDLT35SF	MCDLN35SE

* The symbols of the motor structure and the gear reduction ratio are entered in ☐☐ of the motor part number. Please refer to the above “Model Designation”.
* Motor options: Please check the upper 9th digit of the motor part number. If the motor is connector type, refer to P.31 to P.32. And if the motor is leadwire type, refer to P.29 to P.30.

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Table of Motor Specifications

	Part No.*	Motor Output	Reduction ratio	Output	Rated speed	Max. speed	Rated torque	Peak max. torque	Moment of inertia (motor + reducer/ converted to motor shaft)		Mass		Permissible radial load	Permissible thrust load
									w/o brake	w/ brake	w/o brake	w/ brake		
		(W)		(W)	(r/min)	(r/min)	(N·m)	(N·m)	J(×10^{-4}kg·m^2)		(kg)		(N)	(N)
MQMF Middle inertiaa Flat type	MQMF01□L□1N	100	1/5	85	600	1300	1.36	5.01	0.210	0.240	1.2	1.4	490	245
	MQMF01□L□2N		1/9	85	333	722	2.45	9.02	0.200	0.230	1.2	1.4	588	294
	MQMF01□L□3N		1/15	81	200	433	3.89	14.4	0.207	0.237	1.4	1.7	784	392
	MQMF01□L□4N		1/25	76	120	260	6.08	22.5	0.287	0.317	2.6	2.9	1670	833
	MQMF02□L□1N	200	1/5	175	600	1300	2.78	10.2	0.650	0.740	1.9	2.3	490	245
	MQMF02□L□2N		1/9	157	333	722	4.49	16.6	0.770	0.860	3.0	3.4	1180	588
	MQMF02□L□3N		1/15	163	200	433	7.78	28.7	0.800	0.890	3.4	3.8	1470	735
	MQMF02□L□4N		1/25	163	120	260	13.0	47.9	0.790	0.880	3.4	3.8	1670	833
	MQMF04□L□1N	400	1/5	331	600	1300	5.27	19.6	1.35	1.43	3.4	3.9	980	490
	MQMF04□L□2N		1/9	331	333	722	9.49	35.3	1.25	1.33	3.4	3.9	1180	588
	MQMF04□L□3N		1/15	335	200	433	16.0	59.4	1.28	1.36	3.8	4.3	1470	735
	MQMF04□L□4N		1/25	327	120	260	26.0	96.9	1.31	1.39	5.4	5.9	2060	1030
MHMF High inertia	MHMF01□L□1N	100	1/5	85	600	1300	1.36	5.01	0.131	0.134	1.0	1.2	490	245
	MHMF01□L□2N		1/9	85	333	722	2.45	9.02	0.121	0.124	1.0	1.2	588	294
	MHMF01□L□3N		1/15	81	200	433	3.89	14.4	0.124	0.127	1.1	1.3	784	392
	MHMF02□L□1N	200	1/5	175	600	1300	2.78	10.2	0.437	0.457	1.5	1.8	490	245
	MHMF02□L□2N		1/9	157	333	722	4.49	16.6	0.563	0.583	2.5	2.8	1180	588
	MHMF02□L□3N		1/15	163	200	433	7.78	28.7	0.592	0.612	2.9	3.2	1470	735
	MHMF02□L□4N		1/25	163	120	260	13.0	47.9	0.583	0.603	2.9	3.2	1670	833
	MHMF04□L□1N	400	1/5	339	600	1300	5.39	19.6	0.930	0.950	2.8	3.2	980	490
	MHMF04□L□2N		1/9	332	333	722	9.51	35.3	0.833	0.853	2.8	3.2	1180	588
	MHMF04□L□3N		1/15	335	200	433	16.0	59.4	0.862	0.882	3.2	3.6	1470	735
	MHMF082L□1N	750	1/5	672	600	1200	10.7	38.4	2.38	2.48	4.3	5.0	980	490
	MHMF082L□2N		1/9	645	333	667	18.5	68.4	2.32	2.42	5.6	6.3	1470	735
	MHMF082L□3N		1/15	637	200	400	30.4	111	2.25	2.35	6.0	6.7	1760	882
	MHMF082L□4N		1/25	637	120	240	50.7	186	2.22	2.32	6.0	6.7	2060	1030

* The symbols of the voltage specifications and the motor structure are entered in □ of the motor part number. Please refer to “Model Designation” in P.294.

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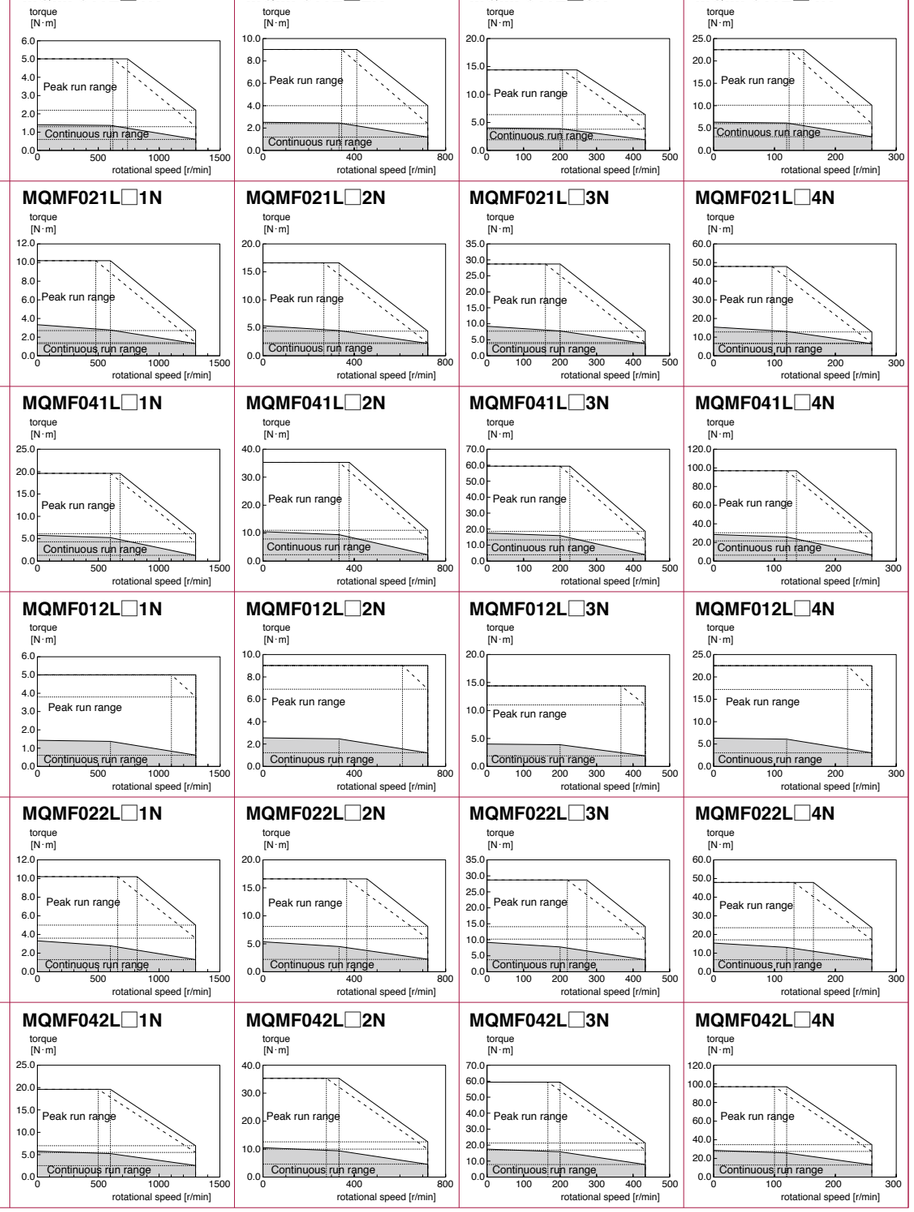
MQMF series (100 W to 400 W)

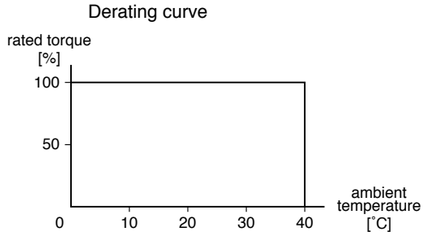
Supply voltage to driver	Motor output \ Reduction ratio	1/5	1/9	1/15	1/25
100 V	100 W	MQMF011L□1N	MQMF011L□2N	MQMF011L□3N	MQMF011L□4N
	200 W	MQMF021L□1N	MQMF021L□2N	MQMF021L□3N	MQMF021L□4N
	400 W	MQMF041L□1N	MQMF041L□2N	MQMF041L□3N	MQMF041L□4N
200 V	100 W	MQMF012L□1N	MQMF012L□2N	MQMF012L□3N	MQMF012L□4N
	200 W	MQMF022L□1N	MQMF022L□2N	MQMF022L□3N	MQMF022L□4N
	400 W	MQMF042L□1N	MQMF042L□2N	MQMF042L□3N	MQMF042L□4N



Dotted line represents the torque at 10 % less supply voltage to driver.

* The symbols of the motor structure are entered in □ of the motor part number. Please refer to “Model Designation” in P.294.

Derating curve



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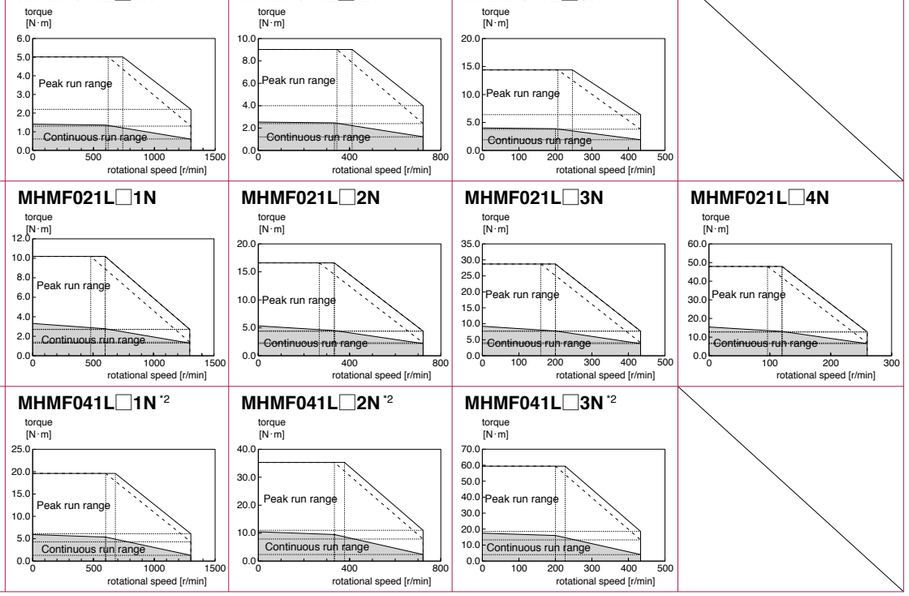
Torque Characteristics of Motor

MHMF series (100 W to 750 W)

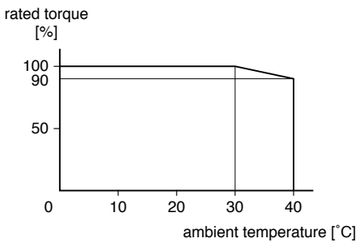
Supply voltage to driver	Motor output \ Reduction ratio	1/5	1/9	1/15	1/25
100 V	100 W	MHMF011L□1N *1	MHMF011L□2N *1	MHMF011L□3N *1	
	200 W	MHMF021L□1N	MHMF021L□2N	MHMF021L□3N	MHMF021L□4N
	400 W	MHMF041L□1N *2	MHMF041L□2N *2	MHMF041L□3N *2	



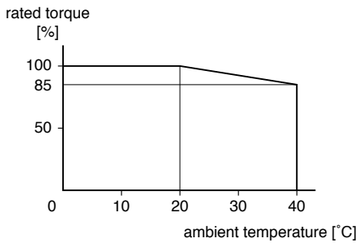
Dotted line represents the torque at 10 % less supply voltage to driver.

* The symbols of the motor structure are entered in □ of the motor part number. Please refer to “Model Designation” in P.294.

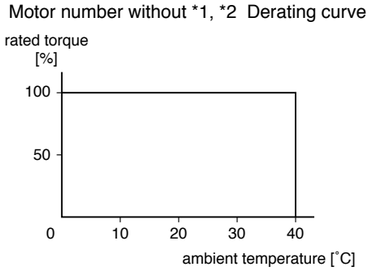
*1 Derating curve



*2 Derating curve



Motor number without *1, *2 Derating curve



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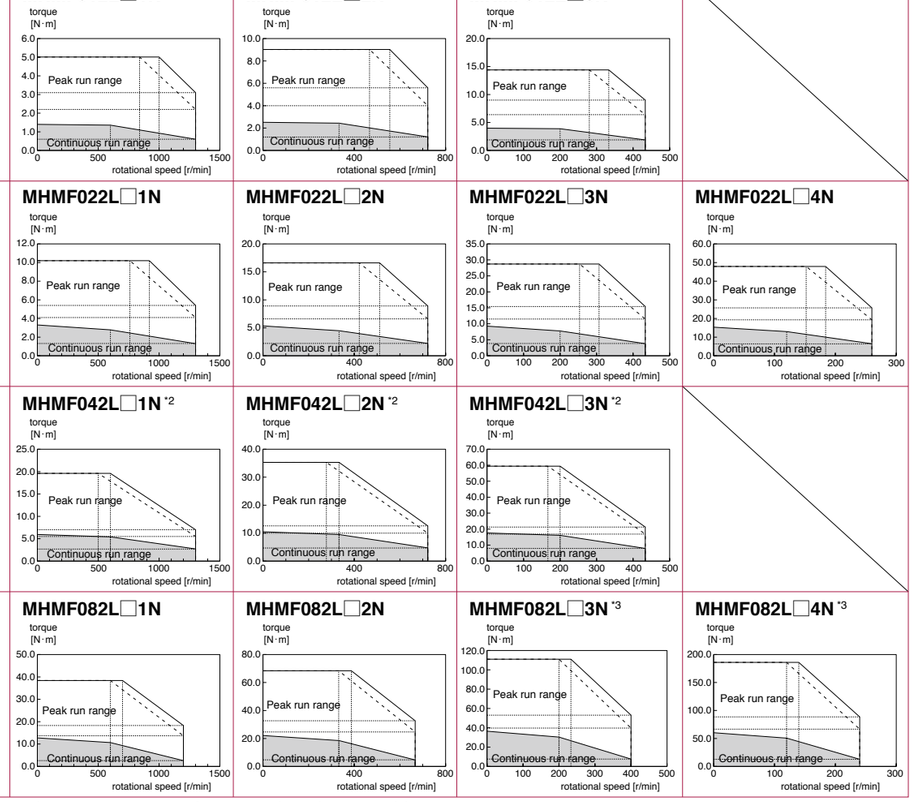
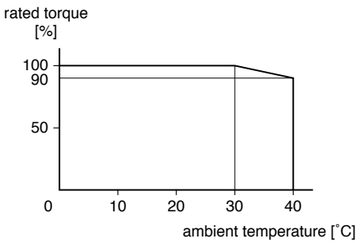
Supply voltage to driver	Motor output \ Reduction ratio	1/5	1/9	1/15	1/25
200 V	100 W	MHMF012L□1N *1	MHMF012L□2N *1	MHMF012L□3N *1	
	200 W	MHMF022L□1N	MHMF022L□2N	MHMF022L□3N	MHMF022L□4N
	400 W	MHMF042L□1N *2	MHMF042L□2N *2	MHMF042L□3N *2	
	750 W	MHMF082L□1N	MHMF082L□2N	MHMF082L□3N *3	MHMF082L□4N *3



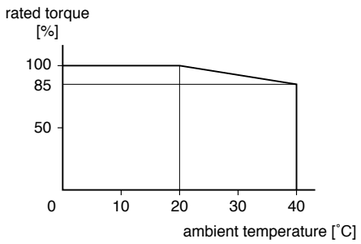
Dotted line represents the torque at 10 % less supply voltage to driver.

* The symbols of the motor structure are entered in □ of the motor part number. Please refer to “Model Designation” in P.294.

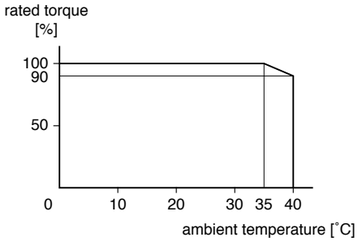
*1 Derating curve



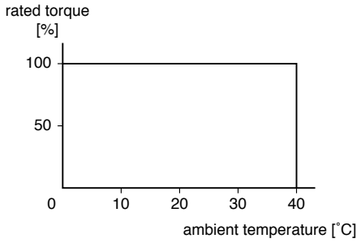
*2 Derating curve



*3 Derating curve



Motor number without *1, *2, *3 Derating curve



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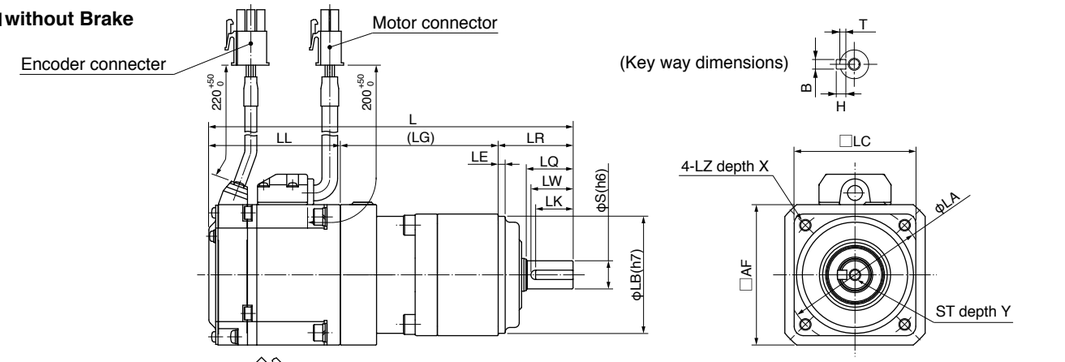
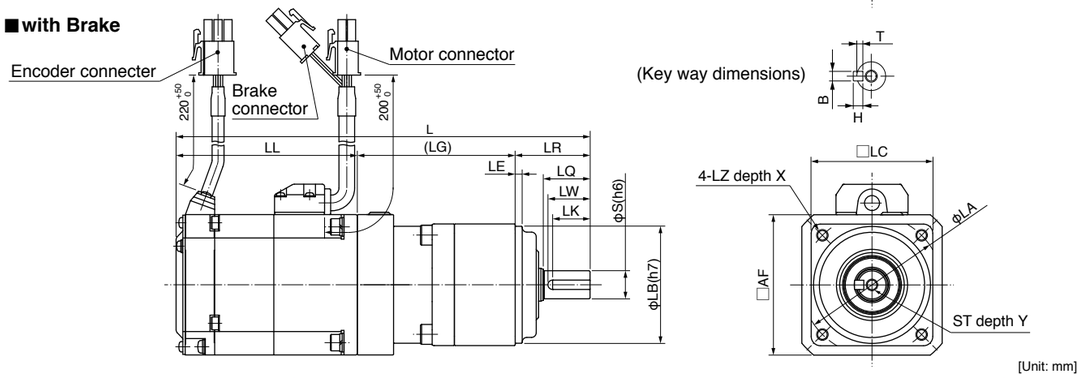
MQMF series (Leadwire type)

■ **without Brake**



■ **with Brake**



[Unit: mm]

Motor Part No.*1	Motor output (W)	Reduction ratio	L without Brake	L with Brake	LL without Brake	LL with Brake	(LG)	LR	LQ	LW	LK	S	B×T	H	ST	Y	LB	LA	LE	LZ	LC *2	X	AF *2
MQMF01□L□1N	100	1/5	155.7	177	56.2	77.5	67.5	32	20	18	16	12	4×2.5	4	M5	10	50	60	3	M5	52	12	60
MQMF01□L□2N		1/9	155.7	177	56.2	77.5																	
MQMF01□L□3N		1/15	171.7	193	56.2	77.5	83.5																
MQMF01□L□4N		1/25	199.7	221	56.2	77.5	93.5	50	30	26	22	19	6×3.5	6	M6	12	70	90		M6	78	20	
MQMF02□L□1N	200	1/5	166.8	190.4	62.3	85.9	72.5	32	20	18	16	12	4×2.5	4	M5	10	50	60	3	M5	52	12	80
MQMF02□L□2N		1/9	201.8	225.4	62.3	85.9	89.5	50	30	26	22	19	6×3.5	6	M6	12	70	90		M6	78	20	
MQMF02□L□3N		1/15	212.3	235.9	62.3	85.9	100																
MQMF02□L□4N		1/25	212.3	235.9	62.3	85.9																	
MQMF04□L□1N	400	1/5	214.3	237.9	74.8	98.4	89.5	50	30	26	22	19	6×3.5	6	M6	12	70	90	3	M6	78	20	80
MQMF04□L□2N		1/9	214.3	237.9	74.8	98.4																	
MQMF04□L□3N		1/15	224.8	248.4	74.8	98.4	100																
MQMF04□L□4N		1/25	239.8	263.4	74.8	98.4	104	61	40	35	30	24	8×4	7	M8	16	90	115	5	M8	98		

*1 The symbols of the voltage specifications and the motor structure are entered in □ of the motor part number. Please refer to “Model Designation” in P.294.
*2 □ LC: flange size of the reduction gear □, AF: □ flange size of the motor

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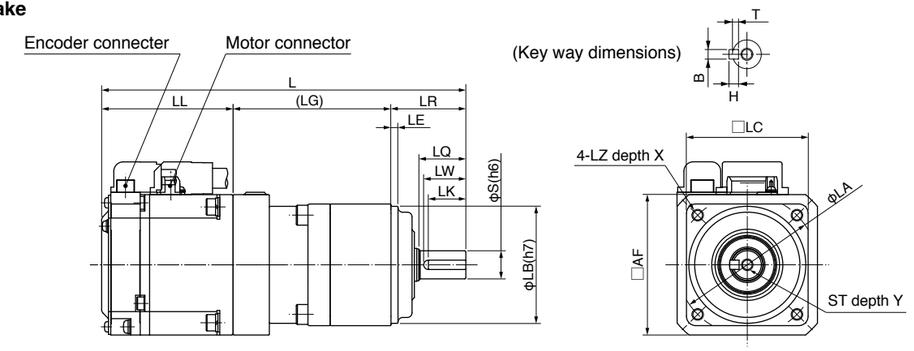
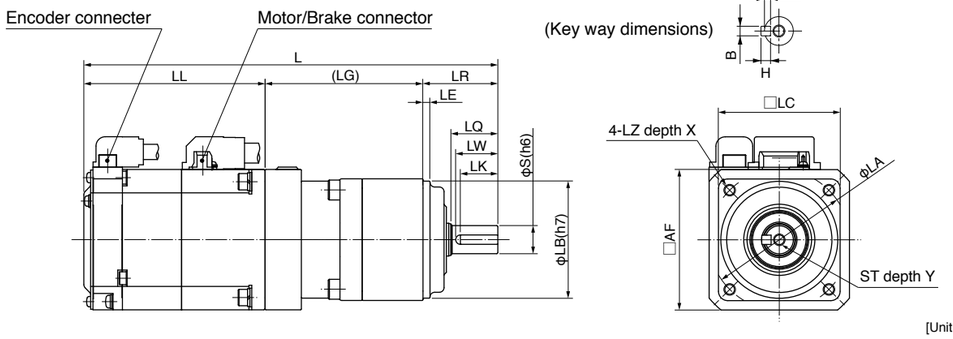
MQMF series (Connector type)

■ **without Brake**



■ **with Brake**



[Unit: mm]

Motor Part No.*1	Motor output (W)	Reduction ratio	L without Brake	L with Brake	LL without Brake	LL with Brake	(LG)	LR	LQ	LW	LK	S	B×T	H	ST	Y	LB	LA	LE	LZ	LC *2	X	AF *2
MQMF01□L□1N	100	1/5	155.7	177	56.2	77.5	67.5	32	20	18	16	12	4×2.5	4	M5	10	50	60	3	M5	52	12	60
MQMF01□L□2N		1/9	155.7	177	56.2	77.5																	
MQMF01□L□3N		1/15	171.7	193	56.2	77.5	83.5																
MQMF01□L□4N		1/25	199.7	221	56.2	77.5	93.5	50	30	26	22	19	6×3.5	6	M6	12	70	90		M6	78	20	
MQMF02□L□1N	200	1/5	166.8	190.4	62.3	85.9	72.5	32	20	18	16	12	4×2.5	4	M5	10	50	60	3	M5	52	12	80
MQMF02□L□2N		1/9	201.8	225.4	62.3	85.9	89.5	50	30	26	22	19	6×3.5	6	M6	12	70	90		M6	78	20	
MQMF02□L□3N		1/15	212.3	235.9	62.3	85.9	100																
MQMF02□L□4N		1/25	212.3	235.9	62.3	85.9																	
MQMF04□L□1N	400	1/5	214.3	237.9	74.8	98.4	89.5	50	30	26	22	19	6×3.5	6	M6	12	70	90	3	M6	78	20	80
MQMF04□L□2N		1/9	214.3	237.9	74.8	98.4																	
MQMF04□L□3N		1/15	224.8	248.4	74.8	98.4	100																
MQMF04□L□4N		1/25	239.8	263.4	74.8	98.4	104	61	40	35	30	24	8×4	7	M8	16	90	115	5	M8	98		

*1 The symbols of the voltage specifications and the motor structure are entered in □ of the motor part number. Please refer to “Model Designation” in P.294.
*2 □ LC: flange size of the reduction gear □, AF: □ flange size of the motor

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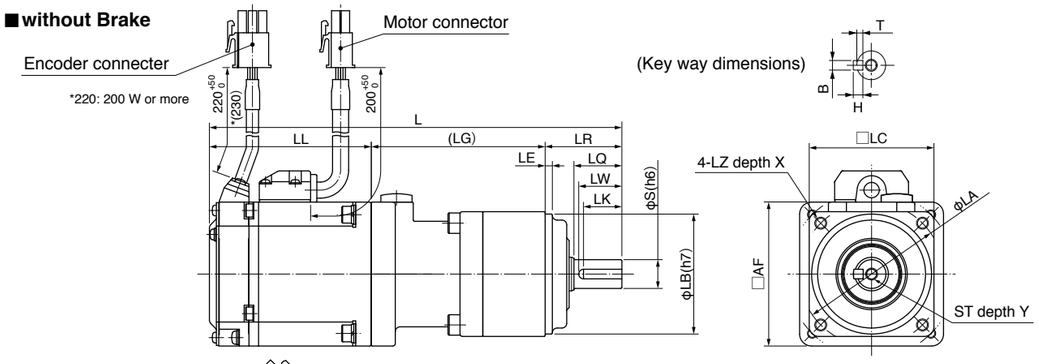
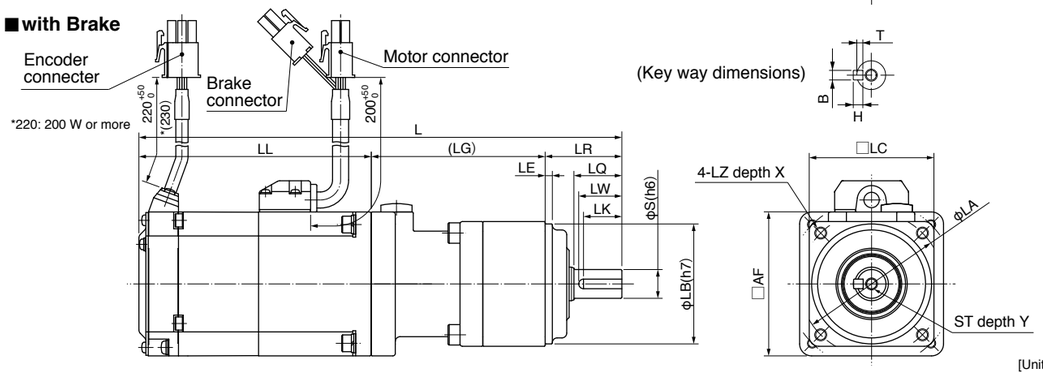
MHMF series (Leadwire type)

■without Brake



■with Brake



[Unit: mm]

Motor Part No.*1	Motor output (W)	Reduction ratio	L without Brake	L with Brake	LL without Brake	LL with Brake	(LG)	LR	LQ	LW	LK	S	B×T	H	ST	Y	LB	LA	LE	LZ	LC *2	X	AF *2
MHMF01□L□1N	100	1/5	167	200.9	67.5	101.4	67.5	32	20	18	16	12	4×2.5	4	M5	10	50	60	3	M5	52	12	40
MHMF01□L□2N		1/9	167	200.9	67.5	101.4																	
MHMF01□L□3N		1/15	177.5	211.4	67.5	101.4	78																
MHMF02□L□1N	200	1/5	172	201.3	67.5	96.8	72.5	32	20	18	16	12	4×2.5	4	M5	10	50	60	3	M5	52	12	60
MHMF02□L□2N		1/9	207	236.3	67.5	96.8	89.5	50	30	26	22	19	6×3.5	6	M6	12	70	90		M6	78	20	
MHMF02□L□3N		1/15	217.5	246.8	67.5	96.8	100																
MHMF02□L□4N		1/25	217.5	246.8	67.5	96.8																	
MHMF04□L□1N	400	1/5	224	253.3	84.5	113.8	89.5	50	30	26	22	19	6×3.5	6	M6	12	70	90	3	M6	78	20	60
MHMF04□L□2N		1/9	224	253.3	84.5	113.8																	
MHMF04□L□3N		1/15	234.5	263.8	84.5	113.8	100																
MHMF082L□1N	750	1/5	235.4	269	91.9	125.5	93.5	50	30	26	22	19	6×3.5	6	M6	12	70	90	3	M6	78	20	80
MHMF082L□2N		1/9	250.4	284	91.9	125.5	97.5	61	40	35	30	24	8×4	7	M8	16	90	115	5	M8	98		
MHMF082L□3N		1/15	262.9	296.5	91.9	125.5	110																
MHMF082L□4N		1/25	262.9	296.5	91.9	125.5																	

*1 The symbols of the voltage specifications and the motor structure are entered in □ of the motor part number.
Please refer to “Model Designation” in P.294.
*2 □ LC: flange size of the reduction gear □, AF: □ flange size of the motor

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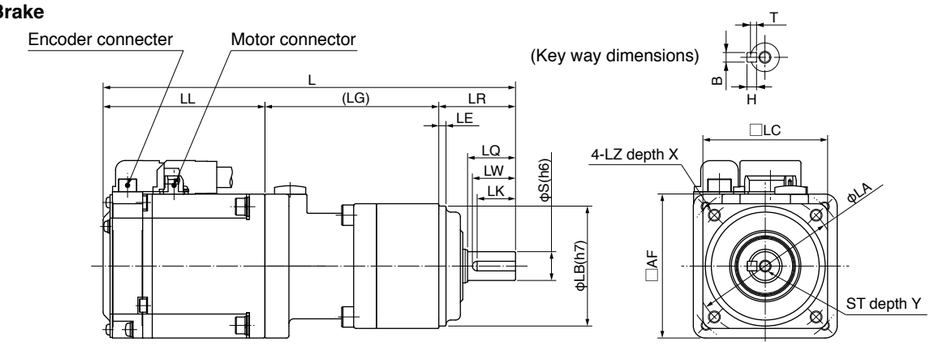
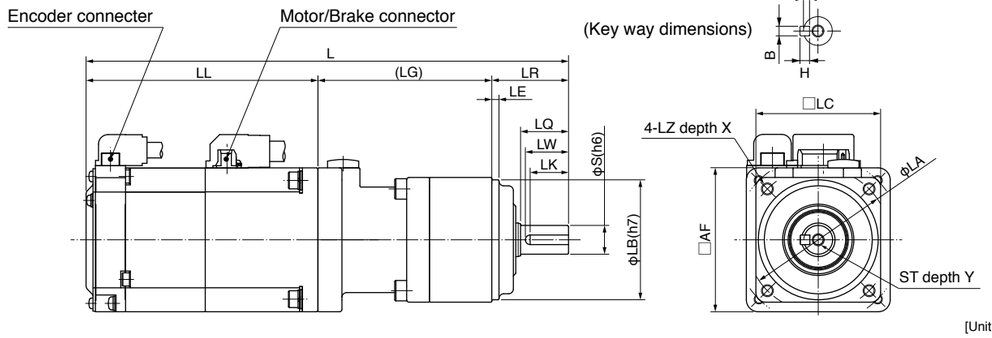
MHMF series (Connector type)

■without Brake



■with Brake



[Unit: mm]

Motor Part No.*1	Motor output (W)	Reduction ratio	L without Brake	L with Brake	LL without Brake	LL with Brake	(LG)	LR	LQ	LW	LK	S	B×T	H	ST	Y	LB	LA	LE	LZ	LC *2	X	AF *2
MHMF01□L□1N	100	1/5	167	200.9	67.5	101.4	67.5	32	20	18	16	12	4×2.5	4	M5	10	50	60	3	M5	52	12	40
MHMF01□L□2N		1/9	167	200.9	67.5	101.4																	
MHMF01□L□3N		1/15	177.5	211.4	67.5	101.4	78																
MHMF02□L□1N	200	1/5	172	201.3	67.5	96.8	72.5	32	20	18	16	12	4×2.5	4	M5	10	50	60	3	M5	52	12	60
MHMF02□L□2N		1/9	207	236.3	67.5	96.8	89.5	50	30	26	22	19	6×3.5	6	M6	12	70	90		M6	78	20	
MHMF02□L□3N		1/15	217.5	246.8	67.5	96.8	100																
MHMF02□L□4N		1/25	217.5	246.8	67.5	96.8																	
MHMF04□L□1N	400	1/5	224	253.3	84.5	113.8	89.5	50	30	26	22	19	6×3.5	6	M6	12	70	90	3	M6	78	20	60
MHMF04□L□2N		1/9	224	253.3	84.5	113.8																	
MHMF04□L□3N		1/15	234.5	263.8	84.5	113.8	100																
MHMF082L□1N	750	1/5	235.4	269	91.9	125.5	93.5	50	30	26	22	19	6×3.5	6	M6	12	70	90	3	M6	78	20	80
MHMF082L□2N		1/9	250.4	284	91.9	125.5	97.5	61	40	35	30	24	8×4	7	M8	16	90	115	5	M8	98		
MHMF082L□3N		1/15	262.9	296.5	91.9	125.5	110																
MHMF082L□4N		1/25	262.9	296.5	91.9	125.5																	

*1 The symbols of the voltage specifications and the motor structure are entered in □ of the motor part number.
Please refer to “Model Designation” in P.294.
*2 □ LC: flange size of the reduction gear □, AF: □ flange size of the motor

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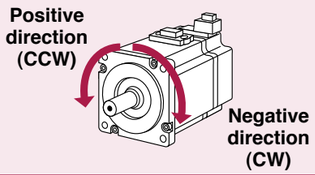
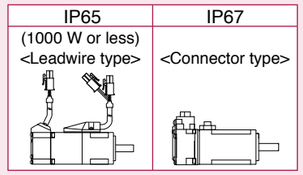
Environmental Conditions

Item		Conditions
Ambient temperature *1		0 ˚C to 40 ˚C (free from freezing)
Ambient humidity		20 %RH to 85 %RH (free from condensation*5*6)
Storage temperature *2		–20 ˚C to 65 ˚C (Max.temperature guarantee: 80 ˚C for 72 hours free from condensation*5)
Storage humidity		20 %RH to 85 %RH (free from condensation*5*6)
Vibration	Motor only	Lower than 49 m/s^2 (5 G) at running, 24.5 m/s^2 (2.5 G) at stall*7
Impact	Motor only	Lower than 98 m/s^2 (10 G)
Enclosure rating (Motor only)	IP65 *3	MSMF, MQMF, MHMF (except rotating portion of output shaft and leadwire end.) (MSMF, MQMF, MHMF In case of leadwire type.)
	IP67 *3*4	IP67 motor (except rotating portion of output shaft and connecting pin part of the motor connector and the encoder connector)
	IP44 *3	Excludes output shaft rotating part, connector connection pin part, and motor lead hole part of terminal box.
Altitude		Lower than 1000 m

*1 Ambient temperature to be measured at 5 cm away from the motor.
*2 Permissible temperature for short duration such as transportation.
*3 These motors conform to the test conditions specified in EN standards (EN60529, EN60034-5). Do not use these motors in application where water proof performance is required such as continuous wash-down operation.
*4 This condition is applied when the connector mounting screw are tightened to the recommended tightening torque.
*5 Air containing water vapor will become saturated with water vapor as the temperature falls, causing dew.
*6 The terminal block of MDMFD22L1 □□ is between 45%RH to 85%RH.
*7 For motors with rated output capacity of 5.5 kW or more, both motor rotation and stop will be 24.5 m/s^2 (2.5 G) or less.

<Note>
Initial setup of rotational direction: positive = CCW and negative = CW. Pay an extra attention.





Notes on [Motor specification] page

Note) 1. Regenerative resistors are not built in drivers of A and B frames. When regeneration occurs, prepare an optional external regenerative resistor.

[At AC100 V of power voltage]

Regenerative brake frequency represents the frequency of the motor's stops from the rated speed with deceleration without load.

- If the load is connected, frequency will be defines as 1/(m+1), where m=load moment of inertia/rotor moment of inertia.
- When the motor speed exceeds the rated speed, regenerative brake frequency is in inverse proportion to the square of (running speed/rated speed).
- Power supply voltage is AC115 V (at 100 V of the main voltage).
  If the supply voltage fluctuates, frequency is in inverse proportion to the square of (Running supply voltage/115) relative to the value in the table.
- When regeneration occurs continuously such cases as running speed frequently changes or vertical feeding, consult us or a dealer.

[At AC200 V of power voltage]

Regenerative brake frequency represents the frequency of the motor's stops from the rated speed with deceleration without load.

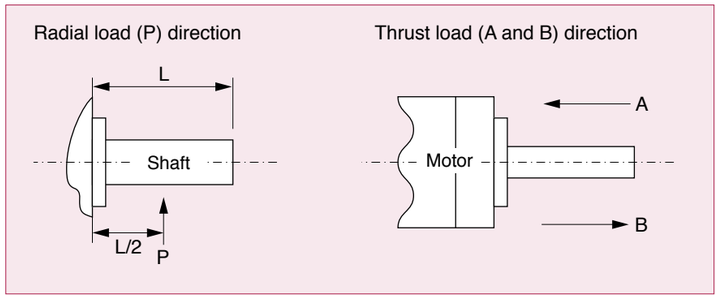
- If the load is connected, frequency will be defines as 1/(m+1), where m=load moment of inertia/rotor moment of inertia.
- When the motor speed exceeds the rated speed, regenerative brake frequency is in inverse proportion to the square of (running speed/rated speed).
- Power supply voltage is AC230 V (at 200 V of the main voltage).
  If the supply voltage fluctuates, frequency is in inverse proportion to the square of (Running supply voltage/230) relative to the value in the table.
- When regeneration occurs continuously such cases as running speed frequently changes or vertical feeding, consult us or a dealer.

Note) 2. If the effective torque is within the rated torque, there is no limit in generative brake.
Note) 3. Consult us or a dealer if the load moment of inertia exceeds the specified value.
Note) 4. Releasing time values represent the ones with DC-cutoff using a varistor.

Permissible Load at Output Shaft

The radial load is defined as a load applied to the output shaft in the right-angle direction. This load is generated when the gear head is coupled to the machine using a chain, belt, etc., but not when the gear head is directly connected to the coupling. As shown in the right figure, the permissible value is determined based on the load applied to the L/2 position of the output shaft. The thrust load is defined as a load applied to the output shaft in the axial direction.

Because the radial load and thrust load significantly affect the life of the bearing, take care not to allow the load during operation to exceed the permissible radial load and thrust load shown in the table below.



Built-in Holding Brake

In the applications where the motor drives the vertical axis, this brake would be used to hold and prevent the work (moving load) from falling by gravity while the power to the servo is shut off.

Use this built-in brake for "Holding" purpose only, that is to hold the stalling status. Never use this for "Brake" purpose to stop the load in motion.

• Output Timing of BRK-OFF Signal

- For the brake release timing at power-on, or braking timing at Servo-OFF/Servo-Alarm while the motor is in motion, refer to the Operating Instructions (Overall).
- With the parameter, Pr4.38 (Setup of mechanical brake action while the motor is in motion), you can set up a time between when the motor enters to a free-run from energized status and when BRK-OFF signal turns off (brake will be engaged), when the Servo-OFF or alarm occurs while the motor is in motion. For details, download a copy of the instruction manual from our website.

<Note>

1. The lining sound of the brake (chattering and etc.) might be generated while running the motor with built-in brake, however this does not affect any functionality.
2. Magnetic flux might be generated through the motor shaft while the brake coil is energized (brake is open). Pay an extra attention when magnetic sensors are used nearby the motor.

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● Specifications of Built-in Holding Brake

Motor series	Motor output	Static friction torque N·m	Rotor inertia × 10^{-4} kg·m^2	Engaging time ms	Releasing time ms	Exciting current DC A (at cool-off)	Releasing voltage DC V / Exciting voltage DC V	Permissible work (J) per one braking	Permissible total work × 10^3 J	Permissible angular acceleration rad/s^2
MSMF (80 mm sq. or less)	50 W,100 W	0.294 or more	0.002	35 or less	20 or less	0.30	1 or more / 24±1.2	39.2	4.9	30000
	200 W,400 W	1.27 or more	0.018	50 or less	15 or less	0.36		137	44.1	
	750 W	2.45 or more	0.075	70 or less	20 or less	0.42		196	147	
	1000 W	3.80 or more					1 or more / 24±2.4	185	80.0	
MSMF (100 mm sq. or more)	1.0 kW, 1.5 kW, 2.0 kW	8.0 or more	0.175	50 or less	15 or less	0.81	2 or more / 24±2.4	600	50	10000
	3.0 kW	12.0 or more		80 or less					900	
	4.0 kW	16.2 or more	1.12	110 or less	50 or less	0.90		1470	2160	
	5.0 kW	22.0 or more						1545	2000	
MQMF (80 mm sq. or less)	100 W	0.39 or more	0.018	15 or less	20 or less	0.30	1 or more / 24±2.4	105	44.1	30000
	200 W, 400 W	1.6 or more	0.075	70 or less		0.36		185	80	
MHMF (80 mm sq. or less)	50 W, 100 W	0.38 or more	0.002	35 or less	20 or less	0.30	1 or more / 24±2.4	39.2	4.9	30000
	200 W, 400 W	1.6 or more	0.018	50 or less		0.36		105	44.1	
	750 W, 1000 W	3.8 or more	0.075	70 or less		0.42		185	80	
MHMF (100 mm sq. or more)	1.0 kW, 1.5 kW	13.7 or more	1.12	100 or less	50 or less	0.79	2 or more / 24±2.4	1470	2160	10000
	2.0 kW, 3.0 kW, 4.0 kW	25.0 or more	4.7	80 or less	25 or less	1.29		1800	3000	5440
	5.0 kW	44.1 or more	4.1	150 or less	30 or less				3100	5108
	7.5 kW	63.0 or more	3.9	200 or less	80 or less					
MDMF (100 mm sq. or more)	1.0 kW, 1.5 kW, 2.0 kW	13.7 or more	1.12	100 or less	50 or less	0.79	2 or more / 24±2.4	1470	2160	10000
	3.0 kW	22.0 or more		110 or less		0.90		1545	2000	
	4.0 kW	25.0 or more	4.7	80 or less	25 or less	1.29		1800	3000	5440
	5.0 kW	44.1 or more	4.1	150 or less	30 or less				3100	5108
	7.5 kW	63.0 or more	3.9	200以下	80 or less					
	11.0 kW	100 or more	7.1	300 or less	140 or less	1.08		2000	4000	
	15.0 kW									
	22.0 kW	200 or more	28		150 or less	1.72		3000		3000
MGMF (100 mm sq. or more)	0.85 kW, 1.3 kW, 1.8 kW	13.7 or more	1.12	100 or less	50 or less	0.79	2 or more / 24±2.4	1470	2160	10000
	2.9 kW	25.0 or more	4.7	80 or less	25 or less	1.29		1800	3000	5440
	4.4 kW	44.1 or more	3.93	150 or less	30 or less				3100	5108
	5.5 kW	63.0 or more	3.9	200 or less	80 or less					

- The engaging time and releasing time represent the delay time of the brake operation.
- Releasing time values represent the ones with DC-cutoff using a varistor.
- Above values (except static friction torque, releasing voltage and exciting voltage) represent typical values.
- Backlash of the built-in holding brake is kept 2° or smaller at ex-factory point.
- Service life of the number of acceleration/deceleration with the above permissible angular acceleration is more than 10 million times. (Life end is defined as when the brake backlash drastically changes.)
- The motor brake power supply must be different from the power supply for the driver's connectors X1, X2, X3, X4, X5, X6.

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Options

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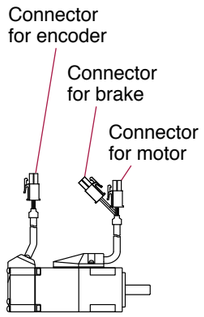
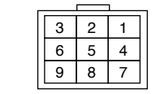
50 W to 1000 W　80 mm sq. or less

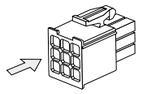
● When the motors of <MSMF, MQMF, MHMF (Leadwire type)> are used, they are connected as shown below.
Connector: Tyco Electronics Japan G.K. (The figures below show connectors for the motor.)



[Connector for encoder]



172169-1
23-bit Absolute



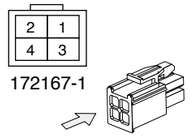
* Connector pin diagram is viewed from the direction of the arrow.

PIN No.	Application
1	BAT+*
2	BAT–*
3	FG(SHIELD)
4	PS
5	$\overline{PS}$
6	NC
7	E5V
8	E0V
9	NC

<Remarks>
Do not connect anything to NC.

* When using the motor as an incremental system, BAT+ and BAT– can be left unconnected.

[Connector for motor]

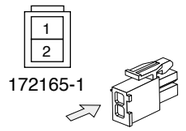


172167-1

PIN No.	Application
1	U-phase
2	V-phase
3	W-phase
4	Ground

* Connector pin diagram is viewed from the direction of the arrow.

[Connector for Brake]



172165-1

PIN No.	Application
1	Brake
2	Brake

* Electromagnetic brake is a nonpolar device.

* Connector pin diagram is viewed from the direction of the arrow.

● When the motors of <MSMF, MQMF, MHMF (Connector type)> are used, they are connected as shown below.
Connector: Made by Japan Aviation Electronics Industry, Ltd. (The figures below show connectors for the motor.)

JN6CR07PM2
JN6CR07PM4
* Top view of the motor.

23-bit Absolute

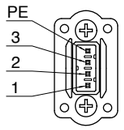
PIN No.	Application
1	FG(SHIELD)
2	BAT–*
3	E0V
4	$\overline{PS}$
5	BAT+*
6	E5V
7	PS

Tightening torque of the screw (M2)
0.19 N·m to 0.21 N·m

* Be sure to use only the screw supplied with the connector, to avoid damage.

* When using the motor as an incremental system, BAT+ and BAT– can be left unconnected.

<MSMF>



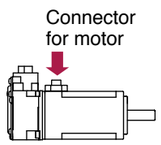
JN8AT04NJ1
* Top view of the motor.

PIN No.	Application
1	U-phase
2	V-phase
3	W-phase
PE	Ground

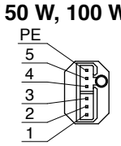
Tightening torque of the screw (M2)
0.085 N·m to 0.095 N·m (screwed to plastic)

* Be sure to use only the screw supplied with the connector, to avoid damage.

* Secure the gasket in place without removing it from the connector.

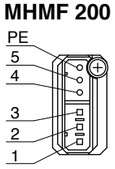


<MHMF 50 W, 100 W>



JN11AH06NN2
* Top view of the motor.

<MQMF, MHMF 200 W to 1000 W>



JN11AH06NN1
* Top view of the motor.

without Brake		with Brake	
PIN No.	Application	PIN No.	Application
1	U-phase	1	U-phase
2	V-phase	2	V-phase
3	W-phase	3	W-phase
4	NC	4	Brake
5	NC	5	Brake
PE	Ground	PE	Ground

Tightening torque of the screw (M2)
0.085 N·m to 0.095 N·m

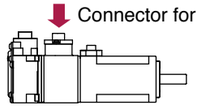
* Electromagnetic brake is a nonpolar device.

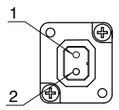
* Be sure to use only the screw supplied with the connector, to avoid damage.

* Secure the gasket in place without removing it from the connector.

<Remarks> Do not connect anything to NC.

[Motor with brake] **<MSMF>**





JN4AT02PJM-R
* Top view of the motor.

PIN No.	Application
1	Brake
2	Brake

Tightening torque of the screw (M2)
0.19 N·m to 0.21 N·m

* Electromagnetic brake is a nonpolar device.

* Be sure to use only the screw supplied with the connector, to avoid damage.

* Secure the gasket in place without removing it from the connector.

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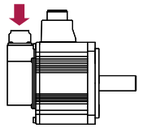
0.85 kW to 5.0 kW　100 mm sq. or more

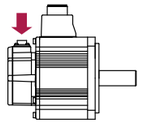
● When the motors of <MSMF, MDMF, MGMF, MHMF> are used, they are connected as shown below.
Connector: Made by Japan Aviation Electronics Industry, Ltd. (The figures below show connectors for the motor.)

• Connector for encoder

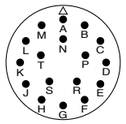
IP67 motor Connector for encoder (Large size)



IP67 motor Connector for encoder (Small size)



<Large size Encoder connector>



JL10-2A20-29P
23-bit Absolute

PIN No.	Application
A	NC
B	NC
C	NC
D	NC
E	NC
F	NC
G	E0V
H	E5V
J	FG(SHIELD)

PIN No.	Application
K	PS
L	$\overline{PS}$
M	NC
N	NC
P	NC
R	NC
S	BAT– *
T	BAT+ *

<Small size Encoder connector>

JN2AS10ML3-R
23-bit Absolute

PIN No.	Application
1	E0V
2	NC
3	PS
4	E5V
5	BAT– *
6	BAT+ *
7	$\overline{PS}$
8	NC
9	FG(SHIELD)
10	NC

<Remarks>
Do not connect anything to NC.

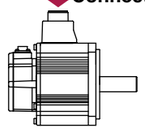
* When using the motor as an incremental system, BAT+ and BAT– can be left unconnected.

• Connector for motor/brake

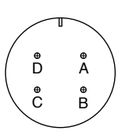
Table for motor connector and brake connector

Motor part No.	Motor output	200 V	
		without Brake	with Brake
MSMF	1.0 kW to 2.0 kW	A	C
	3.0 kW to 5.0 kW	B	D
MDMF	1.0 kW to 2.0 kW	A	C
	3.0 kW to 5.0 kW	B	D
	7.5 kW to 15.0 kW	E	E, F
	22.0 kW	G	G, F
MGMF	0.85 kW to 1.8 kW	A	C
	2.4 kW to 4.4 kW	B	D
	5.5 kW	E	E, F
MHMF	1.0 kW to 1.5 kW	A	C
	2.0 kW to 5.0 kW	B	D
	7.5 kW	E	E, F

Connector for motor/brake



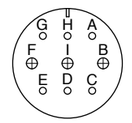
* Electromagnetic brake is a nonpolar device.



A
JL10-2E20-4PE-B

B
JL10-2E22-22PE-B

PIN No.	Application
A	U-phase
B	V-phase
C	W-phase
D	Ground



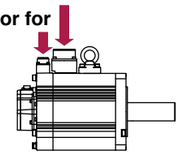
C
JL10-2E20-18PE-B

PIN No.	Application
G	with Brake: Brake
	without Brake: NC
H	with Brake: Brake
	without Brake: NC
A	NC
F	U-phase
I	V-phase
B	W-phase
E	Ground
D	Ground
C	NC

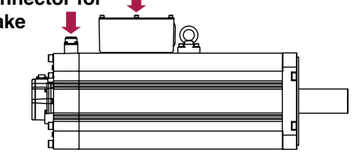
D
JL10-2E24-11PE-B

PIN No.	Application
A	with Brake: Brake
	without Brake: NC
B	with Brake: Brake
	without Brake: NC
C	NC
D	U-phase
E	V-phase
F	W-phase
G	Ground
H	Ground
I	NC

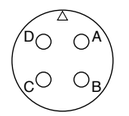
Connector for motor
Connector for brake



Connector for brake
Terminal box for motor



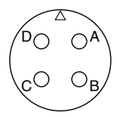
<Motor>



E
JL04V-2E32-17PE-B-R

PIN No.	Application
A	U-phase
B	V-phase
C	W-phase
D	Ground

<Brake>



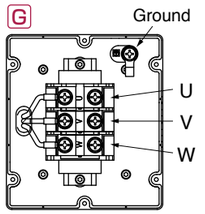
F
N/MS3102A 14S-2P

PIN No.	Application
A	Brake
B	Brake
C	NC
D	NC

* Electromagnetic brake is a nonpolar device.

<Terminal block>

G



Terminal	Application
U	U-phase
V	V-phase
W	W-phase
Ground	Ground

•U, V, W, Earth screw
Nominal: M8
Tightening torque: 12.0 N·m

<Remarks> Do not connect anything to NC.

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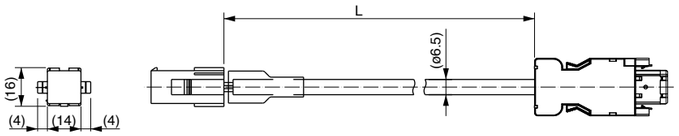
Encoder Cable * It doesn't correspond to IP65 and IP67.

Part No.	MFECA0 ＊＊ 0EAD	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W, MQMF 100 W to 400 W MHMF 50 W to 1000 W (Leadwire type)
Specifications	23-bit absolute encoder When used in incremental system (without battery box)		

[Unit: mm]



Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)
Shell kit	3E306-3200-008	
Connector (Motor side)	172161-1	Tyco Electronics Japan G.K.
Connector pin	170365-1	
Cable	0.20 mm²×3P (6-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030EAD
5	MFECA0050EAD
10	MFECA0100EAD
20	MFECA0200EAD

Part No.	MFECA0 ＊＊ 0EAE	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W, MQMF 100 W to 400 W MHMF 50 W to 1000 W (Leadwire type)
Specifications	23-bit absolute encoder When used in absolute system (with battery box) *		

* Battery is not included. Please buy the absolute encoder battery “DV0P2990” separately.

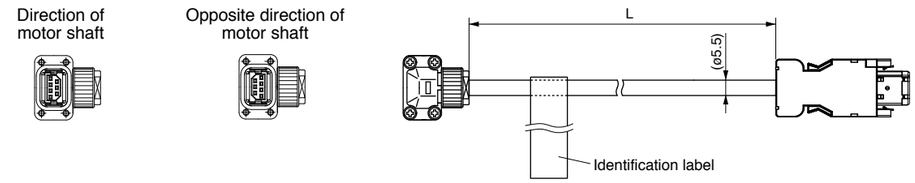
[Unit: mm]

Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)
Shell kit	3E306-3200-008	
Connector (Motor side)	172161-1	Tyco Electronics Japan G.K.
Connector pin	170365-1	
Cable	0.20 mm²×4P (8-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030EAE
5	MFECA0050EAE
10	MFECA0100EAE
20	MFECA0200EAE

Part No.	MFECA0 ＊＊ 0MJD (Highly bendable type, Direction of motor shaft) MFECA0 ＊＊ 0MKD (Highly bendable type, Opposite direction of motor shaft) MFECA0 ＊＊ 0TJD (Standard bendable type, Direction of motor shaft) MFECA0 ＊＊ 0TKD (Standard bendable type, Opposite direction of motor shaft)	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W MQMF 100 W to 400 W MHMF 50 W to 1000 W (Connector type)
Specifications	23-bit absolute encoder When used in incremental system (without battery box)		

[Unit: mm]



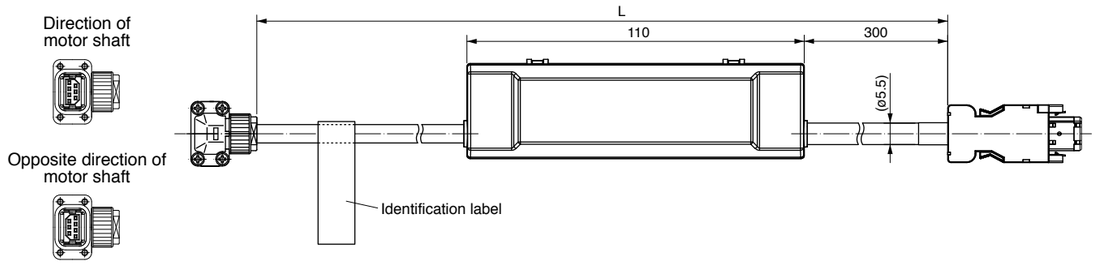
Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)
Shell kit	3E306-3200-008	
Connector (Motor side)	JN6FR07SM1	Japan Aviation Electronics Ind.
Connector pin	LY10-C1-A1-10000	
Cable	AWG24 4-wire, AWG22 2-wire (ø5.5)	Hitachi Cable, Ltd.

L (m)	Part No.(ex.)
3	MFECA0030MJD
5	MFECA0050MJD
10	MFECA0100MJD
20	MFECA0200MJD

Part No.	MFECA0 ＊＊ 0MJE (Highly bendable type, Direction of motor shaft) MFECA0 ＊＊ 0MKE (Highly bendable type, Opposite direction of motor shaft) MFECA0 ＊＊ 0TJE (Standard bendable type, Direction of motor shaft) MFECA0 ＊＊ 0TKE (Standard bendable type, Opposite direction of motor shaft)	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W MQMF 100 W to 400 W MHMF 50 W to 1000 W (Connector type)
Specifications	23-bit absolute encoder When used in absolute system (with battery box) *		

* Battery is not included. Please buy the absolute encoder battery “DV0P2990” separately.

[Unit: mm]



Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)
Shell kit	3E306-3200-008	
Connector (Motor side)	JN6FR07SM1	Japan Aviation Electronics Ind.
Connector pin	LY10-C1-A1-10000	
Cable	AWG24 4-wire、AWG22 2-wire (ϕ5.5)	Hitachi Cable, Ltd.

L (m)	Part No.(ex.)
3	MFECA0030MJE
5	MFECA0050MJE
10	MFECA0100MJE
20	MFECA0200MJE

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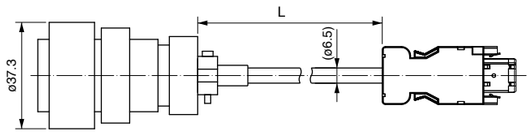
Encoder Cable * It doesn't correspond to IP65 and IP67.

Part No.	MFECA0 ＊＊ 0EPD	100 mm sq. or more Applicable motor output	0.85 kW to 22.0 kW
Specifications	23-bit absolute encoder When used in incremental system (without battery box) <Large one-touch lock type>		

[Unit: mm]

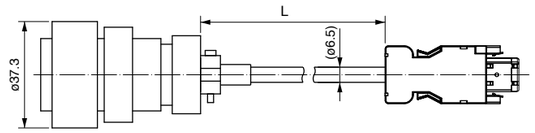


Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)
Shell kit	3E306-3200-008	
Connector (Motor side)	JL10-6A20-29S-EB	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(09)-R	
Cable	0.2 mm² ×3P (6-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030EPD
5	MFECA0050EPD
10	MFECA0100EPD
20	MFECA0200EPD

Part No.	MFECA0 ＊＊ 0ESD	100 mm sq. or more Applicable motor output	0.85 kW to 22.0 kW
Specifications	23-bit absolute encoder When used in incremental system (without battery box) <Large screwed type>		

[Unit: mm]



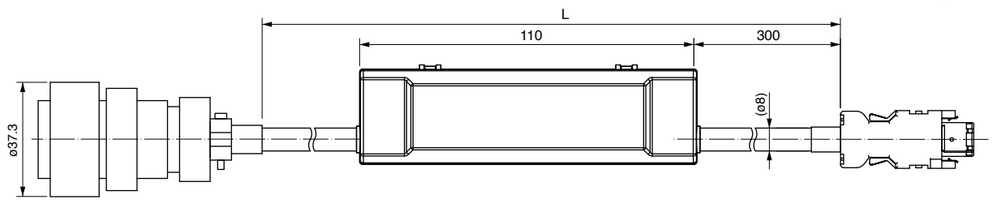
Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)
Shell kit	3E306-3200-008	
Connector (Motor side)	N/MS3106B20-29S	Japan Aviation Electronics Ind.
Cable clamp	N/MS3057-12A	
Cable	0.2 mm² ×3P (6-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030ESD
5	MFECA0050ESD
10	MFECA0100ESD
20	MFECA0200ESD

Part No.	MFECA0 ＊＊ 0EPE	100 mm sq. or more Applicable motor output	0.85 kW to 22.0 kW (IP67 motor)
Specifications	23-bit absolute encoder When used in absolute system (with battery box) * <Large one-touch lock type>		

* Battery is not included. Please buy the absolute encoder battery “DV0P2990” separately.

[Unit: mm]



Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)
Shell kit	3E306-3200-008	
Connector (Motor side)	JL10-6A20-29S-EB	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(09)-R	
Cable	0.2 mm² ×3P (6-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030EPE
5	MFECA0050EPE
10	MFECA0100EPE
20	MFECA0200EPE

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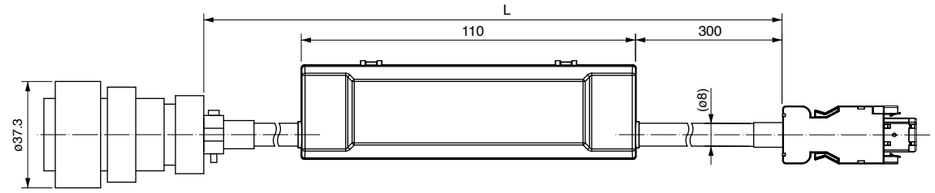
Part No.	MFECA0 ＊＊ 0ESE	100 mm sq. or more Applicable motor output	0.85 kW to 22.0 kW (IP67 motor)
Specifications	23-bit absolute encoder When used in absolute system (with battery box) * <Large screwed type>		

* Battery is not included. Please buy the absolute encoder battery “DV0P2990” separately.

[Unit: mm]

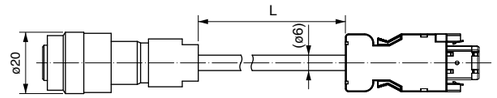


Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)
Shell kit	3E306-3200-008	
Connector (Motor side)	N/MS3106B20-29S	Japan Aviation Electronics Ind.
Cable clamp	N/MS3057-12A	
Cable	0.2 mm² ×4P (8-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030ESE
5	MFECA0050ESE
10	MFECA0100ESE
20	MFECA0200ESE

Part No.	MFECA0 ＊＊ 0ETD	100 mm sq. or more Applicable motor output	0.85 kW to 22.0 kW (IP67 motor)
Specifications	23-bit absolute encoder When used in incremental system (without battery box) <Small one-touch lock type>		

[Unit: mm]



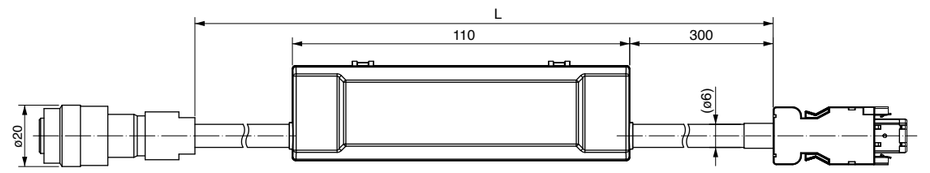
Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)
Shell kit	3E306-3200-008	
Connector (Motor side)	JN2DS10SL1-R	Japan Aviation Electronics Ind.
Connector pin	JN1-22-22S-PKG100	
Cable	0.2 mm² ×3P (6-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030ETD
5	MFECA0050ETD
10	MFECA0100ETD
20	MFECA0200ETD

Part No.	MFECA0 ＊＊ 0ETE	100 mm sq. or more Applicable motor output	0.85 kW to 22.0 kW (IP67 motor)
Specifications	23-bit absolute encoder When used in absolute system (with battery box) * <Small one-touch lock type>		

* Battery is not included. Please buy the absolute encoder battery “DV0P2990” separately.

[Unit: mm]



Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)
Shell kit	3E306-3200-008	
Connector (Motor side)	JN2DS10SL1-R	Japan Aviation Electronics Ind.
Connector pin	JN1-22-22S-PKG100	
Cable	0.2 mm² ×3P (6-wire)	Oki Electric Cable Co., Ltd.

L (m)	Part No.(ex.)
3	MFECA0030ETE
5	MFECA0050ETE
10	MFECA0100ETE
20	MFECA0200ETE

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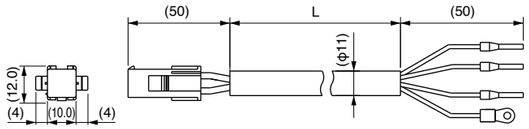
Motor Cable (without Brake) * It doesn't correspond to IP65 and IP67.

Part No.	MFMCA0 ＊＊ 0EED	80 ㎜ sq. or less Applicable model	MSMF 50 W to 1000 W, MQMF 100 W to 400 W MHMF 50 W to 1000 W (Leadwire type)

[Unit: mm]

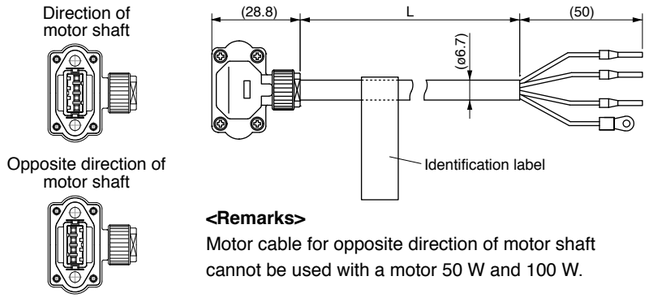


Title	Part No.	Manufacturer
Connector	172159-1	Tyco Electronics Japan G.K.
Cable clamp	170366-1	
Rod terminal	AI0.75-8GY	PHOENIX CONTACT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 0.75 mm² 4-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCA0030EED
5	MFMCA0050EED
10	MFMCA0100EED
20	MFMCA0200EED

Part No.		80 ㎜ sq. or less Applicable model	
	MFMCA0 ＊＊ 0NJD (Highly bendable type, Direction of motor shaft)		MSMF 50 W to 1000 W (Connector type)
	MFMCA0 ＊＊ 0RJD (Standard bendable type, Direction of motor shaft)		
	MFMCA0 ＊＊ 0NKD (Highly bendable type, Opposite direction of motor shaft)		MSMF 200 W to 1000 W (Connector type)
	MFMCA0 ＊＊ 0RKD (Standard bendable type, Opposite direction of motor shaft)		

[Unit: mm]



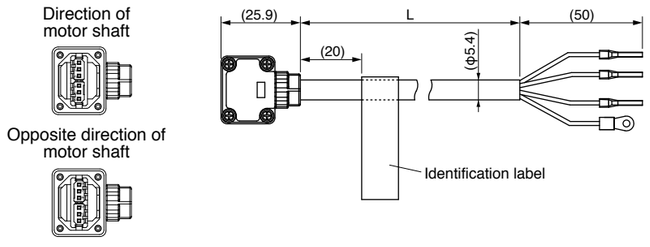
<Remarks>
Motor cable for opposite direction of motor shaft cannot be used with a motor 50 W and 100 W.

Title	Part No.	Manufacturer
Connector	JN8FT04SJ1	Japan Aviation Electronics Ind.
Cable clamp	ST-TMH-S-C1B-3500	
Rod terminal	AI0.75-8GY	PHOENIX CONTACT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	AWG18 4-wire (φ6.7 mm)	Hitachi Cable, Ltd.

L (m)	Part No.(ex.)
3	MFMCA0030NJD
5	MFMCA0050NJD
10	MFMCA0100NJD
20	MFMCA0200NJD

Part No.			80 ㎜ sq. or less Applicable model	
	MFMCA0 ＊＊ 7UFD	(Movable/fixed common-use, direction of motor shaft)		MHMF 50 W, 100 W (Connector type)
	MFMCA0 ＊＊ 7UGD	(Movable/fixed common-use, opposite directionof motor shaft)		

[Unit: mm]



Title	Part No.	Manufacturer
Connector	JN11FH06SN2	Japan Aviation Electronics Ind.
Cable clamp	JN11S10K4A1	
Rod terminal	AI0.34-8TQ	PHOENIX CONTACT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	AWG22 6-wire (φ5.4 mm)	NIKKO ELECTRIC WIRE CO.,LTD

L (m)	Part No.(ex.)
3	MFMCA0037UFD
5	MFMCA0057UFD
10	MFMCA0107UFD
20	MFMCA0207UFD

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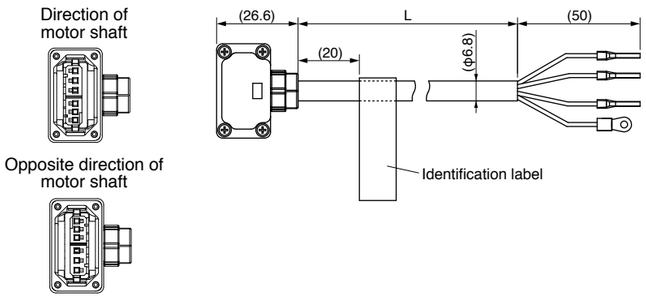
Part No.			80 ㎜ sq. or less Applicable model	
	MFMCA0 ＊＊ 0UFD	(Highly bendable type, Direction of motor shaft)		MQMF 100 W to 400 W MHMF 200 W to 1000 W (Connector type)
	MFMCA0 ＊＊ 0UGD	(Highly bendable type, Opposite direction of motor shaft)		
	MFMCA0 ＊＊ 0WFD	(Standard bendable type, Direction of motor shaft)		
	MFMCA0 ＊＊ 0WGD	(Standard bendable type, Opposite direction of motor shaft)		

[Unit: mm]

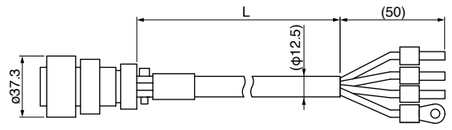


Title	Part No.	Manufacturer
Connector	JN11FH06SN1	Japan Aviation Electronics Ind.
Cable clamp	JN11S35H3A1	
Rod terminal	AI0.75-8GY	PHOENIX CONTACT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	AWG18 6-wire（φ6.8）	NIKKO ELECTRIC WIRE CO.,LTD

L (m)	Part No.(ex.)
3	MFMCA0030UFD
5	MFMCA0050UFD
10	MFMCA0100UFD
20	MFMCA0200UFD

Part No.	MFMCDO ＊＊ 2EUD	100 ㎜ sq. or more Applicable model	MSMF 1.0 kW to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW, 1.5 kW, MGMF 0.85 kW to 1.8 kW <One-touch lock type>

[Unit: mm]

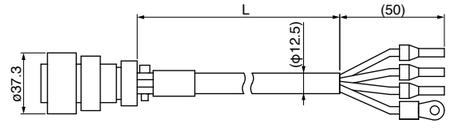


Title	Part No.	Manufacturer
Connector	JL10-6A20-4SE-EB	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Rod terminal	NTUB-2	J.S.T Mfg. Co., Ltd.
Nylon insulated round terminal	N2-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 2.0mm² 4-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCD0032EUD
5	MFMCD0052EUD
10	MFMCD0102EUD
20	MFMCD0202EUD

Part No.	MFMCDO ＊＊ 2ECD	100 ㎜ sq. or more Applicable model	MSMF 1.0 kW to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW, 1.5 kW, MGMF 0.85 kW to 1.8 kW <Screwed type>

[Unit: mm]



Title	Part No.	Manufacturer
Connector	JL04V-6A20-4SE-EB-RK	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Rod terminal	NTUB-2	J.S.T Mfg. Co., Ltd.
Nylon insulated round terminal	N2-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 2.0mm² 4-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCD0032ECD
5	MFMCD0052ECD
10	MFMCD0102ECD
20	MFMCD0202ECD

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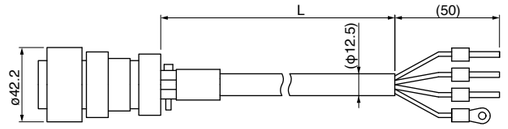
Motor Cable (without Brake) * It doesn't correspond to IP65 and IP67.

Part No.	MFMCEO ＊＊ 2EUD	100 mm sq. or more Applicable model	MHMF 2.0 kW <One-touch lock type>

[Unit: mm]

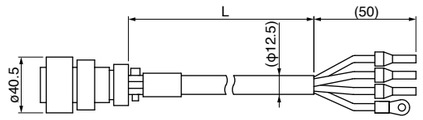


Title	Part No.	Manufacturer
Connector	JL10-6A22-22SE-EB	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Rod terminal	NTUB-2	J.S.T Mfg. Co., Ltd.
Nylon insulated round terminal	N2-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP DP6/2501 2.0 mm² 4-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCE0032EUD
5	MFMCE0052EUD
10	MFMCE0102EUD
20	MFMCE0202EUD

Part No.	MFMCEO ＊＊ 2ECD	100 mm sq. or more Applicable model	MHMF 2.0 kW <Screwed type>

[Unit: mm]

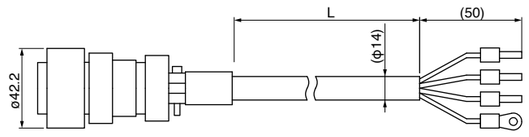


Title	Part No.	Manufacturer
Connector	JL04V-6A22-22SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Rod terminal	NTUB-2	J.S.T Mfg. Co., Ltd.
Nylon insulated round terminal	N2-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 2.0 mm² 4-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCE0032ECD
5	MFMCE0052ECD
10	MFMCE0102ECD
20	MFMCE0202ECD

Part No.	MFMCE0 ＊＊ 3EUT	100 mm sq. or more Applicable model	MGMF 2.4 kW <One-touch lock type>

[Unit: mm]

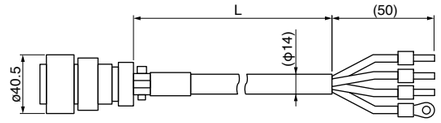


Title	Part No.	Manufacturer
Connector	JL10-6A22-22SE-EB	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Rod terminal	TMENTC3.5-11S	NICHIFU Co., Ltd.
Nylon insulated round terminal	N5.5-5	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP DP6/2501 3.5 mm² 4-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCE0033EUT
5	MFMCE0053EUT
10	MFMCE0103EUT
20	MFMCE0203EUT

Part No.	MFMCE0 ＊＊ 3ECT	100 mm sq. or more Applicable model	MGMF 2.4 kW <Screwed type>

[Unit: mm]

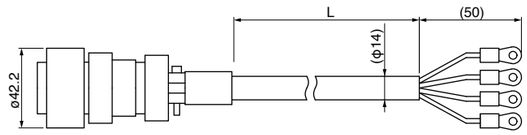


Title	Part No.	Manufacturer
Connector	JL04V-6A22-22SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Rod terminal	TMENTC3.5-11S	NICHIFU Co., Ltd.
Nylon insulated round terminal	N5.5-5	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 3.5 mm² 4-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCE0033ECT
5	MFMCE0053ECT
10	MFMCE0103ECT
20	MFMCE0203ECT

Part No.	MFMCAO ＊＊ 3EUT	100 mm sq. or more Applicable model	MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 3.0 kW to 5.0 kW, MGMF 2.9 kW to 4.4 kW <One-touch lock type>

[Unit: mm]

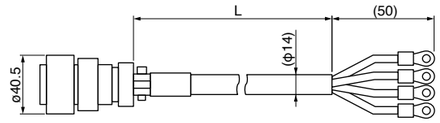


Title	Part No.	Manufacturer
Connector	JL10-6A22-22SE-EB	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Nylon insulated round terminal	N5.5-5	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP DP6/2501 3.5 mm² 4-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCA0033EUT
5	MFMCA0053EUT
10	MFMCA0103EUT
20	MFMCA0203EUT

Part No.	MFMCAO ＊＊ 3ECT	100 mm sq. or more Applicable model	MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 3.0 kW to 5.0 kW, MGMF 2.9 kW to 4.4 kW <Screwed type>

[Unit: mm]



Title	Part No.	Manufacturer
Connector	JL04V-6A22-22SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Nylon insulated round terminal	N5.5-5	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 3.5 mm² 4-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCA0033ECT
5	MFMCA0053ECT
10	MFMCA0103ECT
20	MFMCA0203ECT

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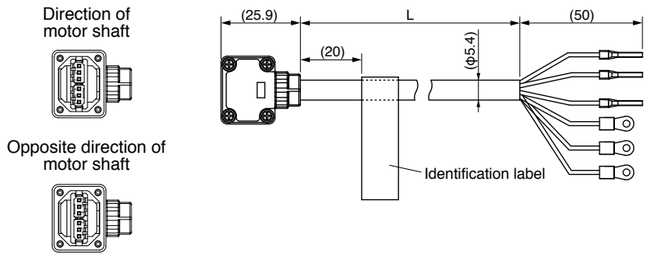
Motor Cable (with Brake) * It doesn't correspond to IP65 and IP67.

Part No.			80 mm sq. or less Applicable model	
	MFMCA0 ＊＊ 7VFD	(Movable/fixed common-use, direction of motor shaft)		MHMF 50 W, 100 W (Connector type)
	MFMCA0 ＊＊ 7VGD	(Movable/fixed common-use, opposite directionof motor shaft)		

[Unit: mm]

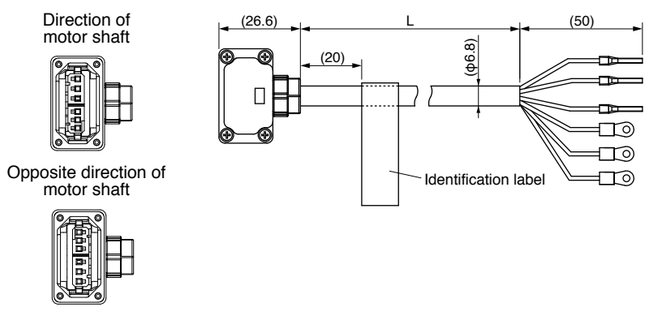


Title	Part No.	Manufacturer
Connector	JN11FH06SN2	Japan Aviation Electronics Ind.
Cable clamp	JN11S10K4A1	
Rod terminal	AI0.34-8TQ	PHOENIX CONTACT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	AWG22 6-wire（ϕ5.4 mm）	NIKKO ELECTRIC WIRE CO.,LTD

L (m)	Part No.(ex.)
3	MFMCA0037VFD
5	MFMCA0057VFD
10	MFMCA0107VFD
20	MFMCA0207VFD

Part No.			80 mm sq. or less Applicable model	
	MFMCA0 ＊＊ 0VFD	(Highly bendable type, Direction of motor shaft)		MQMF 100 W to 400 W MHMF 200 W to 1000 W (Connector type)
	MFMCA0 ＊＊ 0VGD	(Highly bendable type, Opposite direction of motor shaft)		
	MFMCA0 ＊＊ 0XFD	(Standard bendable type, Direction of motor shaft)		
	MFMCA0 ＊＊ 0XGD	(Standard bendable type, Opposite direction of motor shaft)		

[Unit: mm]

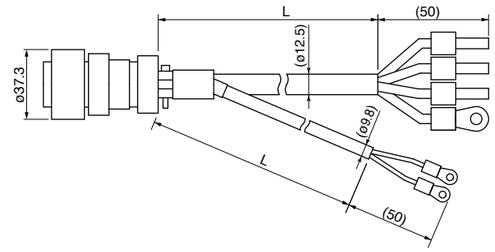


Title	Part No.	Manufacturer
Connector	JN11FH06SN1	Japan Aviation Electronics Ind.
Cable clamp	JN11S35H3A1	
Rod terminal	AI0.75-8GY	PHOENIX CONTACT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	AWG18 6-wire（ϕ6.8 mm）	NIKKO ELECTRIC WIRE CO.,LTD

L (m)	Part No.(ex.)
3	MFMCA0030VFD
5	MFMCA0050VFD
10	MFMCA0100VFD
20	MFMCA0200VFD

Part No.		100 mm sq. or more Applicable model	
	MFMCA0 ＊＊ 2FUD		MSMF 1.0 kW to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW to 1.5 kW, MGMF 0.85 kW to 1.8 kW <One-touch lock type>

[Unit: mm]

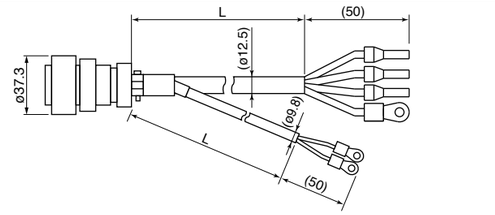


Title		Part No.	Manufacturer
Connector		JL10-6A20-18SE-EB	Japan Aviation Electronics Ind.
Cable clamp		JL042022CK(14)-R	
Rod terminal		NTUB-2	J.S.T Mfg. Co., Ltd.
Nylon insulated round terminal	Earth	N2-M4	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP 600V 2.0 mm² 4-wire ROBO-TOP 600V 0.75 mm² 2-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCA0032FUD
5	MFMCA0052FUD
10	MFMCA0102FUD
20	MFMCA0202FUD

Part No.		100 mm sq. or more Applicable model	
	MFMCA0 ＊＊ 2FCD		MSMF 1.0 kW to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW to 1.5 kW, MGMF 0.85 kW to 1.8 kW <Screwed type>

[Unit: mm]

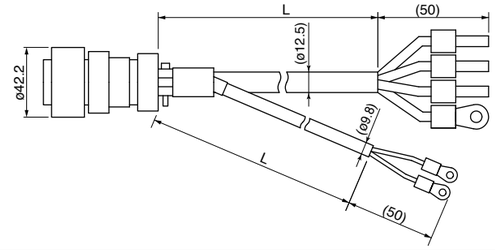


Title		Part No.	Manufacturer
Connector		JL04V-6A20-18SE-EB-RK	Japan Aviation Electronics Ind.
Cable clamp		JL04-2022CK(14)-R	
Rod terminal		NTUB-2	J.S.T Mfg. Co., Ltd.
Nylon insulated round terminal	Earth	N2-M4	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP 600V 2.0 mm² 4-wire ROBO-TOP 600V 0.75 mm² 2-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCA0032FCD
5	MFMCA0052FCD
10	MFMCA0102FCD
20	MFMCA0202FCD

Part No.		100 mm sq. or more Applicable model	
	MFMCE0 ＊＊ 2FUD		MHMF 2.0 kW <One-touch lock type>

[Unit: mm]



Title		Part No.	Manufacturer
Connector		JL10-6A24-11SE-EB	Japan Aviation Electronics Ind.
Cable clamp		JL04-2428CK(17)-R	
Rod terminal		NTUB-2	J.S.T Mfg. Co., Ltd.
Nylon insulated round terminal	Earth	N2-M4	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP DP6/2501 2.0 mm² 4-wire ROBO-TOP DP6/2501 0.75 mm² 2-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCE0032FUD
5	MFMCE0052FUD
10	MFMCE0102FUD
20	MFMCE0202FUD

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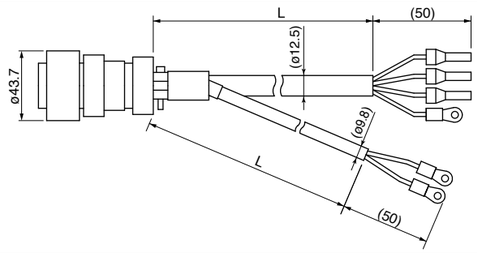
Motor Cable (with Brake) * It doesn't correspond to IP65 and IP67.

Part No.	MFMCE0 ∗ ∗ 2FCD	100 mm sq. or more Applicable model	MHMF 2.0 kW <Screwed type>

[Unit: mm]

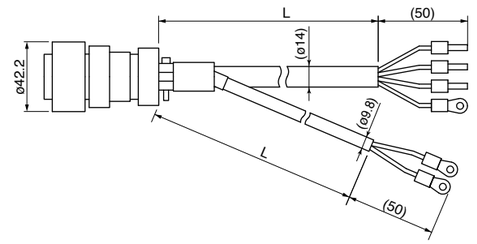


Title		Part No.	Manufacturer
Connector		JL04V-6A24-11SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp		JL04-2428CK(17)-R	
Rod terminal		NTUB-2	J.S.T Mfg. Co., Ltd.
Nylon insulated round terminal	Earth	N2-M4	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP 600V 2.0 mm² 4-wire ROBO-TOP 600V 0.75 mm² 2-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCE0032FCD
5	MFMCE0052FCD
10	MFMCE0102FCD
20	MFMCE0202FCD

Part No.	MFMCD0 ∗ ∗ 3FUT	100 mm sq. or more Applicable model	MGMF 2.4 kW <One-touch lock type>

[Unit: mm]

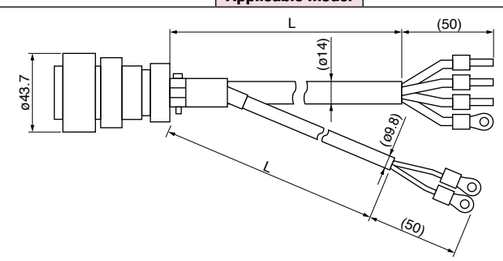


Title		Part No.	Manufacturer
Connector		JL10-6A24-11SE-EB	Japan Aviation Electronics Ind.
Cable clamp		JL04-2428CK(17)-R	
Rod terminal		TMENTC3.5-11S	NICHIFU Co., Ltd.
Nylon insulated round terminal	Earth	N5.5-5	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP DP6/2501 3.5 mm² 4-wire ROBO-TOP DP6/2501 0.75 mm² 2-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCD0033FUT
5	MFMCD0053FUT
10	MFMCD0103FUT
20	MFMCD0203FUT

Part No.	MFMCD0 ∗ ∗ 3FCT	100 mm sq. or more Applicable model	MGMF 2.4 kW <Screwed type>

[Unit: mm]

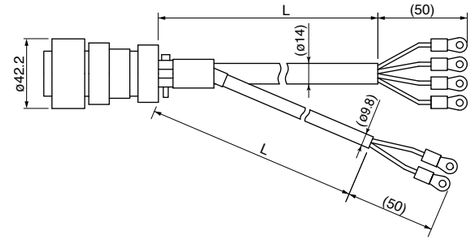


Title		Part No.	Manufacturer
Connector		JL04V-6A24-11SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp		JL04-2428CK(17)-R	
Rod terminal		TMENTC3.5-11S	NICHIFU Co., Ltd.
Nylon insulated round terminal	Earth	N5.5-5	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP 600V 3.5 mm² 4-wire ROBO-TOP 600V 0.75 mm² 2-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCD0033FCT
5	MFMCD0053FCT
10	MFMCD0103FCT
20	MFMCD0203FCT

Part No.	MFMCA0 ∗ ∗ 3FUT	100 mm sq. or more Applicable model	MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 3.0 kW to 5.0 kW, MGMF 2.9 kW, 4.4 kW <One-touch lock type>

[Unit: mm]

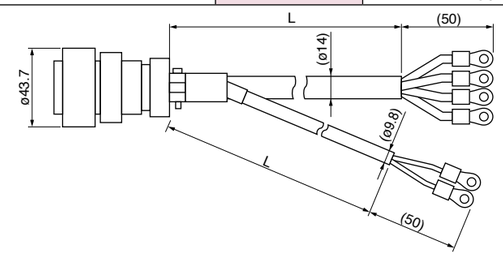


Title		Part No.	Manufacturer
Connector		JL10-6A24-11SE-EB	Japan Aviation Electronics Ind.
Cable clamp		JL04-2428CK(17)-R	
Nylon insulated round terminal	Earth	N5.5-5	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP DP6/2501 3.5 mm² 4-wire ROBO-TOP DP6/2501 0.75 mm² 2-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCA0033FUT
5	MFMCA0053FUT
10	MFMCA0103FUT
20	MFMCA0203FUT

Part No.	MFMCA0 ∗ ∗ 3FCT	100 mm sq. or more Applicable model	MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 3.0 kW to 5.0 kW, MGMF 2.9 kW, 4.4 kW <Screwed type>

[Unit: mm]



Title		Part No.	Manufacturer
Connector		JL04V-6A24-11SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp		JL04-2428CK(17)-R	
Nylon insulated round terminal	Earth	N5.5-5	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP 600V 3.5 mm² 4-wire ROBO-TOP 600V 0.75 mm² 2-wire	DYDEN CORPORATION

L (m)	Part No.(ex.)
3	MFMCA0033FCT
5	MFMCA0053FCT
10	MFMCA0103FCT
20	MFMCA0203FCT

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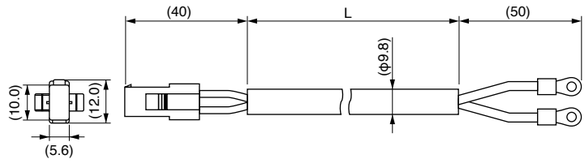
Brake Cable * It doesn't correspond to IP65 and IP67.

Part No.	MFMCB0 ∗ ∗ 0GET	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W, MQMF 100 W to 400 W MHMF 50 W to 1000 W (Leadwire type)

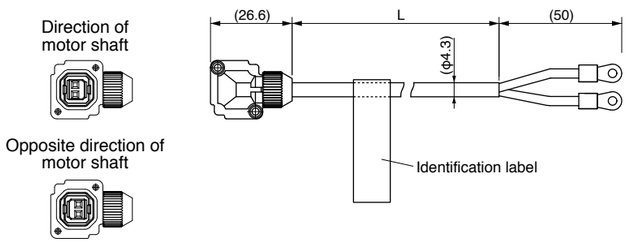
[Unit: mm]



Title	Part No.	Manufacturer	L (m)	Part No.(ex.)
Connector	172157-1	Tyco Electronics Japan G.K.	3	MFMCB0030GET
Connector pin	170366-1, 170362-1		5	MFMCB0050GET
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.	10	MFMCB0100GET
Cable	ROBO-TOP 600V 0.75 mm² 2-wire	DYDEN CORPORATION	20	MFMCB0200GET

Part No.		80 mm sq. or less Applicable model	
	MFMCB0 ∗ ∗ 0PJT (Highly bendable type, Direction of motor shaft)		MSMF 50 W to 1000 W (Connector type)
	MFMCB0 ∗ ∗ 0PKT (Highly bendable type, Opposite direction of motor shaft)		
	MFMCB0 ∗ ∗ 0SJT (Standard bendable type, Direction of motor shaft)		
	MFMCB0 ∗ ∗ 0SKT (Standard bendable type, Opposite direction of motor shaft)		

[Unit: mm]



Title	Part No.	Manufacturer	L (m)	Part No.(ex.)
Connector	JN4FT02SJMR	Japan Aviation Electronics Ind.	3	MFMCB0030PJT
Connector pin	ST-TMH-S-C1B-3500		5	MFMCB0050PJT
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.	10	MFMCB0100PJT
Cable	AWG22 2-wire (φ4.3)	Hitachi Cable, Ltd.	20	MFMCB0200PJT

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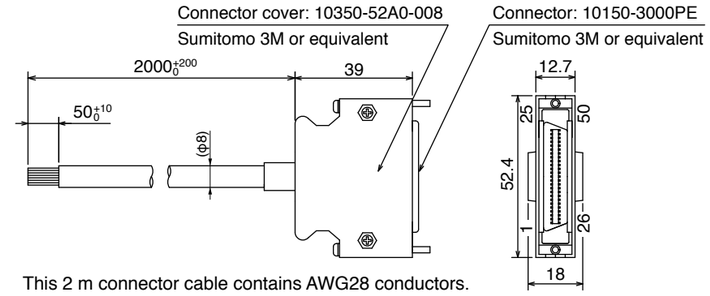
Cable for Interface

Part No.	DV0P4360



This 2 m connector cable contains AWG28 conductors.

[Unit: mm]

• Table for wiring

Pin No.	color	Pin No.	color	Pin No.	color	Pin No.	color	Pin No.	color
1	Orange (Red1)	11	Orange (Black2)	21	Orange (Red3)	31	Orange (Red4)	41	Orange (Red5)
2	Orange (Black1)	12	Yellow (Black1)	22	Orange (Black3)	32	Orange (Black4)	42	Orange (Black5)
3	Gray (Red1)	13	Gray (Red2)	23	Gray (Red3)	33	Gray (Red4)	43	Gray (Red5)
4	Gray (Black1)	14	Gray (Black2)	24	Gray (Black3)	34	White (Red4)	44	White (Red5)
5	White (Red1)	15	White (Red2)	25	White (Red3)	35	White (Black4)	45	White (Black5)
6	White (Black1)	16	Yellow (Red2)	26	White (Black3)	36	Yellow (Red4)	46	Yellow (Red5)
7	Yellow (Red1)	17	Yel (Blk2)/Pink (Blk2)	27	Yellow (Red3)	37	Yellow (Black4)	47	Yellow (Black5)
8	Pink (Red1)	18	Pink (Red2)	28	Yellow (Black3)	38	Pink (Red4)	48	Pink (Red5)
9	Pink (Black1)	19	White (Black2)	29	Pink (Red3)	39	Pink (Black4)	49	Pink (Black5)
10	Orange (Red2)	20	–	30	Pink (Black3)	40	Gray (Black4)	50	Gray (Black5)

<Remarks>
Color designation of the cable
e.g.) Pin-1
Cable color : Orange
(Red1) : One red dot on the cable

<Caution>
Cable pin No. 50 is not connected to the connector shell (housing) or shielded wire (net wire).
Pin No. 50 of the Driver is connected to the shell (housing) of the connector.
The shielded wire (net wire) of the cable is connected to the shell (housing) of the connector of the cable, and by connecting the connector of the optional cable to the Driver, pin No. 50 of the cable and the shielded wire (net wire) of the cable gets connected via the Driver.

Interface Conversion Cable

Part No.	DV0P4120, 4121, 4130, 4131, 4132

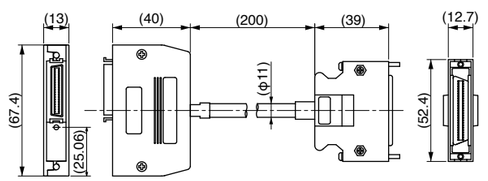
Interface cables for old product (XX series or V series) can be connected to the current product by using the connector conversion cable shown below.

DV0P4120	MINAS XX → A6 series (A5Ⅱ, A5, A4, A series) for position control/ velocity control
DV0P4121	MINAS XX → A6 series (A5Ⅱ, A5, A4, A series) for torque control
DV0P4130	MINAS V → A6 series (A5Ⅱ, A5, A4, A series) for position control
DV0P4131	MINAS V → A6 series (A5Ⅱ, A5, A4, A series) for velocity control
DV0P4132	MINAS V → A6 series (A5Ⅱ, A5, A4, A series) for torque control

* For details of wiring, contact our sales department.

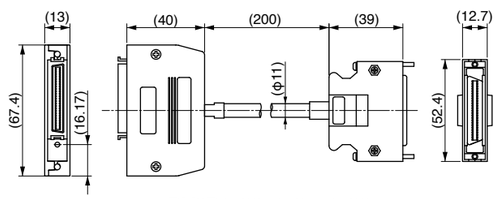
Converts 36-pin configuration to 50-pin.

[Unit: mm]



<DV0P4120, 4121>

[Unit: mm]



<DV0P4130, 4131, 4132>

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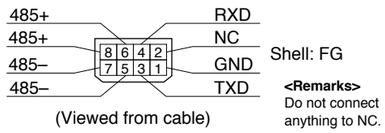
Connector Kit for Communication Cable (for RS485, RS232) (Excluding A6SE, A6NE, A6BE Series)

Part No.	DV0PM20102

• **Components**

Title	Part No.	Manufacturer	Note
Connector	CIF-PCNS08KK-072R	J.S.T Mfg. Co., Ltd.	For Connector X2 (8-pins)

• Pin disposition of connector, connector X2

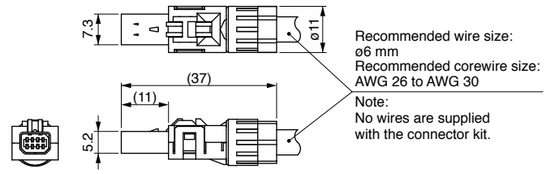


(Viewed from cable)

Shell: FG

<Remarks>
Do not connect anything to NC.

• Dimensions [Unit: mm]



Recommended wire size:
ø6 mm
Recommended corewire size:
AWG 26 to AWG 30

Note:
No wires are supplied with the connector kit.

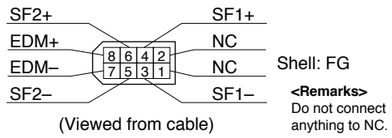
Connector Kit for Safety (Excluding A6SE, A6SG, A6NE, A6BE Series)

Part No.	DV0PM20103

• **Components**

Title	Part No.	Manufacturer	Note
Connector	CIF-PCNS08KK-071R	J.S.T Mfg. Co., Ltd.	For Connector X3 (8-pins)

• Pin disposition of connector, connector X3

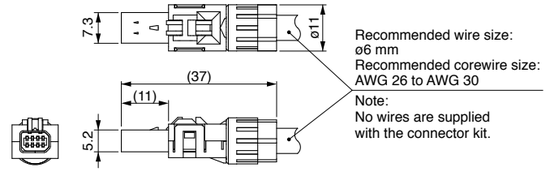


(Viewed from cable)

Shell: FG

<Remarks>
Do not connect anything to NC.

• Dimensions [Unit: mm]



Recommended wire size:
ø6 mm
Recommended corewire size:
AWG 26 to AWG 30

Note:
No wires are supplied with the connector kit.

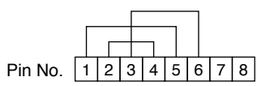
Safety bypass plug (Excluding A6SE, A6SG, A6NE, A6BE Series)

Part No.	DV0PM20094

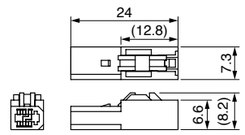
• **Components**

Title	Part No.	Manufacturer	Note
Connector	CIF-PB08AK-GF1R	J.S.T Mfg. Co., Ltd.	For Connector X3

• Internal wiring
(Wiring of the following has been applied inside the plug.)



• Dimensions (Resin color : black) [Unit: mm]



<Remarks>
• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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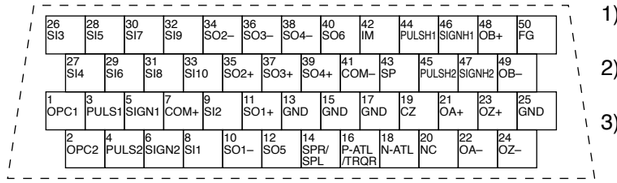
Connector Kit for Interface

Part No.	DV0P4350

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector	10150-3000PE	1	Sumitomo 3M (or equivalent)	For Connector X4 (50-pins)
Connector cover	10350-52A0-008	1		

• Pin disposition (50 pins) (viewed from the soldering side)



1) Check the stamped pin-No. on the connector body while making a wiring.
2) For the function of each signal title or its symbol, refer to the operating manual.
3) Do not connect anything to NC pins in the above table.

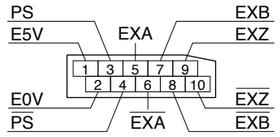
Connector Kit for External Scale (Excluding A6SE, A6SG, A6NE, A6BE Series)

Part No.	DV0PM20026

• **Components**

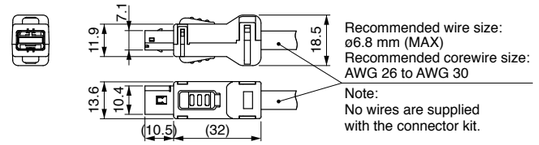
Title	Part No.	Manufacturer	Note
Connector	MUF-PK10K-X	J.S.T Mfg. Co., Ltd.	For Connector X5 (10-pins)

• Pin disposition of connector, connector X5



(Viewed from cable)

• Dimensions [Unit: mm]



Recommended wire size:
ø6.8 mm (MAX)
Recommended corewire size:
AWG 26 to AWG 30

Note:
No wires are supplied with the connector kit.

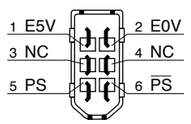
Connector Kit for Encoder

Part No.	DV0PM20010

• **Components**

Title	Part No.	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	Sumitomo 3M (or equivalent)	For Connector X6
Shell kit	3E306-3200-008		

• Pin disposition of connector, connector X6



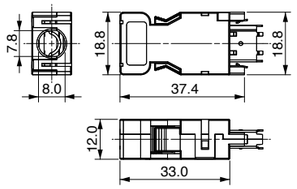
(Viewed from cable)

Shell: FG

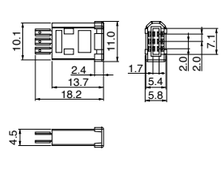
<Remarks>
Do not connect anything to NC.

• Dimensions [Unit: mm]

<Shell kit>

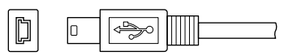


<Connector>



<Remarks>
Connector X1: use with commercially available cable.

• Configuration of connector X1: USB mini-B



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Connector Kit for Power Supply Input

Part No. **DV0PM20032** (For A-frame to D-frame: Single row type)

● Please refer to the Dimensions of driver P.57 for connector XA.

• **Components**

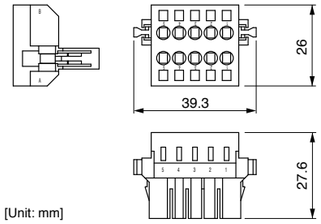
Title	Part No.	Number	Manufacturer	Note
Connector	05JFAT-SAXGF	1	J.S.T Mfg. Co., Ltd.	For Connector XA
Handle lever	J-FAT-OT	2		

Part No. **DV0PM20033** (For A-frame to D-frame: Double row type)

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector	05JFAT-SAXGSA-C	1	J.S.T Mfg. Co., Ltd.	For Connector XA
Handle lever	J-FAT-OT	2		

• Dimensions



[Unit: mm]

* When connection multiple axes in series, make sure the sum of the current value does not exceed the rated current (11.25 A) of DV0PM20033.

Remarks

When using drivers MDDL＊55＊＊ in single-phase power supply, do not use DV0PM20033.

Driver part No.	Power supply	Rated input current
MADL＊01＊＊	Single phase 100 V	1.7 A
MADL＊11＊＊	Single phase 100 V	2.0 A
MADL＊05＊＊	Single phase/3-phase 200 V	1.6 A/0.9 A
MADL＊15＊＊	Single phase/3-phase 200 V	2.0 A/1.1 A
MBDL＊21＊＊	Single phase 100 V	4.5 A
MBDL＊25＊＊	Single phase/3-phase 200 V	3.7 A/2.1 A
MCDL＊31＊＊	Single phase 100 V	7.0 A
MCDL＊35＊＊	Single phase/3-phase 200 V	6.4 A/3.4 A
MDDL＊45＊＊	Single phase/3-phase 200 V	7.9 A/4.6 A
MDDL＊55＊＊	Single phase/3-phase 200 V	13.6 A/7.2 A

Part No. **DV0PM20044** (For E-frame)

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector	05JFAT-SAXGSA-L	1	J.S.T Mfg. Co., Ltd.	For Connector XA
Handle lever	J-FAT-OT-L	2		

Connector Kit for Regenerative Resistor Connection

Part No. **DV0PM20045** (For E-frame)

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector	04JFAT-SAXGSA-L	1	J.S.T Mfg. Co., Ltd.	200 V: For Connector XC * Jumper wire is included.
Handle lever	J-FAT-OT-L	2		

<Remarks>
• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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Connector Kit for Motor Connection (Driver side)

Part No. **DV0PM20034** (For A-frame to D-frame)

● Please refer to the Dimensions of driver P.57 for connector XB.

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector	06JFAT-SAXGF	1	J.S.T Mfg. Co., Ltd.	For Connector XB * Jumper wire is included.
Handle lever	J-FAT-OT	2		

Part No. **DV0PM20046** (For E-frame)

● Please refer to the Dimensions of driver P.59 for connector XB.

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector	03JFAT-SAXGSA-L	1	J.S.T Mfg. Co., Ltd.	For Connector XB
Handle lever	J-FAT-OT-L	2		

Connector Kit for Motor/Encoder Connection

* When IP65 or IP67 are necessary, the customer must give appropriate processing.

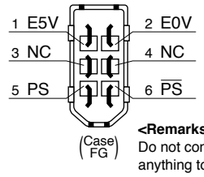
Part No.	DV0P4290	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W *, MQMF 100 W to 400 W MHMF 50 W to 1000 W * (Leadwire type IP65)

* MSMF092L1□2, MHMF092L1□□

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Connector	172161-1	1	Tyco Electronics Japan G.K.	For Encoder cable (9-pins)
Connector pin	170365-1	9		
Connector	172159-1	1	Tyco Electronics Japan G.K.	For Motor cable (4-pins)
Connector pin	170366-1	4		

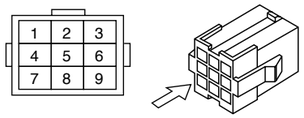
• Pin disposition of connector, connector X6



<Remarks>
Do not connect anything to NC.

(Viewed from cable)

• Pin disposition of connector for encoder cable



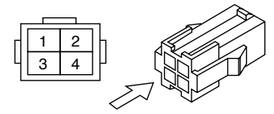
* Connector pin diagram is viewed from the direction of the arrow.

PIN No.	Application
1	BAT+*
2	BAT–*
3	FG(SHIELD)
4	PS
5	$\overline{PS}$
6	NC
7	E5V
8	E0V
9	NC

* When using the motor as an incremental system, BAT+ and BAT– can be left unconnected.

<Remarks>
Do not connect anything to NC.

• Pin disposition of connector for motor cable



* Connector pin diagram is viewed from the direction of the arrow.

PIN No.	Application
1	U-phase
2	V-phase
3	W-phase
4	Ground

* When you connect the battery for absolute encoder, refer to P.338, "When you make your own cable for 23-bit absolute encoder"

<Remarks>
• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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Connector Kit for Motor/Encoder Connection

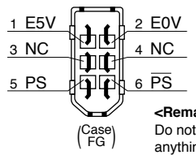
Part No.	DV0PM20035	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W * (Connector type IP67)

* MSMF092L1□1

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN6FR07SM1	1	Japan Aviation Electronics Ind.	For Encoder cable (7-pins)
Socket contact	LY10-C1-A1-10000	7		
Motor connector	JN8FT04SJ1	1	Japan Aviation Electronics Ind.	For Motor cable (4-pins)
Socket contact	ST-TMH-S-C1B-3500	4		

• Pin disposition of connector connector X6

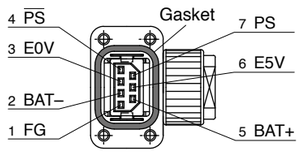


<Remarks>
Do not connect anything to NC.

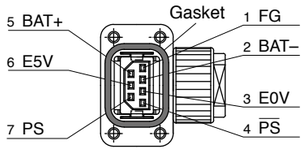
(Viewed from cable)

• Pin disposition of connector for encoder cable

[Direction of motor shaft]



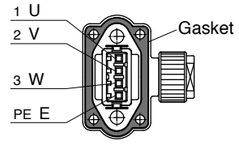
[Opposite direction of motor shaft]



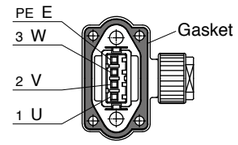
* Pins 2 and 5 are left unused (NC) when used in incremental system.

• Pin disposition of connector for motor cable

[Direction of motor shaft]



[Opposite direction of motor shaft]



<Remarks>
Secure the gasket in place without removing it from the connector.
Otherwise, the degree of protection of IP67 will not be guaranteed.

<Remarks>
• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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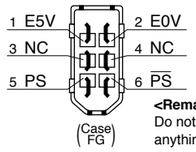
Part No.	DV0PM24581	80 mm sq. or less Applicable model	MHMF 50 W, 100 W (Connector type IP67)	with/without brake common use

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN6FR07SM1	1	Japan Aviation Electronics Ind.	For Encoder cable (7-pins)
Socket contact	LY10-C1-A1-10000	7		
Motor connector	JN11FH06SN2	1	Japan Aviation Electronics Ind.	For Motor cable (6-pins)
Socket contact	JN11S10K4A1	6		

• Pin disposition of connector connector X6

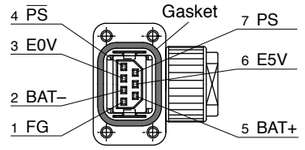


<Remarks>
Do not connect anything to NC.

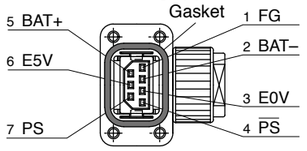
(Viewed from cable)

• Pin disposition of connector for encoder cable

[Direction of motor shaft]



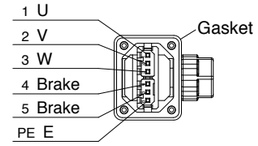
[Opposite direction of motor shaft]



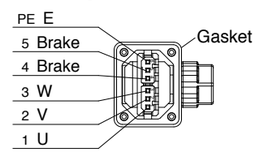
* Pins 2 and 5 are left unused (NC) when used in incremental system.

• Pin disposition of connector for motor cable

[Direction of motor shaft]



[Opposite direction of motor shaft]



* 4-pin and 5-pin are not used in case of no brake.

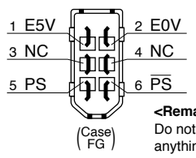
<Remarks>
Secure the gasket in place without removing it from the connector.
Otherwise, the degree of protection of IP67 will not be guaranteed.

Part No.	DV0PM24582	80 mm sq. or less Applicable model	MQMF 100 W to 400 W, MHMF 200 W to 1000 W (Connector type IP67)	with/without brake common use

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN6FR07SM1	1	Japan Aviation Electronics Ind.	For Encoder cable (7-pins)
Socket contact	LY10-C1-A1-10000	7		
Motor connector	JN11FL06SN1	1	Japan Aviation Electronics Ind.	For Motor cable (6-pins)
Socket contact	JN11S35H3A1	6		

• Pin disposition of connector connector X6

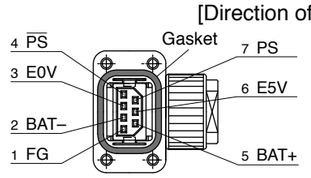


<Remarks>
Do not connect anything to NC.

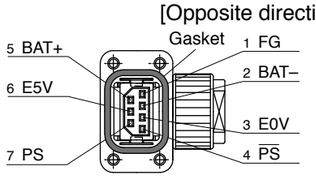
(Viewed from cable)

• Pin disposition of connector for encoder cable

[Direction of motor shaft]



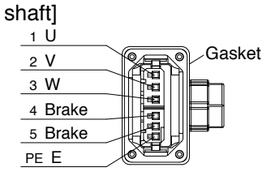
[Opposite direction of motor shaft]



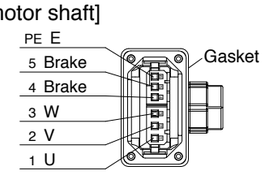
* Pins 2 and 5 are left unused (NC) when used in incremental system.

• Pin disposition of connector for motor cable

[Direction of motor shaft]



[Opposite direction of motor shaft]



* 4-pin and 5-pin are not used in case of no brake.

<Remarks>
Secure the gasket in place without removing it from the connector.
Otherwise, the degree of protection of IP67 will not be guaranteed.

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Connector Kit for Motor/Encoder Connection

* When IP65 or IP67 are necessary, the customer must give appropriate processing.

Part No.	DV0PM24583	100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <Small size connector> MSMF 1.0 kW * to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW *, 1.5 kW, MGMF 0.85 kW to 1.8 kW	Without brake

* MSMF102L1□□, MHMF102L1□□

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Motor connector	JL10-6A20-4SE-EB	1	Japan Aviation Electronics Ind.	For Motor cable (One-touch lock type)
Cable clamp	JL04-2022CK(14)-R	1		

Part No.	DV0PM24585	100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <Small size connector> MSMF 1.0 kW * to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW *, 1.5 kW, MGMF 0.85 kW to 1.8 kW	With brake

* MSMF102L1□□, MHMF102L1□□

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Motor connector	JL10-6A20-18SE-EB	1	Japan Aviation Electronics Ind.	For Motor cable (One-touch lock type)
Cable clamp	JL04-2022CK(14)-R	1		

Part No.	DV0PM24587	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MSMF 1.0 kW * to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW *, 1.5 kW, MGMF 0.85 kW to 1.8 kW	Without brake

* MSMF102L1□□, MHMF102L1□□

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JL10-6A20-29S-EB	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Cable clamp	JL04-2022CK(09)-R	1		
Motor connector	JL10-6A20-4SE-EB	1	Japan Aviation Electronics Ind.	For Motor cable (One-touch lock type)
Cable clamp	JL04-2022CK(14)-R	1		

Part No.	DV0PM24589	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MSMF 1.0 kW * to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW *, 1.5 kW, MGMF 0.85 kW to 1.8 kW	With brake

* MSMF102L1□□, MHMF102L1□□

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JL10-6A20-29S-EB	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Cable clamp	JL04-2022CK(09)-R	1		
Motor connector	JL10-6A20-18SE-EB	1	Japan Aviation Electronics Ind.	For Motor cable (One-touch lock type)
Cable clamp	JL04-2022CK(14)-R	1		

<Remarks>

• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

Part No.	DV0PM24584	100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <Small size connector> MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 2.0 kW to 5.0 kW, MGMF 2.4 kW to 4.4 kW	Without brake

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Motor connector	JL10-6A22-22SE-EB	1	Japan Aviation Electronics Ind.	For Motor cable (One-touch lock type)
Cable clamp	JL04-2022CK(14)-R	1		

Part No.	DV0PM24586	100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <Small size connector> MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 2.0 kW to 5.0 kW, MGMF 2.4 kW to 4.4 kW	With brake

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Motor connector	JL10-6A24-11SE-EB	1	Japan Aviation Electronics Ind.	For Motor cable (One-touch lock type)
Cable clamp	JL04-2428CK(17)-R	1		

Part No.	DV0PM24588	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 2.0 kW to 5.0 kW, MGMF 2.4 kW to 4.4 kW	Without brake

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JL10-6A20-29S-EB	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Cable clamp	JL04-2022CK(09)-R	1		
Motor connector	JL10-6A22-22SE-EB	1	Japan Aviation Electronics Ind.	For Motor cable (One-touch lock type)
Cable clamp	JL04-2022CK(14)-R	1		

Part No.	DV0PM24590	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 2.0 kW to 5.0 kW, MGMF 2.4 kW to 4.4 kW	With brake

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JL10-6A20-29S-EB	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Cable clamp	JL04-2022CK(09)-R	1		
Motor connector	JL10-6A24-11SE-EB	1	Japan Aviation Electronics Ind.	For Motor cable (One-touch lock type)
Cable clamp	JL04-2428CK(17)-R	1		

<Remarks>

• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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Connector Kit for Motor/Encoder Connection

* When IP65 or IP67 are necessary, the customer must give appropriate processing.

Part No.	DV0PM20036	100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <Small size connector> MSMF 1.0 kW * to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW *, 1.5 kW, MGMF 0.85 kW to 1.8 kW	Without brake

* MSMF102L1□□, MHMF102L1□□

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Motor connector	JL04V-6A20-4SE-EB-RK	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	JL04-2022CK(14)-R	1		

Part No.	DV0PM20038	100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <Small size connector> MSMF 1.0 kW * to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW *, 1.5 kW, MGMF 0.85 kW to 1.8 kW	With brake

* MSMF102L1□□, MHMF102L1□□

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Motor connector	JL04V-6A20-18SE-EB-RK	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	JL04-2022CK(14)-R	1		

Part No.	DV0P4310	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MSMF 1.0 kW * to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW *, 1.5 kW, MGMF 0.85 kW to 1.8 kW	Without brake

* MSMF102L1□□, MHMF102L1□□

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	N/MS3106B20-29S	1	Japan Aviation Electronics Ind.	For Encoder cable (Screwed type)
Cable clamp	N/MS3057-12A	1		
Motor connector	N/MS3106B20-4S	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	N/MS3057-12A	1		

Part No.	DV0P4330	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MSMF 1.0 kW * to 2.0 kW, MDMF 1.0 kW to 2.0 kW MHMF 1.0 kW *, 1.5 kW, MGMF 0.85 kW to 1.8 kW	With brake

* MSMF102L1□□, MHMF102L1□□

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	N/MS3106B20-29S	1	Japan Aviation Electronics Ind.	For Encoder cable (Screwed type)
Cable clamp	N/MS3057-12A	1		
Motor connector	N/MS3106B20-18S	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	N/MS3057-12A	1		

<Remarks>

• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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Part No.	DV0PM20037	100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <Small size connector> MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 2.0 kW to 5.0 kW, MGMF 2.4 kW to 4.4 kW	Without brake

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Motor connector	JL04V-6A22-22SE-EB-R	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	JL04-2022CK(14)-R	1		

Part No.	DV0PM20039	100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <Small size connector> MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 2.0 kW to 5.0 kW, MGMF 2.4 kW to 4.4 kW	With brake

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Motor connector	JL04V-6A24-11SE-EB-R	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	JL04-2428CK(17)-R	1		

Part No.	DV0P4320	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 2.0 kW to 5.0 kW, MGMF 2.4 kW to 4.4 kW	Without brake

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	N/MS3106B20-29S	1	Japan Aviation Electronics Ind.	For Encoder cable (Screwed type)
Cable clamp	N/MS3057-12A	1		
Motor connector	N/MS3106B22-22S	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	N/MS3057-12A	1		

Part No.	DV0P4340	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MSMF 3.0 kW to 5.0 kW, MDMF 3.0 kW to 5.0 kW MHMF 2.0 kW to 5.0 kW, MGMF 2.4 kW to 4.4 kW	With brake

• Components

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	N/MS3106B20-29S	1	Japan Aviation Electronics Ind.	For Encoder cable (Screwed type)
Cable clamp	N/MS3057-12A	1		
Motor connector	N/MS3106B24-11S	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	N/MS3057-16A	1		

<Remarks>

• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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Connector Kit for Motor/Encoder Connection

* When IP65 or IP67 are necessary, the customer must give appropriate processing.

Part No.	DV0PM20107	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MDMF 7.5 kW to 15.0 kW MGMF 5.5 kW, MHMF 7.5 kW	Without brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JL10-6A20-29S-EB	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Cable clamp	JL04-2022CK(09)-R	1		
Motor connector	JL04V-6A32-17SE-EB-RK	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	JL04-32CK(24)-RK *1	1		

*1 Casing size: ϕ 22 to ϕ 25. There is no specified cable wire material. Prepare a wire according to the connector used by the customer.

Part No.	DV0PM20108	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MDMF 7.5 kW to 15.0 kW MGMF 5.5 kW, MHMF 7.5 kW	With brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JL10-6A20-29S-EB	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Cable clamp	JL04-2022CK(09)-R	1		
Motor connector	JL04V-6A32-17SE-EB-RK	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	JL04-32CK(24)-RK *1	1		
Brake connector	N/MS3106B14S-2S	1	Japan Aviation Electronics Ind.	For Brake cable (Screwed type)
Cable clamp	N/MS3057-6A	1		

*1 Casing size: ϕ 22 to ϕ 25. There is no specified cable wire material. Prepare a wire according to the connector used by the customer.

Part No.	DV0PM20111	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MDMF 7.5 kW to 15.0 kW MGMF 5.5 kW, MHMF 7.5 kW	Without brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	N/MS3106B20-29S	1	Japan Aviation Electronics Ind.	For Encoder cable (Screwed type)
Cable clamp	N/MS3057-12A	1		
Motor connector	JL04V-6A32-17SE-EB-RK	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	JL04-32CK(24)-RK *1	1		

*1 Casing size: ϕ 22 to ϕ 25. There is no specified cable wire material. Prepare a wire according to the connector used by the customer.

<Remarks>

• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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Part No.	DV0PM20112	100 mm sq. or more Applicable model	(IP67 motor) Encoder JL10 <Large size connector> MDMF 7.5 kW to 15.0 kW MGMF 5.5 kW, MHMF 7.5 kW	With brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	N/MS3106B20-29S	1	Japan Aviation Electronics Ind.	For Encoder cable (Screwed type)
Cable clamp	N/MS3057-12A	1		
Motor connector	JL04V-6A32-17SE-EB-RK	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	JL04-32CK(24)-RK *1	1		
Brake connector	N/MS3106B14S-2S	1	Japan Aviation Electronics Ind.	For Brake cable (Screwed type)
Cable clamp	N/MS3057-6A	1		

*1 Casing size: ϕ 22 to ϕ 25. There is no specified cable wire material. Prepare a wire according to the connector used by the customer.

Part No.	DV0PM20056	100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <Small size connector> MDMF 7.5 kW to 15.0 kW MGMF 5.5 kW, MHMF 7.5 kW	Without brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Motor connector	JL04V-6A32-17SE-EB-RK	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	JL04-32CK(24)-RK *1	1		

*1 Casing size: ϕ 22 to ϕ 25. There is no specified cable wire material. Prepare a wire according to the connector used by the customer.

Part No.	DV0PM20057	100 mm sq. or more Applicable model	(IP67 motor) Encoder JN2 <Small size connector> MDMF 7.5 kW to 15.0 kW MGMF 5.5 kW, MHMF 7.5 kW	With brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Motor connector	JL04V-6A32-17SE-EB-RK	1	Japan Aviation Electronics Ind.	For Motor cable (Screwed type)
Cable clamp	JL04-32CK(24)-RK *1	1		
Brake connector	N/MS3106B14S-2S	1	Japan Aviation Electronics Ind.	For Brake cable (Screwed type)
Cable clamp	N/MS3057-6A	1		

*1 Casing size: ϕ 22 to ϕ 25. There is no specified cable wire material. Prepare a wire according to the connector used by the customer.

<Remarks>

• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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Connector Kit for Motor/Encoder Connection

* When IP44 is necessary, the customer must give appropriate processing.

Part No.	DV0PM20109	100 mm sq. or more Applicable model	(IP44 motor) Encoder JL10 <Large size connector> MDMF 22.0 kW	Without brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JL10-6A20-29S-EB	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Cable clamp	JL04-2022CK(09)-R	1		

Part No.	DV0PM20110	100 mm sq. or more Applicable model	(IP44 motor) Encoder JL10 <Large size connector> MDMF 22.0 kW	With brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JL10-6A20-29S-EB	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Cable clamp	JL04-2022CK(09)-R	1		
Brake connector	N/MS3106B14S-2S	1	Japan Aviation Electronics Ind.	For Brake cable (Screwed type)
Cable clamp	N/MS3057-6A	1		

Part No.	DV0PM20113	100 mm sq. or more Applicable model	(IP44 motor) Encoder JL10 <Large size connector> MDMF 22.0 kW	Without brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	N/MS3106B20-29S	1	Japan Aviation Electronics Ind.	For Encoder cable (Screwed type)
Cable clamp	N/MS3057-12A	1		

<Remarks>

• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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Part No.	DV0PM20114	100 mm sq. or more Applicable model	(IP44 motor) Encoder JL10 <Large size connector> MDMF 22.0 kW	With brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	N/MS3106B20-29S	1	Japan Aviation Electronics Ind.	For Encoder cable (Screwed type)
Cable clamp	N/MS3057-12A	1		
Brake connector	N/MS3106B14S-2S	1	Japan Aviation Electronics Ind.	For Brake cable (Screwed type)
Cable clamp	N/MS3057-6A	1		

Part No.	DV0PM20115	100 mm sq. or more Applicable model	(IP44 motor) Encoder JN2 <Small size connector> MDMF 22.0 kW	Without brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		

Part No.	DV0PM20116	100 mm sq. or more Applicable model	(IP44 motor) Encoder JN2 <Small size connector> MDMF 22.0 kW	With brake

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100KV	1	Sumitomo 3M (or equivalent)	For Connector X6 (6-pins)
Shell kit	3E306-3200-008	1		
Encoder connector	JN2DS10SL1-R	1	Japan Aviation Electronics Ind.	For Encoder cable (One-touch lock type)
Connector pin	JN1-22-22S-PKG100	5		
Brake connector	N/MS3106B14S-2S	1	Japan Aviation Electronics Ind.	For Brake cable (Screwed type)
Cable clamp	N/MS3057-6A	1		

* The motor / encoder connection connector kit for MDMF 22.0 kW does not include the connection parts for motor cable (terminal block). Please prepare a round terminal by yourself. (For details, see P.27)

<Remarks>

• For the crimping tools required for cable production, please check the manufacturer's website or contact the manufacturer. For manufacturer inquiries, refer to P.347 "Peripheral Device Manufacturers List".

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Connector Kit for Motor/Brake Connection

* When IP65 or IP67 are necessary, the customer must give appropriate processing.

Connector Kit for Motor/Brake Connection

Part No.	DV0PM20040	80 mm sq. or less Applicable model	MSMF 50 W to 1000 W * (Connector type IP67)

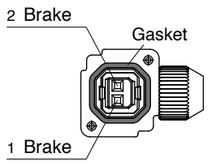
* MSMF092L1□1

• **Components**

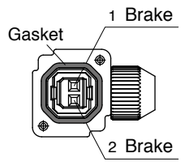
Title	Part No.	Number	Manufacturer	Note
Connector	JN4FT02SJM-R	1	Japan Aviation Electronics Ind.	For brake cable
Socket contact	ST-TMH-S-C1B-3500	2		

• Pin disposition of connector for brake cable

[Direction of motor shaft]



[Opposite direction of motor shaft]



<Remarks>

Secure the gasket in place without removing it from the connector.
Otherwise, the degree of protection of IP67 will not be guaranteed.

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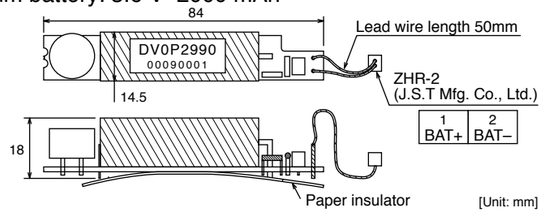
Battery for Absolute Encoder

Part No.	DV0P2990

• Lithium battery: 3.6 V 2000 mAh



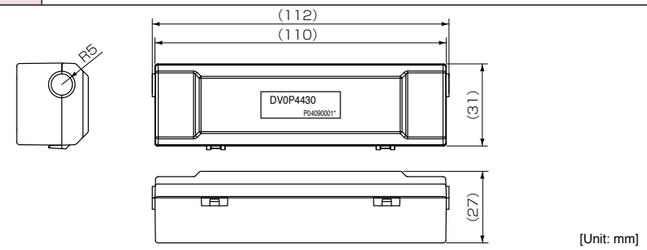
<Caution>

This battery is categorized as hazardous substance, and you may be required to present an application of hazardous substance when you transport by air (both passenger and cargo airlines).

Battery Box for Absolute Encoder *

* Battery is not included. Please buy the absolute encoder battery “DV0P2990” separately.

Part No.	DV0P4430



When waking a cable for 23-bit absolute encoder by yourself

When you make your own cable for 23-bit absolute encoder, connect the optional battery for absolute encoder, DV0P2990 as per the wiring diagram below. Connector of the battery for absolute encoder shall be provided by customer as well.

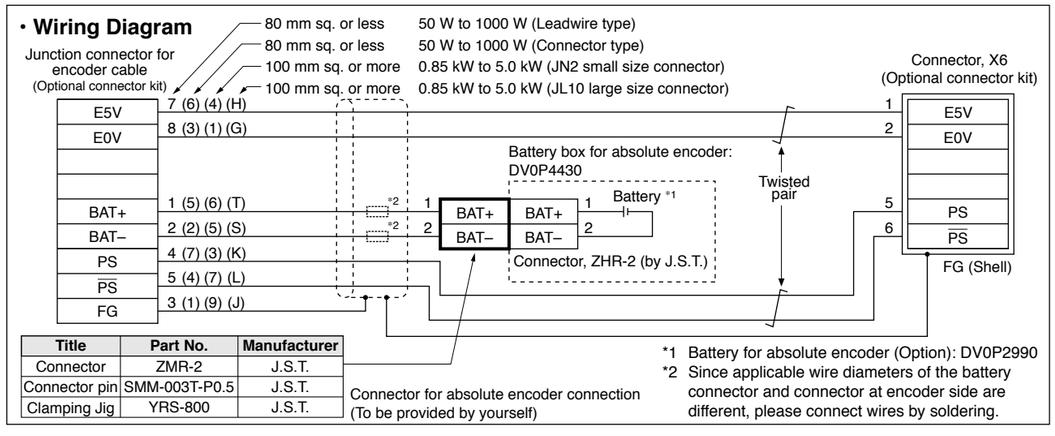
<Caution>

Install and fix the battery securely. If the installation and fixing of the battery is not appropriate, it may cause the wire breakdown or damage of the battery.
Refer to the instruction manual of the battery for handling the battery.

• **Installation Place of Battery**

1) Indoors, where the products are not subjected to rain or direct sun beam.
2) Where the products are not subjected to corrosive atmospheres such as hydrogen sulfide, sulfurous acid, chlorine, ammonia, chloric gas, sulfuric gas, acid, alkaline and salt and so on, and are free from splash of inflammable gas, grinding oil, oil mist, iron powder or chips and etc.
3) Well-ventilated and humid and dust-free place.
4) Vibration-free place

• **Wiring Diagram**



Title	Part No.	Manufacturer
Connector	ZMR-2	J.S.T.
Connector pin	SMM-003T-P0.5	J.S.T.
Clamping Jig	YRS-800	J.S.T.

Connector for absolute encoder connection
(To be provided by yourself)

*1 Battery for absolute encoder (Option): DV0P2990
*2 Since applicable wire diameters of the battery connector and connector at encoder side are different, please connect wires by soldering.

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Surge Absorber for Motor Brake

■ **Recommended components**

Motor		Part No.	Manufacturer
MSMF	50 W to 1000 W	TND14V271K	NIPPON CHEMI-CON CORPORATION
	1.0 kW to 3.0 kW	Z15D151	SEMITEC Corporation
	4.0 kW, 5.0 kW	NVD07SCD082	KOA Corporation
MQMF	100W to 400 W	TND14V271K	NIPPON CHEMI-CON CORPORATION
MHMF	50 W to 1000 W		
	1.0 kW, 1.5 kW	NVD07SCD082	KOA Corporation
	2.0 kW to 4.0 kW	Z15D151	SEMITEC Corporation
	5.0 kW, 7.5 kW	NVD07SCD082	KOA Corporation
MDMF	1.0 kW to 3.0 kW	NVD07SCD082	KOA Corporation
	4.0 kW	Z15D151	SEMITEC Corporation
	5.0 kW to 22.0 kW	NVD07SCD082	KOA Corporation
MGMF	0.85 kW to 1.8 kW	NVD07SCD082	KOA Corporation
	2.4 kW, 2.9 kW	Z15D151	SEMITEC Corporation
	4.4 kW, 5.5 kW	NVD07SCD082	KOA Corporation

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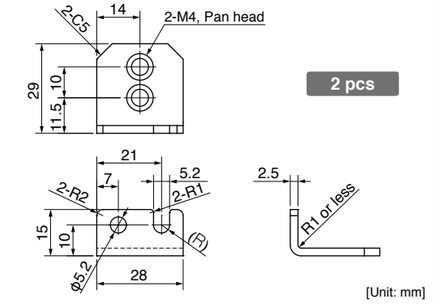
Mounting Bracket

Part No.	DV0PM20100	Frame symbol of applicable driver	A-frame B-frame	Mounting screw	M4 × L6 Pan head 4pcs

Dimension

Top / Bottom side



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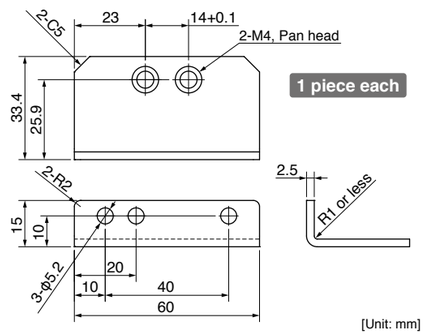
Mounting Bracket

Part No.	DV0PM20101	Frame symbol of applicable driver	C-frame D-frame	Mounting screw	M4 × L6 Pan head 4pcs

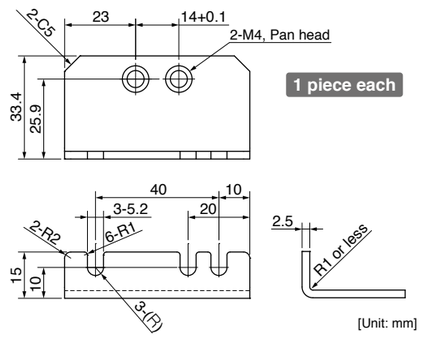
Dimension

Top side



[Unit: mm]

Bottom side



[Unit: mm]

Reactor

Fig.1

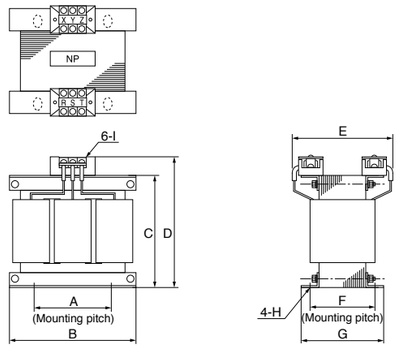
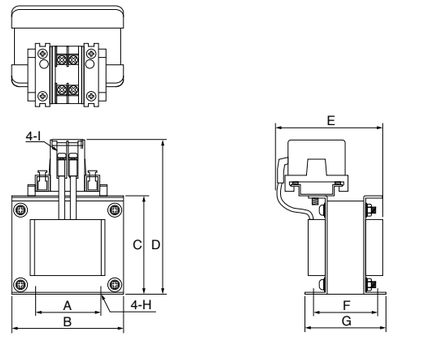
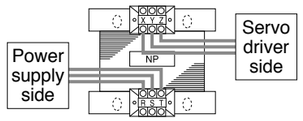
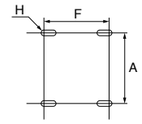


Fig.2



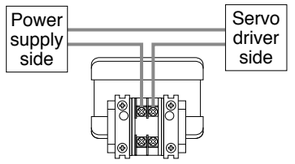
• Wiring of the reactor <3-Phase>

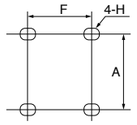




F: Center-to-center distance on outer circular arc

• Wiring of the reactor <Single phase>





F: Center-to-center distance on slotted hole

[Unit: mm]

	Part No.	A	B	C	D	E (Max)	F	G	H	I	Inductance (mH)	Rated current (A)
Fig.1	**DV0P220**	65±1	125±1	(93)	136 Max	155	70+3/–0	85±2	4-7φ×12	M4	6.81	3
	DV0P221	60±1	150±1	(113)	155 Max	130	60+3/–0	75±2	4-7φ×12	M4	4.02	5
	DV0P222	60±1	150±1	(113)	155 Max	140	70+3/–0	85±2	4-7φ×12	M4	2	8
	DV0P223	60±1	150±1	(113)	155 Max	150	79+3/–0	95±2	4-7φ×12	M4	1.39	11
	DV0P224	60±1	150±1	(113)	160 Max	155	84+3/–0	100±2	4-7φ×12	M5	0.848	16
	DV0P225	60±1	150±1	(113)	160 Max	170	100+3/–0	115±2	4-7φ×12	M5	0.557	25
Fig.2	**DV0P227**	55±0.7	80±1	66.5±1	110 Max	90	41±2	55±2	4-5φ×10	M4	4.02	5
	DV0P228	55±0.7	80±1	66.5±1	110 Max	95	46±2	60±2	4-5φ×10	M4	2	8
	DV0PM20047	55±0.7	80±1	66.5±1	110 Max	105	56±2	70±2	4-5φ×10	M4	1.39	11

* For application, refer to P.29 to P.42 and P.205 to P.210 “Table of Part Numbers and Options”.

Harmonic restraint

Harmonic restraint measures are not common to all countries. Therefore, prepare the measures that meet the requirements of the destination country.
When installing a product for Japan, refer to the instruction manual available on our website.

【Panasonic Corporation, Motor Business Unit web site】
industrial.panasonic.com/ac/e/

<Remarks>
When using a reactor, be sure to install one reactor to one servo driver.

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Part No.	Manufacturer's part No.	Specifications					Activation temperature of built-in thermal protector
		Resistance	cable core outside diameter	Weight	Rated power (reference)*1		
					Free air	with fan 1 m/s*2	
		Ω	mm	kg	W	W	
DV0P4280	RF70M	50	ϕ1.27 (AWG18 stranded wire)	0.1	10	25	140±5 ˚C B-contact Open/Close capacity (resistance load) 1 A 125 VAC 6000 times 0.5 A 250 VAC 10000 times
DV0P4281	RF70M	100		0.1	10	25	
DV0P4282	RF180B	25		0.4	17	50	
DV0P4283	RF180B	50		0.2	17	50	
DV0P4284	RF240	30		0.5	40	100	
DV0P4285	RH450F	20		1.2	52	130	

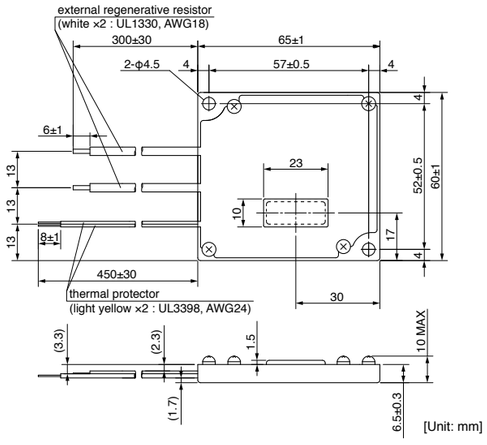
Manufacturer : Iwaki Musen Kenkyusho

*1 Power with which the driver can be used without activating the built-in thermal protector.
A built-in thermal fuse and a thermal protector are provided for safety.
The circuit should be so designed that the power supply will be turned off as the thermal protector operates.
The built-in thermal fuse blows depending on changes in heat dissipation condition, operating temperature limit, power supply voltage or load.
Mount the regenerative resistor on a machine operating under aggressive regenerating condition (high power supply voltage, large load inertia, shorter deceleration time, etc.) and make sure that the surface temperature will not exceed 100 °C.

*2 If the wind speed is 1m / s by the fan.

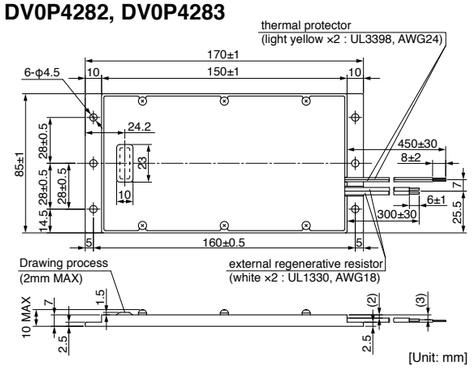
Frame	Power supply	
	Single phase, 100 V	Single phase, 200 V 3-phase, 200 V
A	DV0P4280	DV0P4281 (100 W or less) DV0P4283 (200 W)
B	DV0P4283	DV0P4283
C	DV0P4282	
D	—	DV0P4284
E		DV0P4284 × 2 in parallel or DV0P4285
F		DV0P4285 × 2 in parallel
G		DV0P4285 × 3 in parallel
H		DV0P4285 × 6 in parallel

DV0P4280, DV0P4281



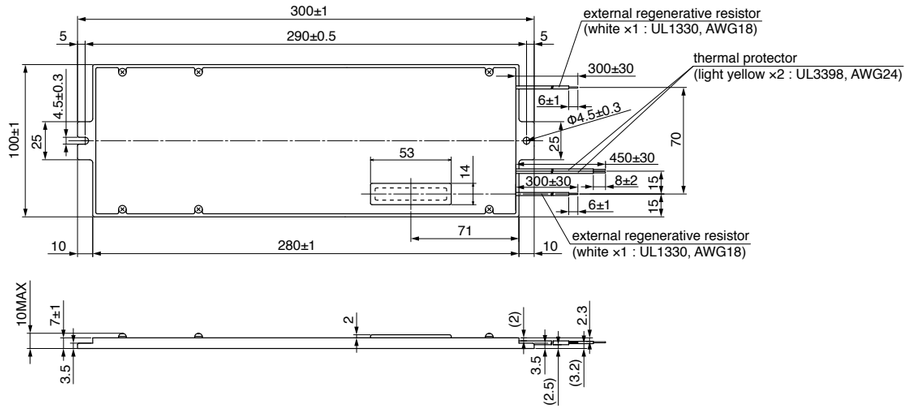
[Unit: mm]

DV0P4282, DV0P4283



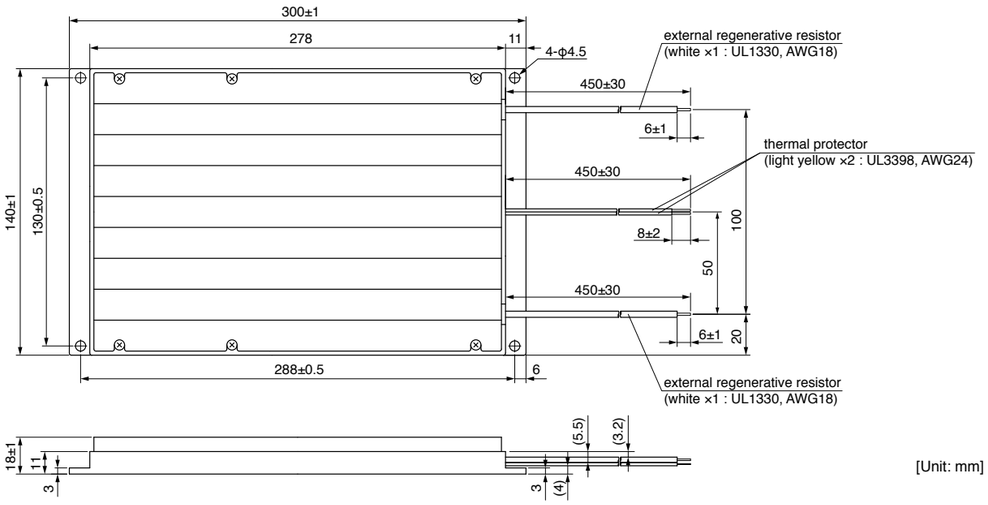
[Unit: mm]

DV0P4284



[Unit: mm]

DV0P4285



[Unit: mm]

<Caution when using external regenerative resistor>

Regenerative resistor gets very hot.

Configure a circuit so that a power supply shuts down when built-in thermal protector of the regenerative resistor works. Because it is automatic reset thermal protector, please apply a self-holding circuit to the outside in order to maintain safety in case of sudden activation. During the failure of the driver, the surface temperature of the regenerative resistor may exceed the operating temperature before thermal protector starts to work.
Built-in thermal fuse of regenerative resistor is intended to prevent from ignition during the failure of the driver and not intended to suppress the surface temperature of the resistor.

- **Be attached the regenerative resistance to non-combustible material such as metal.**
- **Built-in thermal fuse of regenerative resistor is intended to prevent from ignition during the failure of the driver and not intended to suppress the surface temperature of the resistor.**
- **Do not install the regenerative resistor near flammable materials.**

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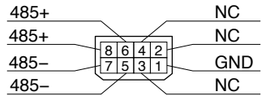
Daisy Chain (Excluding A6SE, A6NE, A6BE Series)

Part No.	DV0PM24610

• **Components**

Title	Part No.	Manufacturer	Note
Connector	CIF-PCNS08KK-072R	J.S.T Mfg. Co., Ltd.	For Connector X2 (2-pins)
Cable	3-core cable with shield	–	Core diameter AWG24

• Pin disposition of connector, connector X2



Shell: FG

(Viewed from cable)

<Remarks>
- Do not connect anything to NC.
- The braided wire of the cable is connected to the shell (housing) of the connector.

• Table for wiring

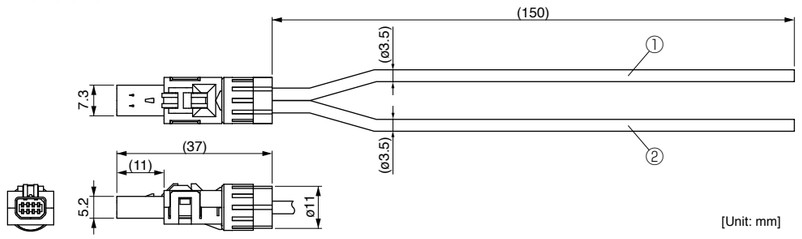
Cable ①

Pin No.	Signal name	Core color
8	485+	Red
7	485–	Yellow
1	GND	White

Cable ②

Pin No.	Signal name	Core color
6	485+	Red
5	485–	Yellow
1	GND	White

• Dimensions



[Unit: mm]

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Encoder Cable For available optional items, please refer to P.309 to P.312.

1	2	3	4	5	6	7	8	9	10	11	12
M	F	E	C	A	0	0	5	0	M	J	D
					①				②	③	④

Type classification

MFECA: Encoder cable

① Cable length

0030	3 m
0050	5 m
0100	10 m
0200	20 m

② Cable type

E	PVC cable with shield by Oki Electric Cable Co., 0.20 mm² × 4P(8-wire), 3P(6-wire)
M	Hitachi Cable, Ltd. Highly bendable type
T	Hitachi Cable, Ltd. Standard bendable type

③ Cable end (Encoder side)

A	Tyco Electronics Japan G.K. connector
J	Japan Aviation Electronics Industry, Ltd. connector (Direction of motor shaft)
K	Japan Aviation Electronics Industry, Ltd. connector (Opposite direction of motor shaft)
P	Japan Aviation Electronics Industry, Ltd. plug connector
S	"S" shaped cannonplug
T	Japan Aviation Electronics Industry, Ltd. plug connector

④ Cable end (Driver side)

D	Connector (Without battery box)
E	Connector (With battery box)

Motor Cable, Brake Cable For available optional items, please refer to P.309 to P.312.

1	2	3	4	5	6	7	8	9	10	11	12
M	F	M	C	A	0	0	5	2	N	J	D
				①		②		③	④	⑤	⑥

AC servo motor cable

① Type classification

A	Standard
B	Special
⋮	Design order

② Cable length

003	3 m
005	5 m
010	10 m
020	20 m

③ Sectional area of cable core

0	0.75 mm²
1	1.25 mm²
2	2.0 mm²
3	3.5 mm²
7	0.3 mm²

④ Cable type

ROBO-TOP® is a trade mark of DYDEN CORPORATION

E	ROBO-TOP® 4-wire by DYDEN CORPORATION
F	ROBO-TOP® 6-wire by DYDEN CORPORATION
G	ROBO-TOP® 2-wire by DYDEN CORPORATION
N	4-wire by Hitachi Cable, Ltd. (Highly bendable type)
P	4-wire by Hitachi Cable, Ltd. (Standard bendable type)
R	2-wire by Hitachi Cable, Ltd. (Highly bendable type)
S	2-wire by Hitachi Cable, Ltd. (Standard bendable type)
U	4-wire for A6 series small motor* (Highly bendable type)
V	6-wire for A6 series small motor* (Highly bendable type)
W	4-wire for A6 series small motor* (Standard bendable type)
X	6-wire for A6 series small motor* (Standard bendable type)

* 80 mm sq. or less

⑤ Cable end at motor side

C	S type cannon plug
E	Tyco Electronics Japan G.K. connector
F	Japan Aviation Electronics Industry, Ltd. connector (Direction of motor shaft)
G	Japan Aviation Electronics Industry, Ltd. connector (Opposite direction of motor shaft)
J	Japan Aviation Electronics Industry, Ltd. connector (Direction of motor shaft)
K	Japan Aviation Electronics Industry, Ltd. connector (Opposite direction of motor shaft)
U	Japan Aviation Electronics Industry, Ltd. plug connector

⑥ Cable end at driver side

D	Rod terminal
T	Clamp terminal

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Manufacturer	Tel No. / Home Page	Peripheral components
Panasonic Corporation Eco Solutions Company	http://panasonic.net/es/	Circuit breaker
Panasonic Corporation Automotive & Industrial Systems Company	http://panasonic.net/id/	Surge absorber Switch, Relay
Iwaki Musen Kenkyusho Co., Ltd.	+81-44-833-4311 http://www.iwakimusen.co.jp/	Regenerative resistor
KOA Corporation	+81-42-336-5300 http://www.koanet.co.jp/en/index.htm	Surge absorber for holding brake
NIPPON CHEMI-CON CORPORATION	+81-3-5436-7711 http://www.chemi-con.co.jp/e/index.html	
SEMITEC Corporation	+81-3-3621-2703 http://www.semitec.co.jp/english2/	
TDK Corporation	+81-3-5201-7229 http://www.global.tdk.com/	Ferrite core
NISSHIN ELECTRIC Co., LTD.	+81-4-2934-4151 http://www.nisshin-electric.com	
Konno Kogyosho Co., Ltd.	+81-184-53-2307	
Okaya Electric Industries Co. Ltd.	+81-3-4544-7040 http://www.okayaelec.co.jp/english/index.html	Surge absorber Noise filter
SOSHIN ELECTRIC Co., Ltd.	+81-3-5730-4500 http://www.soshin-ele.com/	Noise filter
Japan Aviation Electronics Industry, Ltd.	+81-3-3780-2717 http://www.jae.com/en/index.html	Connector
Japan Molex Inc.	+81-462-65-2313 http://www.molex.co.jp	
J.S.T. Mfg. Co., Ltd.	+81-45-543-1271 http://www.jst-mfg.com/index_e.php	
Sumitomo 3M	+81-3-5716-7290 http:/solutions.3m.com/wps/portal/3M/ja_JP/WW2/Country/	
Tyco Electronics Japan G.K.	+81-44-844-8052 http://www.te.com/ja/home.html	
DYDEN CORPORATION	+81-3-5805-5880 http://www.dyden.co.jp/english/index.htm	Cable
DR. JOHANNES HEIDENHAIN GmbH	+81-3-3234-7781 http://www.heidenhain.de/de_EN/company/contact/	External scale
Fagor Automation S.Coop.	+34-943-719-200 http://www.fagorautomation.com	
Magnescale Co., Ltd.	+81-463-92-7971 http://www.mgscale.com/mgs/language/english/	
Mitutoyo Corporation	+81-44-813-8234 http://www.mitutoyo.co.jp/eng/	
Nidec Sankyo Corporation	+81-3-5740-3006 http://www.nidec-sankyo.co.jp/	
Renishaw plc	+44 1453 524524 www.renishaw.com	

* The above list is for reference only. We may change the manufacturer without notice.

MEMO

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Communication cycle 0.0625 ms Ultra-high-speed network driver

RTEX Realtime Express

Realtime Express(RTEX)

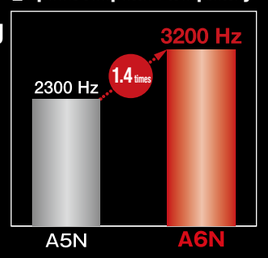
AC servo motor & driver

MINAS A6N series

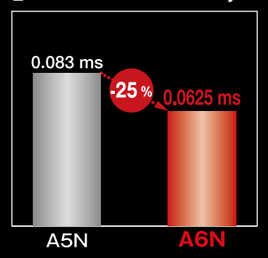
Pursuit of ultimate real-time processing

Pursuit of ultimate real-time processing

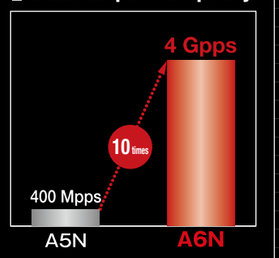
Speed response frequency



Minimum communication cycle



Maximum pulse frequency



● Max.4 Mpps,when using AB-phase external scale

Multifunctional capabilities to match various needs

◎ Supports all positions,speeds and torque modes (w/built-in positioning function)
◎ High-precision position latch and comparison
◎ Communication cycle can be set to any time between 2 ms and 62.5 µs.

Simple network

◎ Satisfies both high performance and low cost requirements
◎ Synchronization established by communication IC
◎ Easier development of compatible equipment

● Easy setup with setup support software “PANATERM”.

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Interface connector Kit 368

* For options other than for Interface cable and connector kit for interface,see P.29 to P.42.

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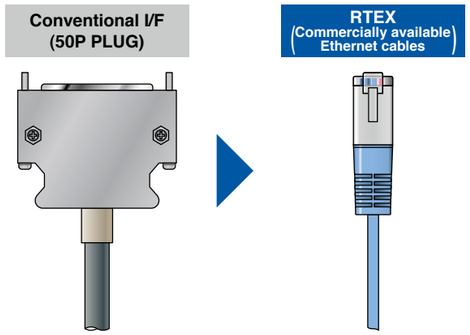
Advantages of RTEX

● The “Conventional I/F” used in this document means a pulse train and analog I/F.

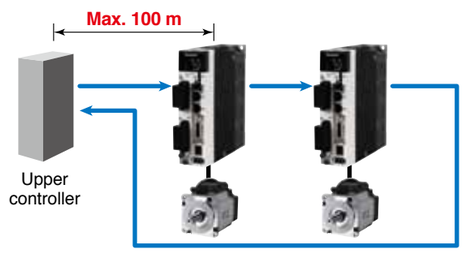
Wire-saving

Wire-saving reduces various troubles relating to wires. The cables used are widely available Ethernet cables, which are easy to obtain and inexpensive.



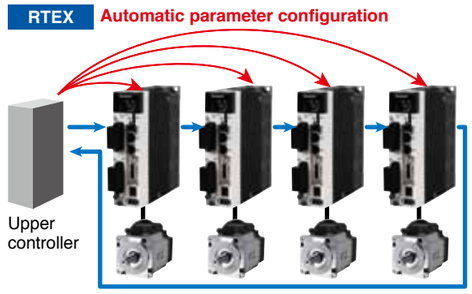
Maximum length of the node-to-node cable is 100 m.

Flexibility increases in the layout of an upper controller and servo motors. The RTEXs can also support large-scale systems.



Configurable parameter settings

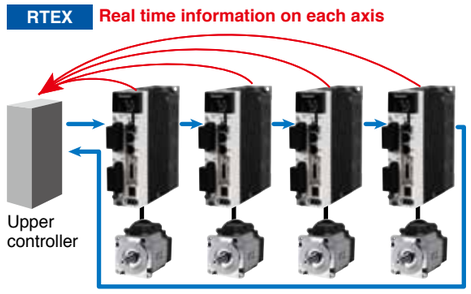
Upper controllers can configure servo parameters. This enables parameters to be configured automatically instead by human at installation.



* Parameters can be changed even during operation

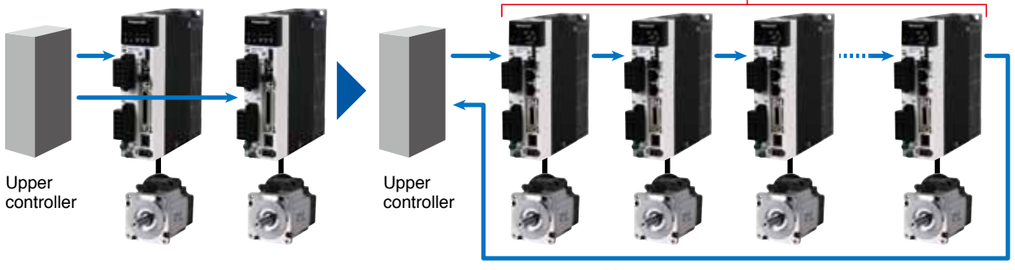
Real time monitoring is enabled.

Upper controllers can monitor various information, such as position, speed, and torque, etc. in real time. Since alarm codes can also be read out, analysis can be performed promptly at trouble occurrence.



Up to 32 axes can be controlled.

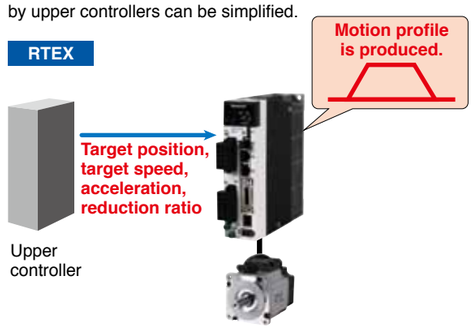
In comparison with conventional I/Fs, the number of axes increases that can be controlled by next upper controllers.



* If devices other than servo motors are also connected, up to 32 nodes can be connected as entire slaves including the servo motors. Actual number of controllable axes depends on the specification of an upper controller.

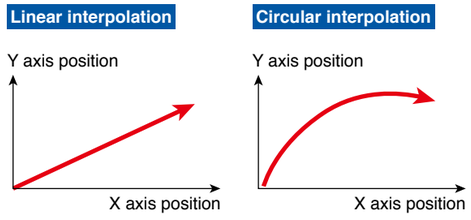
Profile position mode is supported

Profile position mode is supported for PTP control as well as cyclic position, speed, and torque. The processing done by upper controllers can be simplified.



High synchronization capability among axes

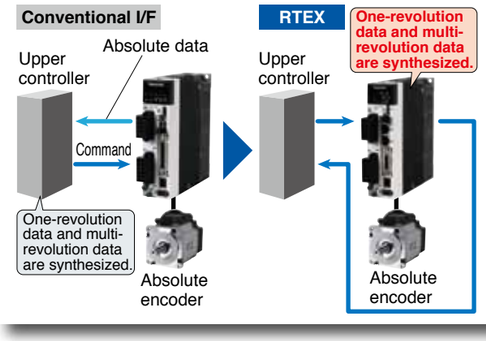
Upper controllers synchronize with entire servo motor axes at high accuracy. With the synchronization capability higher than that of conventional I/F, the RTEX is best suitable for machine tools, robots, gantry systems, and others.



* Interpolation depends on the specification of upper controllers. This is not the function of individual servo motor.

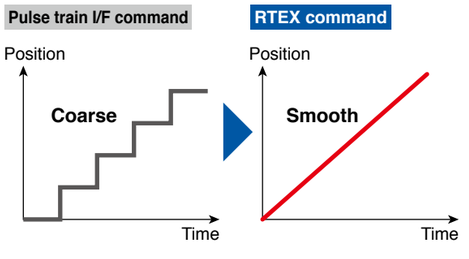
Absolute system can easily be built.

Conventional I/F requires an additional wire to transmit absolute data, while the RTEX doesn’t. Each servo motor synthesizes one-revolution data and multi-revolution data to produce an actual position, so that the amount of work to be done by an upper controller is decreased.



High resolution command is enabled

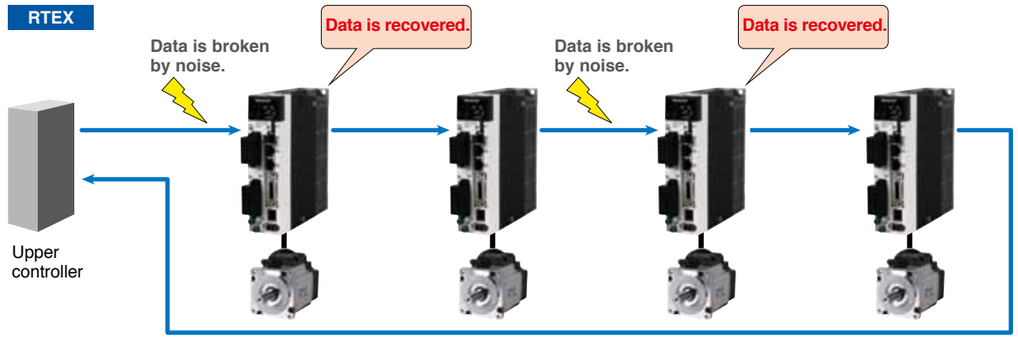
The position command rate of max. 8 Mpps* in a pulse train I/F is improved to 4 Gpps* in the RTEX. Vibrations are reduced due to a smooth command sent to a servo motor using the advantage of the high-resolution encoder.



* Max. 8 Mpps is a rate when A6 servo driver is used.
Max. 4 Gpps is a rate when A6N servo driver is used.

High noise-proof property

With a patented error correction function, noise-proof property is at least 2.5 KV. This conforms to IEC61000-4-4 standard.



* The error correction function has a limit. Unrecovered broken data causes a communication error.

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Model Designation

* For combination of elements of model number, refer to Index P.448.

Servo Motor

M S M | F | 5 A | Z | L | 1 | A 1 | * — Special specifications

① ② ③ ④ ⑤ ⑥ ⑦

① Type

Symbol	Type
MSM	Low inertia (50 W to 5.0 kW)
MQM	Middle inertia (100 W to 400 W)
MDM	Middle inertia (1.0 kW to 22.0 kW)
MGM	Middle inertia (0.85 kW to 5.5 kW)
MHM	High inertia (50 W to 7.5 kW)

② Series

Symbol	Series name
F	A6 Family

③ Motor rated output

Symbol	Rated output
5A	50 W
01	100 W
02	200 W
04	400 W
08	750 W
09	0.85 kW, 1000 W (130 mm sq.) (80 mm sq.)
10	1.0 kW

Symbol	Rated output
13	1.3 kW
15	1.5 kW
18	1.8 kW
20	2.0 kW
24	2.4 kW
29	2.9 kW
30	3.0 kW
40	4.0 kW

Symbol	Rated output
44	4.4 kW
50	5.0 kW
55	5.5 kW
75	7.5 kW
C1	11.0 kW
C5	15.0 kW
D2	22.0 kW

④ Voltage specifications

Symbol	Specifications
1	100 V
2	200 V
Z	100 V/ 200 V common (50 W only)

⑥ Design order

Symbol	Specifications
1	Standard

<Note>
When using a rotary encoder as an incremental system (not using multi-turn data), do not connect a battery for absolute encoder.

⑤ Rotary encoder specifications

Symbol	Format	Pulse counts	Resolution	Wires
L	Absolute	23-bit	8388608	7

⑦ Motor specifications: IP67 *2 100 mm sq. to 220 mm sq. MSMF, MHMF, MDMF, MGMF

Symbol		Shaft		Holding brake		Oil seal		Encoder terminal	
		Round	Key-way	without	with	with	With protective lip	Connector JN2 (Small size)	Connector JL10 (Large size) *3
C	5	●		●		●		●	
C	6	●		●		●			●
C	7	●		●			●	●	
C	8	●		●			●		●
D	5	●			●	●		●	
D	6	●			●	●			●
D	7	●			●		●	●	
D	8	●			●		●		●
G	5		●	●		●		●	
G	6		●	●		●			●
G	7		●	●			●	●	
G	8		●	●			●		●
H	5		●		●	●		●	
H	6		●		●	●			●
H	7		●		●		●	●	
H	8		●		●		●		●

⑦ Motor specifications: 80 mm sq. or less MSMF 50 W to 1000 W

Symbol		Shaft		Holding brake		Oil seal		Motor encoder terminal *1	
		Round	Key-way, center tap	without	with	without	with	Connector JN	Lead wire
A	1	●		●		●		●	
A	2	●		●		●			●
B	1	●			●	●		●	
B	2	●			●	●			●
C	1	●		●			●	●	
C	2	●		●			●		●
D	1	●			●		●	●	
D	2	●			●		●		●
S	1		●	●		●		●	
S	2		●	●		●			●
T	1		●		●	●		●	
T	2		●		●	●			●
U	1		●	●			●	●	
U	2		●	●			●		●
V	1		●		●		●	●	
V	2		●		●		●		●

⑦ Motor specifications: MHMF 50 W to 1000 W, MQMF 100 W to 400 W

Symbol		Shaft		Holding brake		Oil seal			Motor encoder terminal *1	
		Round	Key-way, center tap	without	with	without	with	With protective lip	Connector JN	Lead wire
A	1	●		●		●			●	
A	2	●		●		●				●
B	1	●			●	●			●	
B	2	●			●	●				●
C	1	●		●			●		●	
C	2	●		●			●			●
C	3	●		●				●	●	
C	4	●		●				●		●
D	1	●			●		●		●	
D	2	●			●		●			●
D	3	●			●			●	●	
D	4	●			●			●		●
S	1		●	●		●			●	
S	2		●	●		●				●
T	1		●		●	●			●	
T	2		●		●	●				●
U	1		●	●			●		●	
U	2		●	●			●			●
U	3		●	●				●	●	
U	4		●	●				●		●
V	1		●		●		●		●	
V	2		●		●		●			●
V	3		●		●			●	●	
V	4		●		●			●		●

*1 Connector type: IP67, Lead wire type: IP65 *2 22.0 kW: IP44
*3 Connector on the motor side encoder. (Also applicable to screwed type.)

Servo Driver

M A D | L | N | 1 | 5 | N | E | * * * — Special specifications

① ② ③ ④ ⑤ ⑥ ⑦

① Frame symbol

Symbol	Frame	Symbol	Frame
MAD	A-Frame	MED	E-Frame
MBD	B-Frame	MFD	F-Frame
MCD	C-Frame	MGD	G-Frame
MDD	D-Frame	MHD	H-Frame

② Series

Symbol	Series name
L	A6 Family

③ Safety Function *4

Symbol	Specifications
N	without the safety function
T	with the safety function

④ Max. current rating

Symbol	Current rating	Symbol	Current rating
0	6 A	9	80 A
1	8 A	A	100 A
2	12 A	B	120 A
3	22 A	C	160 A
4	24 A	E	240 A
5	40 A	F	360 A
8	60 A		

⑤ Supply voltage specifications

Symbol	Specifications
1	Single phase 100 V
3	3-phase 200 V
5	Single/3-phase 200 V

⑥ I/f specifications ⑦ Classification of type *4

Symbol (specification)	Symbol	Specification
N (RTEX)	E	Standard for rotary motor
	F	Multifunction for rotary motor
	L	Standard for linear/ DD motor **Special Order Product**
	M	Multifunction for linear/ DD motor **Special Order Product**

*4 Standard type (with a part number ending in E or L) has no safety function. Multi-function type (with a part number ending in F or M) has a safety function.

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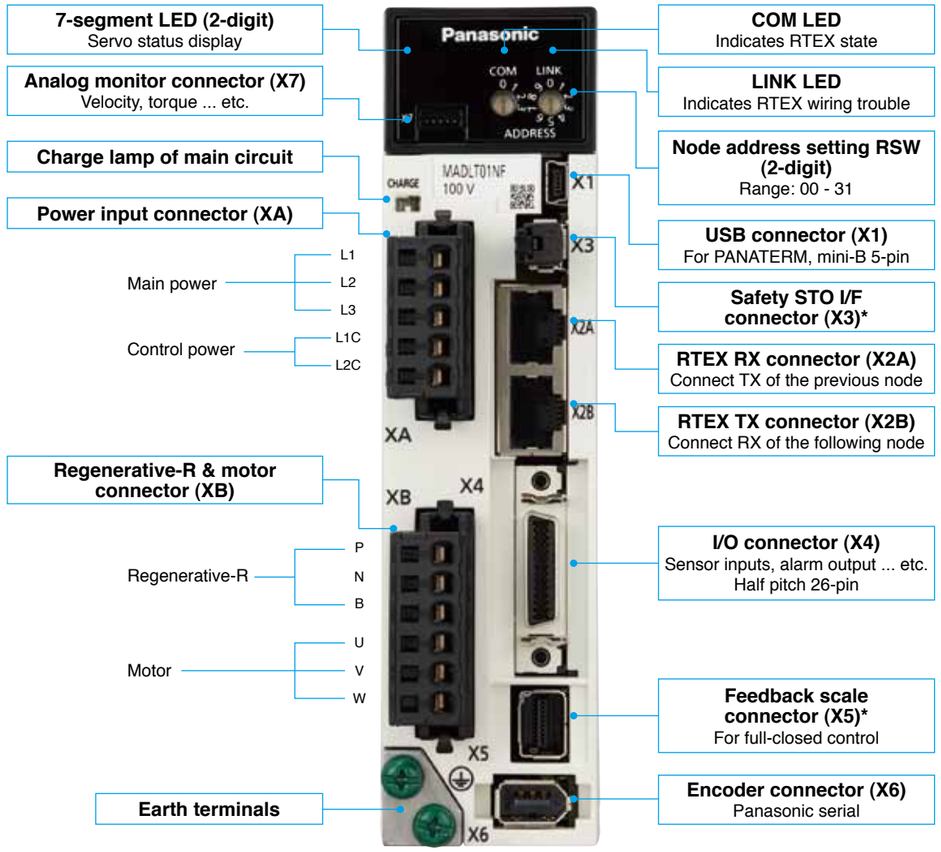
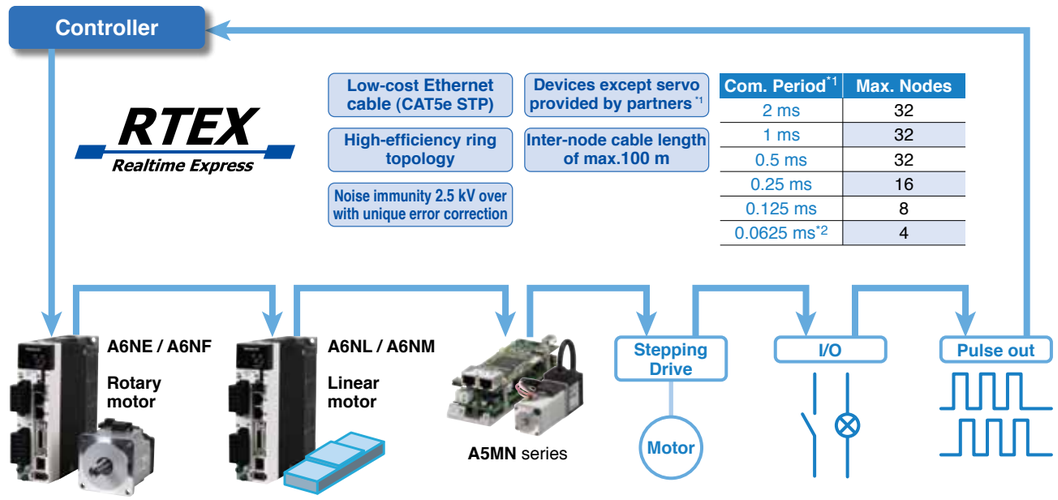
Appearance/ System configuration

Appearance



* The photo is A6NF series. There are no X3 and X5 connectors in the A6NE series.

Typical system configuration



*1: The communication period and connection of slave devices depend on the controller specification.
*2: For communication period 0.0625 ms, command update period is 0.125 ms only.

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For the motor specifications, refer to the A6 series on p.63 to p.118.

● 80 mm sq. or less 50 W to 1000 W MSMF, MQMF, MHMF Leadwire type IP65

Motor					Driver		Power capacity (at rated load)
Motor series		Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame	
MSMF (Leadwire type) 3000 r/min Low inertia		Single phase 100 V	50	MSMF5AZL1 □ 2	MADL☆01N☆	A-frame	Approx. 0.4 kVA
			100	MSMF011L1 □ 2	MADL☆11N☆		
			200	MSMF021L1 □ 2	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MSMF041L1 □ 2	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	50	MSMF5AZL1 □ 2＊	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			100	MSMF012L1 □ 2＊			
			200	MSMF022L1 □ 2＊	MADL☆15N☆		
			400	MSMF042L1 □ 2＊	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
			750	MSMF082L1 □ 2＊	MCDL☆35N☆	C-frame	Approx. 1.8 kVA
			1000	MSMF092L1 □ 2＊	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
MQMF (Leadwire type) 3000 r/min Middle inertia Flat type		Single phase 100 V	100	MQMF011L1 □□	MADL☆11N☆	A-frame	Approx. 0.4 kVA
			200	MQMF021L1 □□	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MQMF041L1 □□	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	100	MQMF012L1 □□＊	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			200	MQMF022L1 □□＊	MADL☆15N☆		
			400	MQMF042L1 □□＊	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
MHMF (Leadwire type) 3000 r/min High inertia		Single phase 100 V	50	MHMF5AZL1 □□	MADL☆01N☆	A-frame	Approx. 0.4 kVA
			100	MHMF011L1 □□	MADL☆11N☆		
			200	MHMF021L1 □□	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MHMF041L1 □□	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	50	MHMF5AZL1 □□＊	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			100	MHMF012L1 □□＊			
			200	MHMF022L1 □□＊	MADL☆15N☆		
			400	MHMF042L1 □□＊	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
			750	MHMF082L1 □□＊	MCDL☆35N☆	C-frame	Approx. 1.8 kVA
			1000	MHMF092L1 □□＊	MDDL☆55N☆	D-frame	Approx. 2.4 kVA

□ ☆ ＊ : For more information, refer to “Model Designation” on P.353.

● 80 mm sq. or less 50 W to 1000 W MSMF, MQMF, MHMF Connector type IP67

Motor					Driver		Power capacity (at rated load)
Motor series		Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame	
MSMF (Connector type) 3000 r/min Low inertia		Single phase 100 V	50	MSMF5AZL1 □ 1	MADL☆01N☆	A-frame	Approx. 0.4 kVA
			100	MSMF011L1 □ 1	MADL☆11N☆		
			200	MSMF021L1 □ 1	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MSMF041L1 □ 1	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	50	MSMF5AZL1 □ 1	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			100	MSMF012L1 □ 1			
			200	MSMF022L1 □ 1	MADL☆15N☆		
			400	MSMF042L1 □ 1	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
			750	MSMF082L1 □ 1	MCDL☆35N☆	C-frame	Approx. 1.8 kVA
			1000	MSMF092L1 □ 1	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
MQMF (Connector type) 3000 r/min Middle inertia Flat type		Single phase 100 V	100	MQMF011L1 □□	MADL☆11N☆	A-frame	Approx. 0.4 kVA
			200	MQMF021L1 □□	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MQMF041L1 □□	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	100	MQMF012L1 □□	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			200	MQMF022L1 □□	MADL☆15N☆		
			400	MQMF042L1 □□	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
MHMF (Connector type) 3000 r/min High inertia		Single phase 100 V	50	MHMF5AZL1 □□	MADL☆01N☆	A-frame	Approx. 0.4 kVA
			100	MHMF011L1 □□	MADL☆11N☆		
			200	MHMF021L1 □□	MBDL☆21N☆	B-frame	Approx. 0.5 kVA
			400	MHMF041L1 □□	MCDL☆31N☆	C-frame	Approx. 0.9 kVA
		Single phase/ 3-phase 200 V	50	MHMF5AZL1 □□	MADL☆05N☆	A-frame	Approx. 0.5 kVA
			100	MHMF012L1 □□			
			200	MHMF022L1 □□	MADL☆15N☆		
			400	MHMF042L1 □□	MBDL☆25N☆	B-frame	Approx. 0.9 kVA
			750	MHMF082L1 □□	MCDL☆35N☆	C-frame	Approx. 1.8 kVA
			1000	MHMF092L1 □□	MDDL☆55N☆	D-frame	Approx. 2.4 kVA

□ ☆ : For more information, refer to “Model Designation” on P.353.

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For the motor specifications, refer to the A6 series on p.63 to p.118.

● 100 mm sq. or more 0.85 kW to 5.0 kW MSMF, MDMF, MGMF, MHMF
Encoder connector (Large size JL10)*1 type IP67

Motor				Driver		Power capacity (at rated load)
Motor series	Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame	
MSMF (Large size JL10 type) 3000 r/min Low inertia IP67	Single phase/ 3-phase 200 V	1000	MSMF102L1 □□∗	MDDL☆55N☆	D-frame	Approx. 2.9 kVA
		1500	MSMF152L1 □□∗			
	3-phase 200 V	2000	MSMF202L1 □□∗	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MSMF302L1 □□∗	MFDL☆A3N☆	F-frame	Approx. 5.2 kVA
		4000	MSMF402L1 □□∗	MFDL☆B3N☆		Approx. 7.8 kVA
		5000	MSMF502L1 □□∗			
MDMF (Large size JL10 type) 2000 r/min Middle inertia IP67	Single phase/ 3-phase 200 V	1000	MDMF102L1 □□∗	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1500	MDMF152L1 □□∗	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	2000	MDMF202L1 □□∗	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MDMF302L1 □□∗	MFDL☆A3N☆	F-frame	Approx. 5.2 kVA
		4000	MDMF402L1 □□∗	MFDL☆B3N☆		Approx. 7.8 kVA
		5000	MDMF502L1 □□∗			
MGMF (Large size JL10 type) [Low speed/ High torque type] 1500 r/min Middle inertia IP67	Single phase/ 3-phase 200 V	850	MGMF092L1 □□∗	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1300	MGMF132L1 □□∗	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	1800	MGMF182L1 □□∗	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		2400	MGMF242L1 □□∗	MEDL☆93N☆		Approx. 4.5 kVA
		2900	MGMF292L1 □□∗	MFDL☆B3N☆	F-frame	Approx. 7.8 kVA
		4400	MGMF442L1 □□∗			
MHMF (Large size JL10 type) 2000 r/min High inertia IP67	Single phase/ 3-phase 200 V	1000	MHMF102L1 □□∗	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1500	MHMF152L1 □□∗	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	2000	MHMF202L1 □□∗	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MHMF302L1 □□∗	MFDL☆A3N☆	F-frame	Approx. 5.2 kVA
		4000	MHMF402L1 □□∗	MFDL☆B3N☆		Approx. 7.8 kVA
		5000	MHMF502L1 □□∗			

□☆∗ : For more information, refer to “Model Designation” on P.353.

● 100 mm sq. or more 0.85 kW to 5.0 kW MSMF, MDMF, MGMF, MHMF
Encoder connector (Small size JN2)*2 type IP67

Motor				Driver		Power capacity (at rated load)
Motor series	Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame	
MSMF (Small size JN2 type) 3000 r/min Low inertia IP67	Single phase/ 3-phase 200 V	1000	MSMF102L1 □□	MDDL☆55N☆	D-frame	Approx. 2.9 kVA
		1500	MSMF152L1 □□			
	3-phase 200 V	2000	MSMF202L1 □□	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MSMF302L1 □□	MFDL☆A3N☆	F-frame	Approx. 5.2 kVA
		4000	MSMF402L1 □□	MFDL☆B3N☆		Approx. 7.8 kVA
		5000	MSMF502L1 □□			
MDMF (Small size JN2 type) 2000 r/min Middle inertia IP67	Single phase/ 3-phase 200 V	1000	MDMF102L1 □□	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1500	MDMF152L1 □□	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	2000	MDMF202L1 □□	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MDMF302L1 □□	MFDL☆A3N☆	F-frame	Approx. 5.2 kVA
		4000	MDMF402L1 □□	MFDL☆B3N☆		Approx. 7.8 kVA
		5000	MDMF502L1 □□			
MGMF (Small size JN2 type) [Low speed/ High torque type] 1500 r/min Middle inertia IP67	Single phase/ 3-phase 200 V	850	MGMF092L1 □□	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1300	MGMF132L1 □□	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	1800	MGMF182L1 □□	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		2400	MGMF242L1 □□	MEDL☆93N☆		Approx. 4.5 kVA
		2900	MGMF292L1 □□	MFDL☆B3N☆	F-frame	Approx. 7.8 kVA
		4400	MGMF442L1 □□			
MHMF (Small size JN2 type) 2000 r/min High inertia IP67	Single phase/ 3-phase 200 V	1000	MHMF102L1 □□	MDDL☆45N☆	D-frame	Approx. 2.4 kVA
		1500	MHMF152L1 □□	MDDL☆55N☆		Approx. 2.9 kVA
	3-phase 200 V	2000	MHMF202L1 □□	MEDL☆83N☆	E-frame	Approx. 3.8 kVA
		3000	MHMF302L1 □□	MFDL☆A3N☆	F-frame	Approx. 5.2 kVA
		4000	MHMF402L1 □□	MFDL☆B3N☆		Approx. 7.8 kVA
		5000	MHMF502L1 □□			

□☆ : For more information, refer to “Model Designation” on P.353.

● 176 mm sq. or more 5.5 kW or more MDMF, MGMF, MHMF
Encoder connector (Large size JL10)*1 type IP67

Motor				Driver		Power capacity (at rated load)
Motor series	Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame	
MDMF (Large size JL10 type) 1500 r/min Middle inertia IP67*3	3-phase 200 V	7500	MDMF752L1 □6∗	MGDLTC3NF	G-frame	Approx. 11 kVA
		11000	MDMFC12L1 □6	MHDLTE3NF	H-frame	Approx. 15 kVA
		15000	MDMFC52L1 □6	MHDLTE3NF		Approx. 20 kVA
		22000 *3	MDMFD22L1 □6	MHDLTF3NF		Approx. 28 kVA
MGMF (Large size JL10 type) [Low speed/ High torque type] 1500 r/min Middle inertia IP67	3-phase 200 V	5500	MGMF552L1 □6∗	MGDLTC3NF	G-frame	Approx. 8.5 kVA
MHMF (Large size JL10 type) 1500 r/min High inertia IP67	3-phase 200 V	7500	MHMF752L1 □6∗	MGDLTC3NF	G-frame	Approx. 11 kVA

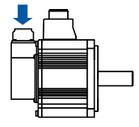
□☆∗ : For more information, refer to “Model Designation” on P.353.

● 176 mm sq. or more 5.5 kW or more MDMF, MGMF, MHMF
Encoder connector (Small size JN2)*2 type IP67

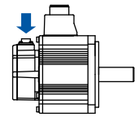
Motor				Driver		Power capacity (at rated load)
Motor series	Power supply	Output (W)	Part No.	A6N series Part No.	Dimension Frame	
MDMF (Small size JN2 type) 1500 r/min Middle inertia IP67*3	3-phase 200 V	7500	MDMF752L1 □5	MGDLTC3NF	G-frame	Approx. 11 kVA
		11000	MDMFC12L1 □5	MHDLTE3NF	H-frame	Approx. 15 kVA
		15000	MDMFC52L1 □5	MHDLTE3NF		Approx. 20 kVA
		22000 *3	MDMFD22L1 □5	MHDLTF3NF		Approx. 28 kVA
MGMF (Small size JN2 type) [Low speed/ High torque type] 1500 r/min Middle inertia IP67	3-phase 200 V	5500	MGMF552L1 □5	MGDLTC3NF	G-frame	Approx. 8.5 kVA
MHMF (Small size JN2 type) 1500 r/min High inertia IP67	3-phase 200 V	7500	MHMF752L1 □5	MGDLTC3NF	G-frame	Approx. 11 kVA

□☆ : For more information, refer to “Model Designation” on P.353.

*1: Encoder connector (Large size JL10)



*2: Encoder connector (Small size JN2)



*3: 22.0 kW motor is IP44.

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A6NF series (Multifunction type)

Position, Speed, Torque, Full-close type

Basic Specifications

Input power	100 V	Main circuit		Single phase 100 V +10 % –15 % to 120 V +10 % –15 % 50 Hz / 60 Hz
		Control circuit		Single phase 100 V +10 % –15 % to 120 V +10 % –15 % 50 Hz / 60 Hz
	200 V	Main circuit	A-frame to D-frame	Single/3-phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
			E-frame to H-frame	3-phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
		Control circuit	A-frame to D-frame	Single phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
			E-frame to H-frame	Single phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
Environment		temperature		Ambient temperature: 0 ˚C to 55 ˚C (free from freezing) Storage temperature: –20 ˚C to 65 ˚C (Max.temperature guarantee: 80 ˚C for 72 hours free from condensation*1)
		humidity		Both operating and storage : 20 %RH to 85 %RH (free from condensation*1)
		Altitude		Lower than 1000 m
		Vibration		5.88 m/s^2 or less, 10 Hz to 60 Hz
Control method				IGBT PWM Sinusoidal wave drive
Encoder feedback				23-bit (8388608 resolution) absolute encoder, 7-wire serial * When using it as an incremental system (not using multi-turn data), do not connect the battery for absolute encoder. Parameter Pr. 0.15 must be set to “1” (factory settings).
External scale feedback				A/B phase, homing signal differential input. Serial communication is also supported. Manufacturers that support serial communication scale: Fagor Automation S.Coop., HEIDENHAIN, Magnescale Co., Ltd., Mitutoyo Corporation Nidec Sankyo Corporation, Renishaw plc
Interface connector	Control signal		Input	Each 8 input can be assigned by the parameter.
			Output	Each 3 output can be assigned by the parameter.
	Analog signal		Output	2 outputs for analog monitors 1 and 2
	Pulse signal		Output	Line driver output for encoder pulses (A/B phase signal) or external scale pulses.
Communication		Realtime Express (RTEX)		Communication for transmission of a real-time operation command, the parameter setting, or the status monitoring.
		USB		USB interface to connect to computers (setup support software PANATERM) for parameter setting or status monitoring.
Safety terminal				Terminal to support safety function.
Front panel				(1) 7 segment LED (double digits) (2) Network status LED(LINK,COM) (3) Rotary switch for node address setting (4) Analog monitor output(Analog monitors 1 and 2)
Regeneration				Size A, B, G and H: Without built-in regenerative resistor (use external resistor) Size C to F: Built-in regenerative resistor (External regenerative resistor is also available)
Dynamic brake				A to G frame: built-in H frame: External resistor only
Control mode				(1) Semi-closed control Position control: Profile position control (PP), Cyclic position control (CP) Velocity control: Cyclic velocity control (CV) Torque control: Cyclic torque control (CT) (2) Full-closed control Position control: Profile position control (PP), Cyclic position control (CP) • The two modes, [1] and [2] above are switched by parameters. • Switch PP/CP/CV/CT mode according to the RTEX communication command.

*1 Air containing water vapor will become saturated with water vapor as the temperature falls, causing dew.

Function

Position control	Control input		Positive direction drive inhibit input, Negative direction drive inhibit, Latch signal, Near home position, etc
	Control output		Positioning completion etc.
	Position command input	Input mode	Command type by RTEX command
		Smoothing filter	Either a primary delay filter or a FIR type filter can be selected against command input.
	Damping control		Available (Up to 3 frequency settings,out of 4 settings in total,can be used simultaneously.)
	Model type damping filter		Available (2 filter available used simultaneously)
	Feed forward function		Available（speed/torque）
	Load variation suppression control		Available
	Gain 3 switching function		Available
	Quadrant glitch inhibit function		Available
	Two-degree-of-freedom control mode		Available
	Motor operatable setup function		Available
	External scale position information monitor		Available
	Other available functions		Friction torque compensation, Torque limit switching function, Torque saturation protection function, Single-turn absolute function, Continuous rotating absolute encoder function
Speed control	Control input		Positive direction drive inhibit input , Negative direction drive inhibit, Latch signal, etc
	Control output		At speed etc.
	Position command input	Input mode	Command type by RTEX command
	Soft start/slowdown function		0 s to 10 s / 1000 r/min Acceleration and deceleration can be set separately. S-curve acceleration/deceleration is also available.
	Feed forward function		Available（torque）
	Load variation suppression control		Available
	Two-degree-of-freedom control mode		Available（standard type）
	External scale position information monitor		Available
	Other available functions		Friction torque compensation, Torque limit switching function, Torque saturation protection function, Single-turn absolute function, Continuous rotating absolute encoder function
Torque control	Control input		Positive direction drive inhibit input, Negative direction drive inhibit, Latch signal, etc
	Control output		At speed etc.
	Position command input	Input mode	Command type by RTEX command
	Speed limit function		Speed limit value can be set by parameter. (Switched by RTEX command.)
	External scale position information monitor		Available
	Other available functions		Single-turn absolute function Continuous rotating absolute encoder function
Full-closed control	Control input		Positive direction drive inhibit input , Negative direction drive inhibit, Latch signal, Near home position , etc
	Control output		Positioning completion etc.
	Position command input	Input mode	Command type by RTEX command
		Smoothing filter	Either a primary delay filter or a FIR type filter can be selected against command input.
	Setting range of external scale division/multiplication.		1/40 times to 125200 times Although the ratio of the encoder pulse (numerator) and external scale pulse (denominator) can be set anywhere between the range of 1 to 2^{23} for the numerator and 1 to 2^{23} for the denominator, Please use within the range indicated above.
	Damping control		Available(Up to 3 frequency settings,out of 4 settings in total,can be used simultaneously.)
	Feed forward function		Available（speed/torque）
	Load variation suppression control		Available
	Gain 3 switching function		Available
	Hybrid vibration suppression function		Available
	Quadrant glitch inhibit function		Available
	Two-degree-of-freedom control mode		Available（standard type）
	Motor operatable setup function		Available
	External scale position information monitor		Available
	Other available functions		Friction torque compensation, Torque limit switching function, Torque saturation protection function
Common	Electronic gear ratio setting		Applicable scaling ratio: 1/1000 to 8000 Although any value of 1 to 2^{30} (numerator) and any value of 1 to 2^{30} (denominator) can be used,resulting value should be within the range shown above.
	Auto tuning		Identifies the load inertia real-time and automatically sets up the gain that meets the stiffness setting when the motor is running with upper and internal operation commands.
	Notch filter		Available (5 filters available)
	Gain switching function		Available
	2-step torque filter		Available
	Position comparison output function		Available
	Protective function		Over-voltage, under-voltage, over-speed, over-load, over-heat, over-current, encoder error, excess position deviation, EEPROM error etc.
	Alarm data trace back function		Tracing back of alarm data is available
	Deterioration diagnosis function		Available

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A6NE series (Basic type)

Position, Speed, Torque type

Basic Specifications

Input power	100 V	Main circuit		Single phase 100 V +10 % –15 % to 120 V +10 % –15 % 50 Hz / 60 Hz
		Control circuit		Single phase 100 V +10 % –15 % to 120 V +10 % –15 % 50 Hz / 60 Hz
	200 V	Main circuit	A-frame to D-frame	Single/3-phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
			E-frame, F-frame	3-phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
		Control circuit	A-frame to D-frame	Single phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
			E-frame, F-frame	Single phase 200 V +10 % –15 % to 240 V +10 % –15 % 50 Hz / 60 Hz
Environment		temperature		Ambient temperature: 0 ˚C to 55 ˚C (free from freezing) Storage temperature: –20 ˚C to 65 ˚C (Max.temperature guarantee: 80 ˚C for 72 hours free from condensation*1)
		humidity		Both operating and storage : 20 %RH to 85 %RH (free from condensation*1)
		Altitude		Lower than 1000 m
		Vibration		5.88 m/s^2 or less, 10 Hz to 60 Hz
Control method				IGBT PWM Sinusoidal wave drive
Encoder feedback				23-bit (8388608 resolution) absolute encoder, 7-wire serial * When using it as an incremental system (not using multi-turn data), do not connect the battery for absolute encoder. Parameter Pr. 0.15 must be set to “1” (factory settings).
Interface connector	Control signal		Input	Each 8 input can be assigned by the parameter.
			Output	Each 3 output can be assigned by the parameter.
	Analog signal		Output	2 outputs for analog monitors 1 and 2
	Pulse signal		Output	Line driver output for encoder pulses (A/B phase signal).
Communication		Realtime Express (RTEX)		Communication for transmission of a real-time operation command, the parameter setting, or the status monitoring.
		USB		USB interface to connect to computers (setup support software PANATERM) for parameter setting or status monitoring.
Front panel				(1) 7 segment LED (double digits) (2) Network status LED(LINK,COM) (3) Rotary switch for node address setting (4) Analog monitor output(Analog monitors 1 and 2)
Regeneration				Size A and B: Without built-in regenerative resistor (use external resistor) Size C to F: Built-in regenerative resistor (External regenerative resistor is also available)
Dynamic brake				A to F frame: built-in
Control mode				(1) Semi-closed control Position control: Profile position control (PP), Cyclic position control (CP) Velocity control: Cyclic velocity control (CV) Torque control: Cyclic torque control (CT) • Switch PP/CP/CV/CT mode according to the RTEX communication command.

*1 Air containing water vapor will become saturated with water vapor as the temperature falls, causing dew.

Function

Position control	Control input		Positive direction drive inhibit input, Negative direction drive inhibit, Latch signal, Near home position , etc
	Control output		Positioning completion etc.
	Position command input	Input mode	Command type by RTEX command
		Smoothing filter	Either a primary delay filter or a FIR type filter can be selected against command input.
	Damping control		Available(Up to 3 frequency settings,out of 4 settings in total,can be used simultaneously.)
	Model type damping filter		Available(2 filter available used simultaneously)
	Feed forward function		Available（speed/torque)
	Load variation suppression control		Available
	Gain 3 switching function		Available
	Quadrant glitch inhibit function		Available
	Two-degree-of-freedom control mode		Available
	Motor operatable setup function		Available
	Other available functions		Friction torque compensation, Torque limit switching function, Torque saturation protection function, Single-turn absolute function, Continuous rotating absolute encoder function
Speed control	Control input		Positive direction drive inhibit input , Negative direction drive inhibit, Latch signal, etc
	Control output		At speed etc.
	Position command input	Input mode	Command type by RTEX command
	Soft start/slowdown function		0 s to 10 s / 1000 r/min Acceleration and deceleration can be set separately. S-curve acceleration/deceleration is also available.
	Feed forward function		Available（torque)
	Load variation suppression control		Available
	Two-degree-of-freedom control mode		Available（standard type)
	Other available functions		Friction torque compensation, Torque limit switching function, Torque saturation protection function, Single-turn absolute function, Continuous rotating absolute encoder function
Torque control	Control input		Positive direction drive inhibit input, Negative direction drive inhibit, Latch signal, etc
	Control output		At speed etc.
	Position command input	Input mode	Command type by RTEX command
	Speed limit function		Speed limit value can be set by parameter. (Switched by RTEX command.)
	Other available functions		Single-turn absolute function Continuous rotating absolute encoder function
Common	Electronic gear ratio setting		Applicable scaling ratio: 1/1000 to 8000 Although any value of 1 to 2^{30} (numerator) and any value of 1 to 2^{30} (denominator) can be used,resulting value should be within the range shown above.
	Auto tuning		Identifies the load inertia real-time and automatically sets up the gain that meets the stiffness setting when the motor is running with upper and internal operation commands.
	Notch filter		Available (5 filters available)
	Gain switching function		Available
	2-step torque filter		Available
	Position comparison output function		Available
	Protective function		Over-voltage, under-voltage, over-speed, over-load, over-heat, over-current, encoder error, excess position deviation, EEPROM error etc.
	Alarm data trace back function		Tracing back of alarm data is available
	Deterioration diagnosis function		Available

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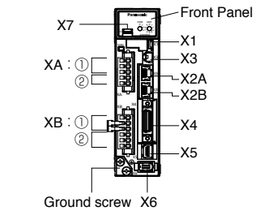
* All dimensions shown in this catalog are for the A6NF series, but outer dimensions are the same as the A6NE series.

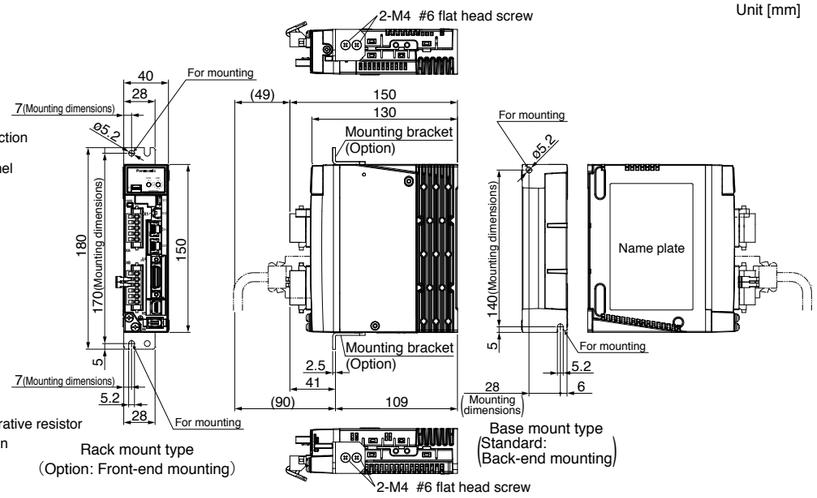
A-frame

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : RTEX RX connector
X2B : RTEX TX connector
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : ①Terminals for external regenerative resistor
②Terminals for motor connection





A-frame: Connector of driver side			Multifunction type	Basic type
Connector XA	S05B-F32SK-GGXR (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector XB	S06B-F32SK-GGXR (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector X1	UB-M5BR-S14-4S (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector X3	CIF-HS08SS-071-TB (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	–
Connector X2A	MOD-WRJ88LY1G-TP+ (or equivalent)	HTK	●	●
Connector X2B	MOD-WRJ88LY1G-TP+ (or equivalent)	HTK	●	●
Connector X4	DF02R026NA2 (or equivalent)	Japan Aviation Electronics Ind.	●	●
Connector X5	MUF-RS10SK-GKX-TB (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	–
Connector X6	3E106-2230KV (or equivalent)	Sumitomo 3M	●	●
Connector X7	53398-8605 (5pin)	Molex	●	●

Mass: 0.8 kg

<Attached to the driver>

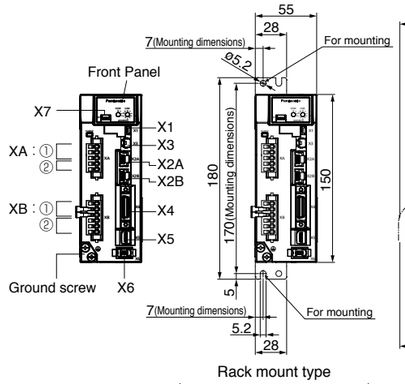
Connector of power and motor side		
Connector XA	05JFAT-SAXGGKK-A	J.S.T. Mfg. Co., Ltd.
Connector XB	06JFAT-SAXGGKK-A	J.S.T. Mfg. Co., Ltd.

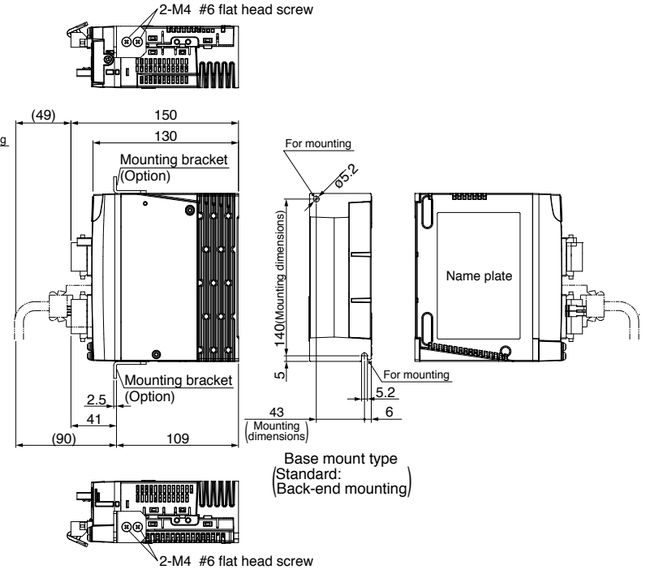
B-frame

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : RTEX RX connector
X2B : RTEX TX connector
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : ①Terminals for external regenerative resistor
②Terminals for motor connection





* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

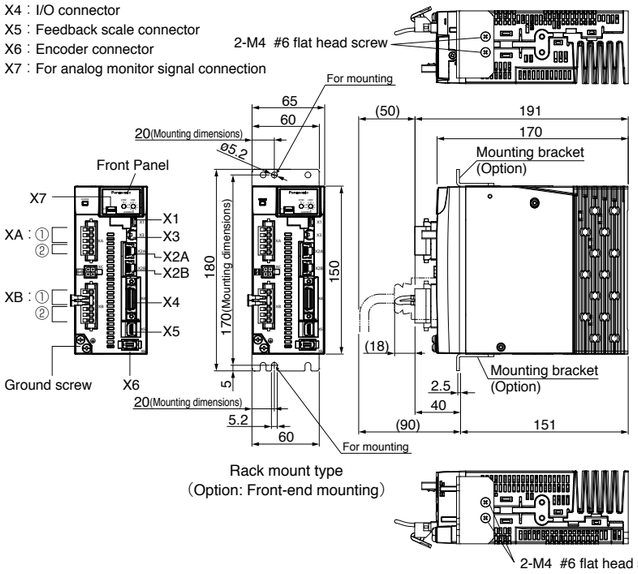
Mass: 1.0 kg

C-frame

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : RTEX RX connector
X2B : RTEX TX connector
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : ①Terminals for external regenerative resistor
②Terminals for motor connection



* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

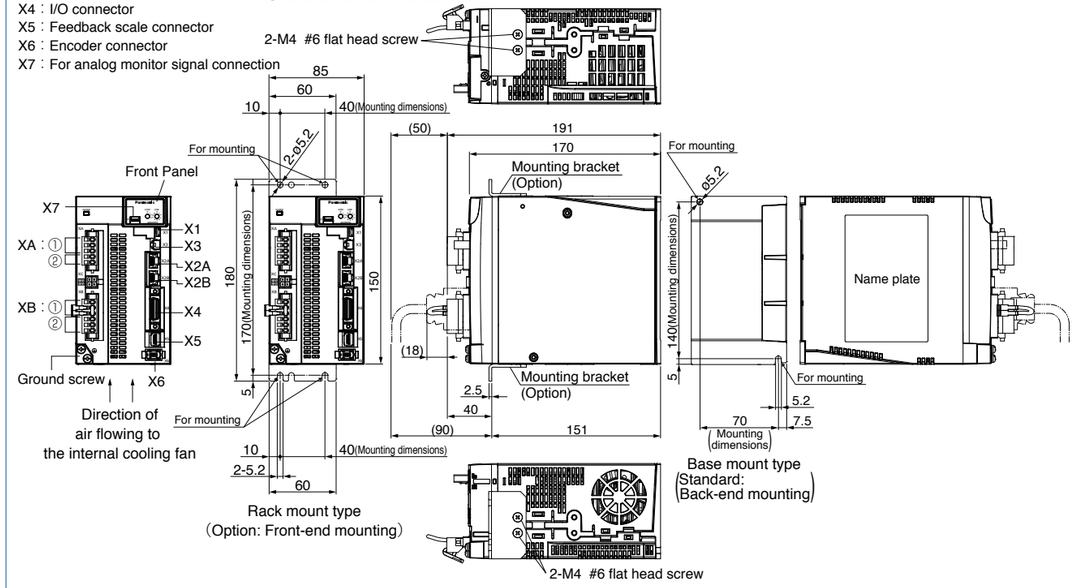
Mass: 1.6 kg

D-frame (200 V)

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : RTEX RX connector
X2B : RTEX TX connector
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : ①Terminals for external regenerative resistor
②Terminals for motor connection



* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 2.1 kg

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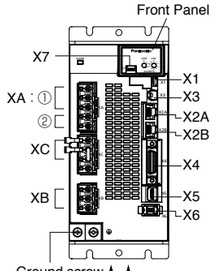
* All dimensions shown in this catalog are for the A6NF series, but outer dimensions are the same as the A6NE series.

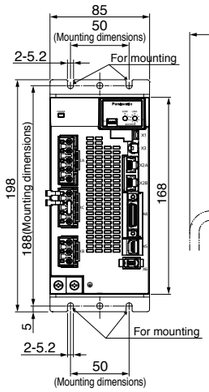
E-frame (200 V)

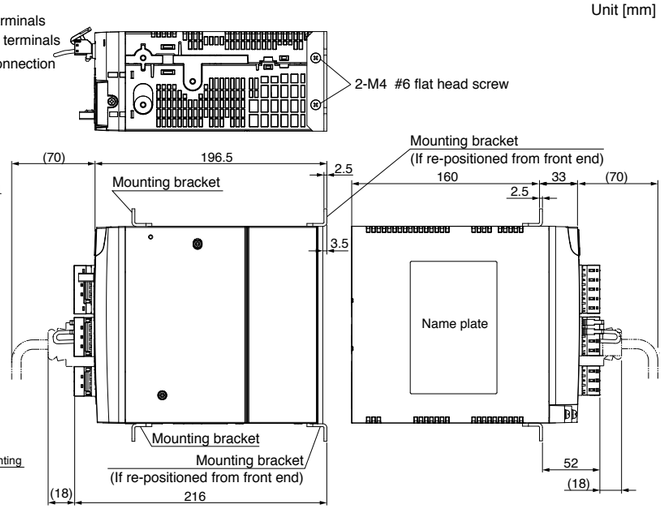
Unit [mm]

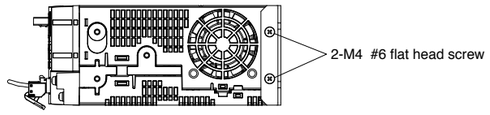
X1 : USB connector
X3 : Safety function connector
X2A : RTEX RX connector
X2B : RTEX TX connector
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : Terminals for motor connection
XC : Terminals for external regenerative resistor









E-frame: Connector of driver side		
Connector XA	S05B-JTSLSK-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XB	S03B-JTSLSK-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XC	S04B-JTSLSS-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.

<Attached to the driver>

E-frame: Connector of power and motor side		
Connector XA	05JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XB	03JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XC	04JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.

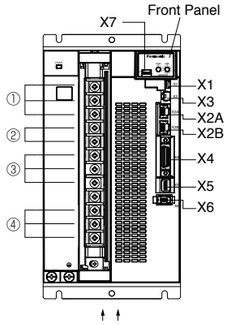
Mass: 2.7 kg

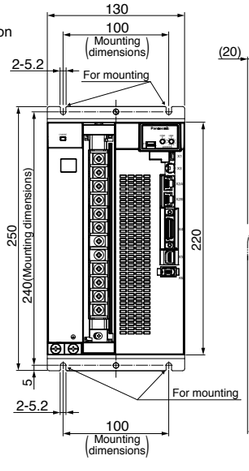
* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

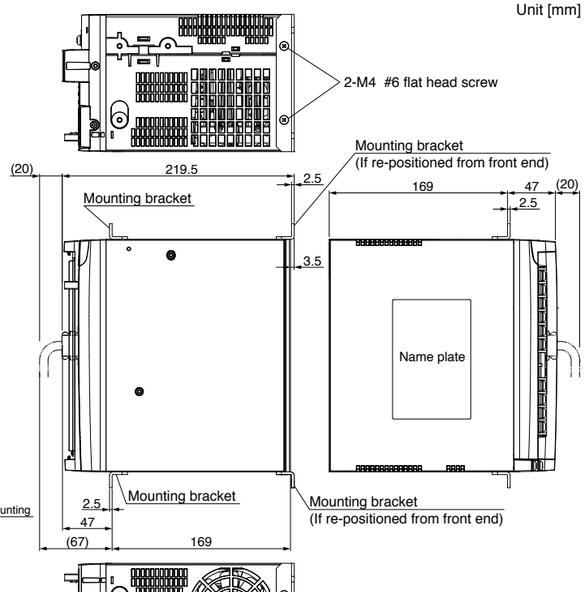
F-frame (200 V)

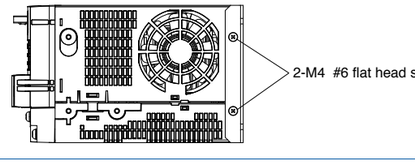
Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : RTEX RX connector
X2B : RTEX TX connector
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection









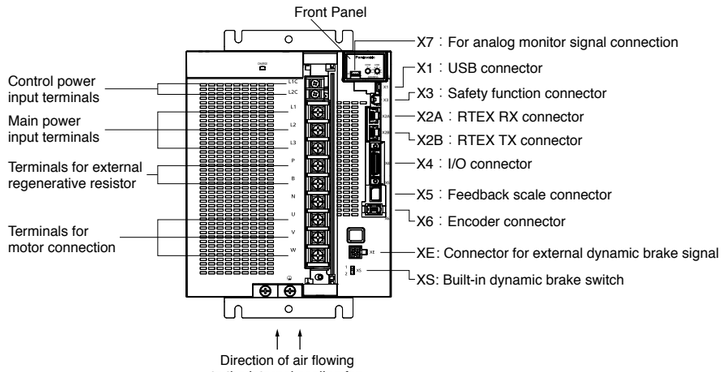
①Main power input terminals
②Control power input terminals
③Terminals for external regenerative resistor
④Terminals for motor connection

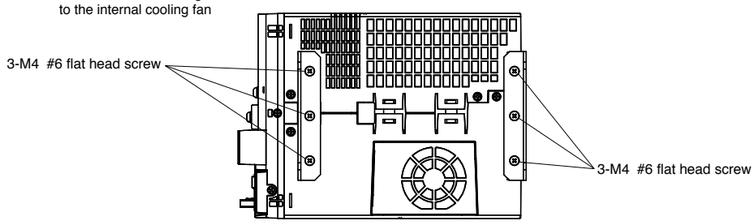
Mass: 5.2 kg

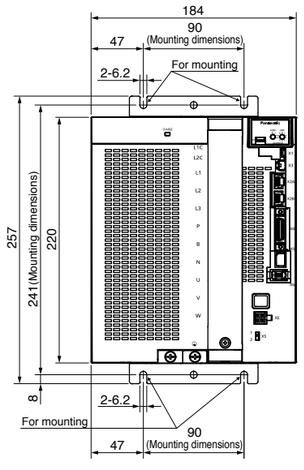
* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

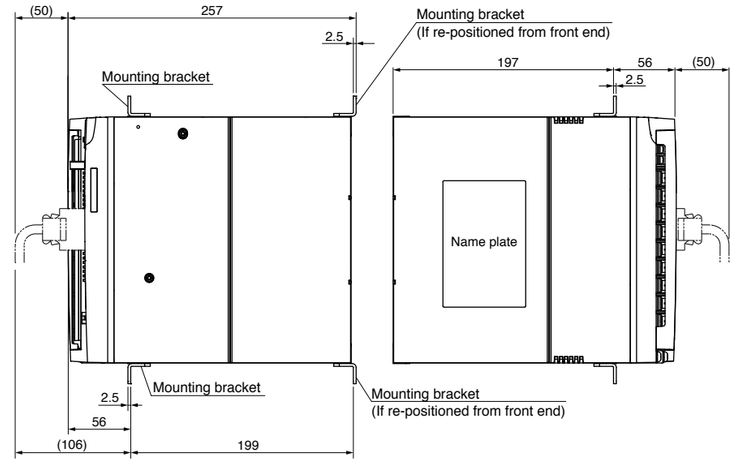
G-frame (200 V) (A6NE series are not available.)

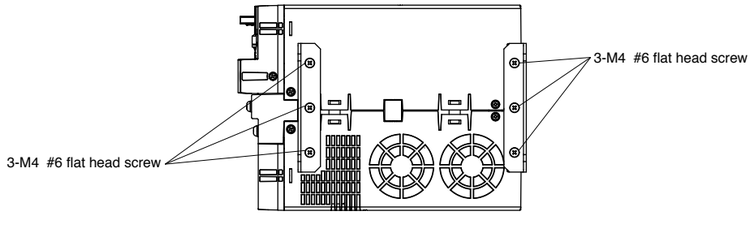
Unit [mm]











Connector of driver side	Controlor side (customer prepares)
Connector XE : 5569-04A2-210 (MOLEX)	Connector : 5557-04R-210 (MOLEX) Pin : 5556PBTL

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 8.2 kg

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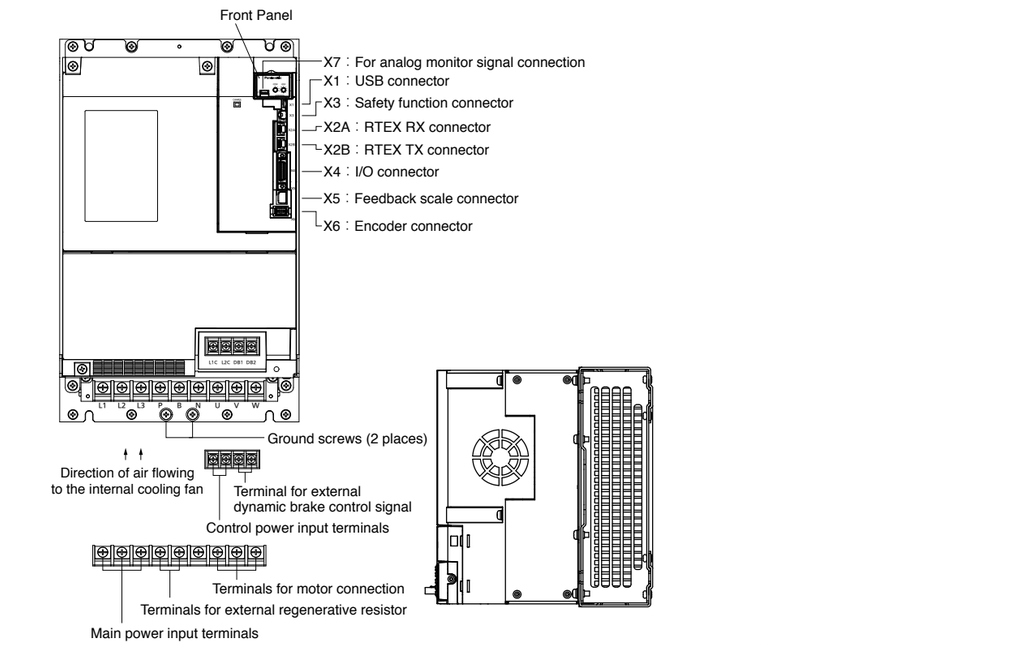
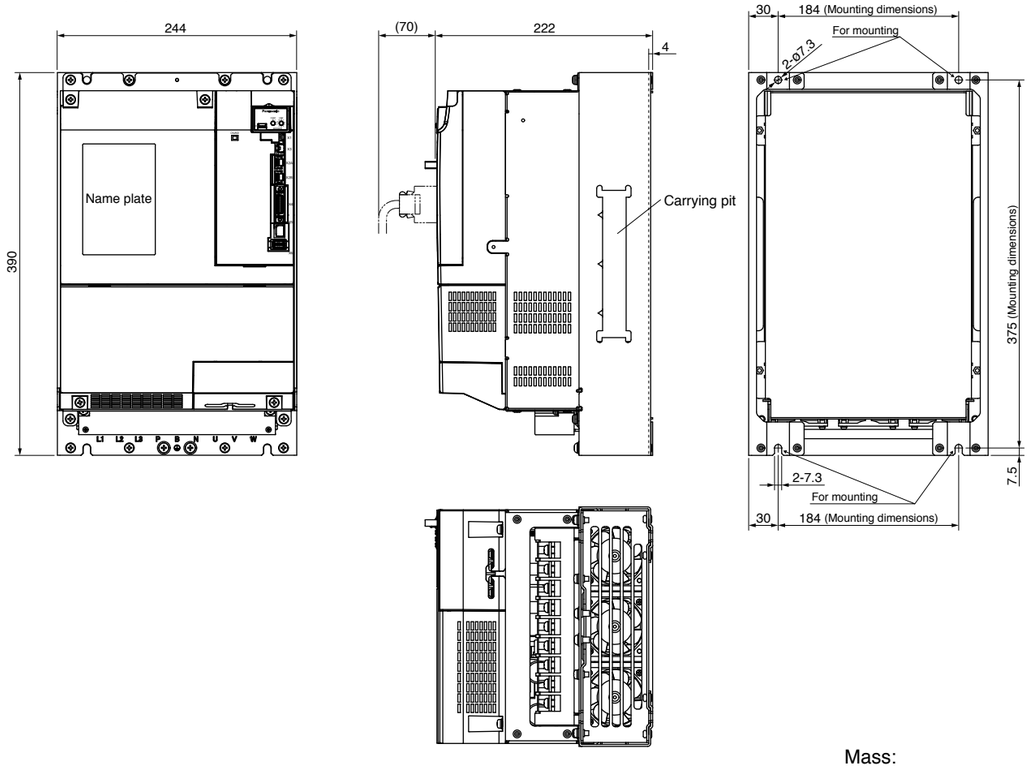
H-frame (200 V) (A6NE series are not available.)

Unit [mm]





* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass:
MHDLTE3NF/ 14.2 kg
MHDLTF3NF/ 15.2 kg

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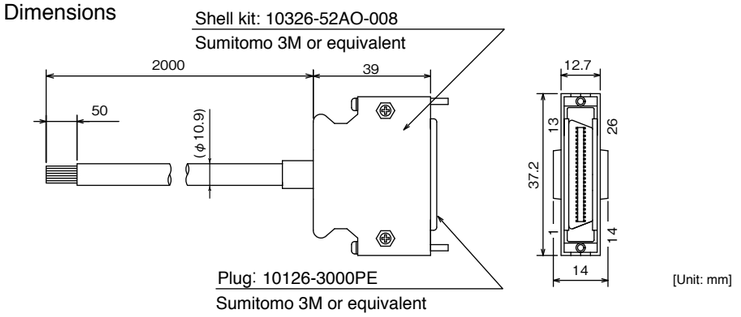
Refer to P.29 to P.42 for other options than the interface cable and interface connector kit.

Cable for Interface

Part No.	DV0P0800	Cable length 2 m, core wire AWG 26 is connected.

• Dimensions



• Table for wiring

Pin No.	Signal name	color	Pin No.	Signal name	color	Pin No.	Signal name	color
1*	BRK-OFF+	Orange (Red1)	10*	HOME	Pink (Black1)	19	OB–/OCMP2–	Pink (Red2)
2*	BRK-OFF–	Orange (Black1)	11*	EXT2	Orange (Red2)	20	OB+/OCMP2+	Pink (Black2)
3*	ALM+	Gray (Red1)	12*	EXT3	Orange (Black2)	21	OCMP3+	Orange (Red3)
4*	ALM–	Gray (Black1)	13*	SI-MON4	Gray (Red2)	22	OCMP3–	Gray (Red3)
5*	SI-MON5	White (Red1)	14	BTP-I	Gray (Black2)	23	–	Gray (Black3)
6	I-COM	White (Black1)	15	BTN-I	White (Red2)	24	–	White (Red3)
7*	POT	Yellow (Red1)	16	GND	White (Black2)	25*	EX-OUT1+	White (Black3)
8*	NOT	Yellow (Black1)	17	OA+/OCMP1+	Yellow (Red2)	26*	EX-OUT1–	Orange (Black3)
9*	SI-MON1	Pink (Red1)	18	OA–/OCMP1–	Yellow (Black2)			

The signals allocated to the pin No. with " * " in the table are factory default.

<Remarks>
Color designation of the cable e.g.) Pin-1 Cable color : Orange (Red1) : One red dot on the cable

<Caution>
The shield of this cable is not connected to the terminal of the connector.
The shielded wire of the cable is connected to the connector shell of the cable, and is connected to the FG via the connector shell on the Driver side. When connecting the shielded wire of the cable to GND, use the connector kit DV0P0770 for the interface. At that time, please note that if you connect the shield and the connector shell on the cable side and process it, FG and GND will be connected.

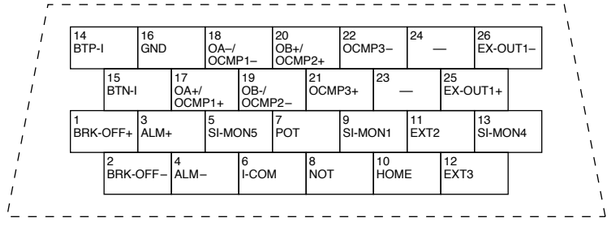
Connector Kit for Interface

Part No.	DV0P0770

• **Components**

Title	Part No.	Number	Manufacturer	Note
Connector	10126-3000PE	1	Sumitomo 3M (or equivalent)	For CN X4 (26-pins)
Connector cover	10326-52A0-008	1		

• Pin disposition: Connector X4 (26 pins) (viewed from the soldering side)



<Remarks>

1. Check the stamped pin-No. on the connector body while making a wiring.
2. For the symbols representing the signal names or the functions of the signals in the figure above, refer to the operation manual.

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Servo driver with EtherCAT open network

EtherCAT

EtherCAT
AC servo motor & driver
MINAS A6B series
Special Order Product

A6BE series
A6BF series

Quickly — **Response frequency 3200 Hz & communication rate 100 Mbps enable fast and highly accurate operation.**
Configurable even for motors with a maximum rotating speed 6500 r/min.*

* MHMF and MQMF types with a maximum wattage 400 W

Wisely — **New algorithm "Two-degree-of-freedom control method" is used to improve machining accuracy and productivity.**

Easily — **Easy and speedy set-up with set-up support software "PANATERM"**

●Fully-featured EtherCAT application (7 control modes, 32 origin-return modes, 2 synchronous modes, and an asynchronous mode.) ●Capable of system upgrade with various slaves. ●Capable of establishing PC-based systems without needing dedicated hardware. ●Planed to pass official EtherCAT Conformance Test. ●Under development of A6BF with safety I/F *2 corresponding to international standard, and A6BL/A6BM supporting linear motors *2 : IEC61800-5-2 STO, IEC61508 SIL3.

●The EtherCAT is a registered trademark of patented technology licensed from Beckhoff Automation GmbH in Germany.

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Special Order Product For more information, please visit our website or request to our distributors separately.

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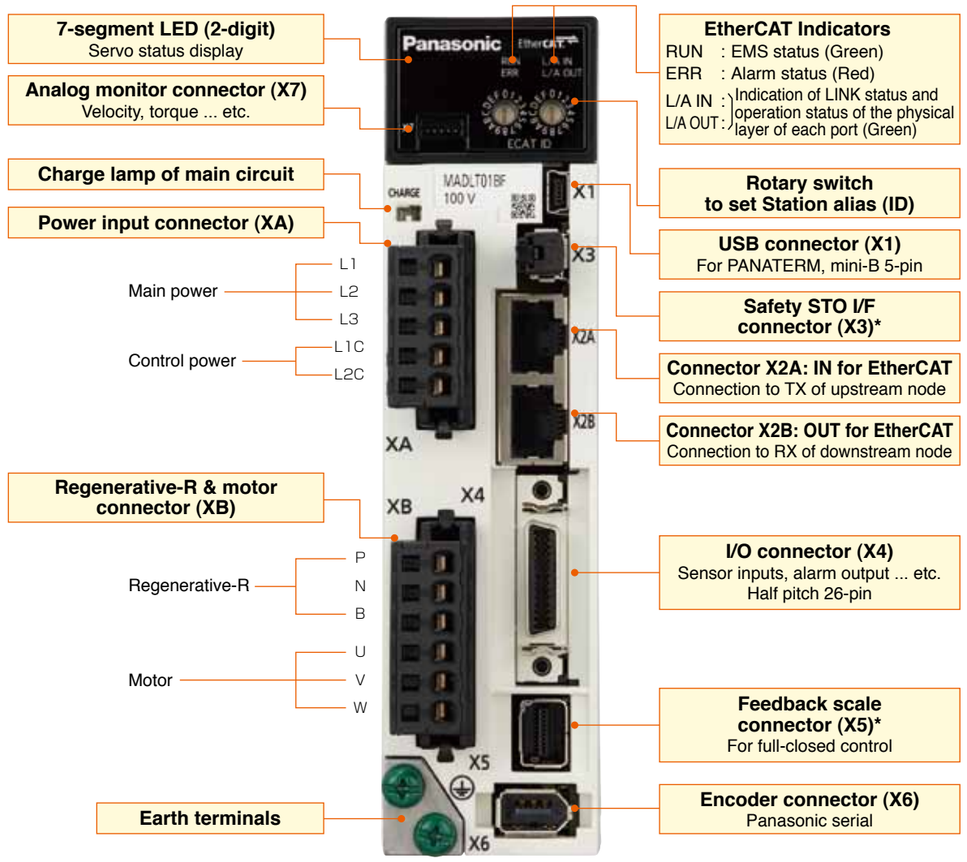
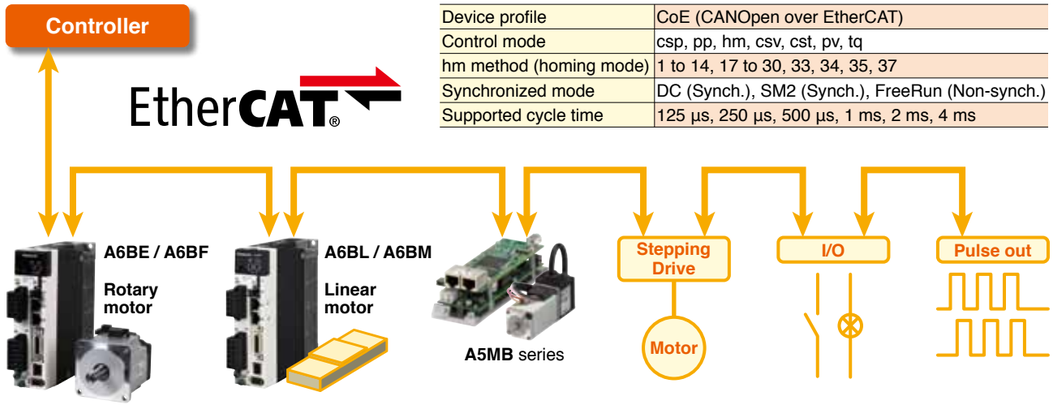
Appearance/ System configuration

Appearance



* The photo is A6BF series. There are no X3 and X5 connectors in the A6BE series.

Typical system configuration



EtherCAT specification

Device profile	CoE (CANOpen over EtherCAT)
Control mode	csp, pp, hm, csv, cst, pv, tq
hm method (homing mode)	1 to 14, 17 to 30, 33, 34, 35, 37
Synchronized mode	DC (Synch.), SM2 (Synch.), FreeRun (Non-synch.)
Supported cycle time	125 µs, 250 µs, 500 µs, 1 ms, 2 ms, 4 ms

● For supported motors, refer to A6 series P.29 to P.42. For options, refer to A6N series P.368 For more information, refer to specification sheets because “Signal names” and “Pin configuration” of connectors vary.

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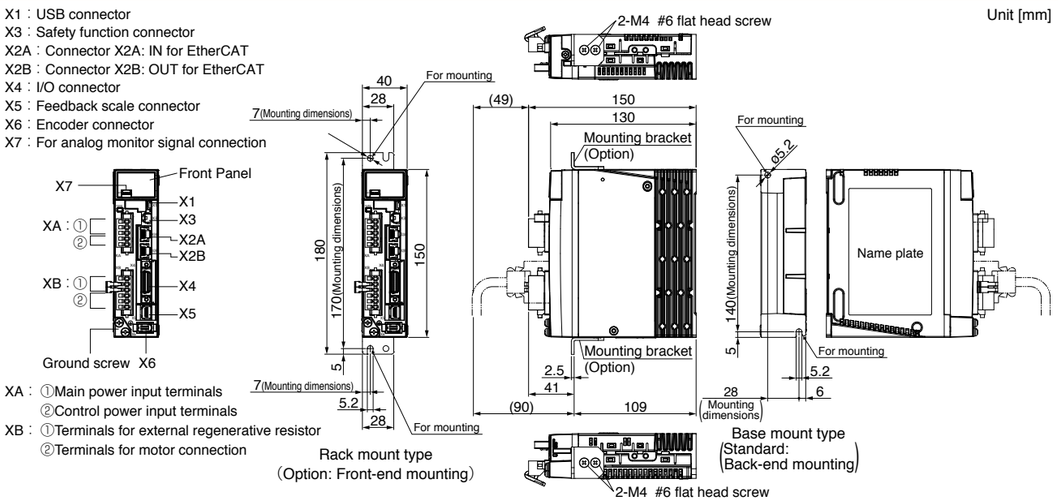
* All dimensions shown in this catalog are for the A6BF series, but outer dimensions are the same as the A6BE series.

A-frame

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : ①Terminals for external regenerative resistor
②Terminals for motor connection

Unit [mm]



A-frame: Connector of driver side			Multifunction type	Basic type
Connector XA	S05B-F32SK-GGXR (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector XB	S06B-F32SK-GGXR (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector X1	UB-M5BR-S14-4S (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	●
Connector X3	CIF-HS08SS-071-TB (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	–
Connector X2A	MOD-WRJ88LY1G-TP+ (or equivalent)	HTK	●	●
Connector X2B	MOD-WRJ88LY1G-TP+ (or equivalent)	HTK	●	●
Connector X4	DF02R026NA2 (or equivalent)	Japan Aviation Electronics Ind.	●	●
Connector X5	MUF-RS10SK-GKX-TB (or equivalent)	J.S.T. Mfg. Co., Ltd.	●	–
Connector X6	3E106-2230KV (or equivalent)	Sumitomo 3M	●	●
Connector X7	53398-8605 (5pin)	Molex	●	●

Mass: 0.8 kg

<Attached to the driver>

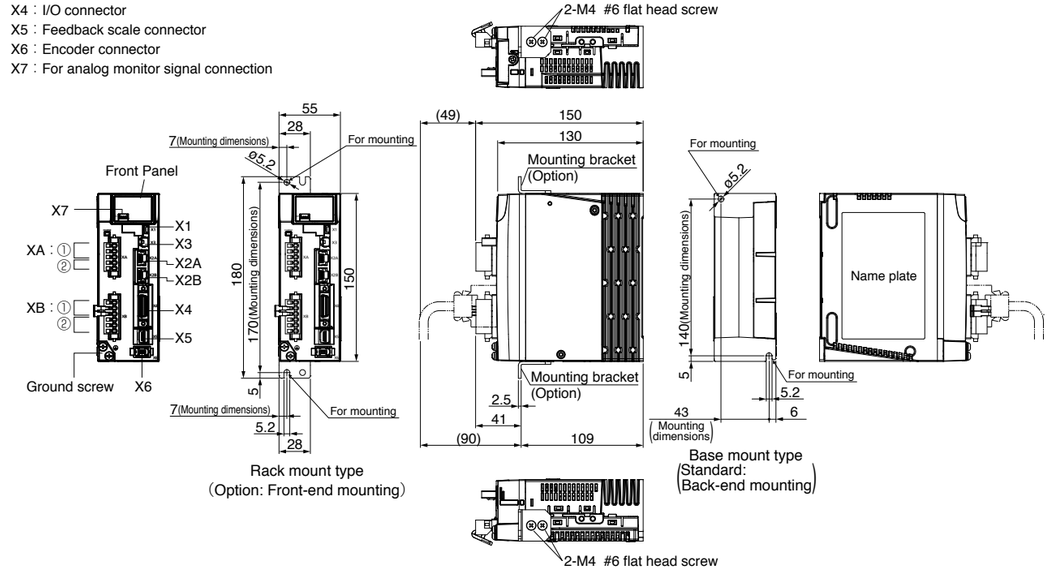
Connector of power and motor side		
Connector XA	05JFAT-SAXGGKK-A	J.S.T. Mfg. Co., Ltd.
Connector XB	06JFAT-SAXGGKK-A	J.S.T. Mfg. Co., Ltd.

B-frame

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : ①Terminals for external regenerative resistor
②Terminals for motor connection



* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 1.0 kg

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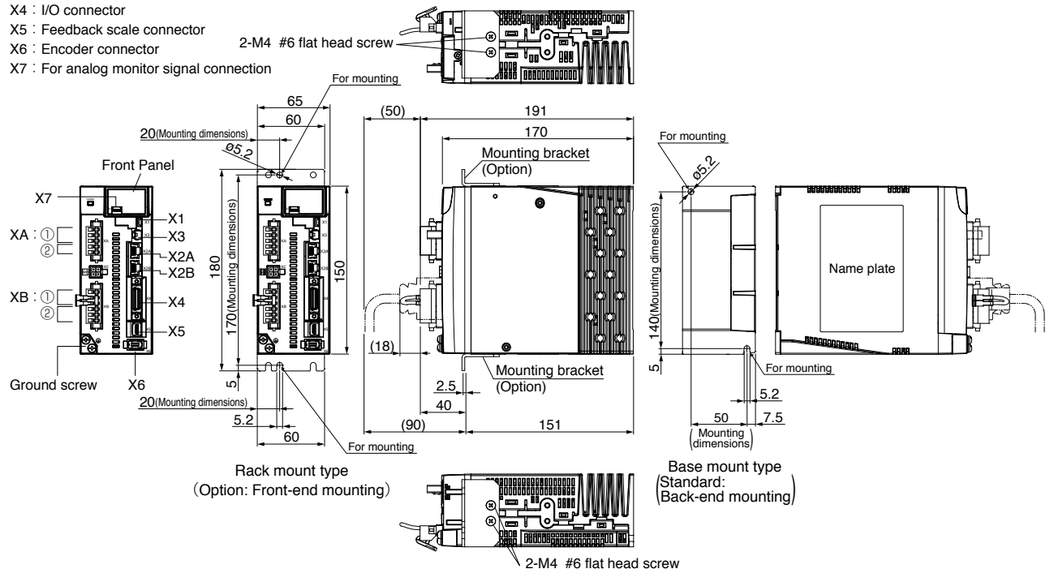
* All dimensions shown in this catalog are for the A6BF series, but outer dimensions are the same as the A6BE series.

C-frame

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : ①Terminals for external regenerative resistor
②Terminals for motor connection



* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

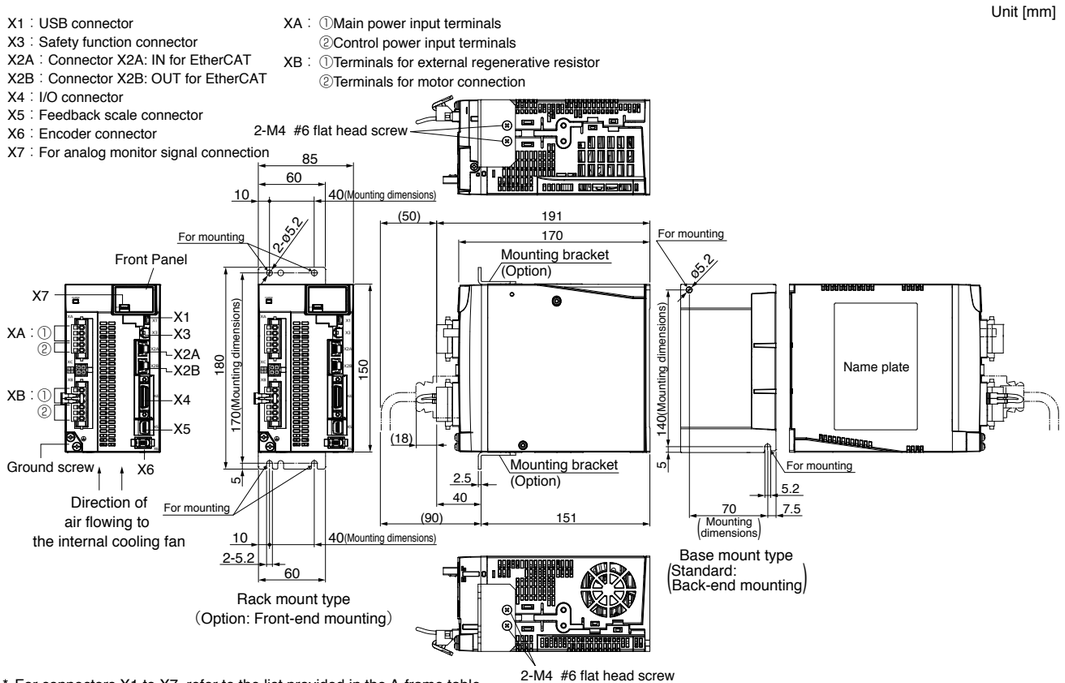
Mass: 1.6 kg

D-frame (200 V)

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : ①Terminals for external regenerative resistor
②Terminals for motor connection



* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

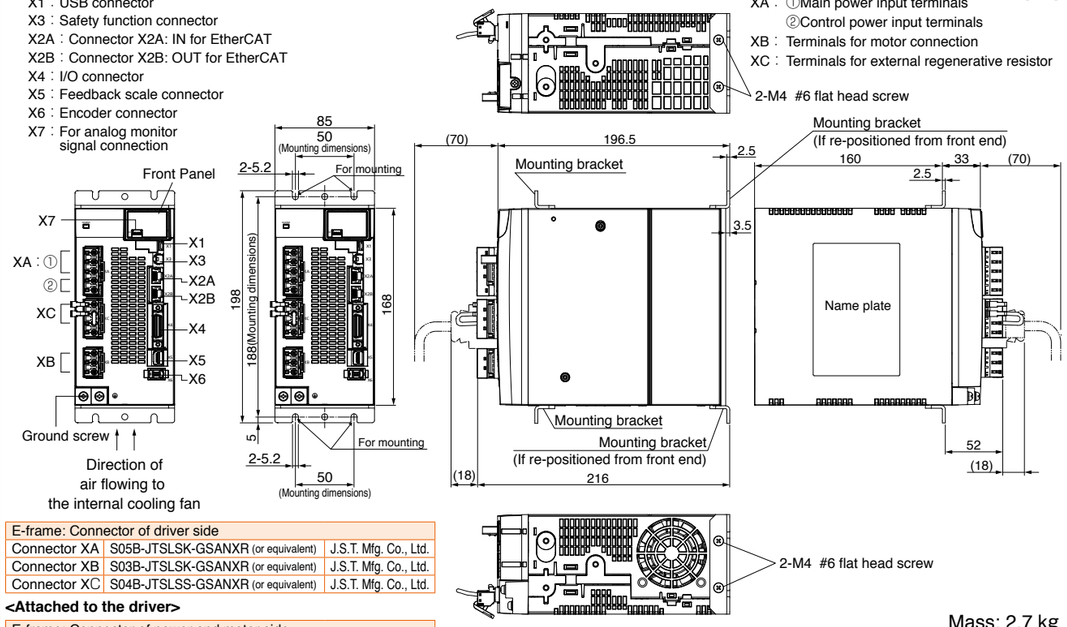
Mass: 2.1 kg

E-frame (200 V)

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection

XA : ①Main power input terminals
②Control power input terminals
XB : Terminals for motor connection
XC : Terminals for external regenerative resistor



E-frame: Connector of driver side		
Connector XA	S05B-JTSLSK-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XB	S03B-JTSLSK-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XC	S04B-JTSLSS-GSANXR (or equivalent)	J.S.T. Mfg. Co., Ltd.

<Attached to the driver>

E-frame: Connector of power and motor side		
Connector XA	05JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XB	03JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.
Connector XC	04JFAT-SAXGSA-L (or equivalent)	J.S.T. Mfg. Co., Ltd.

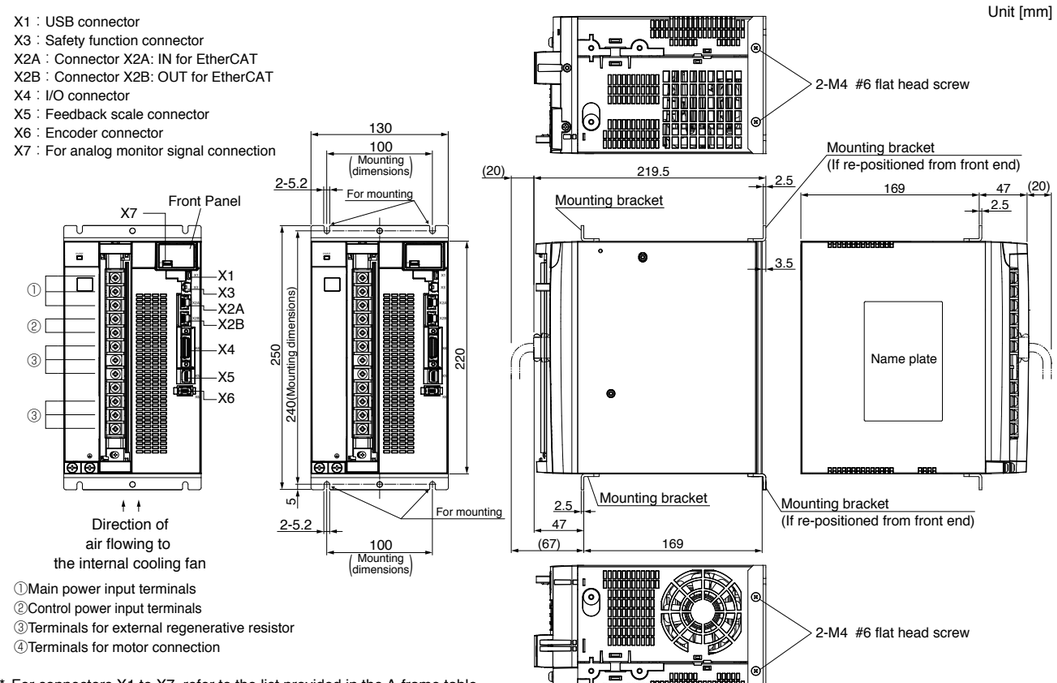
Mass: 2.7 kg

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

F-frame (200 V)

Unit [mm]

X1 : USB connector
X3 : Safety function connector
X2A : Connector X2A: IN for EtherCAT
X2B : Connector X2B: OUT for EtherCAT
X4 : I/O connector
X5 : Feedback scale connector
X6 : Encoder connector
X7 : For analog monitor signal connection



①Main power input terminals
②Control power input terminals
③Terminals for external regenerative resistor
④Terminals for motor connection

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 5.2 kg

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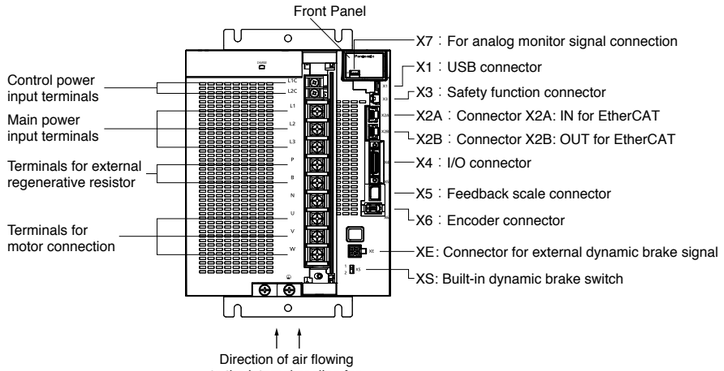
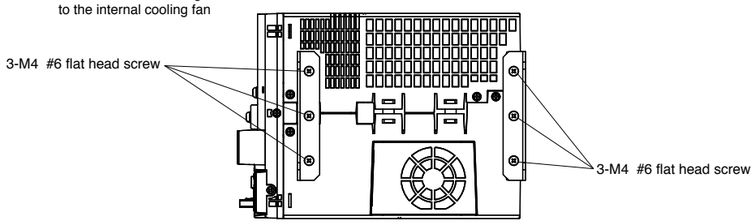
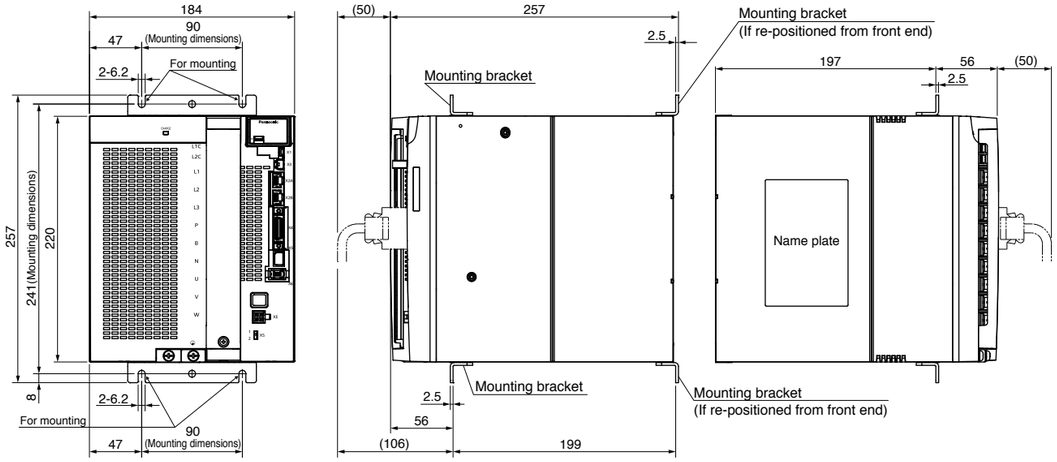
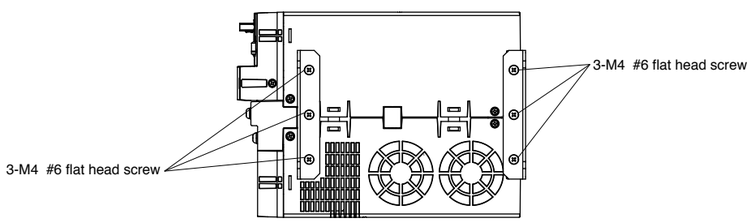
G-frame (200 V) (A6BE series are not available.)

Unit [mm]









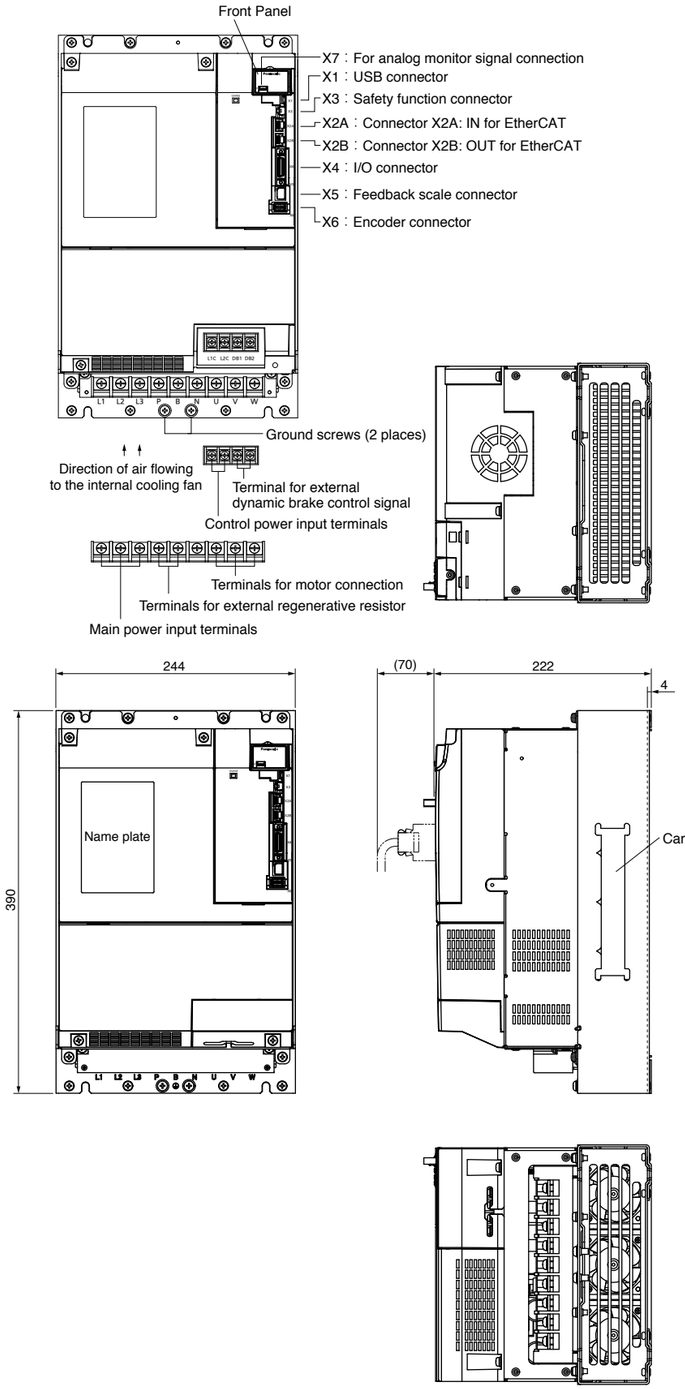
Connector of driver side	Controlor side (customer prepares)
Connector XE : 5569-04A2-210 (MOLEX)	Connector : 5557-04R-210 (MOLEX) Pin : 5556PBTL

* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass: 8.2 kg

H-frame (200 V) (A6BE series are not available.)

Unit [mm]



* For connectors X1 to X7, refer to the list provided in the A-frame table because both frames use the same connectors.

Mass:
MHDLTE3BF/ 14.2 kg
MHDLTF3BF/ 15.2 kg

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Compact Servo Only for Position Control.

Ultra compact position control type

MINAS E Series

1 Best Fit to Small Drives

- Further evolution in down-sizing, by 47 % in size. (Note)
- Exclusively designed for position control.

(Note) Compared to MUDS043A1

2 Easy to Handle, Easy to Use

- DIN-rail mounting unit (option) improves handling/installation.
- User-friendly Console makes the setup easy.
- High functionality Real-Time Auto-Gain Tuning enables adjustment-free operation.

Console
Option

3 High-Speed Positioning with Resonance Suppression Filters

- Built-In notch filter suppresses resonance of the machine.
- Built-in adaptive filter detect resonance frequency and suppress vibration.

4 Smoother operation for Low Stiffness Machine

- Damping control function suppresses vibration during acceleration/deceleration

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1. Easy to Handle, Easy to Use

High-functionality Real-Time Auto-Gain Tuning (Note 1)

- Offers real automatic gain tuning for low and high stiffness machines with a combination of an adaptive filter.
- Supports the vertical axis application where the load torque is different in rotational direction.

DIN-rail mounting unit (option)

- DIN-rail mounting unit allows parallel mounting with small control devices such as PLC.
- Easy to mount and easy to dismount.

2. Further Reduction of Vibration

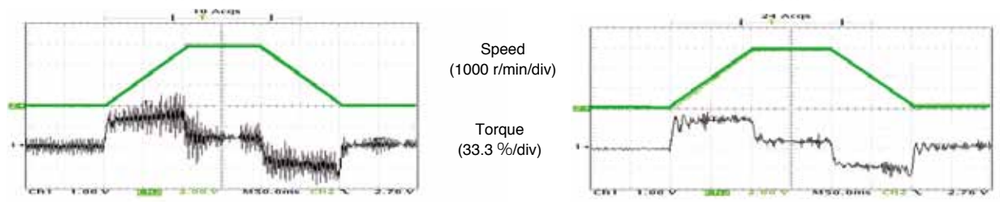
Adaptive filter (Note1)

- Makes the notch filter frequency automatically follow the machine resonance frequency in real-time auto-gain tuning.
- Suppression of “Judder” noise of the machine, which is caused by variation of the machines or resonance frequency due to aging, can be expected.

Notch filter (Note1)

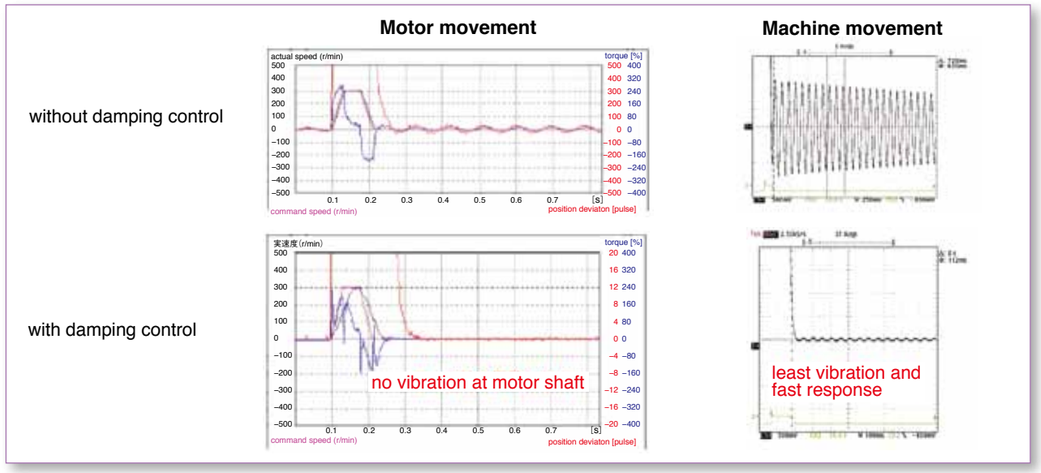
- 1-channel notch filter is equipped in the driver independent from adaptive filter.
- Each of 2 filters can set up frequency and notch width, and frequency in 1Hz unit. Suppression of "Judder" noise of the machine which has multiple resonance points can be expected.

Effect of notch filter



Damping control (Note1)

- You can suppress vibration occurring at both starting and stopping in low stiffness machine, by manually setting up vibration frequency in 0.1 Hz unit. Note) Only applies to manual adjustment



(Note1) Select at positioning action mode.
- At high speed positioning mode (Pr02=0) Select either one of notch filter, damping control or high-functionality real-time auto- gain tuning. Not possible to use them all at the same time. Adaptive filter cannot be used.
- At high-functionality positioning mode (Pr02=1) All of notch filter, damping control, high-functionality real-time auto-gain tuning and adaptive filter can be used at the same time.

3. Further Flexibility and Multiplicity

Console (Option)

- You can set up parameters, copy and make a JOG run.
- Convenient for maintenance at site.
- Refer to P.403, Options.

Command control modes

- Offers 2 command modes, “Position control” and “Internal velocity control”.
- You can make a 4-speed running at preset values with parameter at internal velocity control mode.

Inrush current suppressing function

- Inrush suppressing resistor, which prevent the circuit breaker shutdown of the power supply caused by inrush current at power-on, is equipped in this driver.
- Prevents unintentional shutdown of the power supply circuit breaker in multi axis application and does not give load to the power line.

Regeneration discharging function

- Discharges the regenerative energy with external resistor, where energy is generated while stopping the load with large moment of inertia, or use in up-down operation, and is returned to the driver from the motor.
- No regenerative resistor is installed in the driver.
- It is highly recommended to install an external regenerative resistor (option).

Built-in dynamic brake

- You can select the dynamic brake action which short the servo motor windings of U, V and W, at Servo-OFF, CW/CCW over- travel inhibition, power shutdown and trip.
- You can select the action sequence depending on the machine requirement.

Setup support software (Option)

- With the setup support software, “PANATERM” via RS232 / RS485 communication port, you can monitor the running status of the driver and set up parameters.

  Note) Refer to P.398 for setup support software.

Key-way shaft and tapped shaft end

- Easy pulley attachment and easy maintenance
- Attache screw to the tapped shaft to prevent key or pulley from being pulled out.

Wave-form graphic function

- With the setup support software, “PANATERM”, you can monitor the “Command speed”, “Actual speed”, “Torque”, “Position deviation” and “Positioning complete signal”.
- Helps you to analyze the machine and shorten the setup time.

  Note) Refer to P.398 for setup support software.

Frequency analyzing function

- You can confirm the response frequency characteristics of total machine mechanism including the servo motor with the setup support software, “PANATERM”.
- Helps you to analyze the machine and shorten the setup time.

  Note) Refer to P.398 for setup support software.

Torque limit switching function

- You can select 2 preset torque limit value from external input.
- Use this function for tension control or press-hold control.

Conformity to CE and UL Standards

Subject	Standard conformed		
Motor	IEC60034-1	IEC60034-5 UL1004 CSA22.2 No.100	Conforms to Low-Voltage Directives
Motor and driver	EN50178	UL508C CSA22.2 No.14	
	EN55011	Radio Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment	Conforms to references by EMC Directives
	EN61000-6-2	Immunity for Industrial Environments	
	EC61000-4-2	Electrostatic Discharge Immunity Test	
	IEC61000-4-3	Radio Frequency Electromagnetic Field Immunity Test	
	IEC61000-4-4	Electric High-Speed Transition Phenomenon/Burst Immunity Test	
	IEC61000-4-5	Lightening Surge Immunity Test	
	IEC61000-4-6	High Frequency Conduction Immunity Test	
	IEC61000-4-11	Instantaneous Outage Immunity Test	

IEC : International Electrotechnical Commission
EN : Europaischen Normen
EMC : Electromagnetic Compatibility
UL : Underwriters Laboratories
CSA : Canadian Standards Association

Pursuant to at the directive 2004/108/EC,article 9(2)

Panasonic Testing Centre
Panasonic Service Europe,
a division of Panasonic Marketing Europe GmbH
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Motor Line-up

Motor series		Rated output (kW)	Rated rotational speed (Max. speed) (r/min)	Rotary encoder: 2500 P/r incremental	Rotary encoder: 17bit absolute/ incremental	Brake: Holding	Gear: High precision	UL/ CSA	Enclosure	Features	Applications
Ultra low inertia	MUMA	**0.05 to 0.4** 0.05 0.1 0.2 0.4	3000 (5000)	○	–	○	○	○	IP65 Except shaft throughhole and connector	Small capacity Ultra low inertia	SMT machines Inserters High repetitive positioning application

Model Designation

Servo Motor

M U M A 5 A Z P 1 S ＊ ＊

Special specifications

Symbol	Series
MUMA	Ultra low inertia（50 W to 400 W）

Motor rated output

Symbol	Rated output
5A	50 W
01	100 W
02	200 W
04	400 W

Voltage specifications

Symbol	Specifications
1	100 V
2	200 V
Z	100 V/200 V common (50 W only)

Rotary encoder specifications

Symbol	Format	Pulse counts	Resolution	Wires
P	Incremental	2500 P/r	10000	5

Motor structure

Symbol	Shaft	Holding brake		Oil seal	
	Key-way, center tap	without	with	without	with*
S	●	●		●	
T	●		●	●	

* Motor with oil seal is manufactured by order.

Design order

Symbol	Specifications
1	Standard

See P.389 for motor specifications

Motor with gear reducer

M U M A 0 1 1 P 3 1 N

Symbol	Series
MUMA	Ultra low inertia（100 W to 400 W）

Motor rated output

Symbol	Rated output
01	100 W
02	200 W
04	400 W

Voltage specifications

Symbol	Specifications
1	100 V
2	200 V

Rotary encoder specifications

Symbol	Format	Pulse counts	Resolution	Wires
P	Incremental	2500 P/r	10000	5

Gear reduction ratio, gear type

Symbol	Gear reduction ratio	Motor output (W)			Gear type
		100	200	400	
1N	1/5	●	●	●	For high accuracy
2N	1/9	●	●	●	
4N	1/25	●	●	●	

Motor structure

Symbol	Shaft	Holding brake	
	Key-way	without	with
3	●	●	
4	●		●

See P.394 for motor with gear reducer specifications

Servo Driver

M K D E T 1 3 1 0 P ＊ ＊

Special specifications

Frame symbol

Symbol	Frame
MKDE	E series, K-frame
MLDE	E series, L-frame

Power device Max. current rating

Symbol	Current rating
T1	10 A
T2	15 A

Supply voltage specifications

Symbol	Specifications
1	Single phase, 100 V
2	Single phase, 200 V
3	3-phase, 200 V
5	Single/3-phase, 200 V

Control mode

Symbol	Specifications
P	Pulse train

Current detector current rating

Symbol	Current rating
05	5 A
10	10 A

See P.385 for driver specifications

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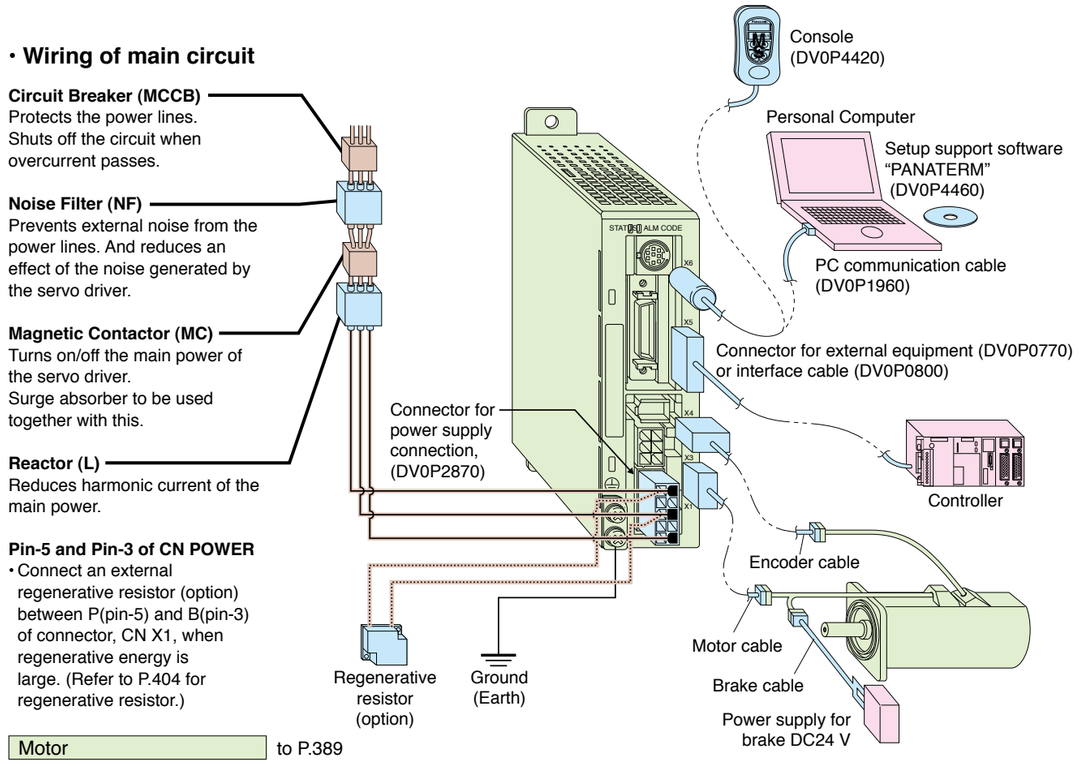
• Wiring of main circuit



Circuit Breaker (MCCB)
Protects the power lines.
Shuts off the circuit when overcurrent passes.

Noise Filter (NF)
Prevents external noise from the power lines. And reduces an effect of the noise generated by the servo driver.

Magnetic Contactor (MC)
Turns on/off the main power of the servo driver.
Surge absorber to be used together with this.

Reactor (L)
Reduces harmonic current of the main power.

Pin-5 and Pin-3 of CN POWER
• Connect an external regenerative resistor (option) between P(pin-5) and B(pin-3) of connector, CN X1, when regenerative energy is large. (Refer to P.404 for regenerative resistor.)

Motor to P.389
Driver to P.385
Option to P.398
Recommended equipments
Parts customer to prepare

List of recommended peripheral devices

Power supply	Motor Series	Motor Output	Power capacity (at rated output)	Circuit Breaker (Rated current)	Noise Filter	Magnetic Contactor (Contact Composition)	Wire diameter (L1, L2, L3, U, V and W)
Single phase, 100 V	MUMA	50 W	0.3 kVA	(5 A)	DV0P4160	10 A (3P+1a)	0.75 mm² to 0.85 mm² AWG18
		100 W	0.4 kVA				
		200 W	0.5 kVA	(10 A)			
Single phase, 200 V		50 W	0.3 kVA	(5 A)		15 A (3P+1a)	
		100 W					
		200 W	0.5 kVA				
		400 W	0.9 kVA	(10 A)			
3-phase 200 V		50 W	0.3 kVA	(5 A)		10 A (3P+1a)	
		100 W					
		200 W	0.5 kVA				
		400 W	0.9 kVA	(10 A)			

∗ Select the single and 3-phase common specifications corresponding to the power supplies.
● To conform to EC Directives, install a circuit breaker which conforms to IEC and UL Standards (Listed, Ⓤ marked) between noise filter and power supply.
● For details of the noise filters, refer to 416.

<Remarks>
• Use a copper conductor cables with temperature rating of 60 ˚C or higher for main power connector and ground terminal wiring.
Use a cable for ground with diameter of 2.0 mm² (AWG14) or larger.

Carrying page

Options		Part No.	Carrying page
Console		DV0P4420	403
Setup Support Software, PANATERM	Japanese	DV0P4460	398
	English		
RS232 Communication Cable (for Connection with PC)		DV0P1960	403
Interface Cable		DV0P0800	403
Connector Kit for Interface		DV0P0770	402
Connector Kit for Motor and Encoder		DV0P3670	401
Connector Kit for Driver Power Supply		DV0P2870	401
Encoder Cable	MFECA0 ∗ ∗ 0EAM		400
Motor Cable	MFMCA0 ∗ ∗ 0AEB		400
Brake Cable	MFMCB0 ∗ ∗ 0GET		400
Cable Set (3 m) (Note 3)	DV0P37300		400
Cable Set (5 m) (Note 3)	DV0P39200		400
DIN Rail Mount Unit	DV0P3811		404
External Regenerative Resistor	100 V	50 Ω 10 W DV0P2890	404
	200 V	100 Ω 10 W DV0P2891	
Reactor	100 V	DV0P227	405
		DV0P228	
	200 V	DV0P220	
Noise Filter		DV0P4160	416
Surge Absorber	Single phase 100 V, 200 V	DV0P4190	416
	3-phase 200 V	DV0P1450	
Ferrite core		DV0P1460	416

(Note 3) Cable set (3 m) contains,
1) Interface cable: DV0P0800
2) Encoder cable (3 m) : MFECA0030EAM
3) Motor cable (3 m) : MFMCA0030AEB
4) Connector kit for driver power supply connection : DV0P2870
Cable set (5 m) contains,
1) Interface cable: DV0P0800
2) Encoder cable (5 m) : MFECA0050EAM
3) Motor cable (5 m) : MFMCA0050AEB
4) Connector kit for driver power supply connection : DV0P2870

Table of Part Numbers and Options

Power supply	Output (W)	2500P/r, Incremental Motor Note) 1	Rating/Spec. (page)	Driver	Dimensions (Frame symbol)	Option Encoder Cable Note) 2	Motor Cable Note) 2		Brake Cable Note) 2	External Regenerative Resistor	Reactor	Noise Filter
Single phase 100 V	50	MUMA5AZP1 □	389	MKDET1105P	388（K）	MFECA0∗∗0EAM	MFMCA0∗∗0AEB		MFMCB0∗∗0GET	DV0P2890	DV0P227	DV0P4160
	100	MUMA011P1 □	389	MKDET1110P	388（K）							
	200	MUMA021P1 □	389	MLDET2110P	388（L）						DV0P228	
Single phase 200 V	50	MUMA5AZP1 □	391	MKDET1505P	388（K）							
	100	MUMA012P1 □	391	MKDET1505P	388（K）							
	200	MUMA022P1 □	391	MLDET2210P	388（L）					DV0P2891	DV0P220	
	400	MUMA042P1 □	391	MLDET2510P	388（L）							
3-phase 200 V	50	MUMA5AZP1 □	391	MKDET1505P	388（K）							
	100	MUMA012P1 □	391	MKDET1505P	388（K）							
	200	MUMA022P1 □	391	MKDET1310P	388（K）							
	400	MUMA042P1 □	391	MLDET2510P	388（L）							
				MLDET2310P								

Note) 1 Motor model number suffix: □
S : Key way with center tap, without brake
T : Kew way with center tap, with brake
Note) 2 ∗ ∗ represents cable length. For details, refer to P.399.

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Basic Specifications	Input power	Single phase, 100 V	Single phase, 100 V to 115 V +10 % –15 % 50 Hz/60 Hz
		Single phase, 200 V	Single phase, 200 V to 240 V +10 % –15 % 50 Hz/60 Hz
		3-phase, 200 V	3-phase, 200 V to 240 V +10 % –15 % 50 Hz/60 Hz
	Environment	Temperature	Operating : 0 ˚C to 55 ˚C, Storage : –20 ˚C to 65 ˚C (Max.temperature guarantee 80 ˚C for 72 hours <Nomal temperature>)
		Humidity	Both operating and storage : 90 %RH or less (free from condensation)
		Altitude	1000 m or lower
		Vibration	5.88 m/s^2 or less, 10 Hz to 60 Hz (No continuous use at resonance frequency)
	Withstand voltage		Should be 1500 VAC (Sensed current: 20 mA) for 1 minute between Primary and Ground.
	Control method		IGBT PWM Sinusoidal wave drive
	Encoder feedback		2500 P/r (10000 resolution) incremental encoder
	Control signal	Input	7 inputs (1) Servo-ON, (2) Alarm clear and other inputs vary depending on the control mode.
		Output	4 outputs (1) Servo alarm, (2) Alarm, (3) Release signal of external brake and other outputs vary depending on the control mode.
	Pulse signal	Input	2 inputs Supports both line driver I/F and open collector I/F.
		Output	4 outputs Feed out the encoder pulse (A, B and Z-phase) in line driver. Z-phase pulse is also feed out in open collector.
	Communication function	RS232	1 : 1 communication to a host with RS232 interface is enabled.
	Display LED		(1) Status LED (STATUS), (2) Alarm code LED (ALM-CODE)
	Regeneration		No built-in regenerative resistor (external resistor only)
	Dynamic brake		Built-in
	Control mode		3 modes of (1) High-speed position control, (2) Internal velocity control and (3) High-functionality positioning control are selectable with parameter.
Functions	Position control	Control input	(1) CW over-travel inhibition, (2) CCW over-travel inhibition, (3) Deviation counter clear, (4) Gain switching, (5) Electronic gear switching
		Control output	(1) Positioning complete (In-position)
		Pulse input: Max. command pulse frequency	Line driver : 500 kpps, Open collector : 200 kpps
		Pulse input: Type of input pulse train	Differential input. Selectable with parameter, ((1) CW/CCW, (2) A and B-phase, (3) Command and Direction)
		Pulse input: Electronic gear (Division/Multiplication of command pulse)	Setup of electronic gear ratio Setup range of (1-10000) × $2^{(0\text{-}17)}$/(1-10000)
		Pulse input: Smoothing filter	Primary delay filter or FIR type filter is selectable to the command input.
	Internal speed control	Control input	(1) CW over-travel inhibition, (2) CCW over-travel inhibition, (3) Selection 1 of internal command speed, (4) Selection 2 of internal command speed, (5) Speed zero clamp
		Control output	(1) Speed arrival (at-speed)
		Internal speed command	Internal 4-speed is selectable with control input.
		Soft-start/down function	Individual setup of acceleration and deceleration are enabled, with 0 s to 10 s/1000 r/min. Sigmoid acceleration/deceleration is also enabled.
		Zero-speed clamp	0-clamp of internal speed command with speed zero clamp input is enabled.
	Common	Auto-gain tuning: Real-time	Estimates the load inertia in real-time in actual operation and sets up the gain automatically corresponding to the machine stiffness. Useable at (1) High-response position control, (2) Internal speed control and (3) High-functionality position control.
		Auto-gain tuning: Normal mode	Estimates the load inertia with an action command inside of the driver, and sets up the gain automatically corresponding to setup of the machine stiffness. Useable at (1) High-response position control, (2) Internal speed control and (3) High-functionality position control.
		Masking of unnecessary input	Masking of the following input signal is enabled. (1) Over-travel inhibition, (2) Speed zero clamp, (3) Torque limit switching
		Division of encoder feedback pulse	1 P/r to 2500 P/r (encoder pulses count is the max.).
		Protective function: Hardware error	Over-voltage, under-voltage, over-speed over-load, over-heat, over-current and encoder error etc.
		Protective function: Software error	Excess position deviation, command pulse division error, EEPROM error etc.
		Traceability of alarm data	Traceable up to past 14 alarms including the present one.
		Damping control function	Manual setup with parameter
		Setup: Manual	Console
		Setup: Setup support software	PANATERM (Supporting OS : Windows98, Windows ME, Windows2000, and WindowsXP)

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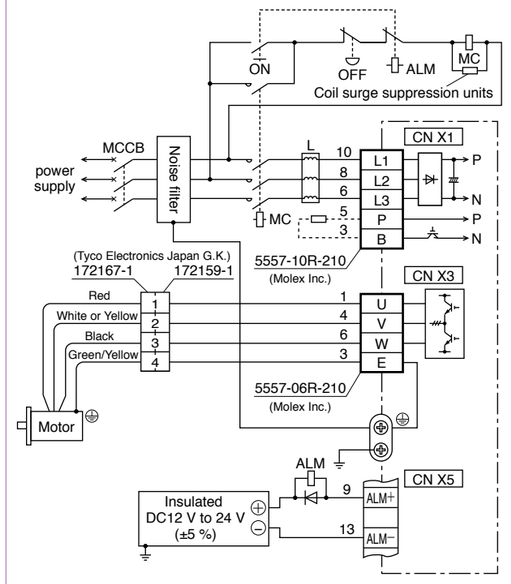
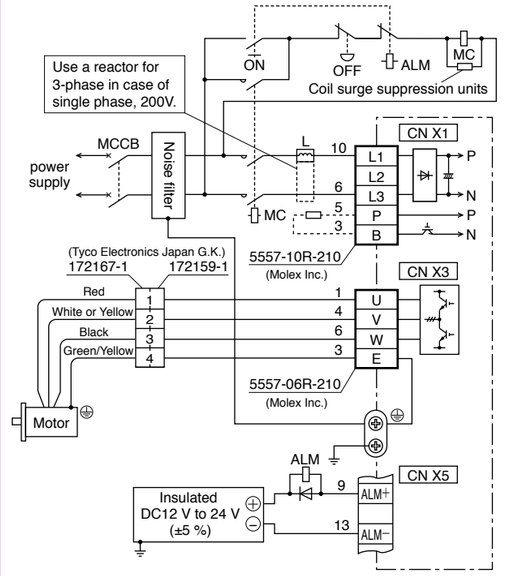
Standard Wiring Example of Main Circuit

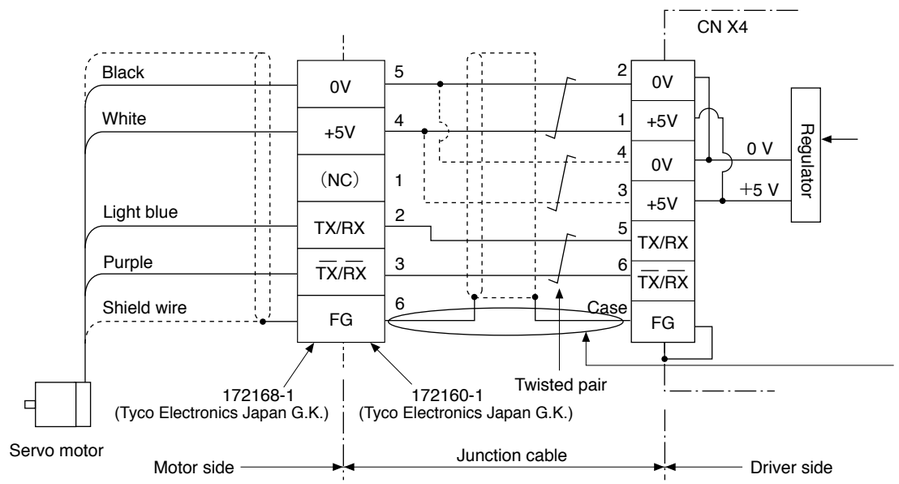
3-Phase, 200 V



Single Phase, 100 V / 200 V



Encoder Wiring Diagram



When you make your own junction cable for encoder (Refer to P.401, P.402 "Options" for connector.)

1) Refer the wiring diagram.
2) Use the twisted pair wire with shield, with core diameter of 0.18 mm2 (AWG24) or larger, with higher bending resistance.
3) Use the twisted pair wire for the corresponding signal and power supply.
4) Shielding
   Connect the shield of the driver to the case of CN X4.
   Connect the shield of the motor to Pin-6.

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CN X 5 Wiring Example at Position Control Mode

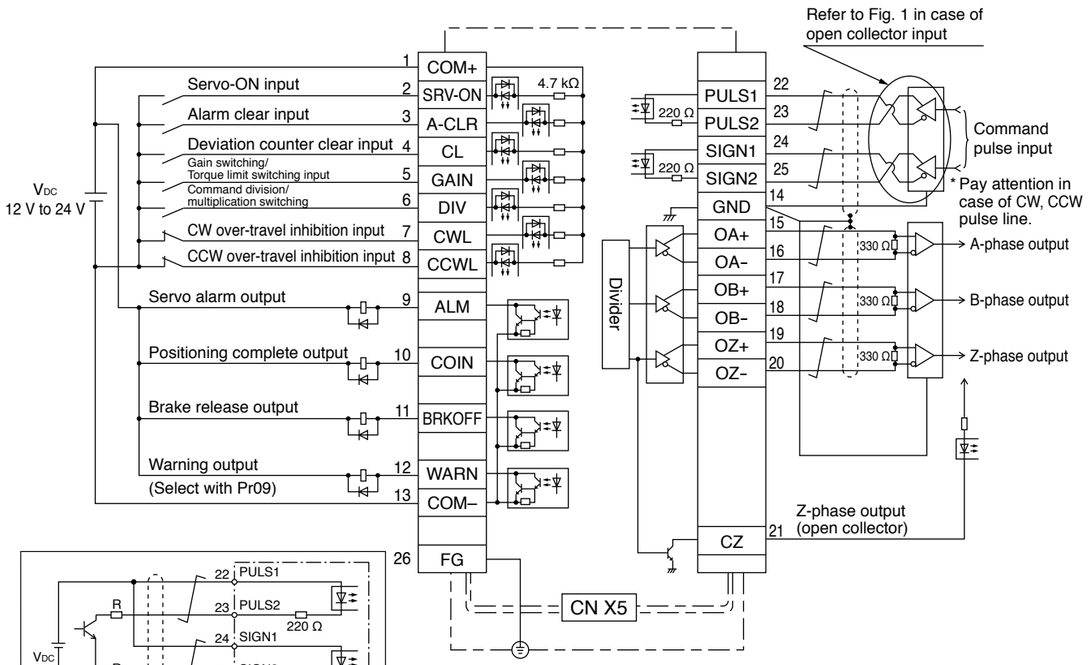
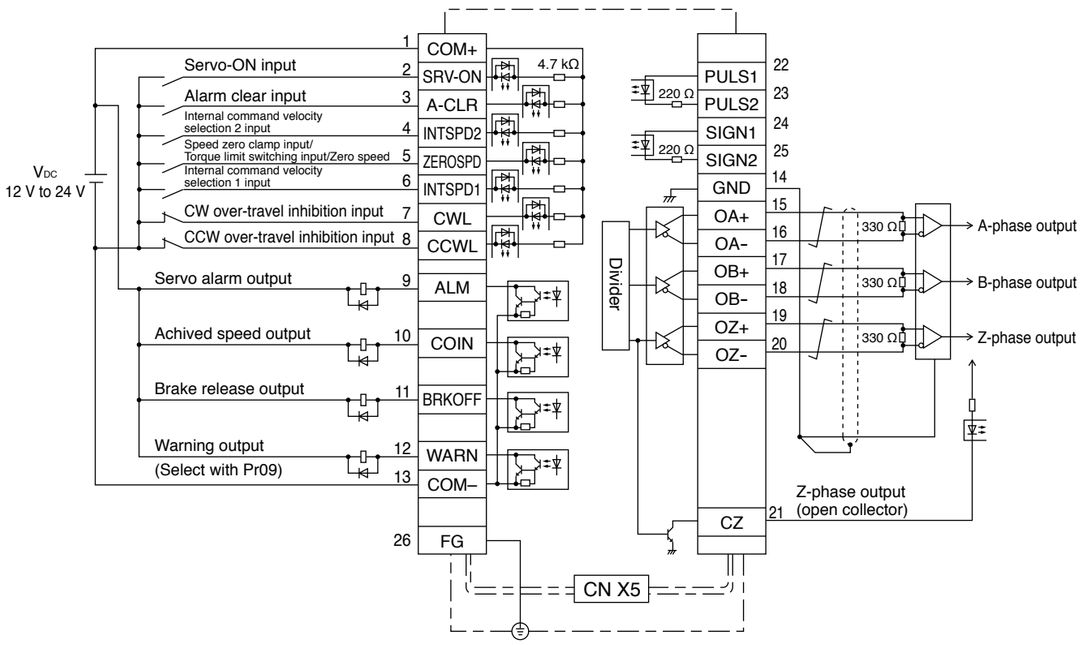


Fig. 1
This fig. shows the usage of an external control signal power supply.
You need to install an resistor R for current limit corresponding to VDC.

CN X 5 Wiring Example at Internal Velocity Control Mode



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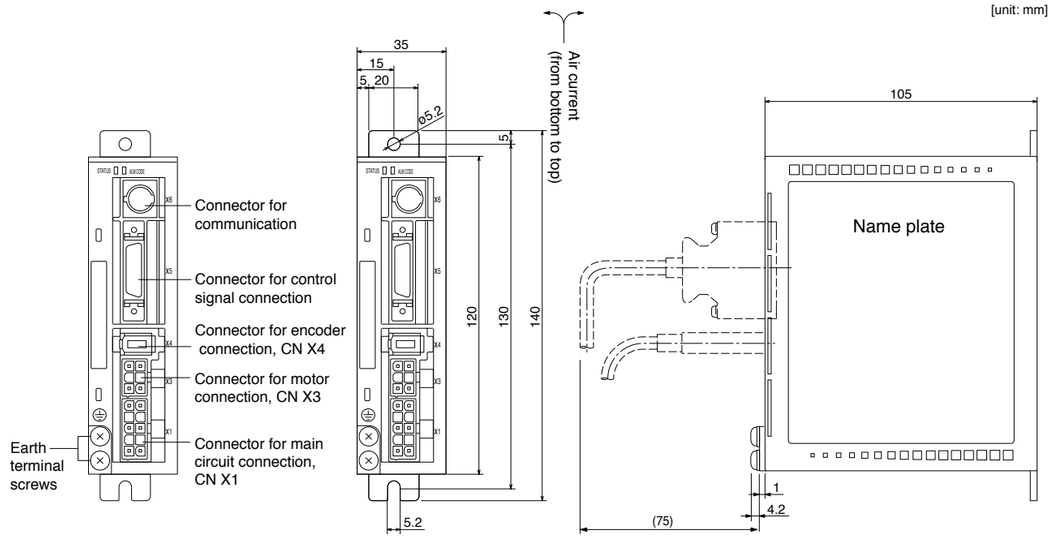
Frame K

[unit: mm]



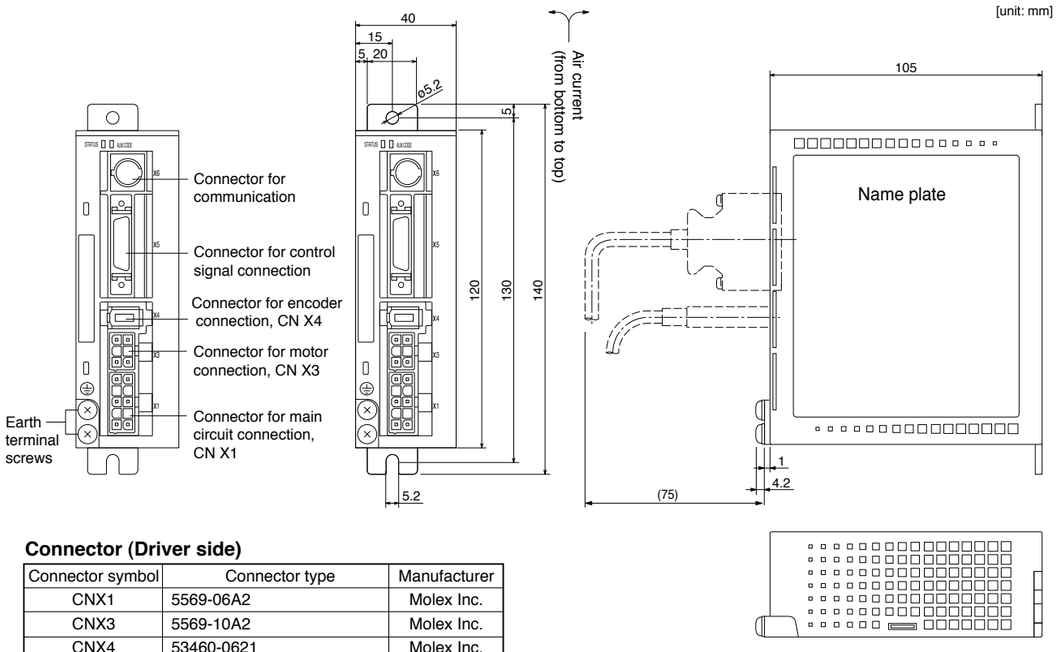
Connector (Driver side)

Connector symbol	Connector type	Manufacturer
CNX1	5569-06A2	Molex Inc.
CNX3	5569-10A2	Molex Inc.
CNX4	53460-0621	Molex Inc.
CNX5	10226-52A11L(or equivalent)	Sumitomo 3M

Mass: 0.35 kg

Frame L

[unit: mm]



Connector (Driver side)

Connector symbol	Connector type	Manufacturer
CNX1	5569-06A2	Molex Inc.
CNX3	5569-10A2	Molex Inc.
CNX4	53460-0621	Molex Inc.
CNX5	10226-52A11L(or equivalent)	Sumitomo 3M

Mass: 0.40 kg

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		AC100 V		
Motor model	MUMA	5AZP1□	011P1□	021P1□
Applicable driver	Model No.	MKDET1105P	MKDET1110P	MLDET2110P
	Frame symbol	Frame K		Frame L
Power supply capacity (kVA)		0.3	0.4	0.5
Rated output (W)		50	100	200
Rated torque (N·m)		0.16	0.32	0.64
Momentary Max. peak torque (N·m)		0.48	0.95	1.91
Rated current (Arms)		1.0	1.6	2.5
Max. current (Ao-p)		4.3	6.9	11.7
Regenerative brake frequency (times/min) Note)1	Without option	No limit Note)2		
	DV0P2890	No limit Note)2		
Rated rotational speed (r/min)		3000		
Max. rotational speed (r/min)		5000		
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake	0.021	0.032	0.10
	With brake	0.026	0.036	0.13
Recommended moment of inertia ratio of the load and the rotor Note)3		30 times or less		
Rotary encoder specifications		2500 P/r Incremental		
	Resolution per single turn	10000		
Protective enclosure rating		IP65 (except rotating portion of output shaft and lead wire end)		
Environment	Ambient temperature	0 ˚C to 40 ˚C (free from freezing), Storage : –20 ˚C to 65 ˚C (Max.temperature guarantee 80 ˚C for 72 hours <nomal humidity>)		
	Ambient humidity	85 %RH or lower (free from condensing)		
	Installation location	Indoors (no direct sunlight), free from corrosive gas, inflammable gas, oil mist and dust		
	Altitude	1000 m or lower		
	Vibration resistance	49 m/s^2 or less		
Mass (kg), ( ) represents holding brake type		0.4 (0.6)	0.5 (0.7)	0.96 (1.36)

Brake specifications (This brake will be released when it is energized. Do not use this for braking the motor in motion.)		
Static friction torque (N·m)	0.29	1.27
Engaging time (ms)	25	50
Releasing time (ms) Note)4	20 (30)	15 (100)
Exciting current (DC) (A)	0.26	0.36
Releasing voltage	DC 1 V or more	
Exciting voltage	DV 24 V ±10 %	

Permissible load				
During assembly	Radial load P-direction (N)	147	392	
	Thrust load A-direction (N)	88	147	
	Thrust load B-direction (N)	117	196	
During operation	Radial load P-direction (N)	68	245	
	Thrust load A-direction (N)	58	98	
	Thrust load B-direction (N)	58	98	

For motor dimensions, refer to P.393, and for the driver, refer to P.388.

Model Designation

e.g.) M U M A 5 A Z P 1 S

Symbol	Series
MUMA	Ultra low inertia (50 W to 200 W)

Motor rated output

Symbol	Rated output
5A	50 W
01	100 W
02	200 W

Voltage specifications

Symbol	Specifications
1	100 V
Z	100/200 V (50 W only)

Design order
1 : Standard

Motor structure

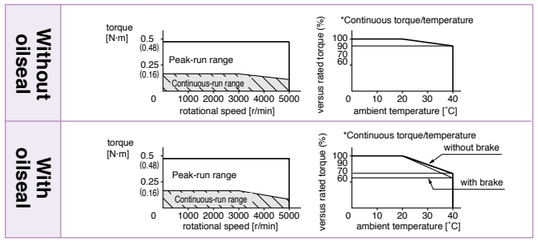
Symbol	Shaft	Holding brake		Oil seal	
	Key-way, center tap	without	with	without	with
S	●	●		●	
T	●		●	●	

Rotary encoder specifications

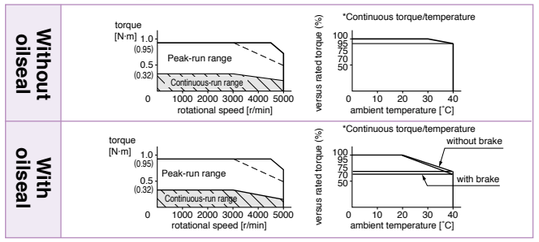
Symbol	Format	Pulse counts	Resolution	Wires
P	Incremental	2500 P/r	10000	5

Torque Characteristics [at AC100 V of power voltage (Dotted line represents the torque at 10 % less supply voltage.)]

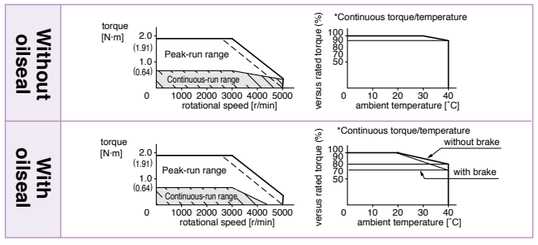
MUMA5AZP1□



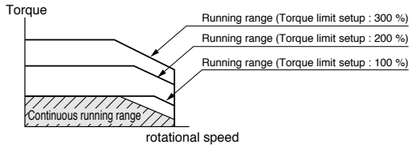
MUMA011P1□

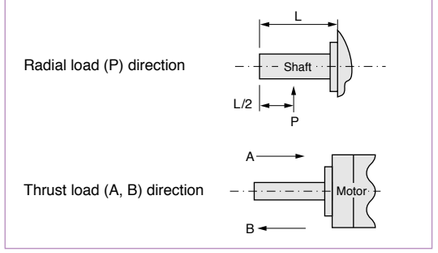


MUMA021P1□



*When you lower the torque limit setup (Pr5E and 5F), running range at high speed might be lowered as well.





Note) 1. Regenerative brake frequency represents the frequency of the motor's stops from the rated speed with deceleration without load.
- If the load is connected, frequency will be defined as 1/(m+1), where m = (load moment of inertia) / (rotor moment of inertia).
- When the motor speed exceeds the rated speed, regenerative brake frequency is in inverse proportion to the square of (running speed/rated speed).
- Power supply voltage is AC115 V (at 100 V of the main voltage). If the supply voltage fluctuates, frequency is in inverse proportion to the square of (Running supply voltage/115) relative to the value in the table.
- When regeneration occurs continuosly such cases as running speed frequently changes or vertical feeding, consult us or a dealer.

2. If the effective torque is within the rated torque, there is no limit in regenerative brake.
3. Consult us or a dealer if the load moment of inertia exceeds the specified value.
4. Specified releasing time is obtained with the use of surge absorber for brake (Z15D151 by SEMITEC Corporation or equivalent). ( ) represents the actually measured value using a diode (200 V, 1 A or equivalent)

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		AC200 V			
Motor model	MUMA	5AZP1□	012P1□	022P1□	042P1□
Applicable driver	Model No.	MKDET1505P		MKDET1310P MKDET2210P	MLDET2310P MLDET2510P
	Frame symbol	Frame K		Frame K Frame L	Frame L
Power supply capacity (kVA)		0.3	0.3	0.5	0.9
Rated output (W)		50	100	200	400
Rated torque (N · m)		0.16	0.32	0.64	1.3
Momentary Max. peak torque (N · m)		0.48	0.95	1.91	3.8
Rated current (Arms)		1.0	1.0	1.6	2.5
Max. current (Ao-p)		4.3	4.3	7.5	11.7
Regenerative brake frequency (times/min) Note)1	Without option	No limit Note)2			
	DV0P2891	No limit Note)2			
Rated rotational speed (r/min)		3000			
Max. rotational speed (r/min)		5000			
Moment of inertia of rotor ($\times 10^{-4}$ kg·m^2)	Without brake	0.021	0.032	0.10	0.17
	With brake	0.026	0.036	0.13	0.20
Recommended moment of inertia ratio of the load and the rotor Note)3		30 times or less			
Rotary encoder specifications		2500 P/r Incremental			
	Resolution per single turn	10000			
Protective enclosure rating		IP65 (except rotating portion of output shaft and lead wire end)			
Environment	Ambient temperature	0 ˚C to 40 ˚C (free from freezing), Storage : –20 ˚C to 65 ˚C (Max.temperature guarantee 80 ˚C for 72 hours <nomal humidity>)			
	Ambient humidity	85 %RH or lower (free from condensing)			
	Installation location	Indoors (no direct sunlight), free from corrosive gas, inflammable gas, oil mist and dust			
	Altitude	1000 m or lower			
	Vibration resistance	49 m/s^2 or less			
Mass (kg), ( ) represents holding brake type		0.4 (0.6)	0.5 (0.7)	0.96 (1.36)	1.5 (1.9)

Brake specifications (This brake will be released when it is energized. Do not use this for braking the motor in motion.)		
Static friction torque (N · m)	0.29	1.27
Engaging time (ms)	25	50
Releasing time (ms) Note)4	20 (30)	15 (100)
Exciting current (DC) (A)	0.26	0.36
Releasing voltage	DC 1 V or more	
Exciting voltage	DV 24 V ±10 %	

Permissible load			
During assembly	Radial load P-direction (N)	147	392
	Thrust load A-direction (N)	88	147
	Thrust load B-direction (N)	117	196
During operation	Radial load P-direction (N)	68	245
	Thrust load A-direction (N)	58	98
	Thrust load B-direction (N)	58	98

For motor dimensions, refer to P.393, and for the driver, refer to P.388.

Note) Driver for 50 W and 100 W has a common power supply of single phase and 3-phase 200 V.
Driver for 200 W, the upper row is the power supply of 3-phase 200 V, and lower is the power supply of single-phase 200 V.
Driver for 400 W, the upper row is the power supply of 3-phase 200 V, and lower is the common power supply of single-phase and 3-phase 200 V.

Model Designation

e.g.) M U M A 5 A Z P 1 S

Symbol	Series
MUMA	Ultra low inertia (50 W to 400 W)

Motor rated output

Symbol	Rated output
5A	50 W
01	100 W
02	200 W
04	400 W

Voltage specifications

Symbol	Specifications
2	200 V
Z	100/200 V (50 W only)

Design order
1 : Standard

Motor structure

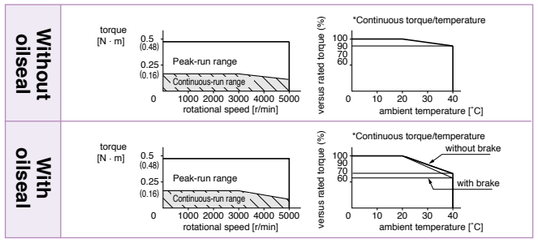
Symbol	Shaft	Holding brake		Oil seal	
	Key-way, center tap	without	with	without	with
S	●	●		●	
T	●		●	●	

Rotary encoder specifications

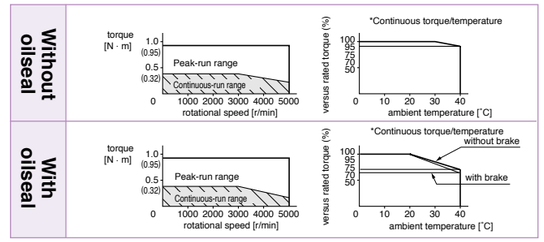
Symbol	Format	Pulse counts	Resolution	Wires
P	Incremental	2500 P/r	10000	5

Torque Characteristics [at AC200 V of power voltage (Dotted line represents the torque at 10 % less supply voltage.)]

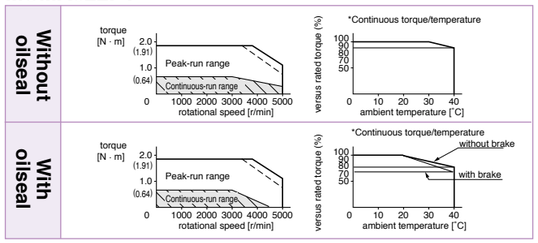
MUMA5AZP1□



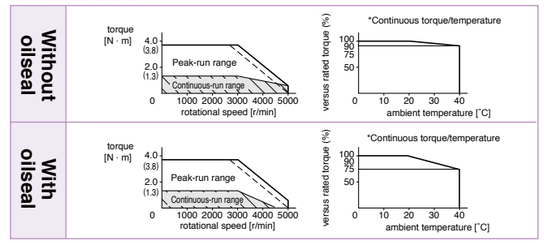
MUMA012P1□



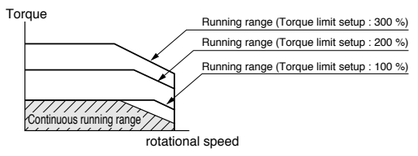
MUMA022P1□

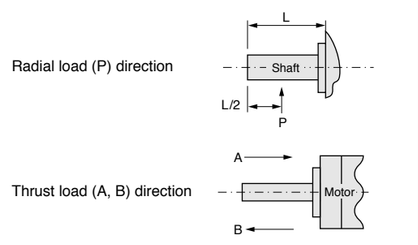


MUMA042P1□



*When you lower the torque limit setup (Pr5E and 5F), running range at high speed might be lowered as well.





Note) 1. Regenerative brake frequency represents the frequency of the motor's stops from the rated speed with deceleration without load.
- If the load is connected, frequency will be defined as 1/(m+1), where m = (load moment of inertia) / (rotor moment of inertia).
- When the motor speed exceeds the rated speed, regenerative brake frequency is in inverse proportion to the square of (running speed/rated speed).
- Power supply voltage is AC240 V (at 200 V of the main voltage). If the supply voltage fluctuates, frequency is in inverse proportion to the square of (Running supply voltage/240) relative to the value in the table.
- When regeneration occurs continuosly such cases as running speed frequently changes or vertical feeding, consult us or a dealer.

2. If the effective torque is within the rated torque, there is no limit in regenerative brake.
3. Consult us or a dealer if the load moment of inertia exceeds the specified value.
4. Specified releasing time is obtained with the use of surge absorber for brake (Z15D151 by SEMITEC Corporation or equivalent). ( ) represents the actually measured value using a diode (200 V, 1 A or equivalent)

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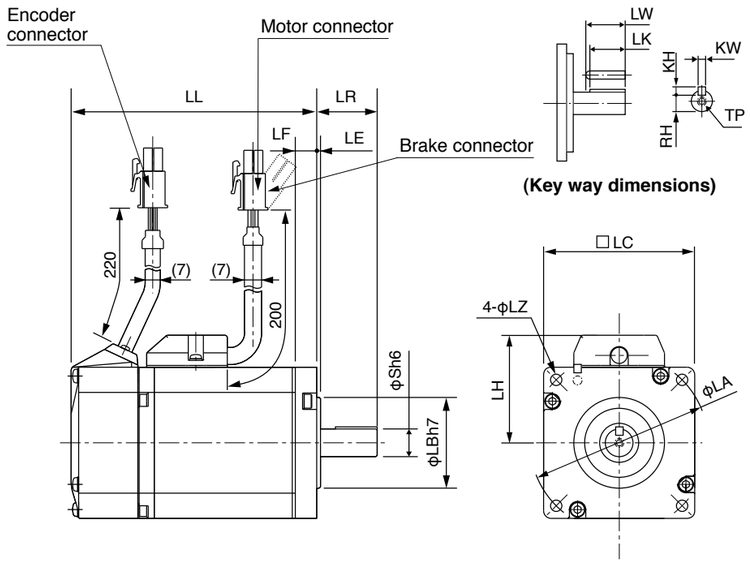
[Unit: mm]



* Dimensions are subject to change without notice. Contact us or a dealer for the latest information

[Unit: mm]

		MUMA series (Ultra low inertia)			
Motor output		50 W	100 W	200 W	400 W
Motor model	MUMA	5A□P1□	01□P1□	02□P1□	04□P1□
Rotary encoder specifications		2500 P/r Incremental	2500 P/r Incremental	2500 P/r Incremental	2500 P/r Incremental
LL	Without brake	75.5	92.5	96	123.5
	With brake	107	124	129	156.5
LR		24	24	30	30
S		8	8	11	14
LA		48	48	70	70
LB		22	22	50	50
LC		42	42	60	60
LE		2	2	3	3
LF		7	7	7	7
LH		34	34	43	43
LZ		3.4	3.4	4.5	4.5
Key way	LW	14	14	20	25
	LK	12.5	12.5	18	22.5
	KW	3h9	3h9	4h9	5h9
	KH	3	3	4	5
	RH	6.2	6.2	8.5	11
	TP	M3 × 6 (depth)	M3 × 6 (depth)	M4 × 8 (depth)	M5 × 10 (depth)
Mass (kg)	Without brake	0.40	0.50	0.96	1.5
	With brake	0.60	0.70	1.36	1.9
Connector/Plug specifications		refer to Options, P.401, P.402.			

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.
Read the Instruction Manual carefully and understand all precautions and remarks before using the products.

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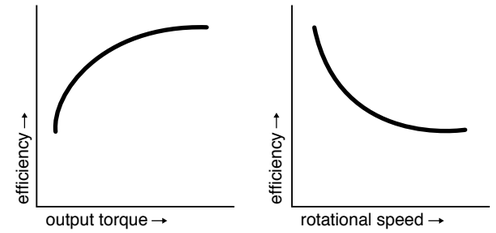
MINAS E Series Motors with Gear Reducer

Motor Types with Gear Reducer

Reduction ratio	Motor output (W)			Type of reducer
	100	200	400	
1/ 5	●	●	●	For high precision
1/ 9	●	●	●	
1/25	●	●	●	

Efficiency of the gear reducer shows the following inclination in relation to output torque and rotational speed.



Model No. Designation

e.g.) M U M A 0 1 1 P 3 1 N

Symbol	Series
MUMA	Low inertia (100 to 400 W)

Motor rated output

Symbol	Rated output
01	100 W
02	200 W
04	400 W

Voltage specifications

Symbol	Specifications
1	100 V
2	200 V

Rotary encoder specifications

Symbol	Format	Pulse counts	Pulse counts	Wire
P	Incremental	2500 P/r	10000	5

Motor types with gear reducer

Symbol	Reduction ratio	Motor output			Type of reducer
		100	200	400	
1N	1/ 5	●	●	●	For High precision
2N	1/ 9	●	●	●	
4N	1/25	●	●	●	

Motor structure

Symbol	Shaft	Holding brake	
	Key-way	without	with
3	●	●	
4	●		●

Specifications of Motor with Gear Reducer

Motor series		MUMA
Gear reducer	Backlash	3 minutes or smaller (initial value) at output shaft of the reducer
	Composition of gear	Planetary gear
	Gear efficiency	65 % to 85 %
	Rotational direction at output shaft (of reducer)	Same direction as the motor output shaft
	Composition of gear	Planetary gear
	Mounting method	Flange mounting
	Permissible moment of inertia of the load (conversion to the motor shaft)	10 times or smaller than rotor moment of inertia of the motor
	Protective structure	IP44 (at gear reducer)
Environment	Ambient temperature	0 ˚C to 40 ˚C
	Ambient humidity	85 %RH (free from condensation) or less
	Vibration resistance	49 m/s² or less (at motor frame)
	Impact resistance	98 m/s² or less

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Table of Motor with Gear Reducer Specifications

Model	Motor	MUMA with gear reducer											
	Output	Reduction ratio	Output	Rated speed	Max. speed	Rated torque	Peak max. torque	Moment of inertia (motor + reducer/converted to motor shaft)		Mass		Permissible radial load	Permissible thrust load
								w/o brake	w/ brake	w/o brake	w/ brake		
	(W)		(W)	(r/min)	(r/min)	(N·m)	(N·m)	J (× 10^{-4}kg·m²)		(kg)		(N)	(N)
MUMA01□P□1N	100	1/5	75	600	1000	1.18	3.72	0.072	0.076	1.05	1.25	490	245
MUMA01□P□2N		1/9	80	333	555	2.25	6.86	0.0663	0.0703	1.05	1.25	588	294
MUMA01□P□4N		1/25	80	120	200	6.27	19.0	0.0645	0.0685	2.20	2.40	1670	833
MUMA02□P□1N	200	1/5	170	600	1000	2.65	8.04	0.218	0.248	1.68	2.08	490	245
MUMA02□P□2N		1/9	132	333	555	3.72	11.3	0.368	0.398	2.66	3.06	1180	588
MUMA02□P□4N		1/25	140	120	200	11.1	33.3	0.388	0.418	2.66	3.06	1670	833
MUMA042P□1N	400	1/5	340	600	1000	5.39	16.2	0.533	0.563	3.2	3.6	980	490
MUMA042P□2N		1/9	332	333	555	9.51	28.5	0.438	0.468	3.2	3.6	1180	588
MUMA042P□4N		1/25	332	120	200	26.4	79.2	0.470	0.500	4.7	5.1	2060	1030

For dimensions, refer to P.397.

The Combination of the Driver and the Motor with Gear Reducer

Combination with driver		100 V		200 V		
Encoder	Motor output	Part No. of motor with gear reducer	Single phase, 100 V Part No. of driver	Part No. of motor with gear reducer	3-phase, 200 V Part No. of driver	Single phase, 200 V Part No. of driver
2500 P/r Incremental	100 W	MUMA011P□□N	MKDET1110P	MUMA012P□□N	MKDET1505P	MKDET1505P
	200 W	MUMA021P□□N	MLDET2110P	MUMA022P□□N	MKDET1310P	MLDET2210P
	400 W	–	–	MUMA042P□□N	MLDET2510P	MLDET2510P
					MLDET2310P	

For dimensions of driver, refer to P.388.

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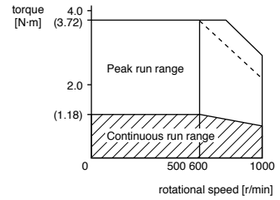
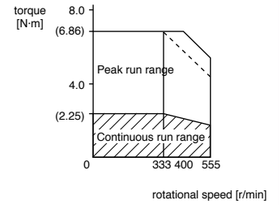
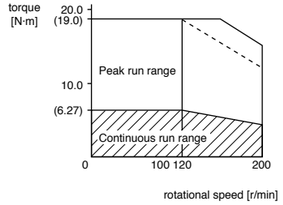
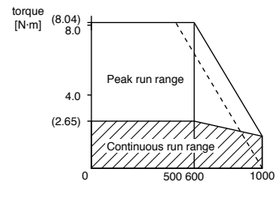
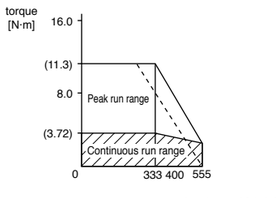
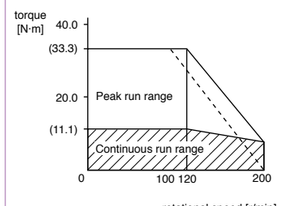
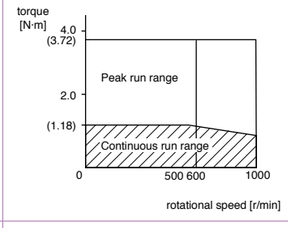
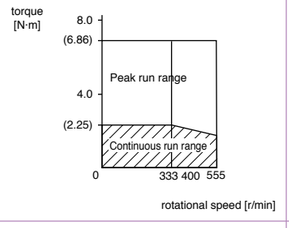
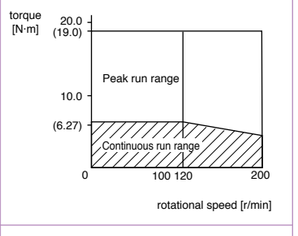
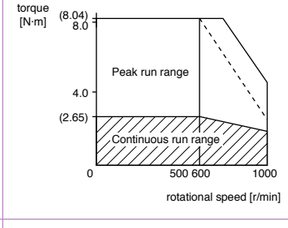
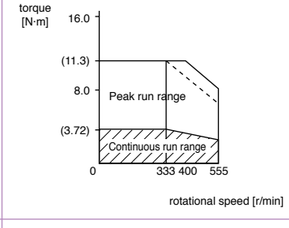
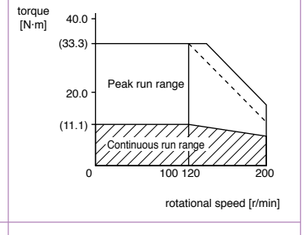
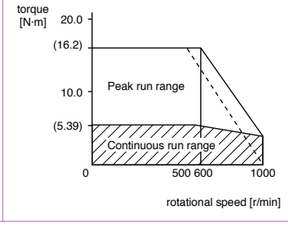
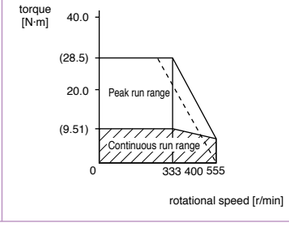
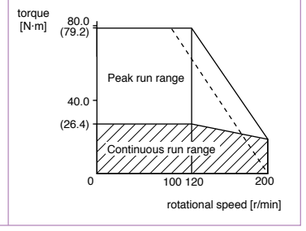
For High Precision (MUMA Series 100 W to 400 W)

Supply voltage to driver	Motor output \ Reduction ratio	1/5	1/9	1/25
100 V	100 W	MUMA011P□1N 	MUMA011P□2N 	MUMA011P□4N 
	200 W	MUMA021P□1N 	MUMA021P□2N 	MUMA021P□4N 
200 V	100 W	MUMA012P□1N 	MUMA012P□2N 	MUMA012P□4N 
	200 W	MUMA022P□1N 	MUMA022P□2N 	MUMA022P□4N 
	400 W	MUMA042P□1N 	MUMA042P□2N 	MUMA042P□4N 

Dotted line represents the torque at 10 % less supply voltage.

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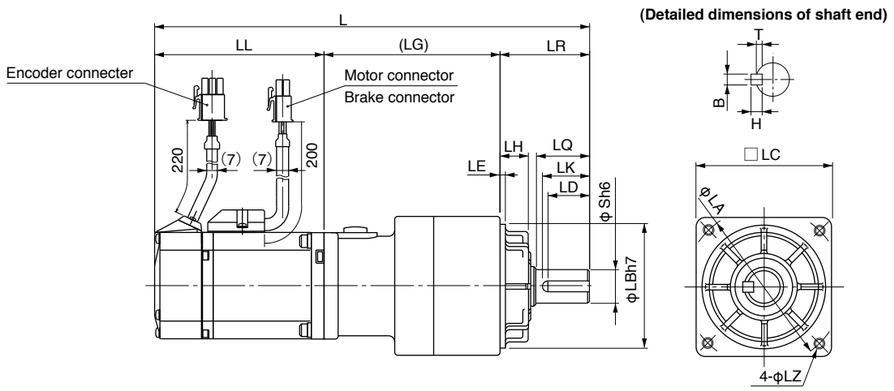
MUMA series with Gear Reducer

[Unit: mm]



2500 P/r Encoder

[Unit: mm]

Model	Motor output	Reduction ratio	L	LL	LR	LQ	LC	LB	LA	S	LH	LZ	LK	(LG)	LE	Key way B×H×LD	T
MUMA01□P□1N	100 W	1 / 5	192	92.5	32	20	52	50	60	12	10	M5 (Depth: 12)	18	67.5	3	4×4×16	2.5
			223.5	124													
MUMA01□P□2N		1 / 9	192	92.5													
			223.5	124													
MUMA01□P□4N		1/25	234.5	92.5	50	30	78	70	90	19	17	M6 (Depth: 20)	26	92		6×6×22	3.5
			266	124													
MUMA02□P□1N	200 W	1 / 5	200.5	96	32	20	52	50	60	12	10	M5 (Depth: 12)	18	72.5		4×4×16	2.5
			233.5	129													
MUMA02□P□2N		1 / 9	235.5	96	50	30	78	70	90	19	17	M6 (Depth: 20)	26	89.5		6×6×22	3.5
			268.5	129													
MUMA02□P□4N		1/25	246	96										100			
			279	129													
MUMA042P□1N	400 W	1 / 5	263	123.5										89.5			
			296	156.5													
MUMA042P□2N		1 / 9	263	123.5													
			296	156.5													
MUMA042P□4N		1/25	288.5	123.5	61	40	98	90	115	24	18	M8 (Depth: 20)	35	104	5	8×7×30	4
			321.5	156.5													

Upper column : without brake
Lower column : with brake

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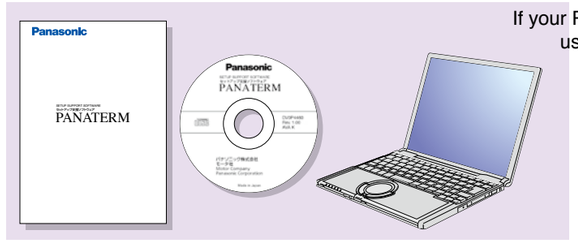
Setup Support Software "PANATERM" for MINAS series AC Servo Motor & Driver

Part No.	**DV0P4460** (Japanese/English version)

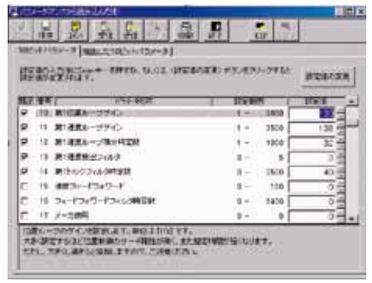
The PANATERM assists users in setting parameters, monitoring control conditions, setup support, and analyzing mechanical operation data on the PC screen, when installed in a commercially available personal computer, and connected to the MINAS A4 series, E series through the RS232 serial interface.



If your PC does not have RS232 port, use RS232-USB converter.

Basic Function

Parameter setup
- After a parameter is defined on the screen, it will be sent to the driver immediately.
- Once you register parameters you frequently use, they can be easily set up on the screen.

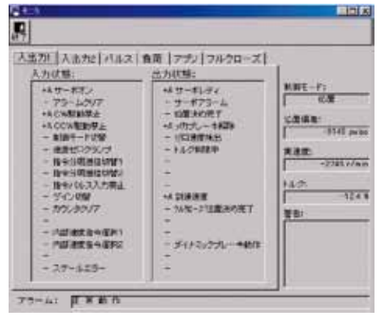


Parameter

Monitoring Control Conditions

Monitor
- Control conditions: Control mode, velocity, torque, error and warning
- Driver input signal
- Load conditions: Total count of command/feedback pulses, Load ratio, Regenerative resistor load ratio

Alarm
- Displays the numbers and contents of the current alarm and up to 14 error events in the past.
- Clears the numbers and contents of the current alarm and up to 14 error events in the past.



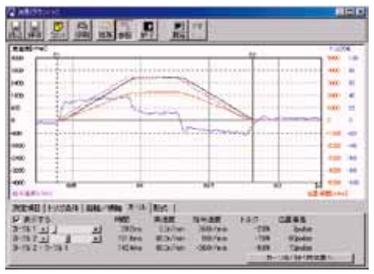
Monitor

Setup

Auto tuning
- Gain adjustment and inertia ratio measurement

Graphic waveform display
- The graphic display shows command velocity, actual velocity, torque, and error waveforms.

Absolute encoder setup
- Clears absolute encoder at the origin.
- Displays single revolution/multi-revolution data.
- Displays absolute encoder status.



Graphic waveform display

Analysis of Mechanical Operation Data

Frequency analysis
- Measures frequency characteristics of the machine, and displays Bode diagram.

■ Can not use with A5, A6 Family.

Hardware configuration
[Personal computer] • CPU : Pentium 100MHz or more • Memory : 16 MB or more (32 MB recommended)
• Hard disk capacity (vacancy of 25 MB or more recommended) • OS : Windows® 98, Windows® Me, Windows® 2000, Windows® XP (US version)
• Communication speed of serial communication port : 2400 bps or more (The software may not operate normally using USB-to-Serial adapter.)
[Display] • Resolution : 640*480 (VGA) or more (desirably 1024*768) • Number of colors : 256 colors or more
[CD-ROM drive] • CD-ROM drive operable on the above-mentioned personal computer

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Encoder Cable

For available optional items, please refer to P.400.

1	2	3	4	5	6	7	8	9	10	11	12
M	F	E	C	A	0	0	5	0	E	A	M

Cable end (Driver side)

M	Connector (MUMA)

Cable end (Encoder side)

A	Tyco Electronics Japan G.K. connector

Cable type

E	PVC cable with shield by Oki Electric Cable Co., 0.20 mm² × 3P

Cable length

0030	3 m
0050	5 m
0100	10 m
0200	20 m

Type classification

MFECA: Encoder cable

Motor Cable, Brake Cable

For available optional items, please refer to P.400.

1	2	3	4	5	6	7	8	9	10	11	12
M	F	M	C	A	0	0	5	0	A	E	B

Cable end at driver side

B	Molex Inc.
T	Clamp terminal

Cable end at motor side

E	Tyco Electronics Japan G.K. connector

Cable type

A	ROBO-TOP® 4-wire (DYDEN CORPORATION)
G	ROBO-TOP® 2-wire (DYDEN CORPORATION)

Cross section of cable core

0	0.75 mm²
1	1.25 mm²
2	2.0 mm²
3	3.5 mm²

Type classification

A	Standard
B	Special
⋮	Design Oder

Cable length

003	3 m
005	5 m
010	10 m
020	20 m

AC servo motor cable

ROBO-TOP® is a trade mark of DYDEN CORPORATION

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Cable Set (3 m)

Part No.	DV0P37300

1) Interface cable : DV0P0800
2) Encoder cable (3 m) : MFECA0030EAM
3) Motor cable (3 m) : MFMCA0030AEB
4) Connector kit for driver power supply connection : DV0P2870

Cable Set (5 m)

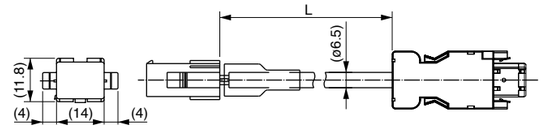
Part No.	DV0P39200

1) Interface cable : DV0P0800
2) Encoder cable (5 m) : MFECA0050EAM
3) Motor cable (5 m) : MFMCA0050AEB
4) Connector kit for driver power supply connection : DV0P2870

Encoder Cable

Part No.	MFECA0 ＊ ＊ 0EAM

[Unit: mm]



Title	Part No.	Manufacturer
Connector (Driver side)	3E206-0100KV	Sumitomo 3M or equivalent
Shell kit	3E306-3200-008	
Connector	172160-1	Tyco Electronics
Connector Pin	170365-1	
Cable	0.20 mm² × 3P	Oki Electric Cable Co., Ltd.

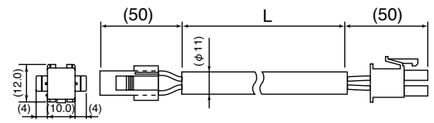
L (m)	Part No.
3	MFECA0030EAM
5	MFECA0050EAM
10	MFECA0100EAM
20	MFECA0200EAM

Motor Cable (ROBO-TOP® 105 °C 600 V . DP)

ROBO-TOP® is a trade mark of DYDEN CORPORATION

Part No.	MFMCA0 ＊ ＊ 0AEB

[Unit: mm]



Title	Part No.	Manufacturer
Connector	172159-1	Tyco Electronics
Connector Pin	170362-1, 170366-1	
Connector	5557-06R-210	Molex Inc
Connector Pin	5556T	
Cable	ROBO-TOP 600 V 0.75 mm²	Daiden Co.,Ltd.

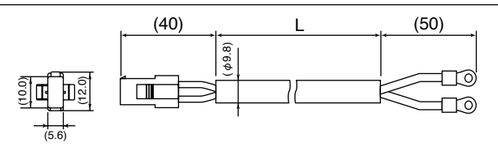
L (m)	Part No.
3	MFMCA0030AEB
5	MFMCA0050AEB
10	MFMCA0100AEB
20	MFMCA0200AEB

Brake Cable (ROBO-TOP® 105 °C 600V . DP)

ROBO-TOP® is a trade mark of DYDEN CORPORATION

Part No.	MFMCB0 ＊ ＊ 0GET

[Unit: mm]



Title	Part No.	Manufacturer
Connector	172157-1	Tyco Electronics
Connector Pin	170362-1, 170366-1	
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600 V 0.75 mm²	Daiden Co.,Ltd.

L (m)	Part No.
3	MFMCB0030GET
5	MFMCB0050GET
10	MFMCB0100GET
20	MFMCB0200GET

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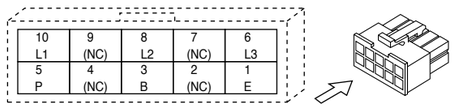
Connector Kit for Power Supply Connection

Part No. DV0P2870

● Parts composition

Title	Part No.	Number	Manufacturer	Note
Connector (10 pins)	5557-10R-210	1	Molex Inc.	For connector, CN X1 (10 pins)
Connector pin	5556PBTL	6		

● Pin configuration of connector CN X1



● Recommended manual crimping tool (to be prepared by customer)

Part No.	Cable material
57026-5000	UL1007
57027-5000	UL1015

<Cautions>

1. The above pin disposition is shown when viewed from the terminal inserting direction. Make a correct wiring by checking the stamped pin numbers on the connector itself.
2. Refer to P.386 for wiring and connection.
3. Do not connect anything to pins marked "NC".

Connector Kit for Motor/Encoder Connection

Part No. DV0P3670 (Incremental 2500 pulse, 5-wire)

This option is required when you make your own encoder cable and motor cable. (Brake cable is required for brake.)

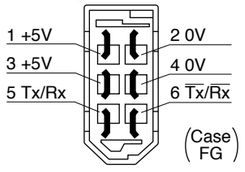
● Parts composition

Title	Part No.	Number	Manufacturer	Note
Connector (Driver side)	3E206-0100 KV	1	Sumitomo 3M or equivalent	For connector, CN X4 (6 pins)
Shell kit	3E306-3200-008	1		
Connector (6 pins)	172160-1	1	Tyco Electronics	For junction to encoder cable (6 pins)
Connector pin	170365-1	6		
Connector (4 pins)	172159-1	1	Tyco Electronics	For junction to motor power cable (4 pins)
Connector pin	170366-1	4		
Connector (6 pins)	5557-06R-210	1	Molex Inc.	For connector, CN X3 (6 pins)
Connector pin	5556PBTL	4		

<Remarks>

We may use parts equivalent to the above for shell and connector cover.

● Pin configuration of connector CN X4 plug



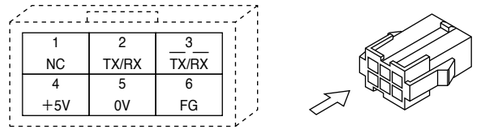
● Recommended manual crimping tool (to be prepared by customer)

Title	Part No.	Manufacturer	Cable material
For encoder cable junction	755330-1	Tyco Electronics	—
For motor power cable junction	755331-1		
For Connector CN X3	57026-5000	Molex Inc.	UL1007
	57027-5000		UL1015

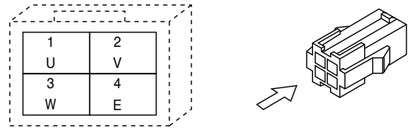
<Remarks>

1. The above pin configuration is shown when viewed from the pin-soldering direction. Make a correct wiring by checking the stamped pin numbers on the connector itself.
2. Connect the shield of the wire to the case (FG) without fail.
3. For wiring and connection, refer to P.386.

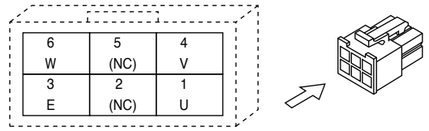
● Pin configuration of encoder cable junction



● Pin configuration of motor power cable junction



● Pin configuration of mating connector to CN X3 connector



<Cautions>

1. The above pin configuration is shown when viewed from the terminal inserting direction. Make a correct wiring by checking the stamped pin numbers on the connector itself.
2. Refer to P.386 for wiring and connection.

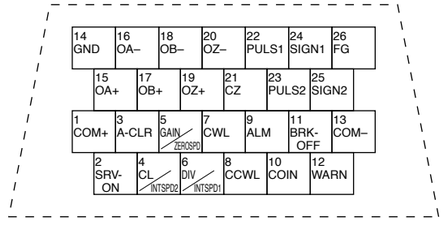
Connector Kit for Interface

Part No. DV0P0770

● Parts composition

Title	Part No.	Number	Manufacturer	Note
Connector	10126-3000PE	1	Sumitomo 3M or equivalent	For connector, CN X5 (26 pins)
Connector cover	10326-52A0-008	1		

● Pin configuration of connector CN X5 (26 pins) (viewed from the soldering side)



<Cautions>

1. Make a correct wiring by checking the stamped pin numbers on the connector itself.
2. Refer to P.387 for symbols and functions of the above signals.

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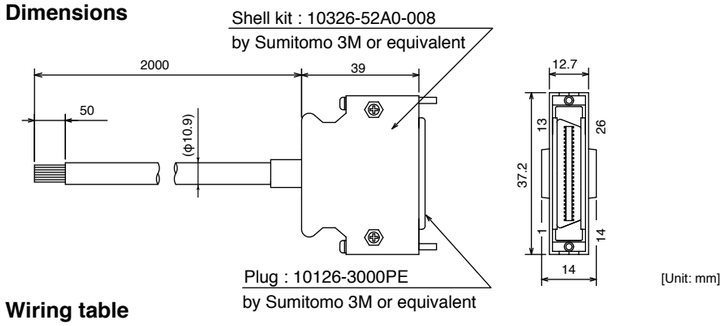
Interface Cable

Part No.	DV0P0800	Cable of 2 m is connected.

● Dimensions



[Unit: mm]

● Wiring table

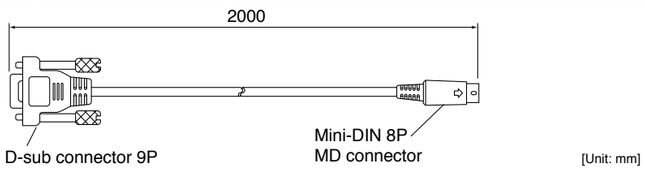
Pin No.	Title of signal	Color or cable	Pin No.	Title of signal	Color or cable	Pin No.	Title of signal	Color or cable
1	COM+	Orange (Red 1)	10	COIN	Pink (Black 1)	19	OZ+	Pink (Red 2)
2	SRV-ON	Orange (Black 1)	11	BRK-OFF	Orange (Red 2)	20	OZ-	Pink (Black 2)
3	A-CLR	Gray (Red 1)	12	WARN	Orange (Black 2)	21	CZ	Orange (Red 3)
4	CL/INTSPD2	Gray (Black 1)	13	COM-	Gray (Red 2)	22	PULS1	Gray (Red 3)
5	GAIN/ZEROSPD	White (Red 1)	14	GND	Gray (Black 2)	23	PULS2	Gray (Black 3)
6	DIV/INTSPD1	White (Black 1)	15	OA+	White (Red 2)	24	SIGN1	White (Red 3)
7	CWL	Yellow (Red 1)	16	OA-	White (Black 2)	25	SIGN2	White (Black 3)
8	CCWL	Yellow (Black 1)	17	OB+	Yellow (Red 2)	26	FG	Orange (Black 3)
9	ALM	Pink (Red 1)	18	OB-	Yellow (Black 2)			

<Notes>
e. g. of Pin No. designation :
Pin No. 1 ... Wire color is orange, and one red dot.
Pin No. 12 ... Wire color is orange, and two black dot.

<Caution>
Cable pin No. 26 is not connected to the connector shell (housing) or shielded wire (net wire).
Pin No. 26 of the Driver is connected to the shell (housing) of the connector.
The shielded wire (net wire) of the cable is connected to the shell (housing) of the connector of the cable, and by connecting the connector of the optional cable to the Driver, pin No. 26 of the cable and the shielded wire (net wire) of the cable gets connected via the Driver.

Communication Cable (For Connection with PC)

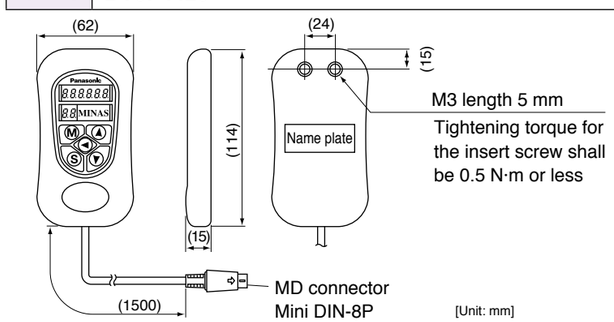
Part No.	DV0P1960



[Unit: mm]

Console

Part No.	DV0P4420



[Unit: mm]

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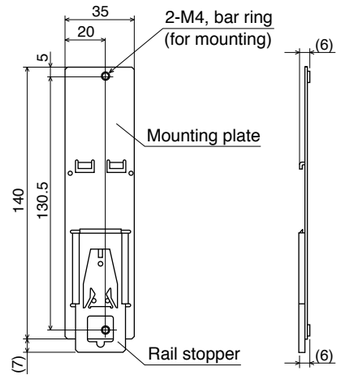
DIN Rail Mounting Unit

Part No.	DV0P3811

● Dimensions

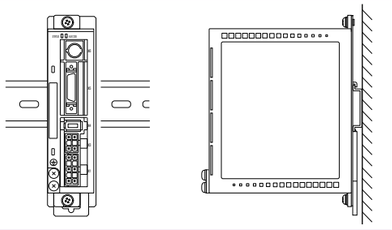


[Unit: mm]

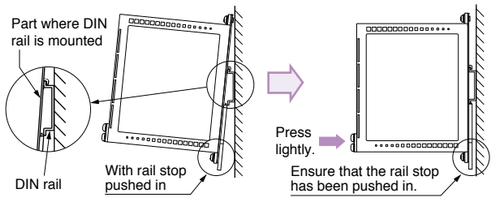
<Notes>
2 mounting screws (M4 X L8, Pan head) are attached.
Rail stopper can be extended to max. 10 mm.

<Cautions>
Please read carefully operation manual before using this product.
In addition, please do not apply excessive stress to the product.

• Driver mounted to DIN rail



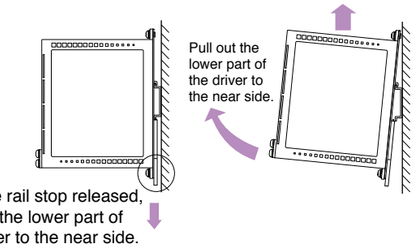
• How to Install



Hook the upper side of DIN rail mounting part on the DIN rail.

Press lightly the lower part of the main body of driver.

• Removing from DIN Rail



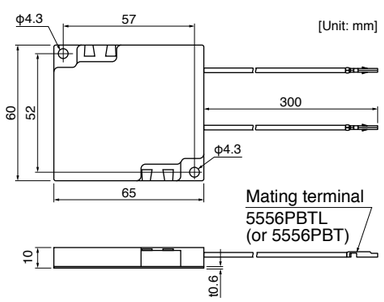
With the rail stop released, pull out the lower part of the driver to the near side.

External Regenerative Resistor

Part No.	Manufacturer's Part No.	Specifications			Note (Input Power of drive)
		Resistance	Rated power	Activation temperature of built-in fuse	
		Ω	W	°C	
DV0P2890	45M03	50	10	137 $^{+3}_{-20}$	Single phase, 100 V
DV0P2891	45M03	100	10	137 $^{+3}_{-20}$	Single/3-phase, 200 V

Manufactured by Iwaki Musen Kenkyuusho Co., Ltd.

● Dimensions



[Unit: mm]

<Caution of when using external regeneration resistor>

Since it becomes high temperature, external regeneration resistor must be installed according to the contents shown below.

- **Attach to incombustibles, such as metal.**
- **Install in the place which cannot touch directly by covering with incombustibles etc.**
- **Do not install near the combustibles.**

Although the thermal cutoff is built in external regeneration resistor, the skin temperature of regeneration resistor may become high exceeding the operating temperature of thermal cutoff by the time the thermal cutoff operates in driver failure. The thermal cutoff is for preventing ignition of the regeneration resistor in driver failure, and is not for controlling the skin temperature of resistor.

<Remarks>
Thermal fuse is installed for safety.
The thermal fuse may blow due to heat dissipating condition, working temperature, supply voltage or load fluctuation. Make it sure that the surface temperature of the resistor may not exceed 100 °C at the worst running conditions with the machine, which brings large regeneration (such case as high supply voltage, load inertia is large or deceleration time is short) Please carry out air cooling if needed.

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Reactor

Frame symbol of driver	Power supply specifications	Rated output	Part No.	Fig.
MKDE	Single phase, 100 V	50 W to 100 W	DV0P227	1
	Single phase, 200 V	50 W to 100 W	DV0P220	2
	3-phase, 200 V	50 W to 200 W		
MLDE	Single phase, 100 V	200 W	DV0P228	1
	Single phase, 200 V	200 W to 400 W	DV0P220	2
	3-phase, 200 V	400 W		

Fig.1

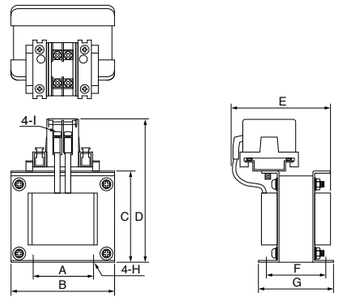
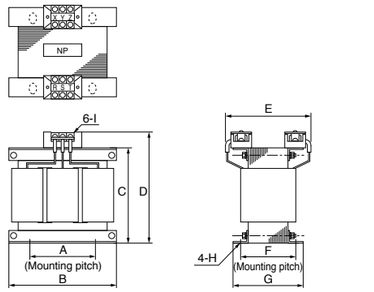
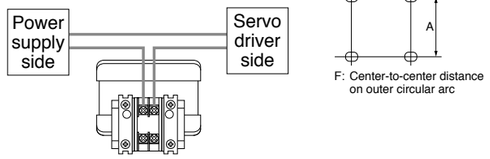
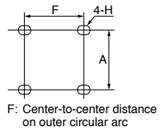


Fig.2



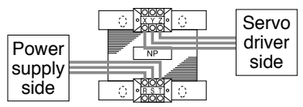
• Wiring of the reactor <Single phase>

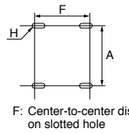




F: Center-to-center distance on outer circular arc

• Wiring of the reactor <3-Phase>





F: Center-to-center distance on slotted hole

[Unit: mm]

	Part No.	A	B	C	D	E (Max)	F	G	H	I	Inductance (mH)	Rated current (A)
Fig.1	**DV0P227**	55±0.7	80±1	66.5±1	110 Max	90	41±2	55±2	4-5φ×10	M4	4.02	5
	DV0P228	55±0.7	80±1	66.5±1	110 Max	95	46±2	60±2	4-5φ×10	M4	2	8
Fig.2	**DV0P220**	65±1	125±1	(93)	136 Max	155	70+3/–0	85±2	4-7φ×12	M4	6.81	3

Harmonic restraint

Harmonic restraint measures are not common to all countries. Therefore, prepare the measures that meet the requirements of the destination country.
When installing a product for Japan, refer to the instruction manual available on our website.

【Panasonic Corporation, Motor Business Unit web site】
industrial.panasonic.com/ac/e/

<Remarks>
When using a reactor, be sure to install one reactor to one servo driver.

■ **Recommended devices**

Surge Absorber for Motor Brake

Motor	Surge absorber for motor brake	
	Part No. (Manufacturer's)	Manufacturer
MUMA 50 W to 400 W	Z15D151	SEMITEC Corporation

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List of Peripheral Devices

Manufacturer	Tel No. / Home Page	Peripheral devices
Panasonic Corporation Eco Solutions Company	http://panasonic.net/es/	Circuit breaker
Panasonic Corporation Automotive & Industrial Systems Company	http://panasonic.net/id/	Surge absorber Switch, Relay
Iwaki Musen Kenkyusho Co., Ltd.	+81-44-833-4311 http://www.iwakimusen.co.jp/	Regenerative resistor
SEMITEC Corporation	+81-3-3621-2703 http://www.semitec.co.jp/english2/	Surge absorber for motor brake
TDK Corporation	+81-3-5201-7229 http://www.global.tdk.com/	Ferrite core
Okaya Electric Industries Co. Ltd.	+81-3-4544-7040 http://www.okayaelec.co.jp/english/index.html	Surge absorber Noise filter
Sumitomo 3M	+81-3-5716-7290 http:/solutions.3m.com/wps/portal/3M/ja_JP/WW2/Country/	Connector
Tyco Electronics Japan G.K.	+81-44-844-8052 http://www.te.com/ja/home.html	
Japan Molex Inc.	+81-462-65-2313 http://www.molex.co.jp	
DYDEN CORPORATION	+81-3-5805-5880 http://www.dyden.co.jp/english/index.htm	Cable

* The above list is for reference only. We may change the manufacturer without notice.

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MEMO

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EU Directives

The EU Directives apply to all such electronic products as those having specific functions and have been exported to EU and directly sold to general consumers. Those products are required to conform to the EU unified standards and to furnish the CE marking on the products.
However, our AC servos meet the relevant EU Directives for Low Voltage Equipment so that the machine or equipment comprising our AC servos can meet EU Directives.

EMC Directives

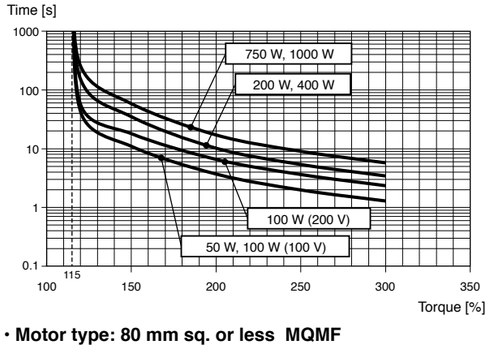
MINAS Servo System conforms to relevant standard under EMC Directives setting up certain model (condition) with certain locating distance and wiring of the servo motor and the driver. And actual working condition often differs from this model condition especially in wiring and grounding. Therefore, in order for the machine to conform to the EMC Directives, especially for noise emission and noise terminal voltage, it is necessary to examine the machine incorporating our servos.

Conformity to UL Standards

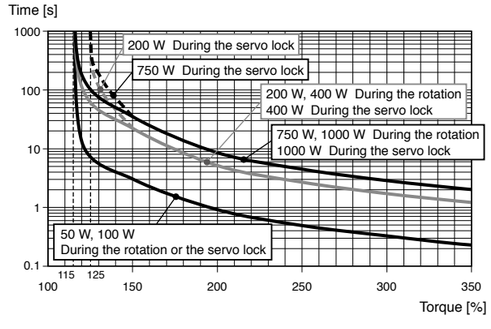
Observe the following conditions of (1) and (2) to make the system conform to UL508C (E164620).
(1) Use the driver in an environment of Pollution Degree 2 or 1 prescribed in IEC60664-1.
(e.g. Install in the control box with IP54 enclosure.)
(2) Make sure to install a circuit breaker or fuse which are UL recognized (Listed Ⓤ marked) between the power supply and the noise filter.
For rated current of circuit breaker and fuse, refer to P.27 “Driver and List of Applicable Peripheral Devices”.
Use a copper cable with temperature rating of 75 ˚C or higher.
(3) Over-load protection level
Over-load protective function will be activated when the effective current exceeds 115 % or more than the rated current based on the time characteristics (see the graph). Confirm that the effective current of the driver does not exceed the rated current.
Set up the peak permissible current with Pr0.13 (Setup of 1st torque limit) and Pr5.22 (Setup 2nd torque limit).

■ Overload protection time characteristics

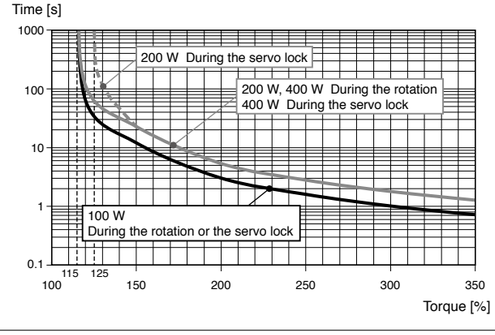
• Motor type: 80 mm sq. or less MSMF



• Motor type: 80 mm sq. or less MHMF



• Motor type: 80 mm sq. or less MQMF



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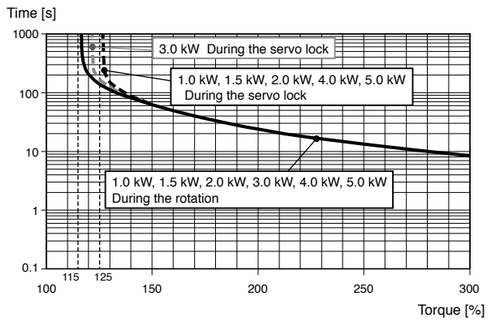
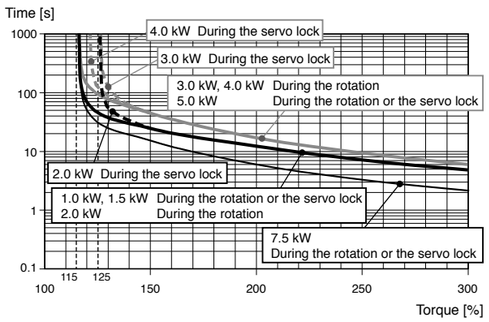
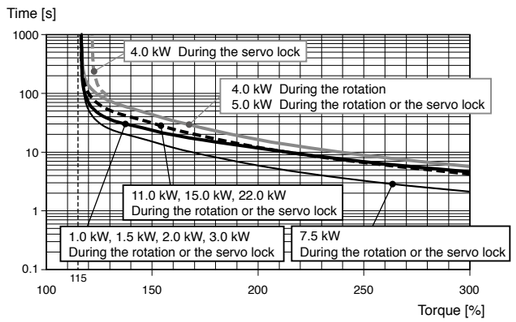
• Motor type: 100 mm sq. or more MSMF



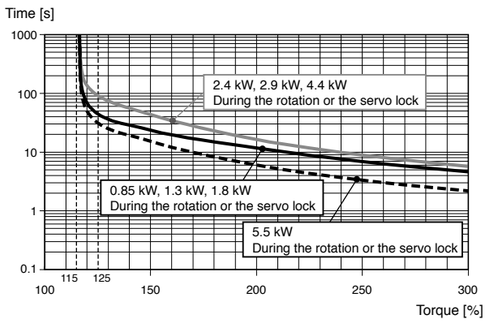
• Motor type: 100 mm sq. or more MHMF



• Motor type: 100 mm sq. or more MDMF



• Motor type: 100 mm sq. or more MGMF



Conformed Standards

		Driver	Motor
EU Directives	EMC Directives	EN55011 EN61000-6-2 EN61000-6-4 EN61800-3	–
	Low-Voltage Directives	EN61800-5-1 EN50178	EN60034-1 EN60034-5
	Machinery Directives Functional safety *1	ISO13849-1(PL e, Cat.3) EN61508(SIL3) EN62061(SILCL 3) EN61800-5-2(SIL3, STO) IEC61326-3-1 IEC60204-1	–
UL Standards		UL508C (E164620)	UL1004-1, UL1004-6 (E327868)
CSA Standards		C22.2 No.14	C22.2 No.100
Radio Waves Act (South Korea) (KC) *2		KN11 KN61000-4-2,3,4,5,6,8,11	–

IEC : International Electrotechnical Commission
EN : Europaischen Normen
EMC : Electromagnetic Compatibility
UL : Underwriters Laboratories
CSA : Canadian Standards Association

Pursuant to the directive 2004/108/EC, article 9(2)
Panasonic Testing Centre
Panasonic Service Europe, a division of
Panasonic Marketing Europe GmbH
Winsbergring 15, 22525 Hamburg, F.R. Germany

● When export this product, follow statutory provisions of the destination country.

*1 A6SE, A6SG, A6NE, A6BE series doesn't correspond to the functional safety standard.
*2 Information related to the Korea Radio Law
This servo driver is a Class A commercial broadcasting radio wave generator not designed for home use. The user and dealer should be aware of this fact.

A 급 기기 (업무용 방송통신기자재)
이 기기는 업무용(A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

(대상기종 : Servo Driver **)**

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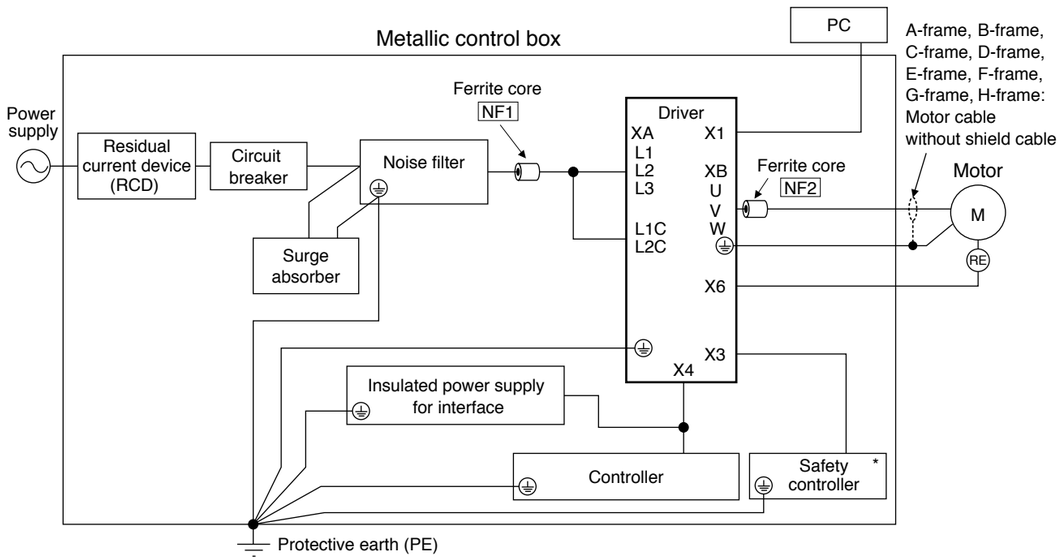
Installation Environment

Use the servo driver in the environment of Pollution Degree 1 or 2 prescribed in IEC-60664-1 (e.g. Install the driver in control panel with IP54 protection structure.)



For NF1 to NF2 , refer to the Table “Ferrite core” (P.414).

* A6SE, A6SG, A6NE, A6BE is not provided with X3 terminal.

<Caution>

Use options correctly after reading Operating Instructions of the options to better understand the precautions.

Take care not to apply excessive stress to each optional part.

Power Supply

100 V type (A-frame to C-frame)	Single phase, 100 V	+10 % –15 %	to	120 V	+10 % –15 %	50 Hz/60 Hz
200 V type (A-frame to D-frame)	Single/3-phase, 200 V	+10 % –15 %	to	240 V	+10 % –15 %	50 Hz/60 Hz
200 V type (E-frame to H-frame)	3-phase, 200 V	+10 % –15 %	to	240 V	+10 % –15 %	50 Hz/60 Hz

(1) This product is designed to be used in over-voltage category (installation category) Ⅲ of EN 61800-5-1:2007.

(2) Use an insulated power supply of DC12 V to 24 V which has CE marking or complies with EN60950.

Circuit Breaker

Install a circuit breaker which complies with IEC Standards and UL recognized (Listed and marked) between power supply and noise filter.

The short-circuit protection circuit on the product is not for protection of branch circuit.

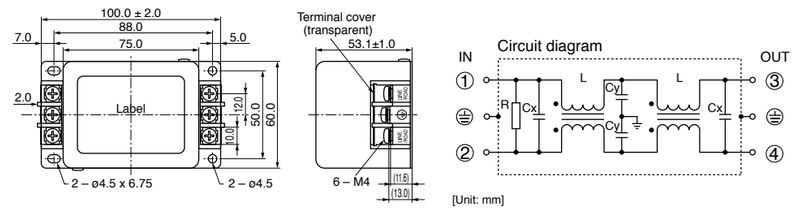
The branch circuit should be protected in accordance with NEC and the applicable local regulations in your area.

Noise Filter

When you install one noise filter at the power supply for multi-axes application, contact the manufacturer of the noise filter. If noise margin is required, connect 2 filters in series to emphasize effectiveness.

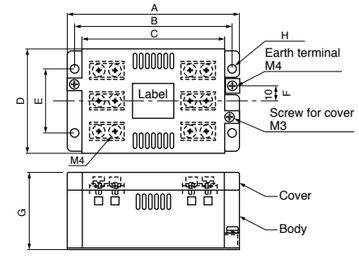
• Options

Option part No.	Voltage specifications for driver	Manufacturer's part No.	Applicable driver (frame)	Manufacturer
DV0P4170	Single phase 100 V, 200 V	SUP-EK5-ER-6	A-frame and B-frame	Okaya Electric Ind.

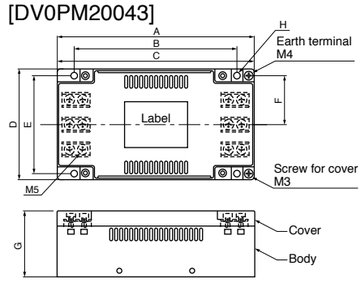


Option part No.	Voltage specifications for driver	Manufacturer's part No.	Applicable driver (frame)	Manufacturer
DV0PM20042	3-phase 200 V	3SUP-HU10-ER-6	A-frame and B-frame	Okaya Electric Ind.
	Single phase 100 V, 200 V 3-phase 200 V		C-frame	
DV0P4220	Single/3-phase 200 V	3SUP-HU30-ER-6	D-frame	
DV0PM20043	3-phase 200 V	3SUP-HU50-ER-6	E-frame	

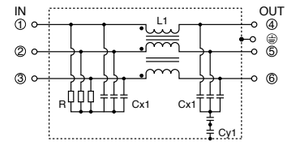
[DV0PM20042, DV0P4220]



[DV0PM20043]



Circuit diagram

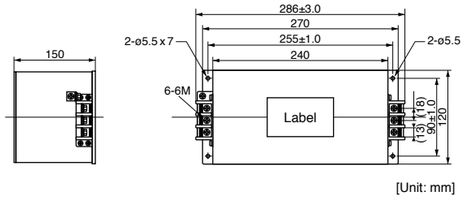


[Size] [Unit: mm]

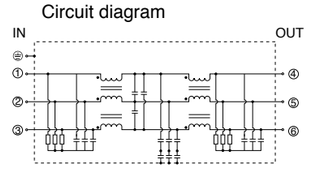
	A	B	C	D	E	F	G	H
DV0PM20042	115	105	95	70	43	10	52	5.5
DV0P4220	145	135	125	70	50	10	52	5.5
DV0PM20043	165	136	165	90	80	40	54	5.5

For single phase application, use 2 terminals among 3 terminals, leaving the remaining terminal unconnected.

Option part No.	Voltage specifications for driver	Manufacturer's part No.	Applicable driver (frame)	Manufacturer
DV0P3410	3-phase 200 V	3SUP-HL50-ER-6B	F-frame	Okaya Electric Ind.



Circuit diagram



<Remarks>

• Select a noise filter of capacity that exceeds the capacity of the power source (also check for load condition).

• For detailed specification of the filter, contact the manufacturer.

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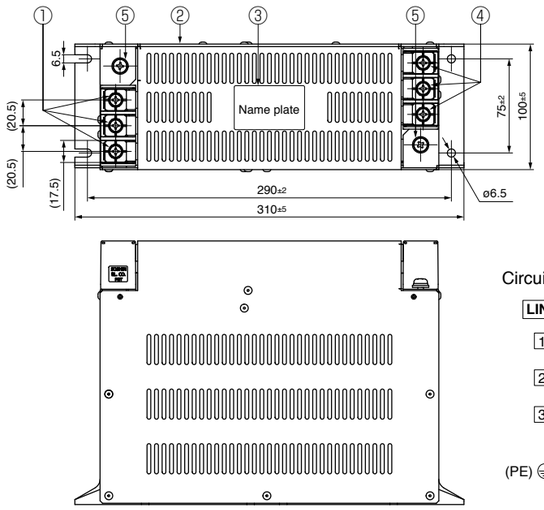
Noise Filter

• Recommended components

Part No.	Voltage specifications for driver	Rated current (A)	Applicable driver (frame)	Manufacturer
HF3080C-SZA	3-phase 200 V	80	G	SOSHIN ELECTRIC CO.,LTD.
HF3100C-SZA		100	H	



<Remarks>

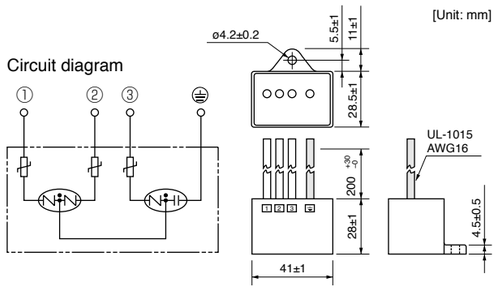
- Select a noise filter of capacity that exceeds the capacity of the power source (also check for load condition).
- For detailed specification of the filter, contact the manufacturer.
- When you install one noise filter at the power supply for multi-axes application, contact the manufacturer of the noise filter.

Surge Absorber

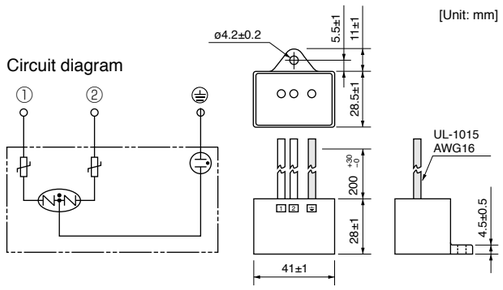
Provide a surge absorber for the primary side of noise filter.

Option part No.	Voltage specifications for driver	Manufacturer's part No.	Manufacturer
DV0P1450	3-phase 200 V	R·A·V-781BXZ-4	Okaya Electric Ind.
DV0P4190	Single phase 100 V, 200 V	R·A·V-781BWZ-4	

[DV0P1450]



[DV0P4190]



<Remarks>

Remove this surge absorber when you perform dielectric test on the machine, or surge absorber might be damaged.

Ferrite core

■ Install ferrite core to power cable and motor cable

Symbol*1	Cable Name	Applicable driver (frame)	Option part No.	Manufacturer's part No.	Manufacturer	Required number
NF1	Power cable	A, B, E	DV0P1460	ZCAT3035-1330	TDK Corp.	1
		G, H				3
			—	RJ8095	Konno Kogyosho Co.Ltd	1
NF2	Motor cable	A, B, C, D, E	DV0P1460	ZCAT3035-1330	TDK Corp.	1
		F				2
		G, H				3
			—	T400-61D	MICROMETALS	1

*1 For symbols, refer to the Block Diagram “Installation Environment” (P.411).

- The number of turns is all 1.
- NF1 is not required for C frame, D frame, F frame.

<Remarks>

To connect the ferrite core to the connector XB connection cable, adjust the sheath length at the tip of the cable, as required.

<Caution>

Fix the ferrite core in order to prevent excessive stress to the cables.

Fig.1: DV0P1460 (Option) 4 pieces

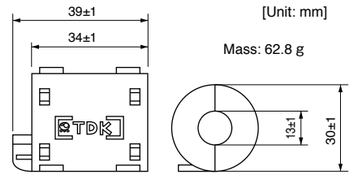


Fig.3: T400-61D (Recommended components) 1 pieces

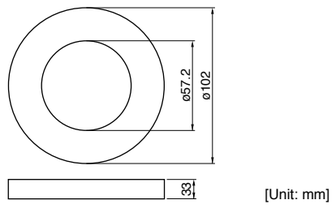
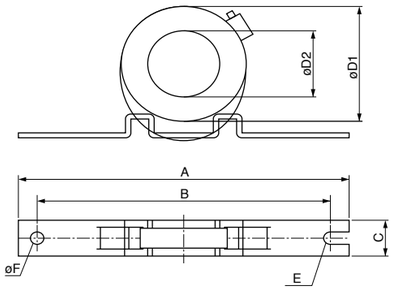


Fig.2: RJ8095 (Recommended components) 1 pieces



Manufacturer's part No.	Current value	100 kHz (µH)	Size [Unit: mm]							
			A	B	C	D1	D2	Core thickness	E	F
RJ8095	95 A	7.9±3	200	180	34	130	107	35	R3.5	7

Residual Current Device

Install a type B Residual current device (RCD) at primary side of the power supply.
Type B: Residual current device which detects a direct-current ingredient.

Grounding

(1) Connect the protective earth terminal (⏚) of the driver and the protective earth terminal (PE) of the control box without fail to prevent electrical shocks.
(2) Do not make a joint connection to the protective earth terminals (⏚). 2 terminals are provided for protective earth.

<Note>

For driver and applicable peripheral devices, refer to P.27 “Driver and List of Applicable Peripheral Devices”.

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Compliance to EU and EMC Directives

EU Directives

The EU Directives apply to all such electronic products as those having specific functions and have been exported to EU and directly sold to general consumers. Those products are required to conform to the EU unified standards and to furnish the CE marking on the products. MINAS AC Servos conforms to the EU Directives for Low Voltage Equipment so that the machine incorporating our servos has an easy access to the conformity to relevant EU Directives for the machine.

EMC Directives

MINAS Servo System conform to relevant standard under EMC Directives setting up certain model (condition) with certain locating distance and wiring of the servo motor and the driver. And actual working condition often differs from this model condition especially in wiring and grounding. Therefore, in order for the machine to conform to the EMC Directives, especially for noise emission and noise terminal voltage, it is necessary to examine the machine incorporating our servos.

Conformed Standards

Subject	Conformed Standard		
Motor	IEC60034-1	IEC60034-5 UL1004 CSA22.2 No.100	Conforms to Low- Voltage Directives
Motor and driver	EN50178	UL508C CSA22.2 No.14	
	EN55011	Radio Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment	Conforms to references by EMC Directives
	EN61000-6-2	Immunity for Industrial Environments	
	IEC61000-4-2	Electrostatic Discharge Immunity Test	
	IEC61000-4-3	Radio Frequency Electromagnetic Field Immunity Test	
	IEC61000-4-4	Electric High-Speed Transition Phenomenon/Burst Immunity Test	
	IEC61000-4-5	Lightening Surge Immunity Test	
	IEC61000-4-6	High Frequency Conduction Immunity Test	
	IEC61000-4-11	Instantaneous Outage Immunity Test	

IEC : International Electrotechnical Commission
EN : Europaischen Normen
EMC: Electromagnetic Compatibility
UL : Underwriters Laboratories
CSA : Canadian Standards Association

Pursuant to at the directive 2004/108/EC,article 9(2)

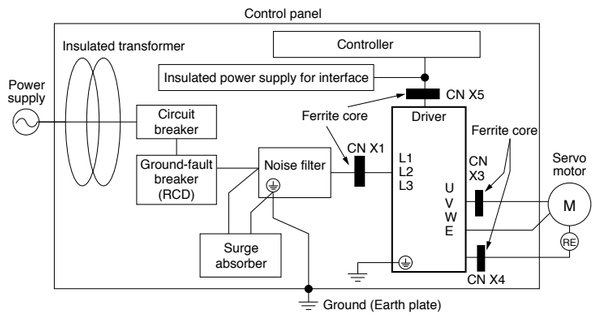
Panasonic Testing Centre
Panasonic Service Europe,
a division of Panasonic Marketing Europe GmbH
Winsbergring 15,22525 Hamburg,F.R.Germany

Composition of Peripheral Components

<Precautions in using options>
Use options correctly after reading operation manuals of the options to better understand the precautions. Take care not to apply excessive stress to each optional part.

Installation Environment

Use Minas driver in environment of Pollution Degree 1 or 2 prescribed in IEC-60664-1 (e.g. Install the driver in control panel with IP54 protection structure.)



Power Supply

100 V system	Single phase, 100 V	+10 % –15 %	to	115 V	+10 % –15 %	50 Hz/60 Hz
200 V system	Single phase, 200 V	+10 % –15 %	to	240 V	+10 % –15 %	50 Hz/60 Hz
200 V system	3-phase, 200 V	+10 % –15 %	to	240 V	+10 % –15 %	50 Hz/60 Hz

(1) Use the power supply under an environment of Overvoltage Category II specified in IEC60664-1.
(2) For a interface power supply, use the insulated one with 12 VDC to 24 VDC which conforms to CE Marking or EN Standards (EN60950).

Circuit Breaker

Connect a circuit breaker which conforms to IEC standards and is UL recognized (UL Listed, Ⓤ marked), between the power supply and the noise filter.

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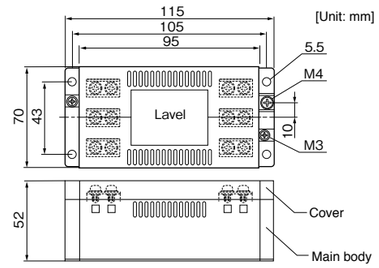
Noise Filter

When you install one noise filter in the power supply for multi axis application, consult with the manufacture of the filter.

Option part No.	Part No.	Manufacturer
DV0P4160	3SUP-HU10-ER-6	Okaya Electric Industries Co.



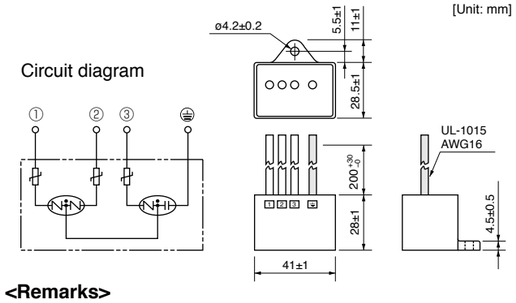
Surge Absorber

Install a surge absorber at primary side of the noise filter.

Option part No.	Driver voltage spec	Part No.	Manufacturer
DV0P1450	3-phase, 200 V	R·A·V-781BXZ-4	Okaya Electric

[Unit: mm]

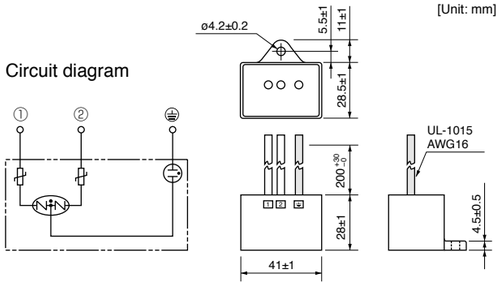
Circuit diagram



Option part No.	Driver voltage spec	Part No.	Manufacturer
DV0P4190	Single phase, 100 V, 200 V	R·A·V-781BWZ-4	Okaya Electric

[Unit: mm]

Circuit diagram



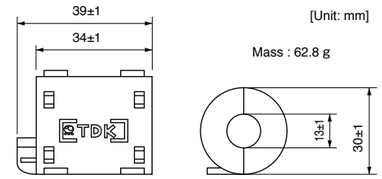
<Remarks>
Remove this surge absorber when you perform dielectric test on the machine, or surge absorber might be damaged.

Ferrite core

Install ferrite core to all cables (Power line, motor cable, encoder cable, interface cable)

<Caution>
- Please fix a ferrite core to avoid excessive stress to the cable.
- When using multiple axes, noise generated from each driver might influence driver and peripheral equipment and result to malfunction.
  Please insert a ferrite core between driver and motor wires (U, V, W but grounding).
  (Please refer to P.415 "Composition of Peripheral Components".)

Option part No.	Part No.	Qty.	Manufacturer
DV0P1460	ZCAT3035-1330	4	TDK Corp.



Grounding

(1) Connect the protective earth terminal of the driver (⏚) and protective earth terminal of the control panel (PE) without fail to prevent electrical shocks.
(2) Do not co-clamp to the ground terminals (⏚). Two ground terminals are provided.

Ground-Fault Breaker

Install a ground fault curcuit braker (RCD) to the primary side of the power supply.
Please use B-type (DC sensitive) ground fault circuit breakers defined in IEC60947-2, JISC8201-2-2.

Conformity to UL Standards

Observe the following conditions of (1) and (2) to make the system conform to UL508C (File No. E164620).
(1) Use the driver in an environment of Pollution Degree 2 or 1 prescribed in IEC60664-1. (e.g. Install in the control box with IP54 enclosure.)
(2) Install a circuit breaker or fuse which are UL recognized (LISTED Ⓤ marked) between the power supply and the noise filter without fail.

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AC Servo Motor Capacity Selection Software

We have prepared PC software “M-SELECT” for AC servo motor capacity selection.
Consult our sales representative or authorized distributor.

• Three-step selection

1. Select components and specified values

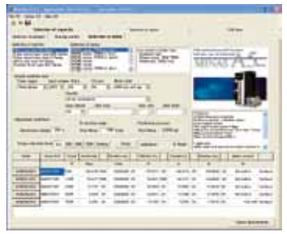
Select appropriate mechanical parameter items and fill them with parameter values derived from the real machine. To simulate the target machine as practical as possible, use maximum number of parameters available.

2. Enter operation pattern

Input the planned operation pattern that will contain [speed and rotation standard] or [absolute position standard] with optional settings such as S-acceleration/deceleration.

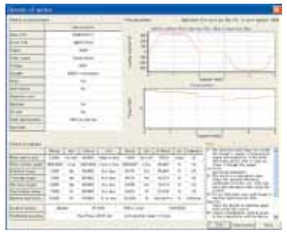
3. Select the motor

When the data required in step 1 and 2 above have been input, the software lists the motors, which will be appropriate to use with your machine. Select the motor that is best suitable for your machine application.



Details of motor

Once the motor is selected, specifications of the motor and driver, and details of reason for determination are displayed and may be printed out.



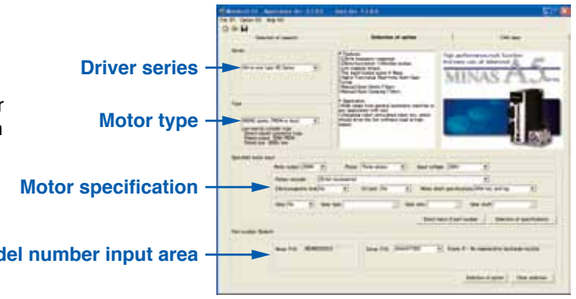
Option Selection Software for AC Servo Motor

We have prepared PC software to enable fast, easy, and correct option selection, a complicated job without the software.

• Two procedures for option selection

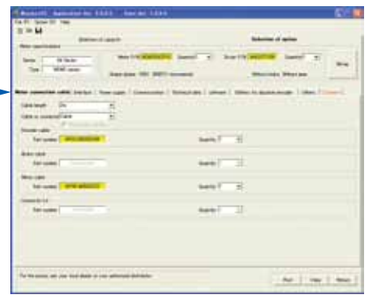
1. Selection according to driver series and motor type

Suitable option can be selected by selecting driver series, motor type and motor specification through pulldown menu.



2. Entry of model number

If you know the model number based on the servo motor and driver currently used, enter the model number.



Result of selection

Tab sheet specific to each of option model numbers is used for easier identification of the desired option.

* When you are using the motor capacity selection software, simply press [Option Selection] tab and the screen as shown right will appear.

Please download from our web site and use after install to the PC.
https://industrial.panasonic.com/ww/products/motors-compressors/fa-motors/ac-servo-motors/minas-a5-panaterm

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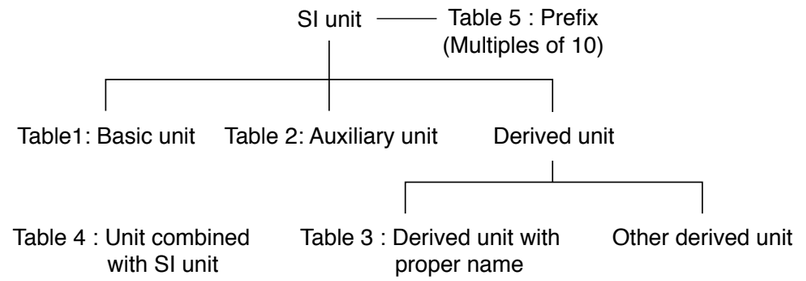

Table1: Basic unit

Quantity	Name of unit	Symbol of unit
Length	meter	m
Weight	kilogram	kg
Time	second	s
Current	ampere	A
Thermodynamic temperature	kelvin	K
Amount of substance	mol	mol
Luminous intensity	candela	cd

Table 2: Auxiliary unit

Quantity	Name of unit	Symbol of unit
Plane angle	radian	rad
Solid angle	steradian	sr

Table 3: Major derived unit with proper name

Quantity	Name	Symbol of unit	Derivation from basic unit, auxiliary unit or other derived unit
Frequency	hertz	Hz	1 Hz = 1 s^{-1}
Force	newton	N	1 N = 1 kg·m/s^2
Pressure, Stress	pascal	Pa	1 Pa = 1 N/m^2
Energy, Work, Amount of heat	joule	J	1 J = 1 N·m
Amount of work, Work efficiency, Power, Electric power	watt	W	1 W = 1 J/s
Electric charge, Amount of electricity	coulomb	C	1 C = 1 A·s
Electric potential, Potential difference, Voltage, Electromotive force	volt	V	1 V = 1 J/C
Electrostatic capacity, Capacitance	farad	F	1 F = 1 C/V
Electric resistance	ohm	Ω	1 Ω = 1 V/A
Electric conductance	siemens	S	1 S = 1 $Ω^{-1}$
Magnetic flux	weber	Wb	1 Wb = 1 V·s
Magnetic flux density, Magnetic induction	tesla	T	1 T = 1 Wb/m^2
Inductance	henry	H	1 H = 1 Wb/A
Degree centigrade (Celsius)	degree centigrade (Celsius) / degree	˚C	t ˚C = (t+273.15) K
Luminous flux	lumen	lm	1 lm = 1 cd·sr
Illuminance	lux	lx	1 lx = 1 lm/m^2

Table 4: Unit combined with SI unit

Quantity	Name	Symbol of unit
Time	minute	min
	hour	h
	day	d
Plane angle	degree	°
	minute	'
	second	"
Volume	liter	l, L
Weight	ton	t

Table 5: Prefix

Multiples powered to unit	Prefix	
	Name	Symbol
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{2}	hecto	h
10	deca	da
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

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Major Compatible Unit

Quantity	Symbol of conventional unit	Symbol of SI unit and compatible unit	Conversion value
Length	μ (micron)	μm	1 μ = 1 μm (micrometer)
Acceleration	Gal	m/s^2	1 Gal = 10^{-2} m/s^2
	G	m/s^2	1 G = 9.80665 m/s^2
Frequency	c/s, c	Hz	1 c/s = Hz
Revolving speed, Number of revolutions	rpm	s^{-1} or min^{-1}, r/min	1 rpm = 1 min^{-1}
Weight	kgf	–	Same value
Mass	–	kg	
Weight flow rate	kgf/s	–	Same value
Mass flow rate	–	kg/s	
Specific weight	kgf/m^3	–	Same value
Density	–	kg/m^3	
Specific volume	m^3/kgf	m^3/kg	Same value
Load	kgf	N	1 kgf = 9.80665 N
Force	kgf	N	1 kgf = 9.80665 N
	dyn	N	1 dyn = 10^{-5} N
Moment of force	kgf·m	N·m	1 kgf·m = 9.806 N·m
Pressure	kgf/cm^2	Pa, bar (1) or kgf/cm^2	1 kgf/cm^2 = 9.80665 x 10^4 Pa = 0.980665 bar
	at (Engineering atmospheric pressure)	Pa	1 at = 9.80665 x 10^4 Pa
	atm (Atmospheric pressure)	Pa	1 atm = 1.01325 x 10^5 Pa
	mH_2O, mAq	Pa	1 mH_2O = 9.80665 x 10^3 Pa
	mmHg	Pa or mmHg (2)	1 mmHg = 133.322 Pa
	Torr	Pa	
Stress	kgf/mm^2	Pa or N/m^2	1 kgf/mm^2 = 9.80665 x 10^6 Pa =9.80665 x 10^6 N/m^2
	kgf/cm^2	Pa or N/m^2	1 kgf/cm^2 = 9.80665 x 10^4 Pa = 9.80665 x 10^4 N/m^2
Elastic modulus	kgf/m^2	Pa or N/m^2	1 kgf/m^2 = 9.80665 Pa = 9.80665 N/m^2 1 kgf/cm^2 = 9.80665 x 10^4 N/m^2
Energy, Work	kgf·m	J (joule)	1 kgf·m = 9.80665 J
	erg	J	1 erg = 10^{-7} J
Work efficiency, Power	kgf·m/s	W (watt)	1 kgf·m/s = 9.80665 W
	PS	W	1 PS = 0.7355 kW
Viscosity	PP	Pa·s	1 P = 0.1 Pa·s
Kinetic viscosity	St	mm^2/s	10^{-2} St = 1 mm^2/s
Thermodynamic temperature	K	K (kelvin)	1 K = 1 K
Temperature interval	deg	K (3)	1 deg = 1 K
Amount of heat	cal	J	1 cal = 4.18605 J
Heat capacity	cal/°C	J/K (3)	1 cal/°C = 4.18605 J/K
Specific heat, Specific heat capacity	cal/ (kgf·°C)	cal/ (kgf·K)(3)	1 cal/ (kgf·°C) = 4.18605 J/ (kg·K)
Entropy	cal/K	J/K	1 cal/K = 4.18605 J/K
Specific entropy	cal/ (kgf·K)	J/(kg·K)	1 cal/ (kgf·K) = 4.18605 J/ (kg·K)
Internal energy (Enthalpy)	cal	J	1 cal = 4.18605 J
Specific internal energy (Specific enthalpy)	cal/kgf	J/kg	1 cal/kgf = 4.18605 J/kg
Heat flux	cal/h	W	1 kcal/h = 1.16279 W
Heat flux density	cal/ ($h·m^2$)	W/m^2	1 kcal/ ($h·m^2$) = 1.16279 W/m^2
Thermal conductivity	cal/ (h·m·°C)	W/ (m·K) (3)	1 kcal/ (h·m·°C) = 1.16279 W/ (m·K)
Coefficient of thermal conductivity	cal/ ($h·m^2$·°C)	W/ (m^2·K) (3)	1 kcal/ ($h·m^2$·°C) = 1.16279 W/ (m^2·K)
Intensity of magnetic field	Oe	A/m	1 Oe = 10^3 / (4π) A/m
Magnetic flux	Mx	Wb (weber)	1 Mx = 10^{-8} Wb
Magnetic flux density	Gs,G	T (tesla)	1 Gs = 10^{-4} T

Note
(1) Applicable to liquid pressure. Also applicable to atmospheric pressure of meteorological data, when “bar” is used in international standard.
(2) Applicable to scale or indication of blood pressure manometers.
(3) “°C” can be substituted for “K”.

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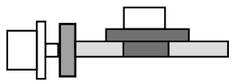
Flow of Motor Selection

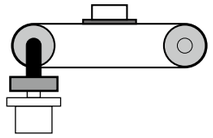
1. Definition of mechanism to be driven by motor.
Define details of individual mechanical components (ball screw length, lead and pulley diameters, etc.)

<Typical mechanism>

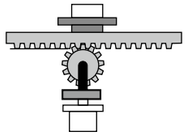
Ball screw mechanism



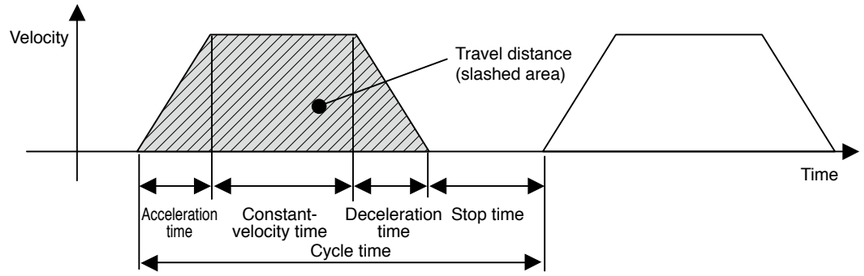
Belt mechanism



Rack & pinion, etc.



2. Definition of operating pattern.
Acceleration/deceleration time, Constant-velocity time, Stop time, Cycle time, Travel distance



Note) Selection of motor capacity significantly varies depending on the operating pattern.
The motor capacity can be reduced if the acceleration/deceleration time and stop time are set as long as possible.

3. Calculation of load inertia and inertia ratio.
Calculate load inertia for each mechanical component. (Refer to "General inertia calculation method" described later.)
Divide the calculated load inertia by the inertia of the selected motor to check the inertia ratio.
For calculation of the inertia ratio, note that the catalog value of the motor inertia is expressed as "× 10^{-4} kg·m²".

4. Calculation of motor velocity
Calculate the motor velocity from the moving distance, acceleration / deceleration time and constant-velocity time.

5. Calculation of torque
Calculate the required motor torque from the load inertia, acceleration/deceleration time and constant-velocity time.

6. Calculation of motor
Select a motor that meets the above 3 to 5 requirements.

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Description on the Items Related to Motor Selection

1. Torque

(1) Peak torque

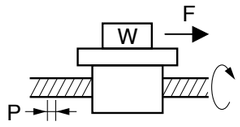
Indicate the maximum torque that the motor requires during operation (mainly in acceleration and deceleration steps). The reference value is 80% or less of the maximum motor torque. If the torque is a negative value, a regenerative discharge resistor may be required.

(2) Traveling torque, Stop holding torque

Indicates the torque that the motor requires for a long time. The reference value is 80% or less of the rated motor torque. If the torque is a negative value, a regenerative discharge resistor may be required.

Traveling torque calculation formula for each mechanism

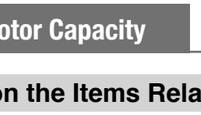
Ball screw mechanism



Traveling torque $T_f = \frac{P}{2\pi\eta}(\mu g W + F)$

W : Weight [kg]
P : Lead [m]
F : External force [N]
η : Mechanical efficiency
μ : Coefficient of friction
g : Acceleration of gravity 9.8[m/s^2]

Belt mechanism



Traveling torque $T_f = \frac{D}{2\pi\eta}(\mu g W + F)$

W : Weight [kg]
P : Pulley diameter [m]
F : External force [N]
η : Mechanical efficiency
μ : Coefficient of friction
g : Acceleration of gravity 9.8[m/s^2]

(3) Effective torque

Indicates a root-mean-square value of the total torque required for running and stopping the motor per unit time. The reference value is approx. 80% or less of the rated motor torque.

$$Trms = \sqrt{\frac{Ta^2 \times ta + Tf^2 \times tb + Td^2 \times td}{tc}}$$

T_a : Acceleration torque [N·m]
T_f : Traveling torque [N·m]
T_d : Deceleration torque [N·m]
t_a : Acceleration time [s]
t_b : Constant-velocity time [s]
t_d : Deceleration time [s]
t_c : Cycle time [s] (Run time + Stop time)

2. Motor velocity

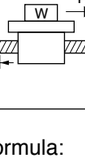
Maximum velocity

Maximum velocity of motor in operation: The reference value is the rated velocity or lower value.
When the motor runs at the maximum velocity, you must pay attention to the motor torque and temperature rise. For actual calculation of motor velocity, see "Example of motor selection" described later.

3. Inertia and inertia ratio

Inertia is like the force to retain the current moving condition.
Inertia ratio is calculated by dividing load inertia by rotor inertia.
Generally, for motors with 750 W or lower capacity, the inertia ratio should be “20” or less. For motors with 1000 W or higher capacity, the inertia ratio should be “10” or less.
If you need quicker response, a lower inertia ratio is required.
(For example, when the motor takes several seconds in acceleration step, the inertia ratio can be further increased.)

General inertia calculation method

Shape	J calculation formula	Shape	J calculation formula
Disk	$J = \frac{1}{8} W D^2$ [kg·m^2] W : Weight [kg] D : Outer diameter [m]	**Hollow cylinder** 	$J = \frac{1}{8} W (D^2 + d^2)$ [kg·m^2] W : Weight [kg] D : Outer diameter [m] d : Inner diameter [m]
Prism	$J = \frac{1}{12} W (a^2 + b^2)$ [kg·m^2] W : Weight [kg] a, b, c : Side length [m]	**Uniform rod**	$J = \frac{1}{48} W (3D^2 + 4L^2)$ [kg·m^2] W : Weight [kg] D : Outer diameter [m] L : Length [m]
Straight rod	$J = \frac{1}{3} W L^2$ [kg·m^2] W : Weight [kg] L : Length [m]	**Separated rod**	$J = \frac{1}{8} W D^2 + W S^2$ [kg·m^2] W : Weight [kg] D : Outer diameter [m] S : Distance [m]
Reduction gear	Inertia on shaft "a" $J = J_1 + (\frac{n_2}{n_1})^2 J_2$[kg·m^2] n_1 : A rotational speed of a shaft [r/min] n_2 : A rotational speed of b shaft [r/min]		
Conveyor	$J = \frac{1}{4} W D^2$ [kg·m^2] W : Workpiece weight on conveyor [kg] D : Drum diameter [m] * Excluding drum J	**Ball screw**	$J = J_B + \frac{W \cdot P^2}{4\pi^2}$ [kg·m^2] W : Weight [kg] P : Lead J_B : J of ball screw

If weight (W [kg]) is unknown, calculate it with the following formula:
Weight W[kg]=Density ρ [kg/m^3] x Volume V[m^3]
Density of each material
Iron ρ =7.9 x 10^3 [kg/m^3] Aluminum ρ =2.8 x 10^3 [kg/m^3]
Brass ρ =8.5 x 10^3 [kg/m^3]

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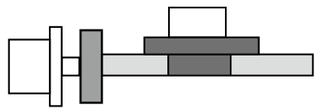
To Drive Ball Screw Mechanism

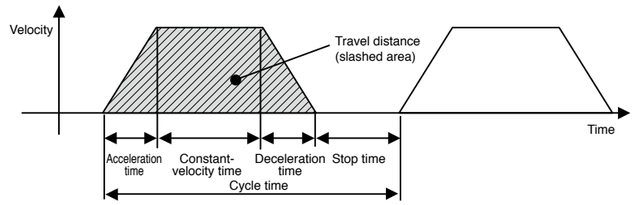
1. Example of motor selection for driving ball screw mechanism



Workpiece weight $W_A = 10$ [kg]
Ball screw length $B_L = 0.5$ [m]
Ball screw diameter $B_D = 0.02$ [m]
Ball screw lead $B_P = 0.02$ [m]
Ball screw efficiency $B\eta = 0.9$
Travel distance 0.3[m]
Coupling inertia $J_C = 10 \times 10^{-6}$ [kg·m²] (Use manufacturer-specified catalog value, or calculation value.)

2. Running pattern :

Acceleration time $t_a = 0.1$ [s]
Constant-velocity time $t_b = 0.8$ [s]
Deceleration time $t_d = 0.1$ [s]
Cycle time $t_c = 2$ [s]
Travel distance 0.3[m]



3. Ball screw weight

$$B_W = \rho \times \pi \times \left(\frac{B_D}{2}\right)^2 \times B_L = 7.9 \times 10^3 \times \pi \times \left(\frac{0.02}{2}\right)^2 \times 0.5$$
$$= 1.24 \text{ [kg]}$$

4. Load inertia

$$J_L = J_C + J_B = J_C + \frac{1}{8} B_W \times B_D^2 + \frac{W_A \cdot B_P^2}{4\pi^2}$$
$$= 0.00001 + (1.24 \times 0.02^2) / 8 + 10 \times 0.02^2 / 4\pi^2$$
$$= 1.73 \times 10^{-4} \text{ [kg·m²]}$$

5. Provisional motor selection

In case of MSMF 200 W motor : $J_M = 0.14 \times 10^{-4}$ [kg·m²]

6. Calculation of inertia ratio

$J_L / J_M = 1.73 \times 10^{-4} / 0.14 \times 10^{-4}$ Therefore, the inertia ratio is "12.3" (less than "30")
(In case of MSMF 100 W motor: $J_M = 0.048 \times 10^{-4}$ Therefore, the inertia ratio is "36.0".)

7. Calculation of maximum velocity (Vmax)

$$\frac{1}{2} \times \text{Acceleration time} \times \text{Vmax} + \text{Constant-velocity time} \times \text{Vmax} + \frac{1}{2} \times \text{Deceleration time} \times \text{Vmax} = \text{Travel distance}$$
$$\frac{1}{2} \times 0.1 \times \text{Vmax} + 0.8 \times \text{Vmax} + \frac{1}{2} \times 0.1 \times \text{Vmax} = 0.3$$
$$0.9 \times \text{Vmax} = 0.3$$
$$\text{Vmax} = 0.3 / 0.9 = 0.334 \text{ [m/s]}$$

8. Calculation of motor velocity (N [r/min]) Ball screw lead per resolution: B_P = 0.02 [m]

$N = 0.334 / 0.02 = 16.7$ [r/s]
$= 16.7 \times 60 = 1002$ [r/min] < 3000 [r/min] (Rated velocity of MSMF 200 W motor)

9. Calculation of torque

Traveling torque $T_f = \frac{B_P}{2\pi B\eta} (\mu g W_A + F) = \frac{0.02}{2\pi \times 0.9} (0.1 \times 9.8 \times 10 + 0)$
$= 0.035$ [N·m]

Acceleration torque $T_a = \frac{(J_L + J_M) \times 2\pi N[r/s]}{\text{Acceleration time [s]}}$ + Traveling torque
$= \frac{(1.73 \times 10^{-4} + 0.14 \times 10^{-4}) \times 2\pi \times 16.7}{0.1} + 0.035$
$= 0.196 + 0.035 = 0.231$ [N·m]

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Deceleration torque $T_d = \frac{(J_L + J_M) \times 2\pi N[r/s]}{\text{Deceleration time [s]}}$ – Traveling torque
$= \frac{(1.73 \times 10^{-4} + 0.14 \times 10^{-4}) \times 2\pi \times 16.7}{0.1} - 0.035$
$= 0.196 - 0.035 = 0.161$ [N·m]

10. Verification of maximum torque

Acceleration torque = $T_a = 0.231$ [N·m] < 1.91 [N·m] (Maximum torque of MSMF 200 W motor)

11. Verification of effective torque

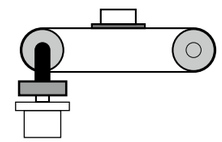
$$T_{rms} = \sqrt{\frac{T_a^2 \times t_a + T_f^2 \times t_b + T_d^2 \times t_d}{t_c}}$$
$$= \sqrt{\frac{0.231^2 \times 0.1 + 0.035^2 \times 0.8 + 0.161^2 \times 0.1}{2}}$$
$$= 0.067 \text{ [N·m]} < 0.64 \text{ [N·m]} \text{ (Rated torque of MSMF 200 W motor)}$$

12. Judging from the inertia ratio calculated above, selection of 200 W motor is preferable, although the torque margin is significantly large.

Example of Motor Selection

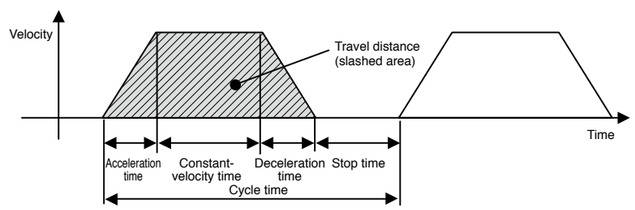
Example of motor selection for timing belt mechanism

1.Mechanism
Workpiece weight $W_A = 2$[kg] (including belt)
Pulley diameter $P_D = 0.05$[m]
Pulley weight $W_P = 0.5$[kg] (Use manufacturer-specified catalog value, or calculation value.)
Mechanical efficiency $B\eta = 0.8$
Coupling inertia $J_C = 0$ (Direct connection to motor shaft)
Belt mechanism inertia J_B
Pulley inertia J_P



2. Running pattern

Acceleration time $t_a = 0.1$[s]
Constant-velocity time $t_b = 0.8$[s]
Deceleration time $t_d = 0.1$[s]
Cycle time $t_c = 2$[s]
Travel distance 1[m]



3. Load inertia $J_L = J_C + J_B + J_P$

$= J_C + \frac{1}{4} W_A \times P_D^2 + \frac{1}{8} W_P \times P_D^2 \times 2$
$= 0 + \frac{1}{4} \times 2 \times 0.05^2 + \frac{1}{8} \times 0.5 \times 0.05^2 \times 2$
$= 0.00156 = 15.6 \times 10^{-4}$ [kg·m²]

4. Provisional motor selection

In case of MSMF 750 W motor : $J_M = 0.96 \times 10^{-4}$ [kg·m²]

5. Calculation of inertia ratio

$J_L / J_M = 15.6 \times 10^{-4} / 0.96 \times 10^{-4}$ Therefore, the inertia ratio is "16.3" (less than "20")

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Example of Motor Selection

6. Calculation of maximum velocity (Vmax)

$\frac{1}{2}$ × Acceleration time × Vmax + Constant-velocity time × Vmax + $\frac{1}{2}$ × Deceleration time × Vmax = Travel distance

$$\frac{1}{2} \times 0.1 \times Vmax + 0.8 \times Vmax + \frac{1}{2} \times 0.1 \times Vmax = 1$$

$$0.9 \times Vmax = 1$$

$$Vmax = 1 / 0.9 = 1.111[m/s]$$

7. Calculation of motor velocity (N [r/min])

A single rotation of pulley : $\pi \times P_D = 0.157[m]$

$N = 1.111 / 0.157 = 7.08[r/s]$

$= 7.08 \times 60 = 424.8[r/min] < 3000[r/min]$ (Rated velocity of MSMF 750 W motor)

8. Calculation of torque

Traveling torque

$$T_f = \frac{P_D}{2\eta}(\mu g W_A + F) = \frac{0.05}{2 \times 0.8}(0.1 \times 9.8 \times 3 + 0)$$

$$= 0.061[N \cdot m]$$

Acceleration torque

$$T_a = \frac{(J_L + J_M) \times 2\pi N[r/s]}{\text{Acceleration time}[s]} + \text{Traveling torque}$$

$$= \frac{(15.6 \times 10^{-4} + 0.96 \times 10^{-4}) \times 2\pi \times 7.08}{0.1} + 0.061$$

$$= 0.736 + 0.061 = 0.797[N \cdot m]$$

Deceleration torque

$$T_d = \frac{(J_L + J_M) \times 2\pi N[r/s]}{\text{Deceleration time}[s]} - \text{Traveling torque}$$

$$= \frac{(15.6 \times 10^{-4} + 0.96 \times 10^{-4}) \times 2\pi \times 7.08}{0.1} - 0.061$$

$$= 0.736 - 0.061 = 0.675[N \cdot m]$$

9. Verification of maximum torque

Acceleration torque $T_a = 0.797[N \cdot m] < 7.1[N \cdot m]$ (Maximum torque of MSMF 750 W motor)

10. Verification of effective torque

$$T_{rms} = \sqrt{\frac{T_a^2 \times t_a + T_f^2 \times t_b + T_d^2 \times t_d}{t_c}}$$

$$= \sqrt{\frac{0.797^2 \times 0.1 + 0.061^2 \times 0.8 + 0.675^2 \times 0.1}{2}}$$

$= 0.237[N \cdot m] < 2.4[N \cdot m]$ (Rated torque of MSMF 750 W motor)

11. Judging from the above calculation result, selection of MSMF 750W motor is acceptable.

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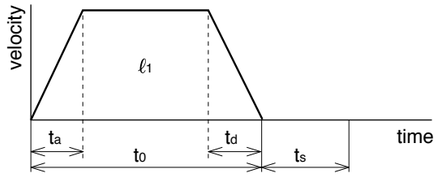
Request Sheet for Motor Selection

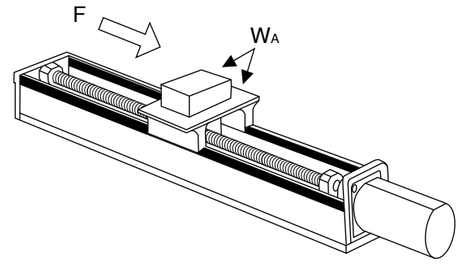
Request for motor selection Ⅰ : Ball screw drive

1. Driven mechanism and running data

1)	Travel distance of the work load per one cycle	ℓ_1:	mm
2)	Cycle time	to:	s
	(Fill in items 3) and 4) if required.)		
3)	Acceleration time	ta:	s
4)	Deceleration time	td:	s
5)	Stopping time	ts:	s
6)	Max. velocity	V:	mm/s
7)	External force	F:	N
8)	Positioning accuracy of the work load	±	mm
9)	Total weight of the work load and the table	W_A:	kg
10)	Power supply voltage		V
11)	Diameter of the ball screw		mm
12)	Total length of the ball		mm
13)	Lead of the ball screw		mm

Running pattern





14) Traveling direction (horizontal, vertical etc.)

2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

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Department/Section :
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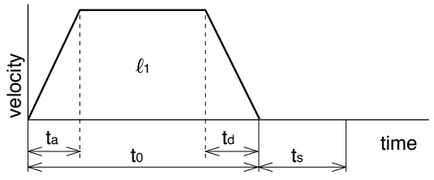
Request Sheet for Motor Selection

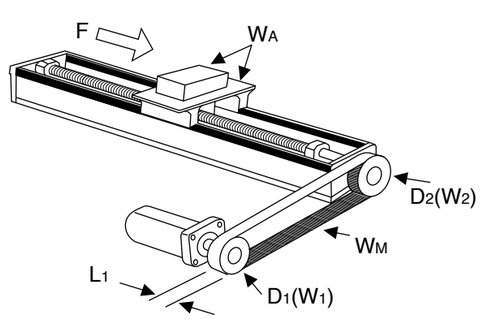
Request for motor selection Ⅱ : Timing pulley + Ball screw drive

1. Driven mechanism and running data

1)	Travel distance of the work load per one cycle	ℓ_1: mm	15)	Diameter of the pulley	Motor side D_1: mm / Ball screw side D_2: mm
2)	Cycle time	to: s	16)	Weight of the pulley	W_1: kg / W_2: kg
	(Fill in items 3) and 4) if required.)			(or item 17) and 18))	
3)	Acceleration time	ta: s	17)	Width of the pulley	L1: mm
4)	Deceleration time	td: s	18)	Material of the pulley	
5)	Stopping time	ts: s	19)	Weight of the belt	W_M: kg
6)	Max. velocity	V: mm/s			
7)	External force	F: N			
8)	Positioning accuracy of the work load	± mm			
9)	Total weight of the work load and the table	W_A: kg			
10)	Power supply voltage	V			
11)	Diameter of the ball screw	mm			
12)	Total length of the ball screw	mm			
13)	Lead of the ball screw	mm			
14)	Traveling direction (horizontal, vertical etc.)				

Running pattern





2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

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Department/Section :
Name :
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Fax :
E-mail address:

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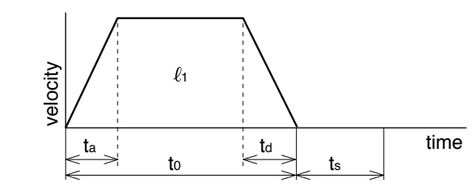
Request Sheet for Motor Selection

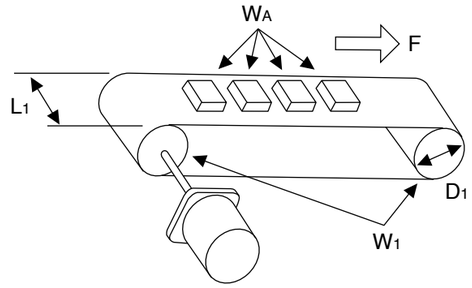
Request for motor selection Ⅲ : Belt drive

1. Driven mechanism and running data

1)	Travel distance of the work load per one cycle	ℓ_1: mm			
2)	Cycle time	to: s			
	(Fill in items 3) and 4) if required.)				
3)	Acceleration time	ta: s			
4)	Deceleration time	td: s			
5)	Stopping time	ts: s			
6)	Max. velocity	V: mm/s			
7)	External force	F: N			
8)	Positioning accuracy of the work load	± mm			
9)	Total weight of the work load	W_A: kg			
10)	Power supply voltage	V		(or item 14) and 15))	
11)	Weight of the belt	W_M: kg	14)	Width of the pulley	L_1: mm
12)	Diameter of the driving pulley	D_1: mm	15)	Material of the pulley	
13)	Total weight of the pulley	W_1: kg	16)	Traveling direction (horizontal, vertical etc.)	

Running pattern





2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

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Request Sheet for Motor Selection

Request for motor selection Ⅳ : Timing pulley + Belt drive

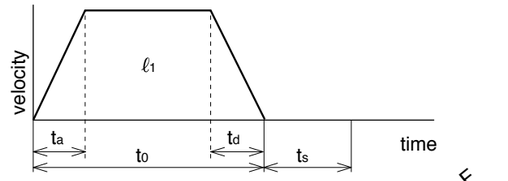
1. Driven mechanism and running data

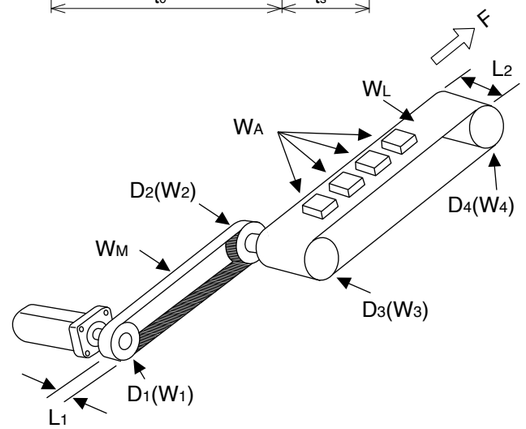
1)	Travel distance of the work load per one cycle	ℓ_1:	mm		
2)	Cycle time	t_0:	s		
	(Fill in items 3) and 4) if required.)				
3)	Acceleration time	t_a:	s		
4)	Deceleration time	t_d:	s		
5)	Stopping time	t_s:	s		
6)	Max. velocity	V:	mm/s		
7)	External force	F:	N		
8)	Positioning accuracy of the work load	±	mm		
9)	Total weight of the work load	W_A:	kg		
10)	Power supply voltage		V		
11)	Weight of motor side belt	W_M:	kg		

		Motor side		Belt side	
12)	Diameter of the pulley	D_1:	mm	D_2:	mm
13)	Weight of the pulley	W_1:	kg	W_2:	kg
	(or item 14) and 15))				
14)	Width of the belt	L_1:	mm		
15)	Material of the pulley				

		Motor side		Belt side	
16)	Diameter of the pulley	D_3:	mm	D_4:	mm
17)	Weight of the pulley	W_3:	kg	W_4:	kg
	(or item 18) and 19))				
18)	Width of the pulley	L_2:	mm		
19)	Material of the pulley				
20)	Weight of the belt	W_L:	kg		
21)	Traveling direction (horizontal, vertical etc.)				

Running pattern





2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

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Request Sheet for Motor Selection

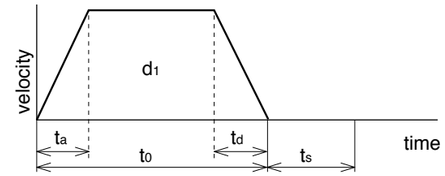
Request for motor selection Ⅴ : Turntable drive

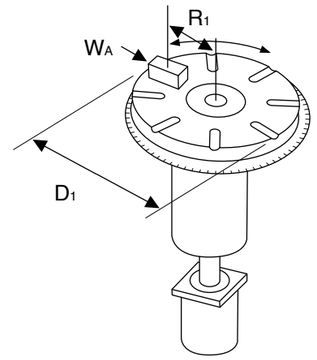
1. Driven mechanism and running data

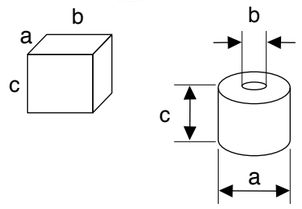
1)	Travel distance of the work load per one cycle	d_1:	deg
2)	Cycle time	t_0:	s
	(Fill in items 3) and 4) if required.)		
3)	Acceleration time	t_a:	s
4)	Deceleration time	t_d:	s
5)	Stopping time	t_s:	s
6)	Max. rotational speed of the table	v:	deg/s
	(or)	V:	r/s
7)	Positioning accuracy of the work load	±	deg
8)	Weight of one work load	W_A:	kg
9)	Driving radius of the center of gravity of the work	R_1:	mm
10)	Diameter of the table	D_1:	mm
11)	Mass of the table	W_1:	kg
12)	Diameter of the table support	T_1:	mm
13)	Power supply voltage		V

		Prism		Cylinder	
14)	Dimensions of the work load	a:	mm	a:	mm
		b:	mm	b:	mm
		c:	mm	c:	mm
15)	Number of work loads		pcs		

Running pattern







2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

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Name :
Address :
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Request Sheet for Motor Selection

Request for motor selection Ⅵ : Timing pulley + Turntable drive

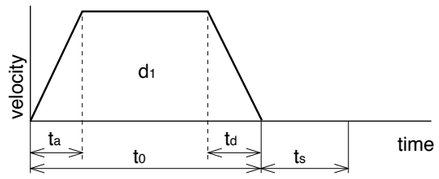
1. Driven mechanism and running data

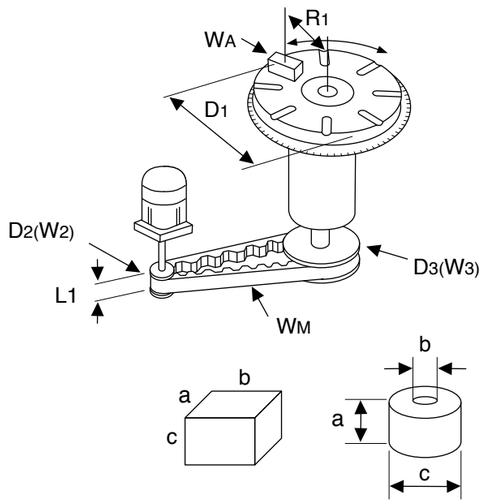
1)	Travel distance of the work load per one cycle	d_1:	deg	
2)	Cycle time	t_0:	s	
	(Fill in items 3) and 4) if required.)			
3)	Acceleration time	t_a:	s	
4)	Deceleration time	t_d:	s	
5)	Stopping time	t_s:	s	
6)	Max. rotational speed of the table	v:	deg/s	
	(or)	V:	r/s	
7)	Positioning accuracy of the work load	±	deg	
8)	Weight of one work load	W_A:	kg	
9)	Driving radius of the center of gravity of the work	R_1:	mm	
10)	Diameter of the table	D_1:	mm	
11)	Mass of the table	W_1:	kg	
12)	Diameter of the table support	T_1:	mm	
13)	Power supply voltage		V	

		(Prism)		(Cylinder)	
14)	Dimension of the work load	a:	mm	a:	mm
		b:	mm	b:	mm
		c:	mm	c:	mm
15)	Number of work loads		pcs		

		Motor side		Turntable side	
16)	Diameter of the pulley	D_2:	mm	D_3:	mm
17)	Weight of the pulley	W_2:	kg	W_3:	kg
	(or item 18) and 19))				
18)	Width of the pulley	L_1:	mm		
19)	Material of the pulley				
20)	Weight of the belt	W_M:	kg		

Running pattern





2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

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	E-mail address:

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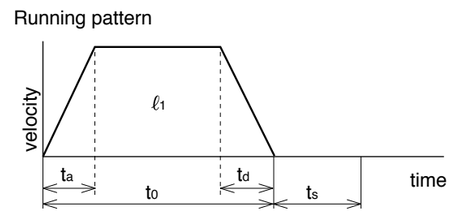
Request Sheet for Motor Selection

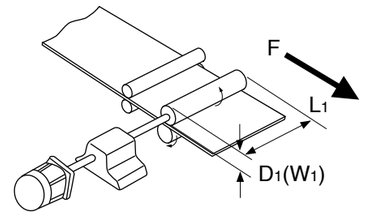
Request for motor selection Ⅶ : Roller feed drive

1. Driven mechanism and running data

1)	Travel distance of the work load per one cycle	ℓ_1:	mm	
2)	Cycle time	t_0:	s	
	(Fill in items 3) and 4) if required.)			
3)	Acceleration time	t_a:	s	
4)	Deceleration time	t_d:	s	
5)	Stopping time	t_s:	s	
6)	Max. velocity	v:	mm/s	
7)	External pulling force	F:	N	
8)	Positioning accuracy of the work load	±	mm	
9)	Number of rollers		pcs	
10)	Power supply voltage		V	
11)	Diameter of the roller	D_1:	mm	
12)	Mass of the roller	W_1:	kg	

Running pattern





(or item 13) and 14))

13)	Width of the roller	L_1:	mm
14)	Material of the roller		

2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

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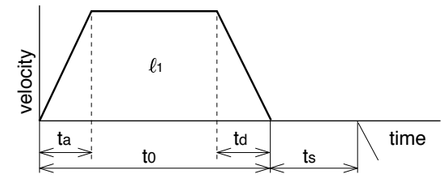
Request Sheet for Motor Selection

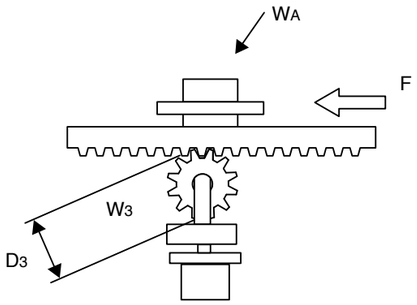
Request for motor selection Ⅷ : Driving with Rack & Pinion

1. Driven mechanism and running data

1)	Travel distance of the work load per one cycle	ℓ_1:	mm
2)	Cycle time	to:	s
	(Fill in items 3) and 4) if required.)		
3)	Acceleration time	ta:	s
4)	Deceleration time	td:	s
5)	Stopping time	ts:	s
6)	Max. velocity	V:	mm/s
7)	External force	F:	N
8)	Positioning accuracy of the work load	±	mm
9)	Total weight of the work load	W_A:	kg
10)	Power supply voltage		V
11)	Diameter of the pinion	D_3:	mm
12)	Mass of the pinion	W_3:	kg
13)	Traveling direction (horizontal, vertical, etc.)		

Running pattern





2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

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Department/Section :
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Address :
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Fax :
E-mail address:

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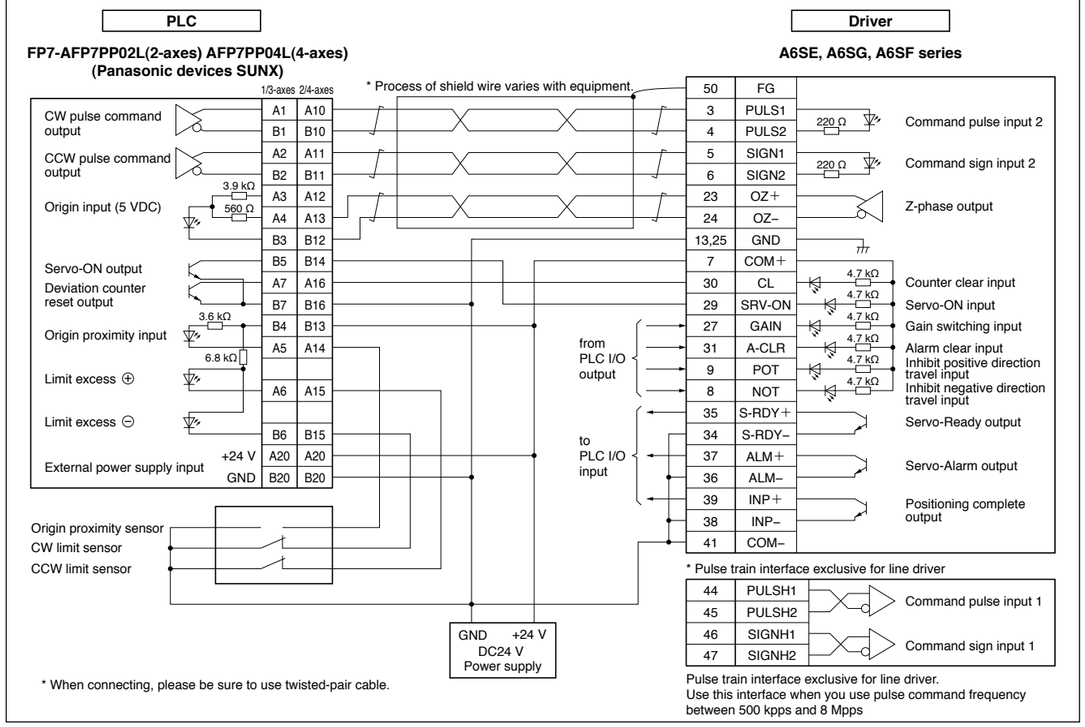
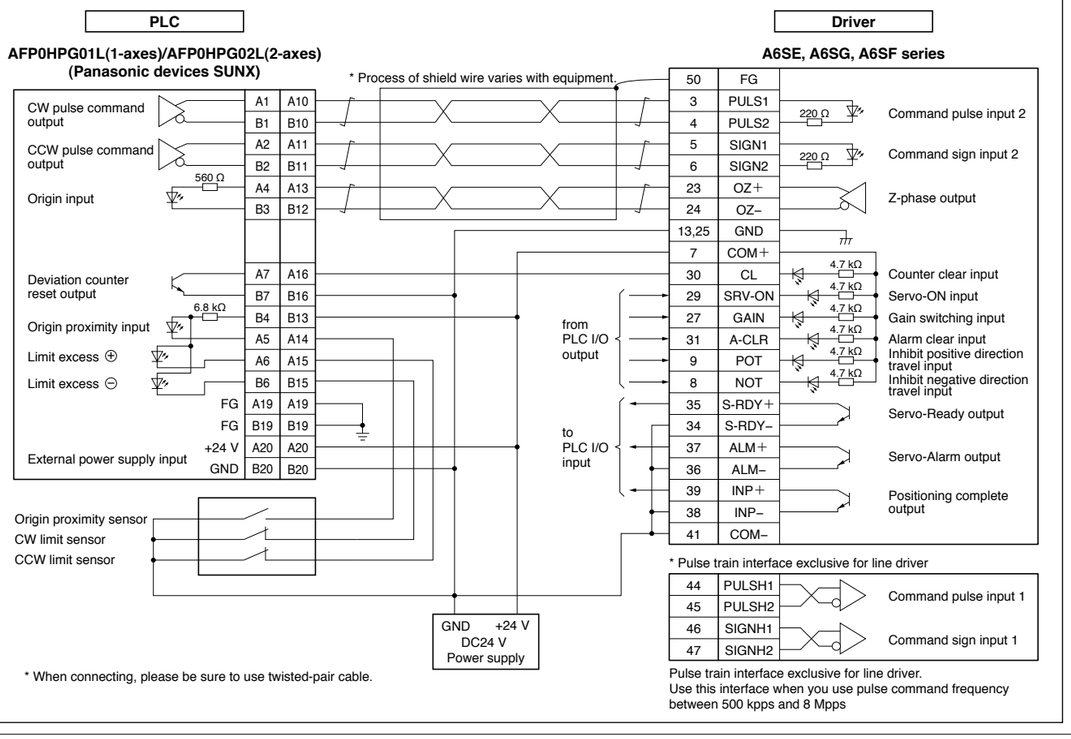
FP7-AFP7PP02L(2-axes) AFP7PP04L(4-axes) Connection with the Panasonic devices SUNX.



AFP0HPG01L(1-axes)/AFP0HPG02L(2-axes) Connection with the Panasonic devices SUNX.



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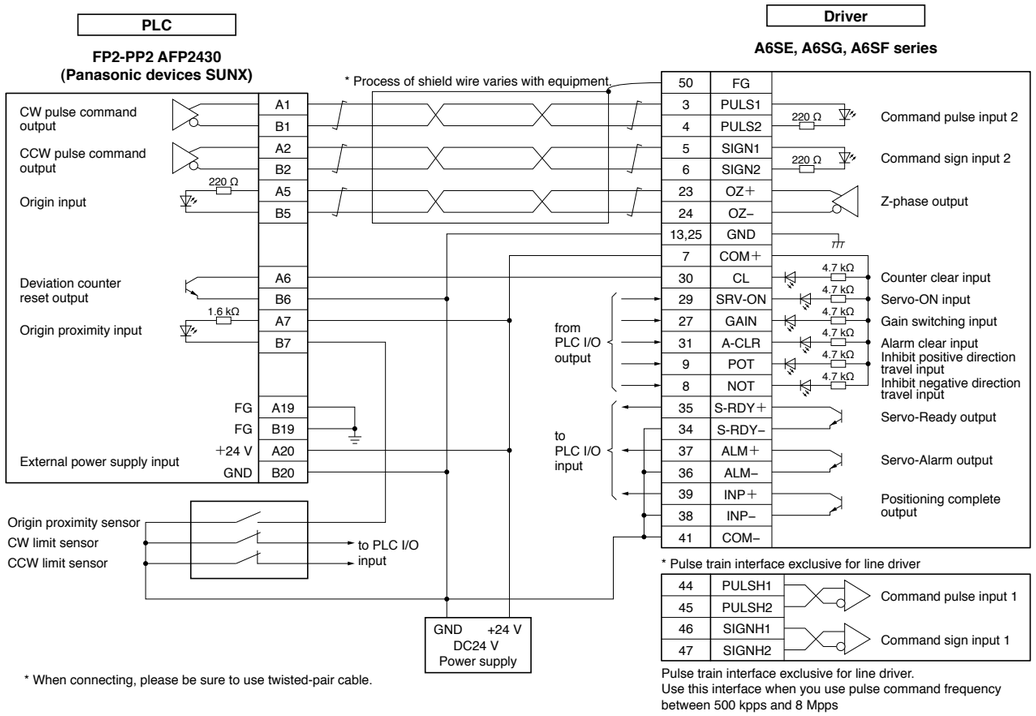
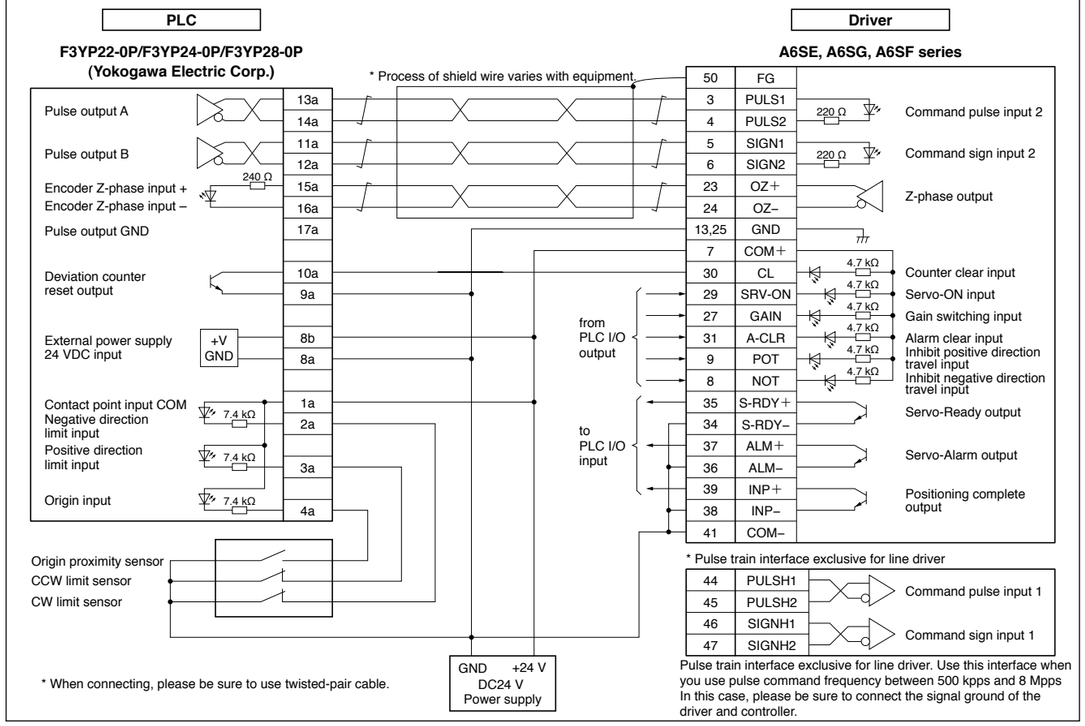
Connection Between Driver and Controller

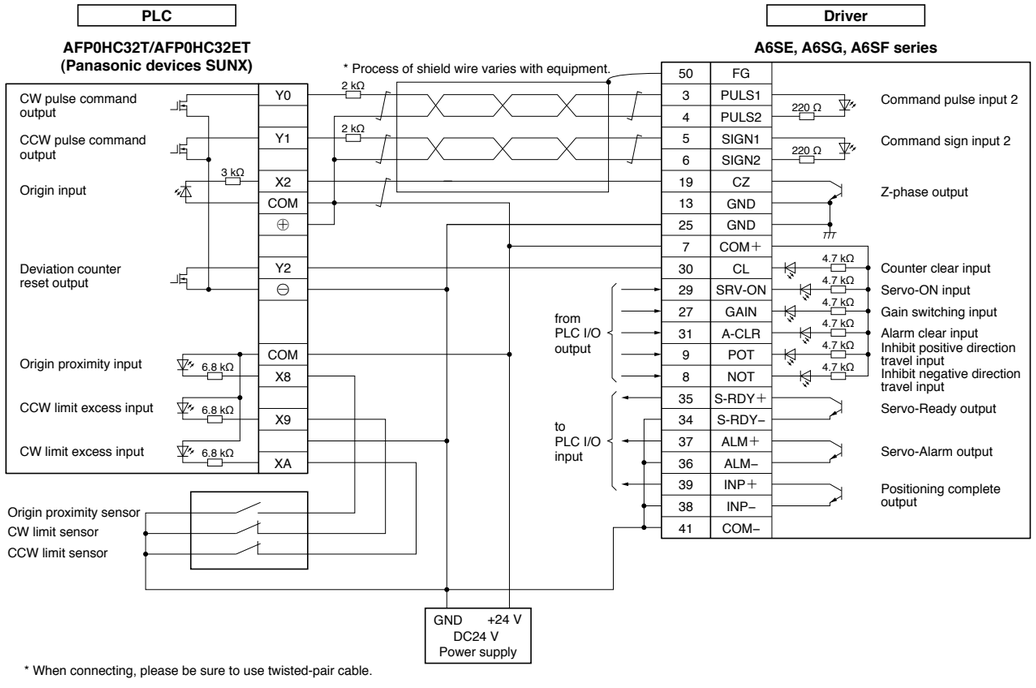
FP2-PP2 AFP2430 Connection with the Panasonic devices SUNX.



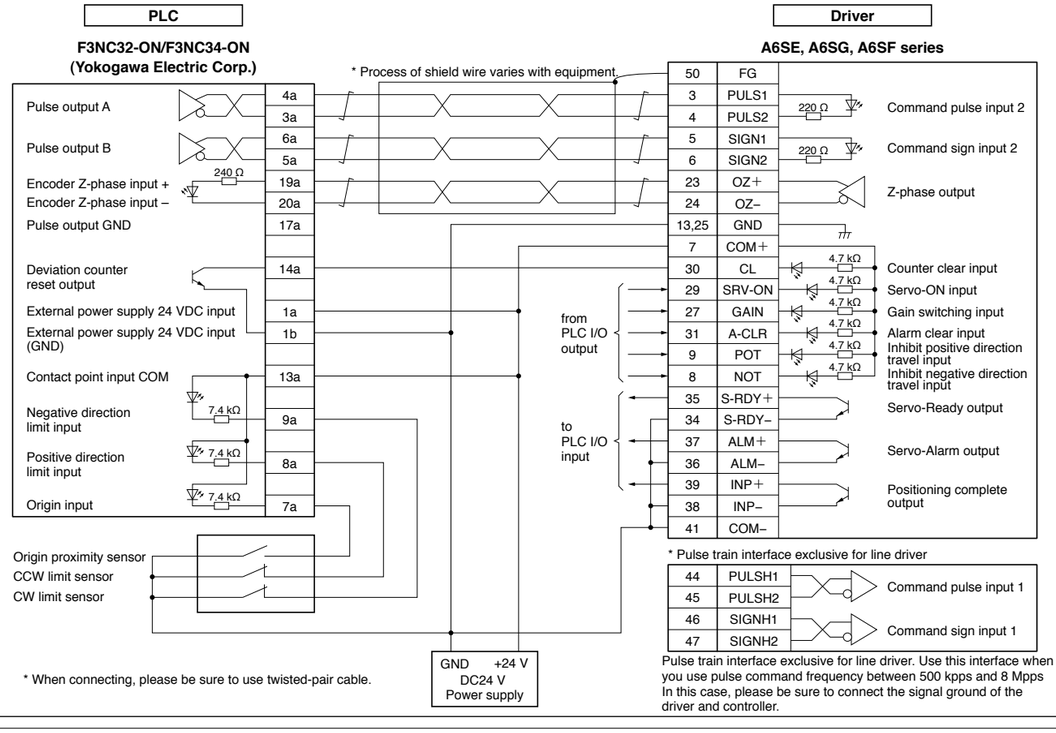
F3YP22-0P/F3YP24-0P/F3YP28-0P Connection with the Yokogawa Electric Corp.



AFP0HC32T/AFP0HC32ET Connection with the Panasonic devices SUNX.



F3NC32-ON/F3NC34-ON Connection with the Yokogawa Electric Corp.



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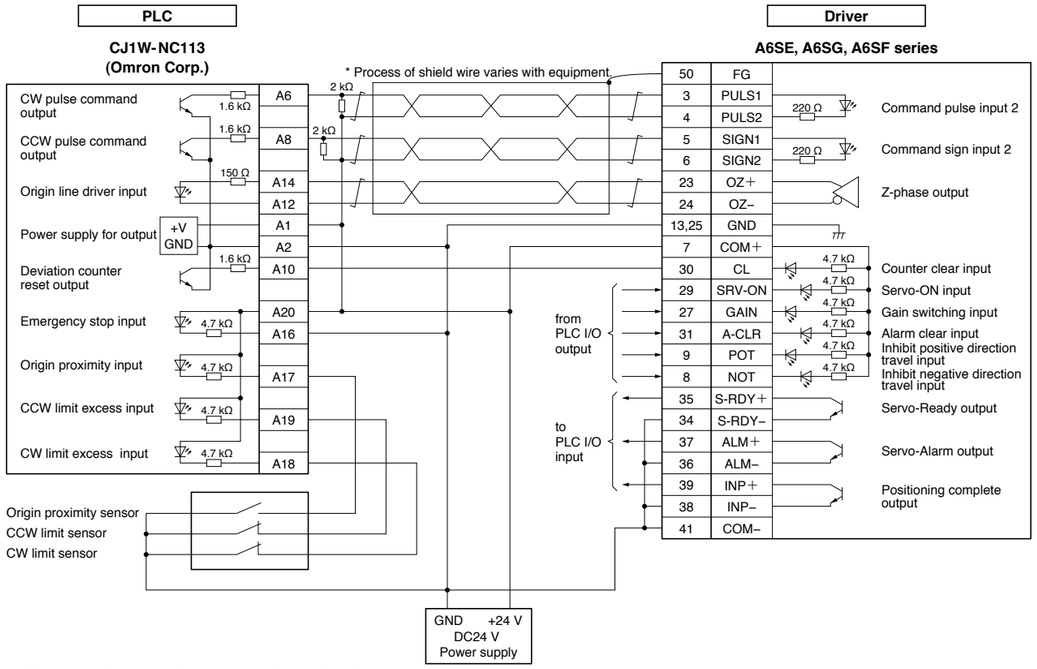
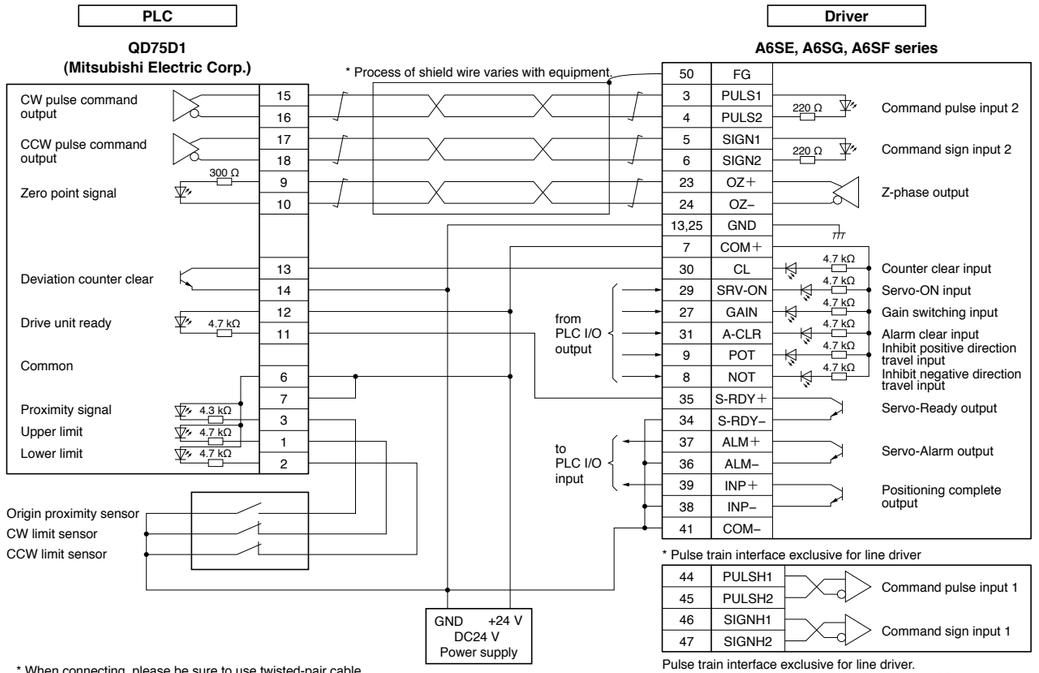
Connection Between Driver and Controller

CJ1W-NC113 Connection with the Omron Corp.



* When connecting, please be sure to use twisted-pair cable.

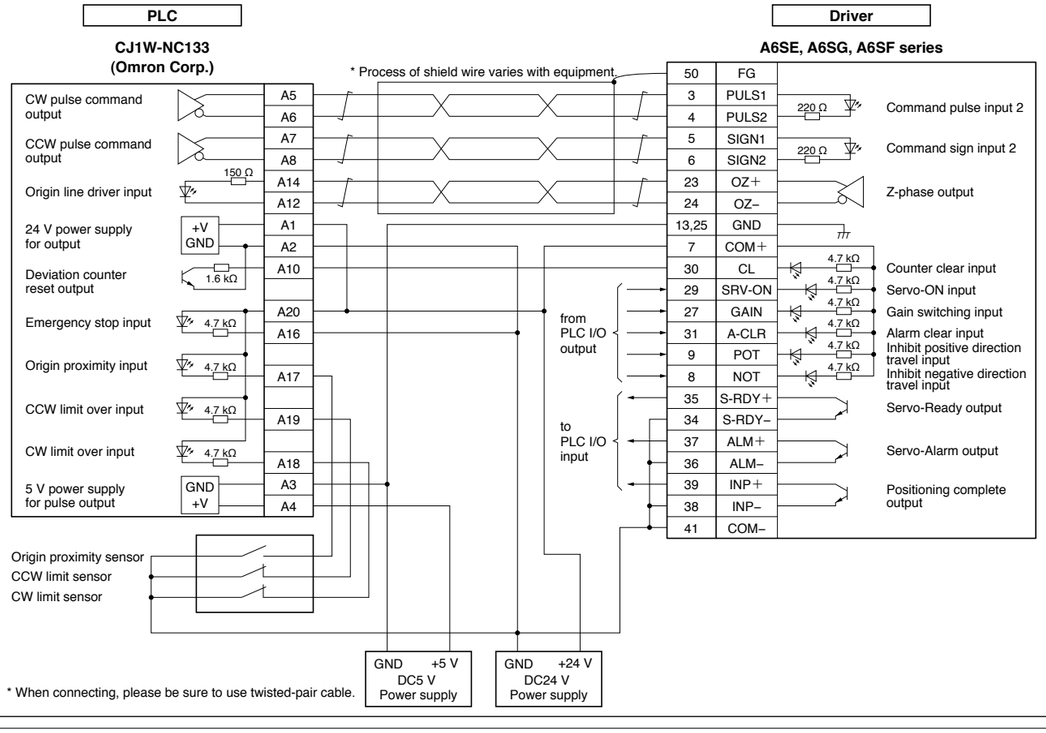
QD75D1 Connection with the Mitsubishi Electric Corp.



* When connecting, please be sure to use twisted-pair cable.

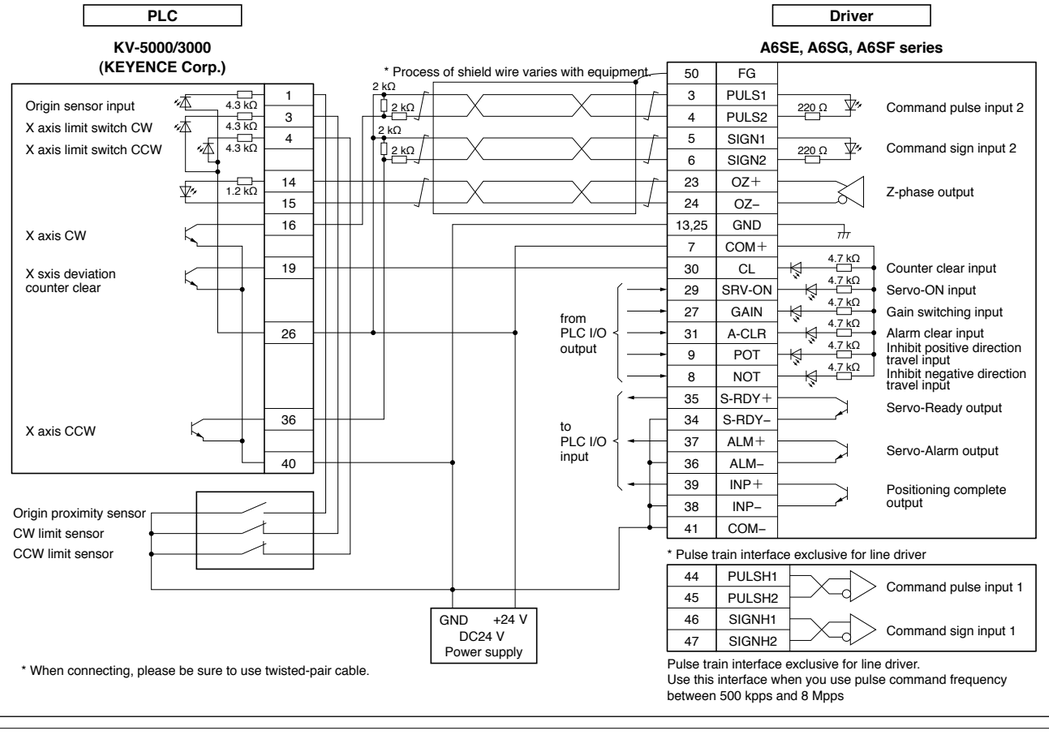
Pulse train interface exclusive for line driver.
Use this interface when you use pulse command frequency between 500 kpps and 8 Mpps

CJ1W-NC133 Connection with the Omron Corp.



* When connecting, please be sure to use twisted-pair cable.

KV-5000/3000 Connection with the KEYENCE Corp.



* When connecting, please be sure to use twisted-pair cable.

Pulse train interface exclusive for line driver.
Use this interface when you use pulse command frequency between 500 kpps and 8 Mpps

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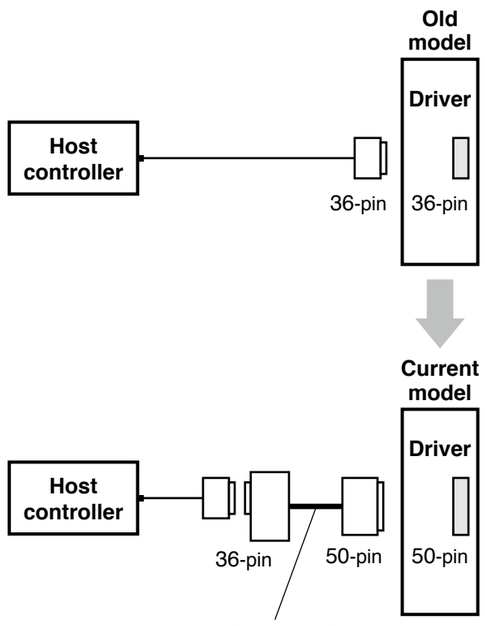
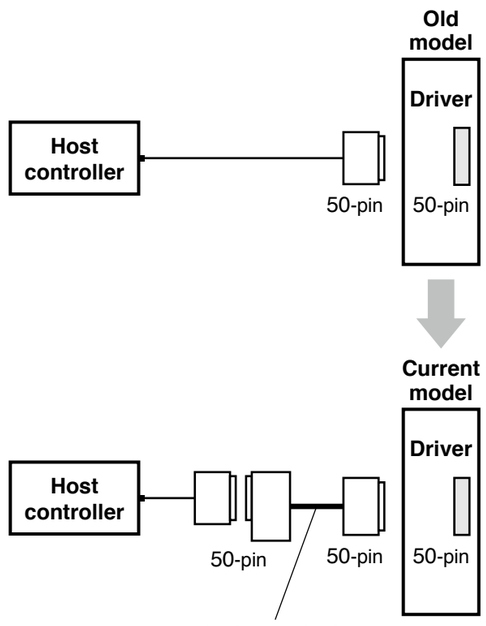
Replacing Old Model Servo Driver with MINAS A6 series

For easier replacement of old driver (MINAS X/XX/V series) with A6 series, use the interface conversion connector.

〈36-pin → 50-pin〉



〈50-pin → 50-pin〉



When selecting the cable, refer to the table below because the part number of the cable is specific to the control mode of the old model.

Old model	Control mode	Conversion cable part No.	Conversion wiring table
X series XX series (36-pin)	Position/velocity control	DV0P4120	P.440
	Torque control	DV0P4121	
V series (50-pin)	Position control	DV0P4130	P.441
	Velocity control	DV0P4131	
	Torque control	DV0P4132	P.442

* For external dimensions, refer to P.322.

Conversion Wiring Table

Pin No. on Old Model	DV0P4120			DV0P4121		
	Pin No. on Current Model	Signal Name	Symbol	Pin No. on Current Model	Signal Name	Symbol
1	23	Z-phase output	OZ+	23	Z-phase output	OZ+
2	24	Z-phase output	OZ–	24	Z-phase output	OZ–
3	13	Signal ground	GND	13	Signal ground	GND
4	19	Z-phase output	CZ	19	Z-phase output	CZ
5	4	Command pulse input 2	PULS2	4	Command pulse input 2	PULS2
6	3	Command pulse input 2	PULS1	3	Command pulse input 2	PULS1
7	6	Command pulse sign input 2	SIGN2	6	Command pulse sign input 2	SIGN2
8	5	Command pulse sign input 2	SIGN1	5	Command pulse sign input 2	SIGN1
9	33	Command pulse inhibition input	INH	33	Command pulse inhibition input	INH
10	26	Speed zero clamp input	ZEROSPD	26	Speed zero clamp input	ZEROSPD
11	7	Power supply for control signal (+)	COM+	7	Power supply for control signal (+)	COM+
12	29	Servo-ON input	SRV-ON	29	Servo-ON input	SRV-ON
13	30	Deviation counter clear input	CL	30	Deviation counter clear input	CL
14	14	Speed command input	SPR	NC		
15	15	Signal ground	GND	15	Signal ground	GND
16	43	Speed monitor output	SP	43	Speed monitor output	SP
17	25	Signal ground	GND	25	Signal ground	GND
18	50	Frame ground	FG	50	Frame ground	FG
19	21	A-phase output	OA+	21	A-phase output	OA+
20	22	A-phase output	OA-	22	A-phase output	OA-
21	48	B-phase output	OB+	48	B-phase output	OB+
22	49	B-phase output	OB–	49	B-phase output	OB–
23	NC			NC		
24	NC			NC		
25	39	Positioning complete output Speed arrival output	COIN+ AT-SPEED+	39	Positioning complete output Speed arrival output	COIN+ AT-SPEED+
26	37	Servo-Alarm output	ALM+	37	Servo-Alarm output	ALM+
27	35	Servo-Ready output	S-RDY+	35	Servo-Ready output	S-RDY+
28	34	Positioning complete output (–) Speed arrival output (–)	COIN– AT-SPEED–	34	Positioning complete output (–) Speed arrival output (–)	COIN– AT-SPEED–
	36	Servo-Alarm output (–)	ALM–	36	Servo-Alarm output (–)	ALM–
	38	Servo-Ready output (–)	S-RDY–	38	Servo-Ready output (–)	S-RDY–
	41	Power supply for control signal (–)	COM–	41	Power supply for control signal (–)	COM–
29	8	CW over-travel inhibit input	CWL	8	CW over-travel inhibit input	CWL
30	9	CCW over-travel inhibit input	CCWL	9	CCW over-travel inhibit input	CCWL
31	31	Alarm clear input	A-CLR	31	Alarm clear input	A-CLR
32	32	Control mode switching input	C-MODE	32	Control mode switching input	C-MODE
33	18	CW direction torque limit input	CWTL	18	CW direction torque limit input	CWTL
34	16	CCW direction torque limit input	CCWTL	14	Torque command input	TRQR
35	17	Signal ground	GND	17	Signal ground	GND
36	42	Torque monitor output	IM	42	Torque monitor output	IM

* "NC" is no connect.

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Replacing Old Model Servo Driver with MINAS A6 series

Pin No. on Old Model	DV0P4130			DV0P4131		
	Pin No. on Current Model	Signal Name	Symbol	Pin No. on Current Model	Signal Name	Symbol
1	8	CW over-travel inhibit input	CWL	8	CW over-travel inhibit input	CWL
2	9	CCW over-travel inhibit input	CCWL	9	CCW over-travel inhibit input	CCWL
3	3	Command pulse input 2	PULS1	NC		
4	4	Command pulse input 2	PULS2	NC		
5	5	Command pulse sign input 2	SIGN1	NC		
6	6	Command pulse sign input 2	SIGN2	NC		
7	7	Power supply for control signal (+)	COM+	7	Power supply for control signal (+)	COM+
8	NC			NC		
9	NC			NC		
10	NC			NC		
11	11	External brake release signal	BRK-OFF+	11	External brake release signal	BRK-OFF+
12	12	Zero-speed detection output signal	ZSP	12	Zero-speed detection output signal	ZSP
13	13	Torque in-limit signal output	TLC	13	Torque in-limit signal output	TLC
14	NC			14	Speed command input	SPR
15	15	Signal ground	GND	15	Signal ground	GND
16	16	CCW direction torque limit input	CCWTL	16	CCW direction torque limit input	CCWTL
17	17	Signal ground	GND	17	Signal ground	GND
18	18	CW direction torque limit input	CWTL	18	CW direction torque limit input	CWTL
19	19	Z-phase output	CZ	19	Z-phase output	CZ
20	NC			NC		
21	21	A-phase output	OA+	21	A-phase output	OA+
22	22	A-phase output	OA-	22	A-phase output	OA-
23	23	Z-phase output	OZ+	23	Z-phase output	OZ+
24	24	Z-phase output	OZ-	24	Z-phase output	OZ-
25	50	Frame ground	FG	50	Frame ground	FG
26	26	Speed zero clamp input	ZEROSPD	26	Speed zero clamp input	ZEROSPD
27	27	Gain switching input	GAIN	27	Gain switching input	GAIN
28	NC			33	Selection 1 input of internal command speed	INTSPD1
29	29	Servo-ON input	SRV-ON	29	Servo-ON input	SRV-ON
30	30	Deviation counter clear input	CL	NC		
31	31	Alarm clear input	A-CLR	31	Alarm clear input	A-CLR
32	32	Control mode switching input	C-MODE	32	Control mode switching input	C-MODE
33	33	Command pulse inhibition input	INH	NC		
34	NC			NC		
35	35	Servo-Ready output	S-RDY+	35	Servo-Ready output	S-RDY+
36	NC			NC		
37	37	Servo-Alarm output	ALM+	37	Servo-Alarm output	ALM+
38	NC			NC		
39	39	Positioning complete output	COIN+	39	Speed arrival output	AT-SPEED+
40	40	Torque in-limit signal output	TLC	40	Torque in-limit signal output	TLC
41	10	External brake release signal (–)	BRK-OFF–	10	External brake release signal (–)	BRK-OFF–
	34	Positioning complete output (–)	COIN–	34	Speed arrival output (–)	AT-SPEED–
	36	Servo-Alarm output (–)	ALM–	36	Servo-Alarm output (–)	ALM–
	38	Servo-Ready output (–)	S-RDY–	38	Servo-Ready output (–)	S-RDY–
	41	Power supply for control signal (–)	COM–	41	Power supply for control signal (–)	COM–
42	42	Torque monitor output	IM	42	Torque monitor output	IM
43	43	Speed monitor output	SP	43	Speed monitor output	SP
44	25	Signal ground	GND	25	Signal ground	GND
45	25	Signal ground	GND	25	Signal ground	GND
46	25	Signal ground	GND	25	Signal ground	GND
47	NC			NC		
48	48	B-phase output	OB+	48	B-phase output	OB+
49	49	B-phase output	OB–	49	B-phase output	OB–
50	50	Frame ground	FG	50	Frame ground	FG

* “NC” is no connect.

Pin No. on Old Model	DV0P4132		
	Pin No. on Current Model	Signal Name	Symbol
1	8	CW over-travel inhibit input	CWL
2	9	CCW over-travel inhibit input	CCWL
3	NC		
4	NC		
5	NC		
6	NC		
7	7	Power supply for control signal (+)	COM+
8	NC		
9	NC		
10	NC		
11	11	External brake release signal	BRK-OFF+
12	12	Zero-speed detection output signal	ZSP
13	13	Torque in-limit signal output	TLC
14	NC		
15	15	Signal ground	GND
16	16	Torque command input	TRQR
17	17	Signal ground	GND
18	18	CW direction torque limit input	CWTL
19	19	Z-phase output	CZ
20	NC		
21	21	A-phase output	OA+
22	22	A-phase output	OA-
23	23	Z-phase output	OZ+
24	24	Z-phase output	OZ-
25	50	Frame ground	FG
26	26	Speed zero clamp input	ZEROSPD
27	27	Gain switching input	GAIN
28	NC		
29	29	Servo-ON input	SRV-ON
30	NC		
31	31	Alarm clear input	A-CLR
32	32	Control mode switching input	C-MODE
33	NC		
34	NC		
35	35	Servo-Ready output	S-RDY+
36	NC		
37	37	Servo-Alarm output	ALM+
38	NC		
39	39	Speed arrival output	AT-SPEED+
40	40	Torque in-limit signal output	TLC
41	10	External brake release signal (–)	BRK-OFF–
	34	Speed arrival output (–)	AT-SPEED–
	36	Servo-Alarm output (–)	ALM–
	38	Servo-Ready output (–)	S-RDY–
	41	Power supply for control signal (–)	COM–
42	42	Torque monitor output	IM
43	43	Speed monitor output	SP
44	25	Signal ground	GND
45	25	Signal ground	GND
46	25	Signal ground	GND
47	NC		
48	48	B-phase output	OB+
49	49	B-phase output	OB–
50	50	Frame ground	FG

* “NC” is no connect.

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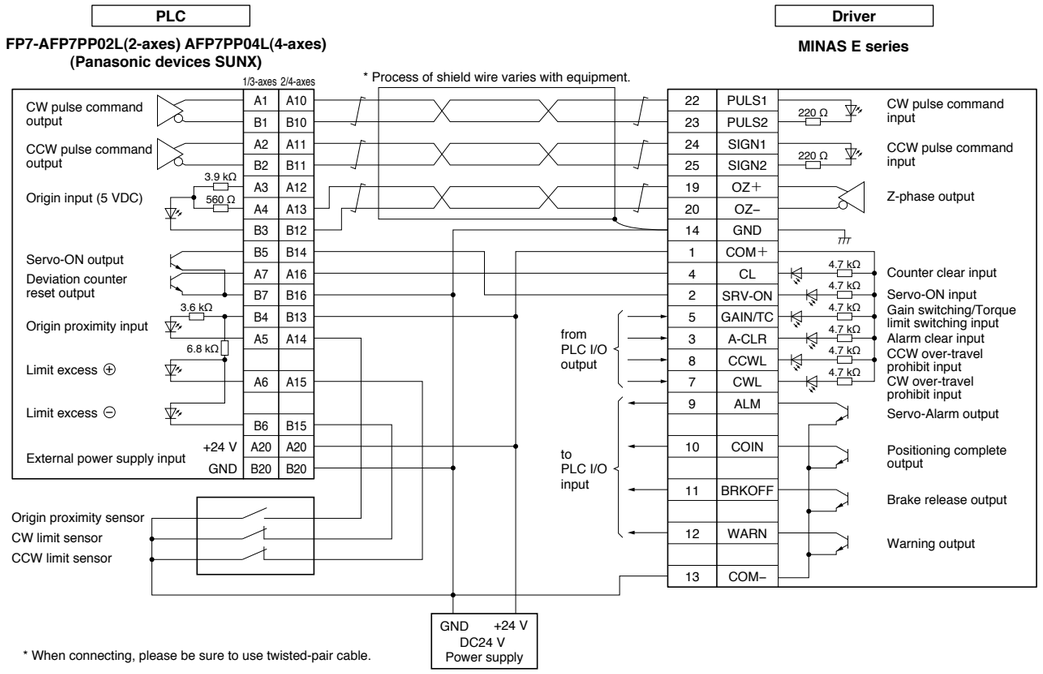
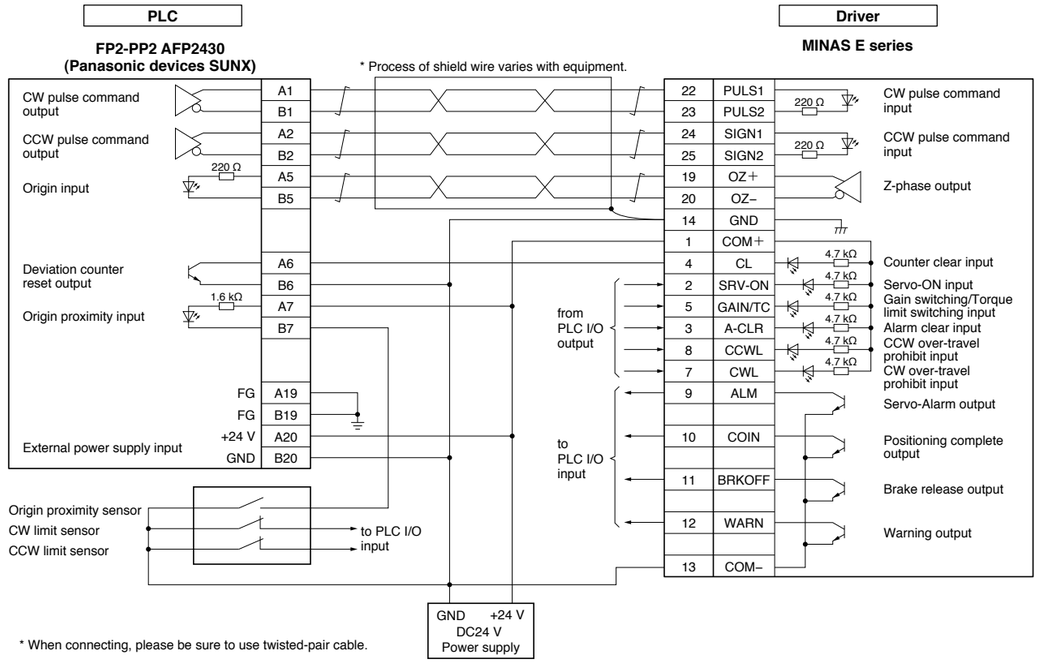
Connection Between Driver and Controller

FP7-AFP7PP02L(2-axes) AFP7PP04L(4-axes) Connection with the Panasonic devices SUNX.



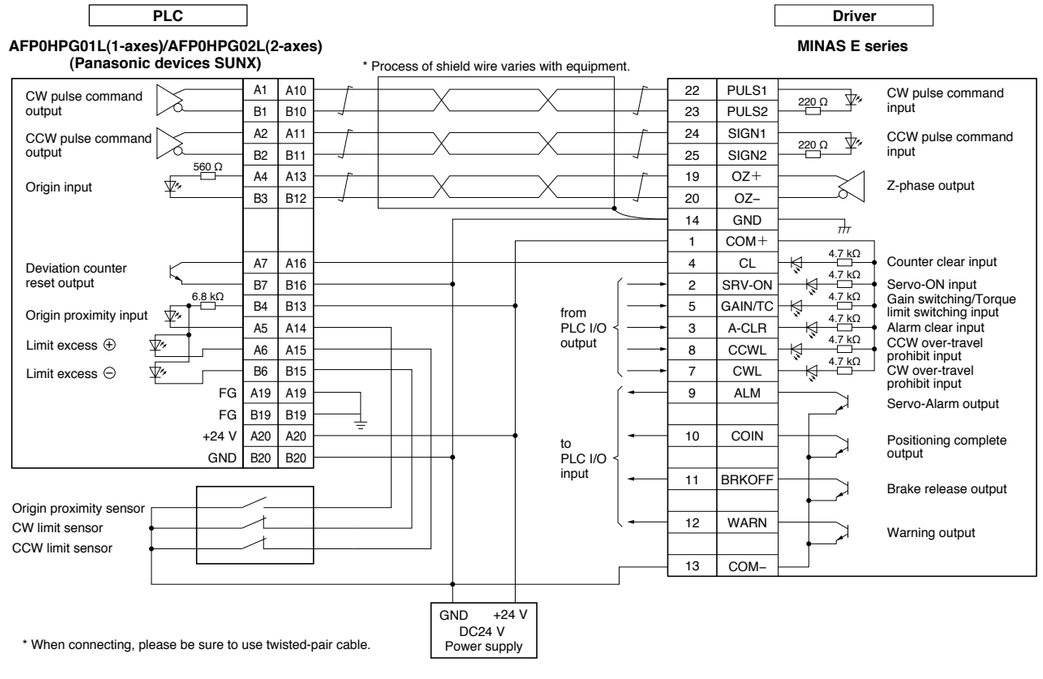
A1	A10	22	PULS1
B1	B10	23	PULS2
A2	A11	24	SIGN1
B2	B11	25	SIGN2
A3	A12	19	OZ+
A4	A13	20	OZ–
B3	B12	14	GND
B5	B14	1	COM+
A7	A16	4	CL
B7	B16	2	SRV-ON
B4	B13	5	GAIN/TC
A5	A14	3	A-CLR
		8	CCWL
A6	A15	7	CWL
		9	ALM
B6	B15		
A20	A20	10	COIN
B20	B20		
		11	BRKOFF
		12	WARN
		13	COM–

FP2-PP2 AFP2430 Connection with the Panasonic devices SUNX.



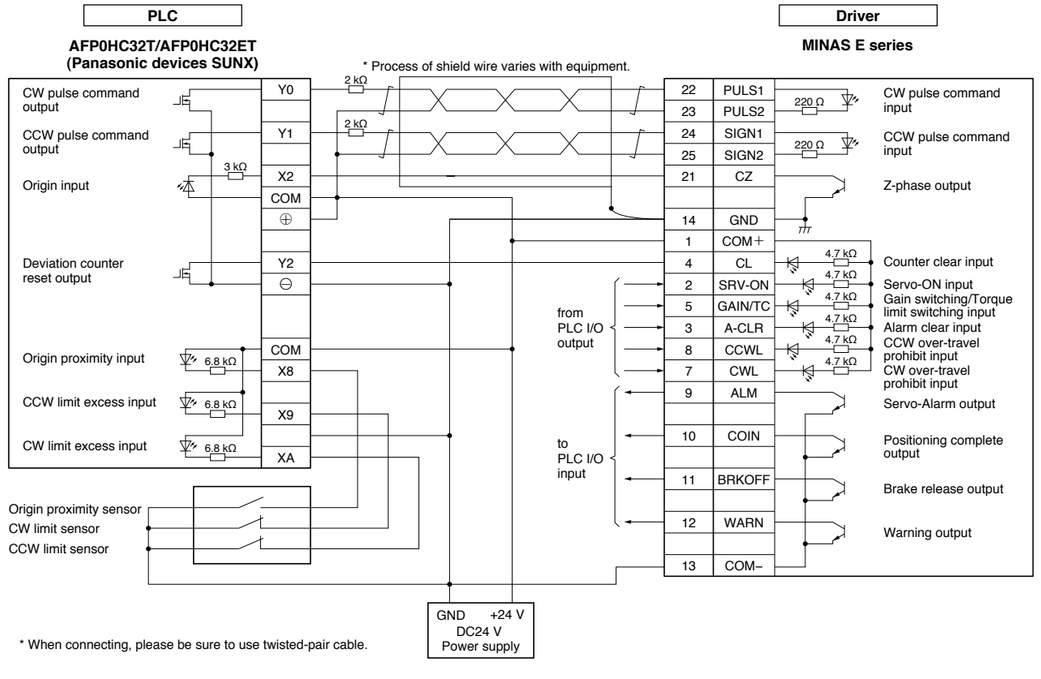
A1		22	PULS1
B1		23	PULS2
A2		24	SIGN1
B2		25	SIGN2
A5		19	OZ+
B5		20	OZ–
		14	GND
		1	COM+
A6		4	CL
B6		2	SRV-ON
A7		5	GAIN/TC
B7		3	A-CLR
		8	CCWL
		7	CWL
A19		9	ALM
B19			
A20		10	COIN
B20			
		11	BRKOFF
		12	WARN
		13	COM–

AFP0HPG01L(1-axes)/AFP0HPG02L(2-axes) Connection with the Panasonic devices SUNX.



A1	A10	22	PULS1
B1	B10	23	PULS2
A2	A11	24	SIGN1
B2	B11	25	SIGN2
A4	A13	19	OZ+
B3	B12	20	OZ–
		14	GND
		1	COM+
A7	A16	4	CL
B7	B16	2	SRV-ON
B4	B13	5	GAIN/TC
A5	A14	3	A-CLR
A6	A15	8	CCWL
B6	B15	7	CWL
A19	A19	9	ALM
B19	B19		
A20	A20	10	COIN
B20	B20		
		11	BRKOFF
		12	WARN
		13	COM–

AFP0HC32T/AFP0HC32ET Connection with the Panasonic devices SUNX.



Y0		22	PULS1
		23	PULS2
Y1		24	SIGN1
		25	SIGN2
X2		21	CZ
COM			
⊕		14	GND
		1	COM+
Y2		4	CL
⊖		2	SRV-ON
		5	GAIN/TC
COM		3	A-CLR
X8		8	CCWL
		7	CWL
X9		9	ALM
XA		10	COIN
		11	BRKOFF
		12	WARN
		13	COM–

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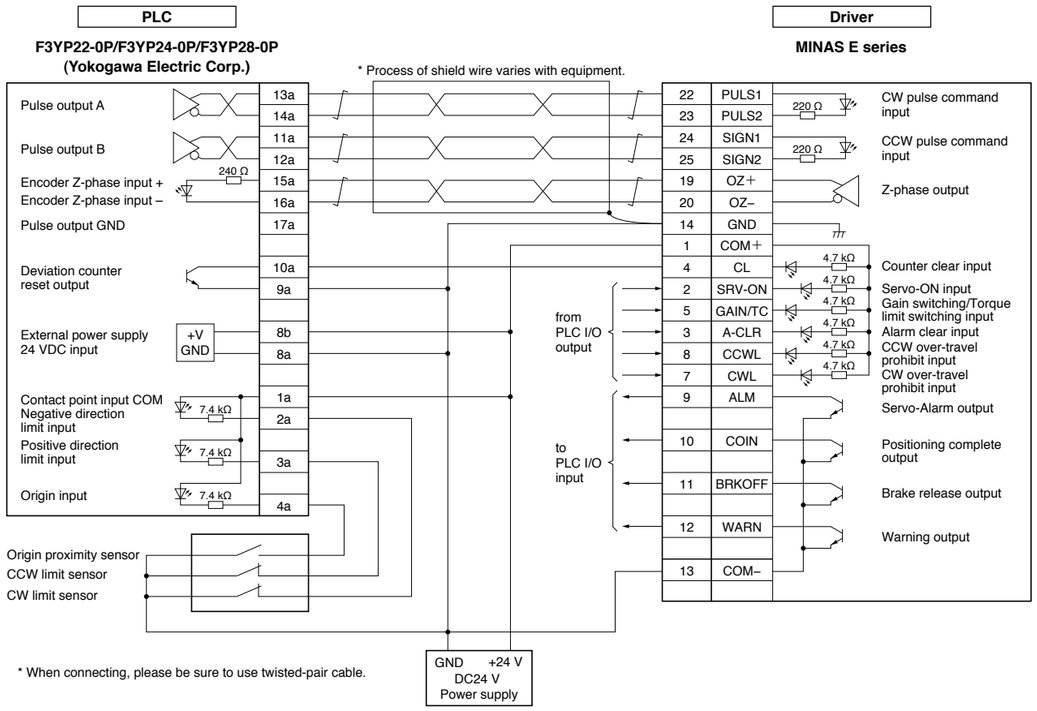
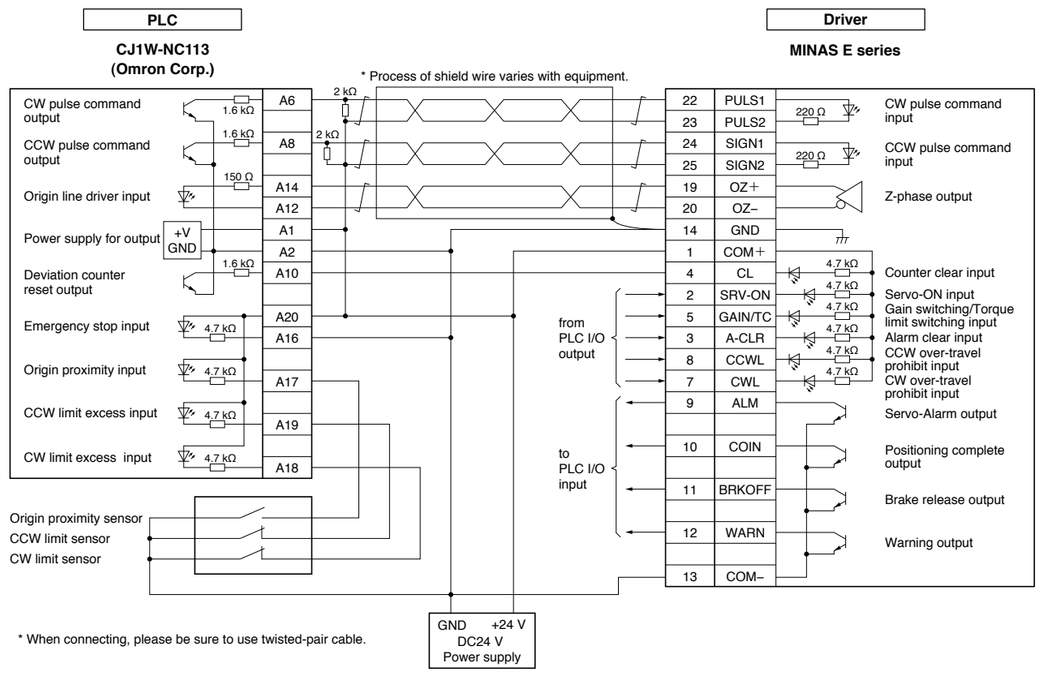
Connection Between Driver and Controller

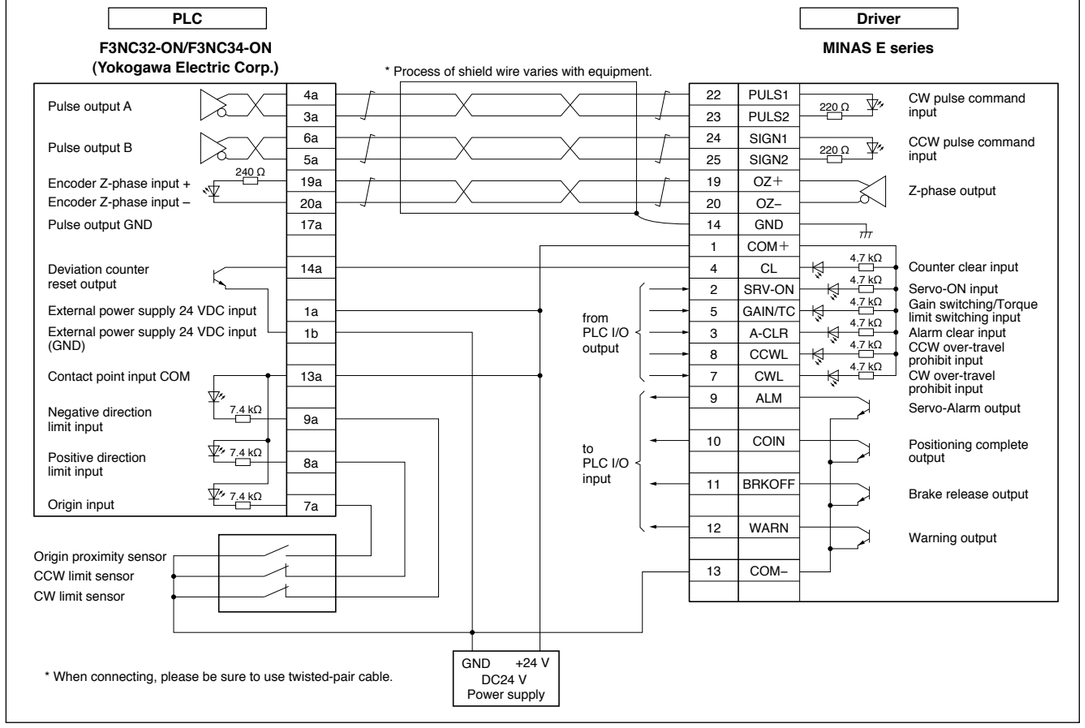
F3YP22-0P/F3YP24-0P/F3YP28-0P Connection with the Yokogawa Electric Corp.



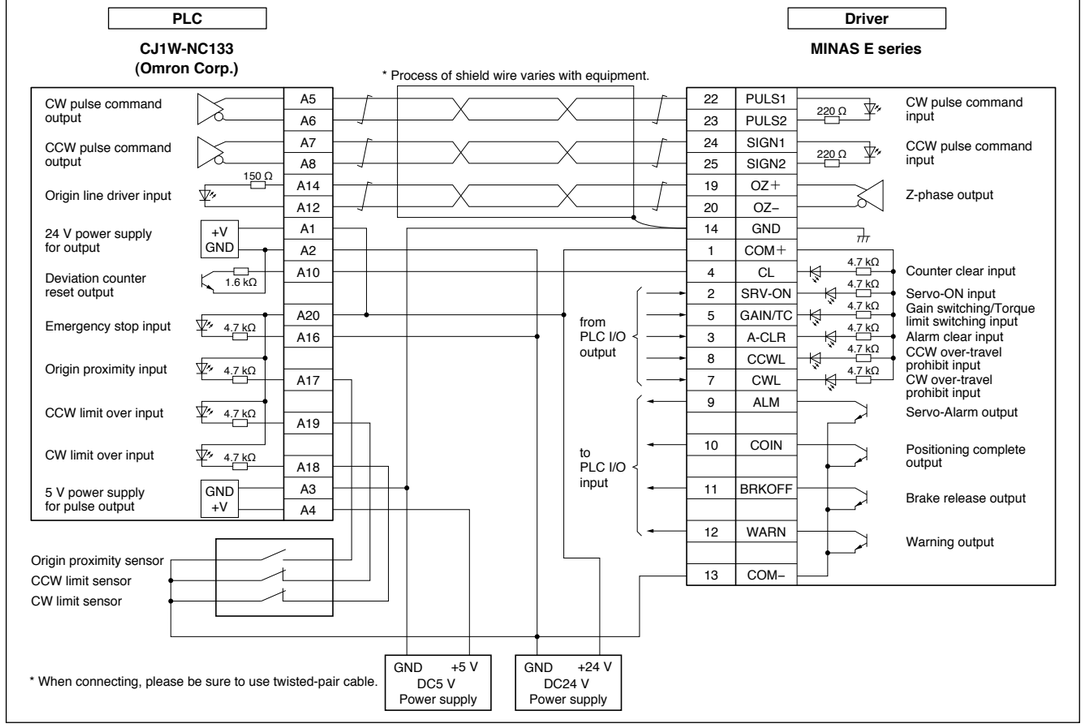
CJ1W-NC113 Connection with the Omron Corp.



F3NC32-ON/F3NC34-ON Connection with the Yokogawa Electric Corp.



CJ1W-NC133 Connection with the Omron Corp.



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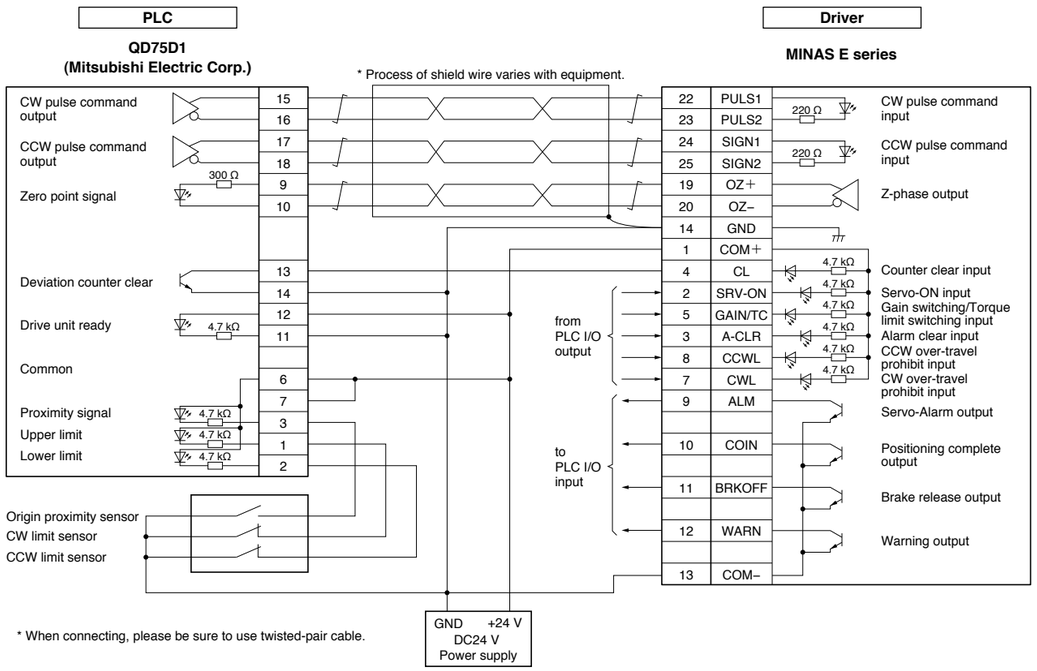
Connection Between Driver and Controller

QD75D1 Connection with the Mitsubishi Electric Corp.



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DV0P		
Part No.	Title	Page
DV0P0770	Connector kit for external peripheral equipment	368,402
DV0P0800	Interface cable	368,403
DV0P1450	Surge absorber (3-phase)	413,416
DV0P1460	Ferrite core	416
DV0P1960	Communication cable	403
DV0P220	Reactor	342,405
DV0P221	Reactor	342
DV0P222	Reactor	342
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DV0P2870	Connector kit for power supply connection	401
DV0P2890	External regenerative resistor	404
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DV0P4131	Interface conversion cable	439
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MUMA021P42N		394,397
MUMA021P44N		394,397
MUMA022P31N	MUMA with reduction gear 200 W 200 V Incremental encoder	394,397
MUMA022P32N		394,397
MUMA022P34N		394,397
MUMA022P41N		394,397
MUMA022P42N		394,397
MUMA022P44N		394,397
MUMA042P31N	MUMA with reduction gear 400 W 200 V Incremental encoder	394,397
MUMA042P32N		394,397
MUMA042P34N		394,397
MUMA042P41N		394,397
MUMA042P42N		394,397
MUMA042P44N		394,397

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(December.01.2020)

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Operation Manual

AC servo driver MINAS series

Set up support software

PANATERM Ver. 6.0

(For Windows® 8.1/Windows® 10)

We really appreciate that you have demand the Panasonic AC servo-driver MINAS series setup supporting software PANATERM Ver.6.0.

Please be sure to read this manual cautiously and use this product appropriately. Especially, please be sure to read “Safety Precaution (P.2 - 3)” before using this product and use this product safely.

Rev 3.13

REVISIONS

Revision History of Operation Manual

Date	Page	Rev	Description	Signed
Oct. 30, 2009		0.05	Initial version	-
Dec. 28, 2009	P9, 11, 17, 18, 22, 23, 26, 37, 40, 43, 45, 46, 49, 50, 57-59, 62, 67, 71, 73, 81	0.06	Correcting errors	
	P20		Adding the “Welcome” screen	
	P25, 27		Adding “Decimal point is displayed”	
May 10, 2010	P1, 5	0.07	Correcting errors	
Mar. 8, 2011	P7, 10	1.00	Adding Korean as a supported language	
	P36, 43, 46, 96		Adding a description on “Information”	
	P46, 54		Adding the “Parameter” tab	
	P77		Correcting a description on setting parameters of the protection function	
	P84		Adding “Auto servo on”	
	P102-108, 134		Adding an item for “Setup Wizard”	
	P109-123, 135		Adding an item for “Fit Gain”	
	P125		Adding “Cannot start PANATERM”	
	P126		Adding “The explanation of parameter is unkind”	
May 31, 2011	P1, 7, 8	1.01	Adding Windows 7	
	P7		Adding information on the MINAS-A5N series	
	P7, 10, 125		Adding a description on Windows 64-bit version	
Aug. 9, 2011	P132	1.02	Adding “Operation doesn’t reach at the speed”	
Sep. 6, 2011	P7	1.03	Adding information on the MINAS-A5E series	
	P26, 28, 128		Changing “Decimal point is displayed” to “Display - Set value description”	
June 19, 2012	P6-8, 12, 17-18, 22-30, 138-140, 142, 148,	1.04	Adding descriptions on the RS232 communication	
	P7		Adding information on the MINAS - A5NL series	
Apr. 26, 2013	P7	1.05	Adding information on the MINAS-A5II series	
	P16		Adding “Fit gain measure result file (filename.fit5)” to the list of file extensions	
	P27, 124, 158, 161, 165, 168		Changing “Fit gain screen” → “Fit gain screen (Standard)”	
	P138-154, 158, 161, 164, 165, 167, 169		Adding descriptions on the “Fit gain screen (2 degrees of freedom control)”	
July 7, 2014	P1, 8-9, 12, 14, 172	1.06	Stopping the support for Windows XP due to the end of Microsoft support for Windows XP, and starting the support for Windows 8.	
	P7, 24, 26		Adding information on the MINAS-A5B, MINAS-A5ND1, and MINAS-A5L04 (LA4) series	
	P30, 33-38		Adding the function of series definition settings to simplify the support for special products	
	P15, 28-29, 162-169, 185		Adding the object editor function	
	P174, 178-181		Adding a description on troubleshooting	
June 1, 2015	P7, 8, 20, 24, 33, 36, 37	1.09	Expansion of the scope of model codes supporting MINAS-A5B series	
Oct. 28, 2015	P1, 10, 11, 19	1.11	Changing “PANATERM Ver.5.0” to “PANATERM Ver.6.0”	
	P7, 8, 26, 27		Adding information on the MINAS-A5BL series	
	P7, 8, 24, 26, 34, 38, 64, 73, 81, 101, 151, 184		Adding information on the MINAS-A6 series	
	P15, 26, 27, 29, 30, 171-184, 188, 190, 198-202		Adding a description on added functions, which are the battery refresh, the block operation editor, and the block operation monitor	

Note) The page number (Page) is the current page number at the time of revision.

REVISIONS

Revision History of Operation Manual

Date	Page	Rev	Description	Signed
Dec. 11, 2015	P7, 8	2.00	Updating the dates for series	
Dec. 25, 2015	P7, 8, 27, 28	2.01	Adding information on the MINAS-A6N series	
Jan. 8, 2016	P7, 8	2.02	Updating the information on the MINAS-A5B series	
Oct. 12, 2016	P1, 9, 10	2.03	Adding a description on the support for Windows 10	
	P8		Expansion of the scope of model codes supporting MINAS-A6N series	
	P8, 25, 27, 28, 35, 38, 39		Adding information on the MINAS-A6L series	
	P16		Adding file extensions for the waveform graphic expanded function	
	P30, 31		Adding descriptions on the added functions and deterioration diagnosis information	
June 2, 2017	P4-9, 13, 16, 19, 22, 23, 27, 33, 35-42, 101, 108, 134, 143, 158, 212, 213, 215,	3.00	Adding a description on Wireless LAN	
	P7, 27, 29, 30, 46, 47, 177, 178		Adding information on the MINAS-A6B, and MINAS-A6NL series	
	P30-34, 205-211, 216-218, 220-231		A description is added on the additional function, RTEX communication setting screen.	
	P72, 101, 126, 131, 134, 136, 143, 158, 176, 184, 187, 195, 198, 205		Adding a note on the function that cannot be performed during RS232 communication	
	P85, 86, 92, 93, 98, 99, 216, 218, 221		Adding a description on the support of longer sampling cycles of waveform graphics	
	P128, 129, 224		Adding a description on the RTEX communication error counter monitoring function	
	P198-204, 227-231		Adding chapters for the screen operation of the deterioration diagnosis function and trouble shooting	
	P232		Adding a description on the post-sale service	
July 3, 2017	P7	3.01	Updating the month and year in the note	
	P39-40		Correct errors related to the wireless LAN / Driver information set-up	
Nov. 17, 2017	P7	3.02	Updating the information on the MINAS-A6B series	
May. 17, 2018	P7, 30-31	3.03	Adding information on the MINAS-A6 (V-frame) series	
	P22-25		Adding a description on the Nickname setting screen	
	P216		Adding a description on troubleshooting	
July. 31, 2018	P6-7, 30-31	3.04	Adding information on the MINAS-A5MN and MINAS-A6BL series.	
	P31, 33-37, 215-216, 221, 223, 226, 230-237		A description is added on the additional function, Magnetic pole position estimation results copying screen.	
	P31, 161-164, 168, 233		Adding descriptions on the Fit gain screen (2 degrees of freedom control)	
Oct. 26, 2018	P31, 161	3.05	Adding descriptions on the Fit gain screen (2 degrees of freedom control)	
	P146		Adding descriptions on the Fit gain screen (Standard)	
Mar. 15, 2019	P3, 26, 34, 39, 64-65, 225, 229-230, 236	3.06	Correcting errors	
	P7		Updating the month and year in the note	

Note) The page number (Page) is the current page number at the time of revision.

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Revision History of Operation Manual

Date	Page	Rev	Description	Signed
May 15, 2019	P5, 19, 42	3.07	Added the United States, Taiwan, and Korea as regions that can support wireless LAN.	
	P7		Updating the month and year in the note	
	P36		Correction Removed the block operation monitor described in the function that cannot be opened simultaneously during degradation diagnosis.	
	P238		Update Contact point for repairs information	
Jan. 10, 2020	P7	3.08	Updating the month and year in the note	
	P8		Correcting errors	
Mar. 11, 2020	P5, 19, 42, 43	3.09	Correct errors related to the wireless LAN / Driver information set-up	
	P7		Updating the month and year in the note	
	P41, 44		Updating the image of the wireless LAN / Driver information set-up screen	
Nov. 12, 2020	P1, 8-9	3.10	Stopping the support for Windows Vista, Windows 7 due to the end of Microsoft support for Windows Vista, Windows 7.	
	P2		Added mark description	
	P3		Added a note depending on the state of the PC	
	P7		Updating the month and year in the note	
	P8, 19, 42		Added a note about WPA	
	P8, 18, 25-31, 36, 38, 65, 67, 71, 74, 78, 82-83, 85, 89-90, 92, 96-99, 105, 109, 113, 115-116, 123, 132, 135, 142, 149, 159, 194, 200, 208, 228, 234		Correcting errors	
	P9		Update the contents of <Notes>	
	P10, 14, 16, 20-22, 25-28, 31, 34, 36-38,43, 45, 47-49, 51-53, 56-61, 68-70, 73-83, 88, 92-93, 95-96, 98, 100-101, 103-104, 111-112, 114, 116-122, 124-127, 129-131, 134-135, 137-144, 147-148, 150-152, 155-160, 162-181, 185, 189, 191, 195, 197		Fixed to the description of Windows 10	
	P11		Rename shortcut	
	P12		Added notes about installing Visual Studio 2013	
	P12, 218		Added notes about installing Microsoft Access Database Engine	
	P15		Add description of object comparison file	
	P17		Removed description of USB multi-axis connection	
	P29-30		Updated list of useable function	
	P30, 119, 229		Added content related to analysis after frequency characteristic measurement	
	P72		Added a note about control mode	
	P76		Added notes about Real time Auto Tuning Custom Setting	
	P92-94, 176-177		Change the numbering of image areas	

Note) The page number (Page) is the current page number at the time of revision.

REVISIONS

Revision History of Operation Manual

Date	Page	Rev	Description	Signed
Nov. 12, 2020	P116-117		Added description about operation button	
	P146, 161		Added the cautionary note about fit gain function	
	P182		Added comparison button	
	P184		Added parameter column, description of [ESC] key	
	P186		Added description of comparison function	
	P219, 221		Added items for troubleshooting	
	P226		Added annotation of M frame driver	
Mar. 10, 2021	P4-6	3.11	Added Software License Agreement	
	P12		Change the way of uninstall	
	P46		Added a note on the wireless LAN / Driver information set-up screen	
	P69		Added a note on the monitor screen	
May. 20, 2021	P10	3.12	Change needed system construction	
Jan. 6, 2022	P7	3.13	Changed the notes about wireless LAN dongle	

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Safety Precaution

Please keep without fail

Instructions to be observed to avoid personal injury and property damage are given in the following way.
Please keep it without fail

The degree of injury and damage caused by failure in observing the instructions or improper usage is indicated in the following format.

⚠ Caution	Indicates a potentially hazardous situation which may result in injury or only property damage.

The following pictorial display explains the types of content to be protected.

	This indication shows “prohibition”.
	This indication shows “imposition” to be done.

Caution

The communication cable or wireless LAN dongle should not be connected or cut during the driver power supply turned on.

It may cause injury, breakdown or damage.

The communication cable or wireless LAN dongle should not be cut under the condition of this software turned on. Also, don't put your PC to sleep, hibernate, or screen saver.

It may cause injury, breakdown or damage.

On modifying parameters of the driver, please do it after reading the manual of the driver or technical reference carefully.

It may cause injury, breakdown or damage.

Trial Run, Z phase search, and frequency characteristics measurement accompanies motor operation. Please execute it after securing surrounding safety without fail.

It may cause injury, breakdown or damage.

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This Software consists of the following types of software.

(1) The software developed independently by PANASONIC

(2) The software owned by and licensed by the third party

(3) This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/).

Software in categories (3) above is distributed with the expectation of effectiveness as a single piece of software, but there is no guarantee provided, including implied guarantees regarding viability as a product and/or suitability for specific purposes. For details, Please refer to the detailed terms and conditions thereof shown in the installation package of this Software.

1. Initially

Notes for safety issues

This software runs on “Windows”, and performs communications between personal computers and MINAS series driver.
MINAS series have functions to perform communications with commercially available personal computers with USB cables.
MINAS series drivers supporting wireless LAN can make wireless communication by connecting to a Panasonic optional device: Wireless LAN dongle (DV0PM20105). Moreover in a part of series has the function to perform RS232 communication with RS232 cable. And can set parameters of the drivers, or can monitor control situations using a PC screen and mouse. When using the device, also read the operation manuals and technical publications on the driver main unit and wireless LAN dongle.

Microsoft and Windows is registered trademark of Microsoft Corporation in the United States and other countries.
Other company’s names, product’s names and so on are each company’s registered marks.

Notes 1) The wireless LAN dongle is currently not available.

2. System Construction

Confirming applicable drivers

This software is for our AC servo driver MINAS series. It is not available for other products. Applicable driver's model names and series are as below.

Series	Model name	USB	RS232	Wireless
MINAS - A5 series	M * DH * * * * *	✓	✓	
	M * DH * * * * * E	✓		
MINAS - A5B series	M * DH * * * * * B01 M * DH * * * * * B03 M * DH * * * * * B21 M * DH * * * * * BA1 M * DH * * * * * BA3 M * DH * * * * * BD1	✓		
MINAS - A5BL series	M * DH * * * * * B91 M * DH * * * * * BL1	✓		
MINAS - A5II series	M * DK * * * * *	✓	✓	
	M * DK * * * * * E	✓		
MINAS - A5L series	M * DH * * * * * L01 M * DH * * * * * LA1	✓	✓	
MINAS - A5L04(LA4) series	M * DH * * * * * L04	✓	✓	
	M * DH * * * * * LA4	✓		
MINAS - A5MN series	MMDHT * * * * ND1 MMDHT * * * * N21	✓		
MINAS - A5N series	M * DH * * * * * N01 M * DH * * * * * NA1	✓		
MINAS - A5ND1 series	M * DHT * * * * ND1 M * DHT * * * * N21	✓		
MINAS - A5NL series	M * DH * * * * * N91 M * DH * * * * * NL1	✓		

(Continued on next page)

Series	Model name	USB	RS232	Wireless
MINAS - A6 series	M * DL * * * SF M * DL * * * SG	✓	✓	✓
	M * DL * * * SE	✓		✓
MINAS - A6B series	M * DL * * * BF M * DL * * * BE	✓		✓
MINAS - A6BL series	M * DL * * * BM M * DL * * * BL	✓		✓
MINAS - A6L series	M * DL * * * SM	✓	✓	✓
	M * DL * * * SL	✓		✓
MINAS - A6N series	M * DL * * * NF M * DL * * * NE	✓		✓
MINAS - A6NL series	M * DL * * * NM M * DL * * * NL	✓		✓
MINAS-A6 (V-frame) series	MVDL * * * SF MVDL * * * SG	✓	✓	✓

Models of drivers can be identified with the character of * in the model name above.
(The characters of * are defined model by model.)

Notes 1) That is information on the day of Jan. 2022. Please check with the shop you buy from if this software is applied to the drive you use.
Notes 2) Among the series that support a wireless LAN listed in the above table, drivers of the October 2016 lot and later support wireless LAN. Check the Panasonic website for the latest support status.

Needed system construction

To use this software, equipment which satisfy the conditions below are needed. Please refer to the operation manual attached to the each equipment, and then construct the system. The software may not be operated with a different environment from recommended one.

Personal Computer (PC)

Operation system	Windows 8.1(32bit version, 64bit version) Windows 10(32bit version, 64bit version) Japanese, English(US), Chinese(Simply), Korean version of the OS above
CPU	Follow operating system recommendations
Memory	Follow operating system recommendations
Hard disk	512MB or more
Communication	USB port Wireless LAN adapter Note) A wireless LAN adapter is required for wireless connections. COM port (Communication speed 2400bps - 115,200bps) Note) A COM port is required when using RS232 communication. Communication speed recommends not less than 9600 bps.

Wireless network

Wireless LAN standards	IEEE802.11b (Maximum rate: 11Mbps) IEEE802.11g (Maximum rate: 54Mbps) IEEE802.11n (Maximum rate: 300Mbps)
Frequency band	2.4GHz band
Channel	1ch to 13ch
Operation mode	Infrastructure mode
Security	WPA-PSK (AES) Note) When using WPA, update the key in about 2 minutes to ensure security. WPA2-PSK (AES)

Display

Resolution	1024×768 PIXEL or more
Color number	24bit color (True Color) or more

<Notes>

- Windows is needed to be prepared by customers.
- To use different OS from ones above, customers need to check operations.
- PANATERM should be used in condition that initial setting of Windows is renewed into the newest one.
- Using with other applications, operation of PANATERM may become unstable. Please use PANATERM solely.
- All users can operate the servo driver with PANATERM. To prevent dangerous operations, do not leave the PC with PANATERM installed in a state where it can be operated by a third party.

<Notes>

- Not guaranteed with other OS.
- Please check the operation by customers when used with different system environment from ones above.
- This product is performing checking of operations by Windows 8.1 and Windows 10. The operation may be different on other versions.
- This product is not applied to indication on multiple displays.
- In case two or more PANATERM are running, all operations cannot be guaranteed.
- Illustrations/screens may be different from actual cases.
- In conjunction with that Microsoft has ended all support for Windows XP (United States time) April 8, 2014, we end support for PANATERM in Windows XP.
- In conjunction with that Microsoft has ended all support for Windows Vista (United States time) April 11, 2017, we end support for PANATERM in Windows Vista.
- In conjunction with that Microsoft has ended all support for Windows 7 (United States time) Jan 14, 2020, we end support for PANATERM in Windows 7.

3. Set up

Installer construction

PANATERM installer includes the data below.

Item	Folder name after installation
PANATERM main body	PANATERM
Parameter file conversion software	ParameterConverter
Software for simulation	SimMotor
Disk driver for USB communication	USBDriver

<Notes>
Using PANATERM installer, please install it to the hard disk of the PC. It cannot be installed to the network drive. Even with copy or other measure, it cannot be installed/setup.

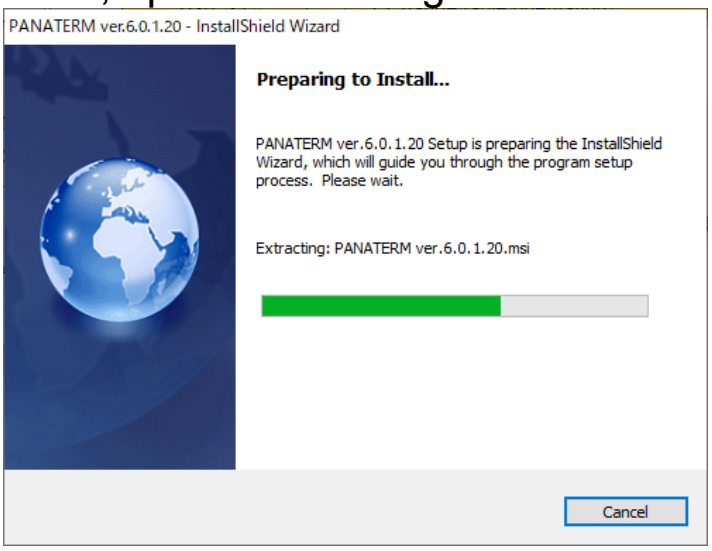
Way of installation

<Advance preparation>

1 Turn on the power supply of PC and start Windows.
(Close down other software running.)
2 Copy PANATERM installer (setup.exe) into an arbitrary folder.
3 Disconnect if the driver is connected to the PC with a USB cable.
4 Uninstall the PANATERM with the way below if PANATERM is already installed.
Select “PANATERM ver.6.0” with “Control panel” > “Programs and Features”, and click “Uninstall”.

<Start install>

1 Double - click “setup.exe”. Startup PANATERM Installer. Select the language (Japanese, English, Chinese (Simply) and Korean). And then, operate following the direction on the screen



2 After completing the install, the short cut icons below will be made on the desktop.

PANATERM ver.6.0

ParameterConverter

SimMotor

■Notes

· When an error occurs during setup, an error message will be displayed. Please refer to page 220 “Set up”, and remove the cause of the error.

· Please do not turn off the power supply of the PC or start up other software before completion of the install.

· PANATERM will be installed in C:\ProgramFiles\Panasonic Corporation\MINAS\PANATERM without special assignment. If windows for 64 bit version, it will be installed in C:\ProgramFiles(x86)\Panasonic Corporation\MINAS\PANATERM without special assignment. Please do not delete files under this folder (especially under \ini folder). When PANATERM should be deleted, please use “Deletion (Uninstall) way” described before.

- When Microsoft .NET Framework 3.5 SP1 is not installed, Installer of Microsoft .NET Framework 3.5 SP1 will start up when the installer start. Follow the instructions to continue the installation. Follow the instruction when you are asked to restart the computer after the installation.

- If Microsoft Visual C++ 2013 Redistributable(x86) is not installed, starting the installer activates the installer of Microsoft Visual C++ 2013 Redistributable(x86).
  Follow the instructions to continue the installation. Follow the instruction when you are asked to restart the computer after the installation.
  In addition, Microsoft Visual C++ 2013 Redistributable (x86) may not be installed under the following environments.
  Only Microsoft Visual C++ 2013 Redistributable (x86) was uninstalled on the PC with Visual Studio 2013 installed.
  Make sure you have Microsoft Visual C++ 2013 Redistributable (x86) installed.

- If Microsoft Office 2010 or later or Microsoft Access Database Engine is not installed, the Microsoft Access Database Engine 2010 installer will be installed when the installer is started. Follow the instructions to continue the installation. Follow the instruction when you are asked to restart the computer after the installation.

- Selection of language on setup is to select language of setup screen. The language selection of PANATERM can be changed with “File” > “Setting” > “Culture” on the menu bar on the condition that all function windows are closed down.

<Connection to driver (Device driver setting)>

1 When you connect using a USB cable, please refer to page 19 “Connection”, and connect the USB connector on the front of the driver and USB connector of the PC. When you connect using a RS232 cable, it is not necessary to carry out the following items.

2 When the driver’s power supply is turned on, pop-up appears on the task bar, and installing device driver automatically.
  Notes 1) It is necessary to setup the device driver to each USB connector. Please setup device driver for each USB connector of using.

4. Basic Operation

Indication of keys

General Key indications which do not rely on the models of the keyboards are used in this manual, the indication may be different. Please read the indication based on the table below.

Indication	Context
[↑][←] [↓][→]	Up down and right and left are indicated. With these keys input, selected items are changed. Selected item is highlighted.
Number (0 - 9)	Number keys are indicated. Please input the objective number.
[ESC]	On keyboards, escape keys are indicated [Esc], [ESC]. They are used to turn inputted value back to the original one.
[ENTER]	Enter keys which is indicated [Enter], [ENTER], [RETURN] on keyboards are indicated. Input when each menus are selected and executed and at the end of input of values.

Section operation way of menu

Each item is executed by left - clicking the menu item or the operation button required to select.
Each items can be executed also by highlighting the menu required to select with [↑], [→], [↓], [←] keys, and pressing [ENTER] key.

Input of value

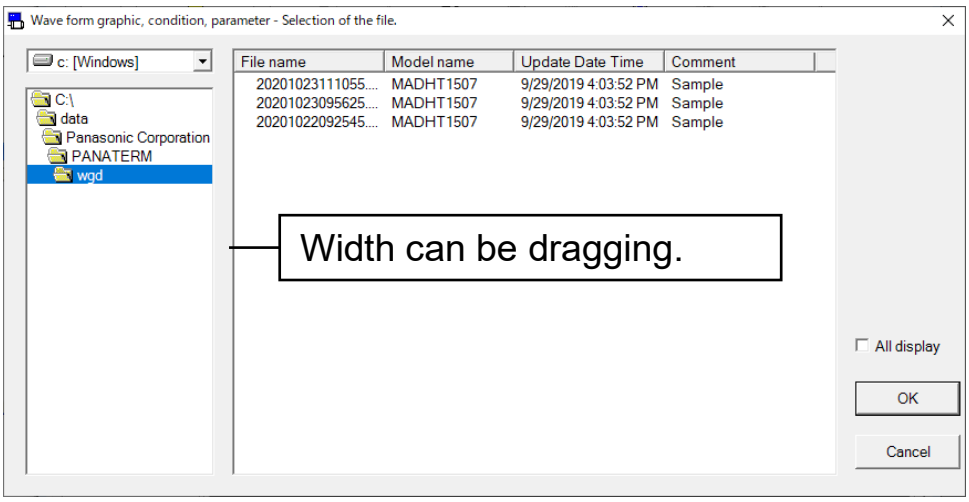
Please input them with number keys on the keyboard.
Value data of parameter changing and so on is indicated with decimal numbers. Please input them with decimal numbers. Binary numbers and hexadecimal numbers are not available.
Value input can be cancelled with [ESC] key.

File operations

The following dialogue of file is displayed when files need to be appointing on “Read” or “Save” of parameters and so on.

<Read>

Use built-in dialogue box in PANATERM for read in parameter file, wave form graphic file or frequency character file.
This dialogue is only the objective file is displayed.

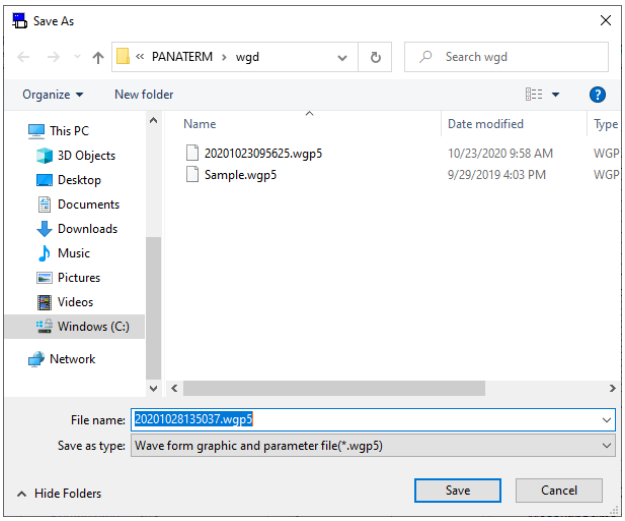


“All display” : If you checked this, files are displayed that you didn’t select series too.

Use dialogue box of Windows common dialogue box for read other file.

<Save>

Use dialogue box of Windows common dialogue box.



<Notes>
Extensions are added to files dealt with PANATERM to identify the types of each files. Please do not change the extensions. PANATERM cannot read files if their extensions are changed.

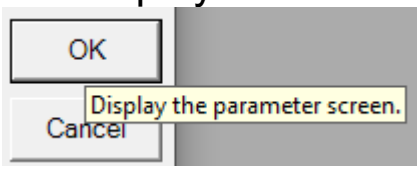
Parameter file	filename.prm5
Parameter comparison file Object comparison file	filename.csv
Wave form graphic measure condition file	filename.wgc5 filename.wgc6
Wave form graphic measure result file	filename.wgd5 filename.wgd6
Wave form graphic parameter and measure result file	filename.wgp5 filename.wgp6
Frequency character measure condition file	filename.fcc5
Frequency character measure result file	filename.fcd5
Frequency character parameter and measure result file	filename.fcp5
Monitor screen log file	filename.mon5
Fit gain measure result file	filename.fit5
Object data file	filename.obj5
Block parameter file	filename.obj5
Wireless setting parameter file	filename.prw5

Closing down way of each screen

Each screen are closed down clicking “Exit” with left button of the mouse when there is “Exit” button on the tool bar of the each screen. Also they can be closed down clicking right above of the screen.

Tool chip text

The explanations of the objective items are displayed if the mouse button is put on the displayed items.

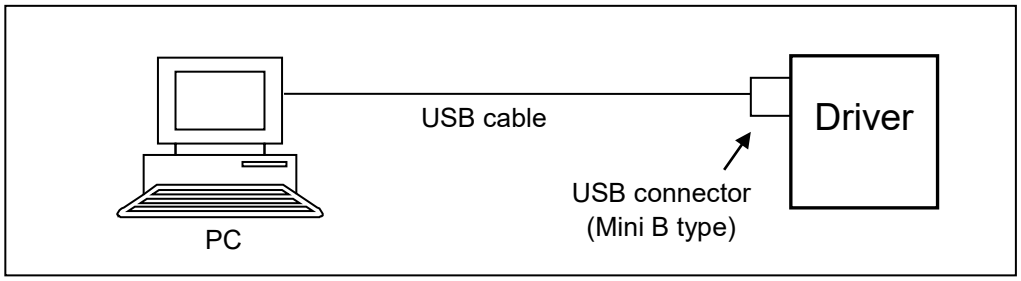


5. Start up and Close down

Connection

Connection of USB cable (Commercialized product)

Please confirm that all power supplies of the driver and PC are turned off. Please be sure to insert USB cable.
Please refer to the driver's manual or technical reference regarding connection and setting measure with the front panel.
<In case 1 driver is connected>



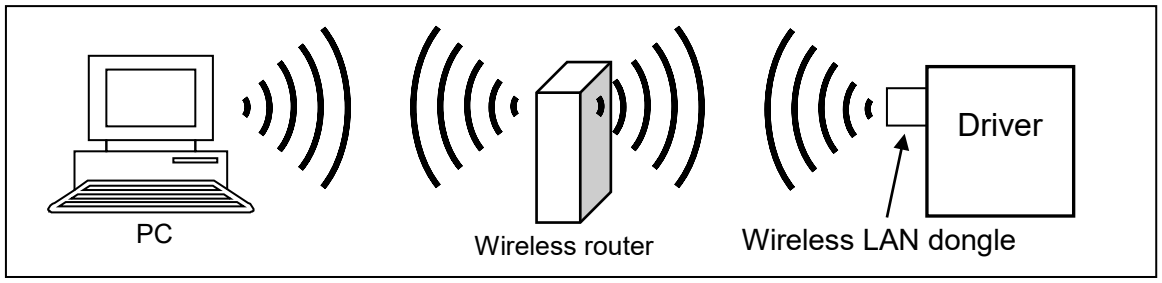
Notes 1) Regarding communication speed, it is applicable to full speed of 12 Mbps only. Actual communication speed may change largely by many causes, connection to USB equipment other than drivers, operation load condition of PC side OS, communication error caused by communication error by noise or something, driver's response speed, and so on.

Notes 2) USB cables are not prepared by our company. Please use commercialized USB cables applied to USB2.0 with shield and ferrite core for anti - noise.

Notes 3) When two or more systems are connected simultaneously in parallel the operation of PANATERM cannot be guaranteed.

Connection of wireless LAN

Confirm that the power of the driver is completely turned off. Then firmly insert the Panasonic optional device: wireless LAN dongle (DV0PM20105).
If you connect multiple drivers, firmly insert the Panasonic optional device, wireless LAN dongle (DV0PM20105), to each driver.
You must initialize the device before establishing a connection.
For the setting, see the chapter of the page 42 “Wireless LAN/Driver information set-up” screen.



Notes 1) The wireless LAN dongle can only be used in Japan, China, United States, Korea and Taiwan. Care must be taken when using it in region other than those that allows the use of the device, because it may be a violation of the law.

Notes 2) A longer wireless communication distance may cause communication instability such as communication disconnections, slow communication speeds, and driver response delays.

Notes 3) A third party may enter the network to adversely affect the communication. In such a case, disconnect the device from the network.

* How to disconnect devices

PC	:	Disable the network connection
Driver	:	Pull out the wireless LAN dongle from the driver and turn off the power.
Wireless router	:	Pull out the adapter from the wall outlet to turn off the power.

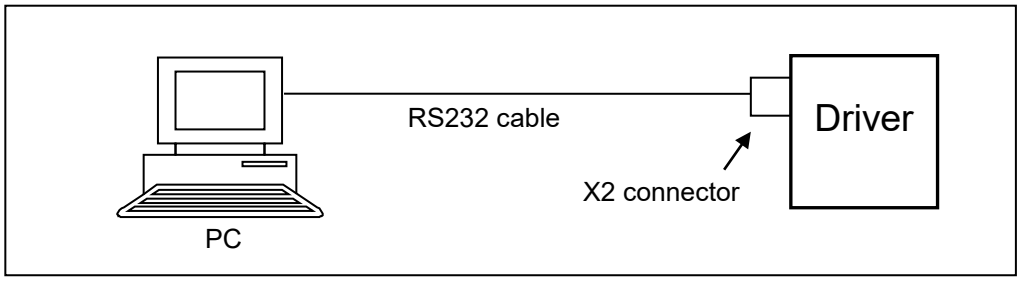
Notes 4) Make the setting to encrypt (WPA/WPA2) the communication on the network to prevent third party intrusion.

* When using WPA, update the key in about 2 minutes to ensure security.

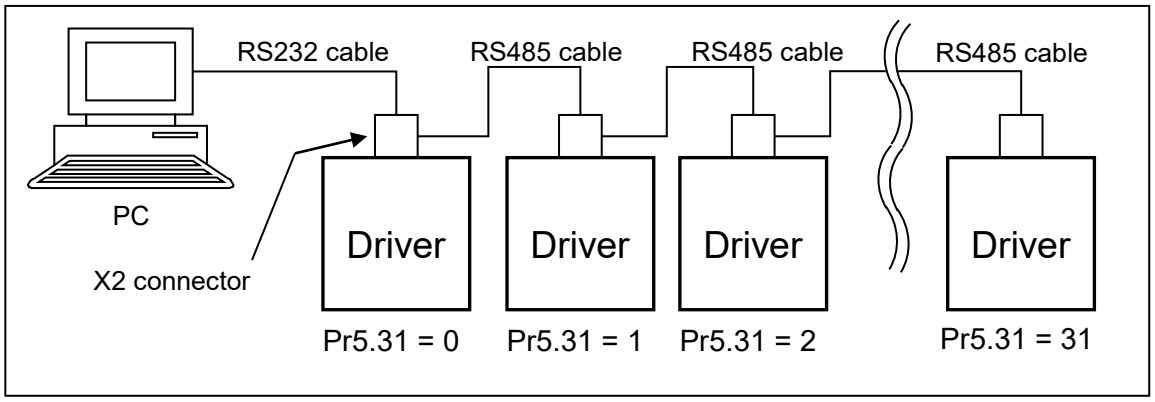
Connection of RS232 cable

Please confirm that all power supplies of the driver and PC are turned off. Please be sure to insert RS232 cable.
In connecting two or more drivers, it connects driver with a PC by RS232 communication. It connects by RS485 communication between each driver.
Please refer to the driver's manual or technical reference regarding connection and setting measure with the front panel.

<In case 1 driver is connected>



<In case 2 or more drivers are connected>



Notes 1) About RS232 cable and RS485 cable, it is not preparing at our company. Please prepare the cable.

Notes 2) Pr5.31 is set as the axis address (ID). Please set the axis address (ID) of the driver linked to a PC as 0. The other drivers set the axis address (ID) from 1 to 31. Please do not overlap the axis address (ID).

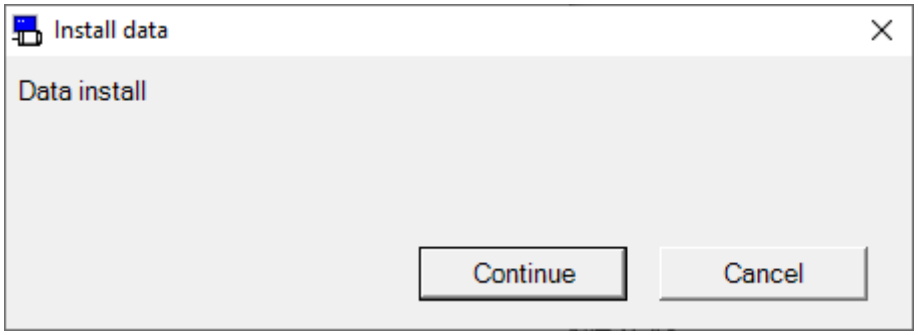
Notes 3) When you connect two or more drivers, please set up so that the communicate speed of each driver becomes the same.

Notes 4) Driver is not connectable with PC by RS485 communication.

Start up of PANATERM

1 Turn on the PC, and start up Windows.
2 Turn on the driver.
3 Click the shortcut of “PANATERM ver.6.0” made on the desktop on the installation.
In case of no shortcut on the desktop, select the group of “start” > “Panasonic Corporation” of Windows, and click “PANATERM ver.6.0” among them.
4 PANATERM main screen is displayed.

Note) When PANATERM starts up for the first time, the indication below is displayed to copy sample data of wave form graphic or something saved in PANATERM into “My document”. Choose “Continue”.



Close down of PANATERM

1 To close down PANATERM, click “File” > “Exit of PANATERM” on the menu of PANATERM screen.
(Clicking right end of the title bar on PANATERM screen is also same operation as “Exit of PANATERM”)
2 A message to confirm closing down PANATERM is displayed.
To close down, click “Yes”, to continue PANATERM operation, click “No”.

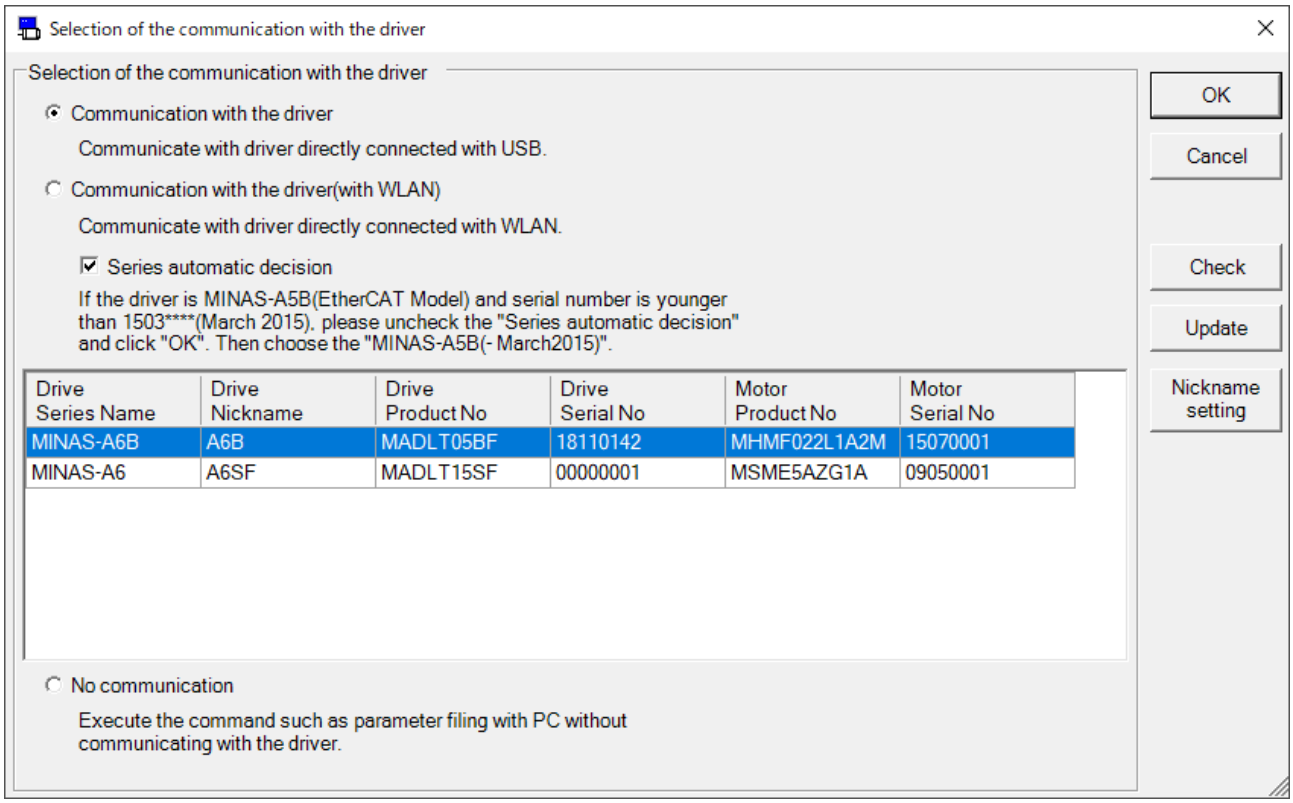
Note) Please note that if programs are closed down without saving information set or data obtained, all information would be lost.

6. Screen Operation

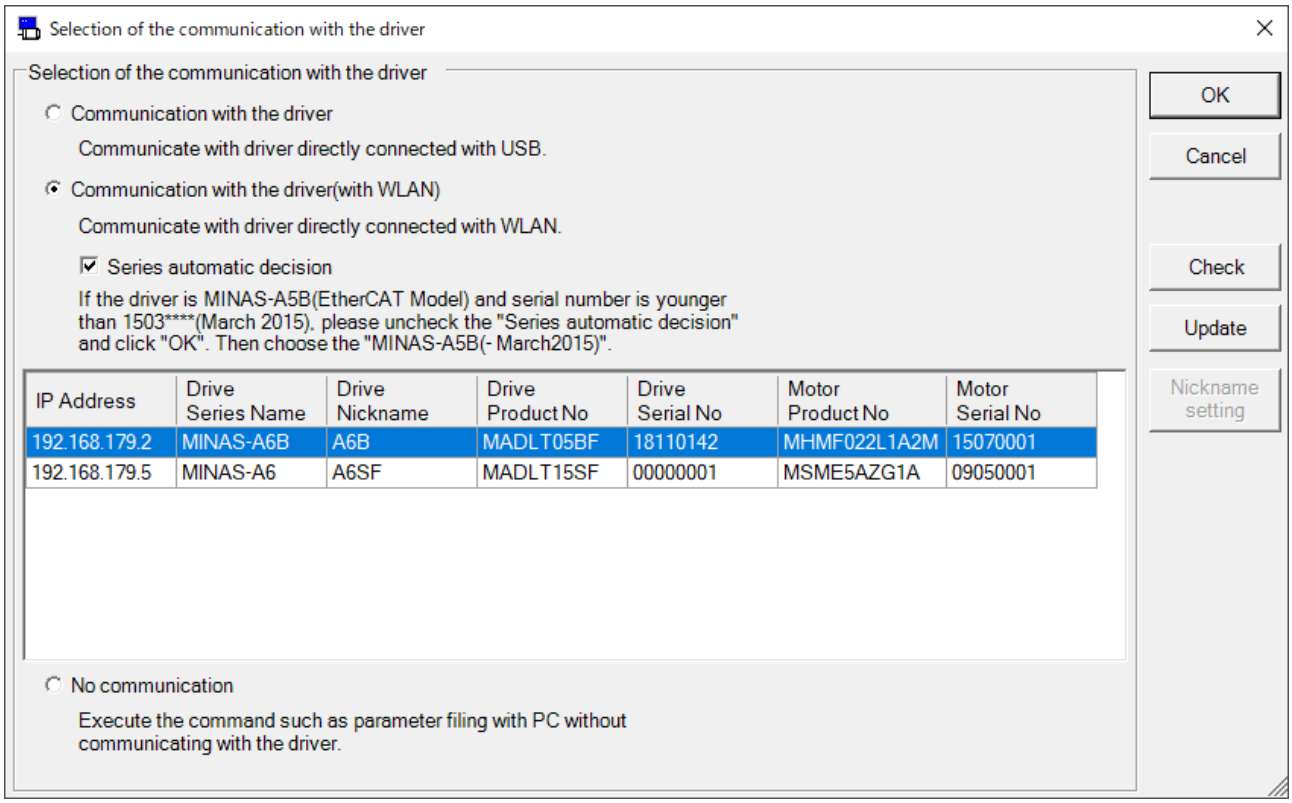
Select connection with drivers

Starting PANATERM displays a dialog box asking if you want to start communication with a driver. Different screens are displayed depending on whether the communication method used is USB, wireless, or RS232. The dialog box also appears when you click “Connect” from the tool bar of the main screen or when you select “File” > “Setting” > “Communication with the driver” from the menu bar of the main screen.

<When USB communication is used>



<When wireless communication is used>



Selection of the communication with the driver

□“Communication with the driver”
Communication with the driver connected by USB is done. The list of the drivers and motors model names and serial numbers are displayed. Please select the driver connected, among them.

□“Communication with the driver (with WLAN)”
Selecting this checkbox and then clicking the “Update” button displays the drivers that support wireless connection. Nicknames of connectable drivers as well as product numbers and serial numbers of drivers and motors are listed. Select a desired driver from the list.

□“Series automatic decision”
The series automatic decision function of driver is set up. Usually, please put in a check and validate it.

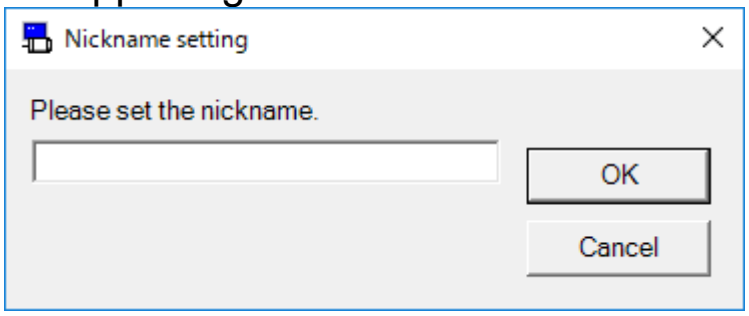
□“No communication”
Without communication with drivers, edition of parameter etc. saved in files can be available freely.

“OK”	: Determine the context selected.
“Cancel”	: Make the selected context invalid.
“Check”	: Selected driver’s front panel LED blinks. (Only “Communication with the driver” is selected.)
“Update”	: A list of the driver connected is updated.
“Nickname setting”	: Selected driver’s nickname setting is changed. (Only “Communication with the driver” is selected.)

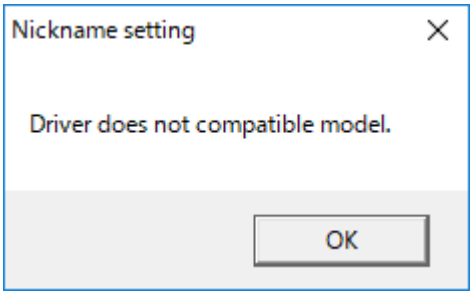
Nickname setting

When “Nickname setting” is clicked on the Communication with the driver screen, Nickname setting screen will be displayed for models which support nicknames. An error dialog will be displayed for models which do not support nicknames

< Supporting models >



< Non-supporting models >

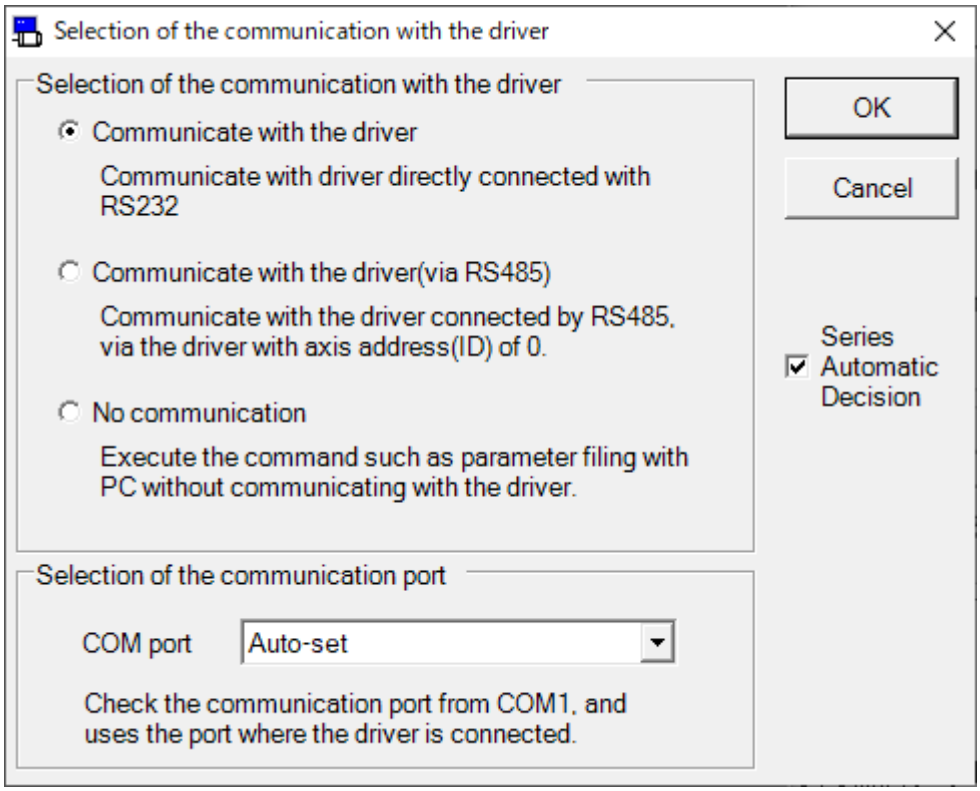


Note) Initial indication of Nickname setting screen shows blank if no nickname is set up, and the set nickname if a nickname has already been set.

Set up the nickname on Nickname setting screen and click “OK” to reflect the change in nickname, then terminate the Nickname setting screen.
Click “Cancel” to terminate Nickname setting screen without reflecting the nickname change.

Notes 1) When there are drivers communicating, the drivers are displayed “Now Connect”. To continue the communication with the drivers communicating, please click “Cancel”.
Notes 2) The driver displayed as "Already Used" cannot be selected. The driver may be communicating with other applications, or it may be operating the front panel.

<When RS232 communication is used>



Selection of the communication with the driver

□“Communicate with the driver”
Communication with the driver connected by RS232 is done.

□“Communicate with the driver (via RS485)”
It communicates with the driver connected by RS485 cable via the driver of the axial address 0.

□“No communication”
Without communication with drivers, edition of parameter etc. saved in files can be available freely.

“OK” : Determine the context selected.
“Cancel” : Exits the screen without reflecting the selected contents.

□“Series automatic decision”
The series automatic decision function of driver is set up. Usually, please put in a check and validate it.

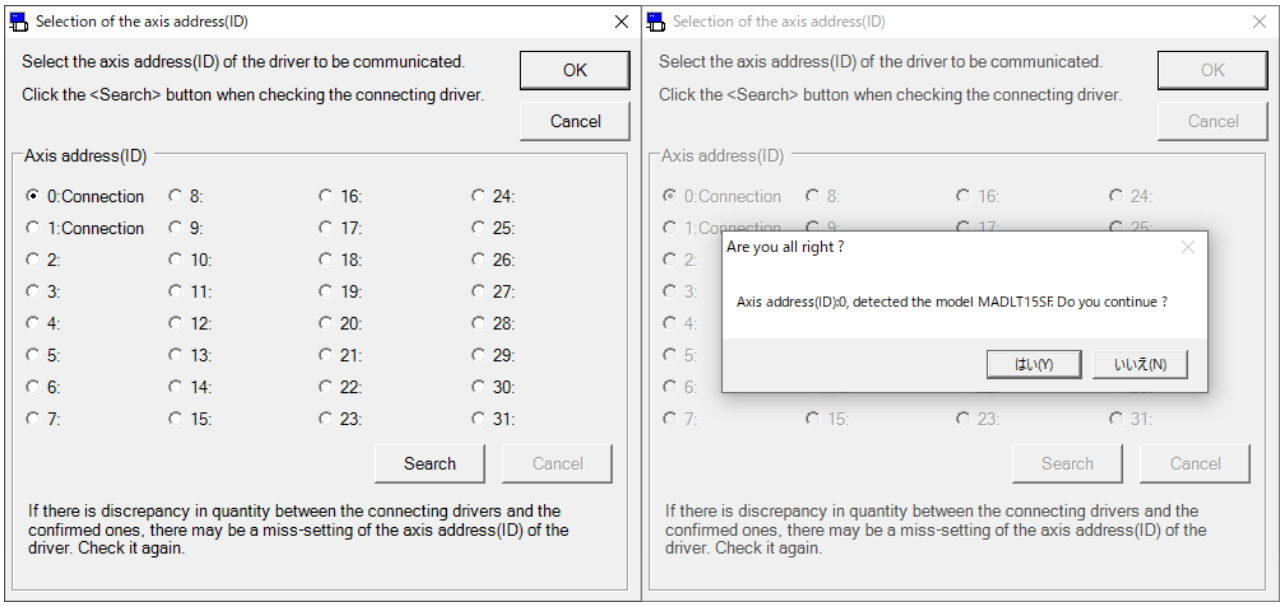
Selection of the communication port

Select the communication port.

COM 1 – 16 : The specified port is used.
Auto-set : Connected port is automatically identified.

Selection of the axis address (ID)

When connecting to a driver (via RS485) is selected, select the axis address (ID) of the driver from a list.
PANATERM performs a parameter setting and the surveillance of a state to the driver of the specified axis address in this.



"OK" : Determine the context selected.
"Cancel" : Exits the screen without reflecting the selected contents.

Axis address (ID)

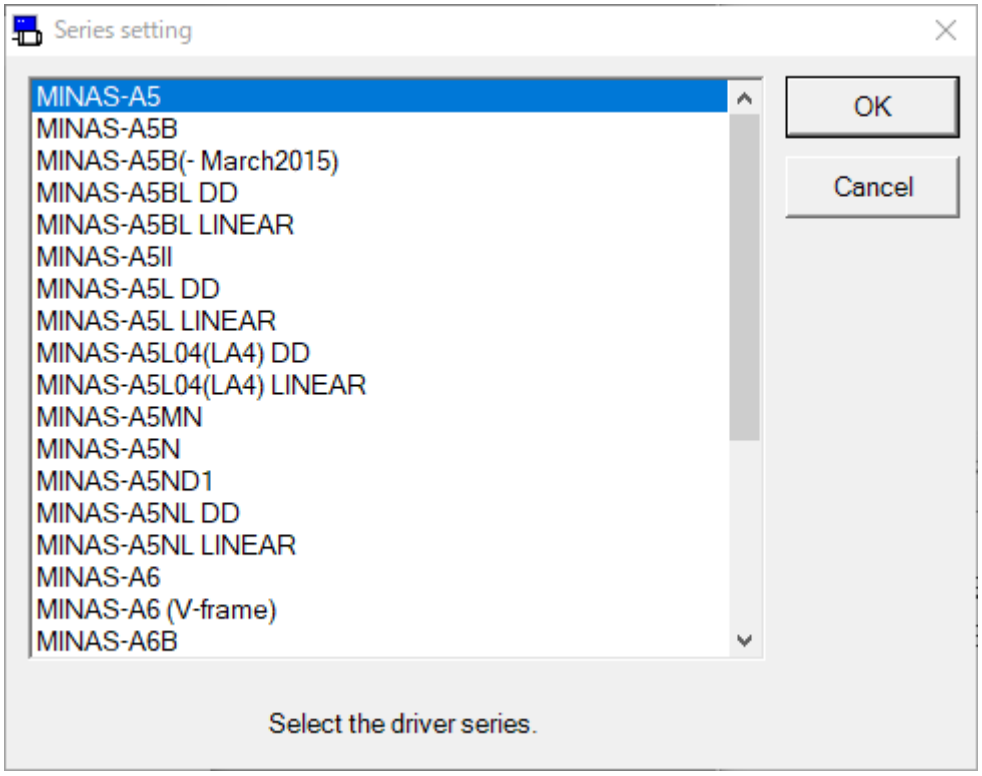
"Search" : The state of the connected driver is searched.
"Cancel" : Search of driver is stopped.

Notes 1) When the actually connected number of driver differs from the number of the driver whose check of connection was completed by search, there is a possibility that a setup of the axis address (ID) is wrong. Please check that the axis address (ID) of the driver linked to a PC is 0. Moreover, please check whether the axis address (ID) of other driver overlaps in 1 to 31.
Notes 2) Search of driver requires the time for about 1 minute.

Series setting

When select the “No communication” or “Series automatic decision” invalidity, series setting screen is displayed. Select the series name of the driver from the list.

1 Regarding the combination between the driver’s model and the series, please refer to page 8 “Confirming applicable drivers”.

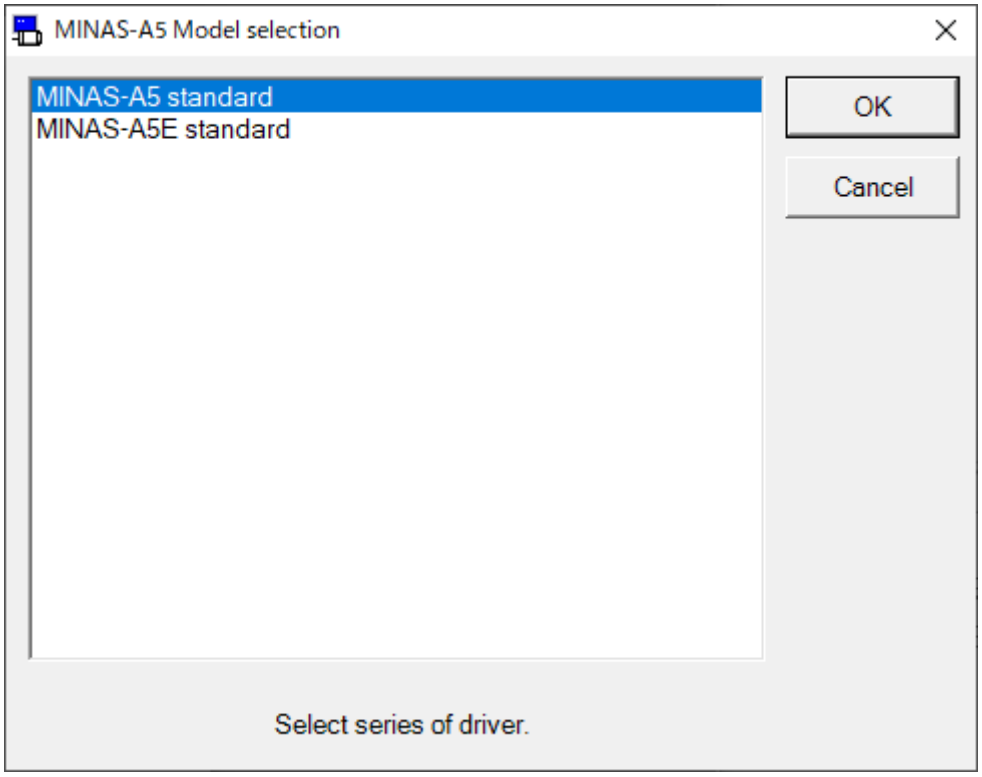


“OK” : Determine the context selected.
“Cancel” : Exits the screen without reflecting the selected contents.

Note) Even “Communication with the driver” selected, if drivers model cannot be identified automatically, series selection is executed in case of derivational model, specified model.

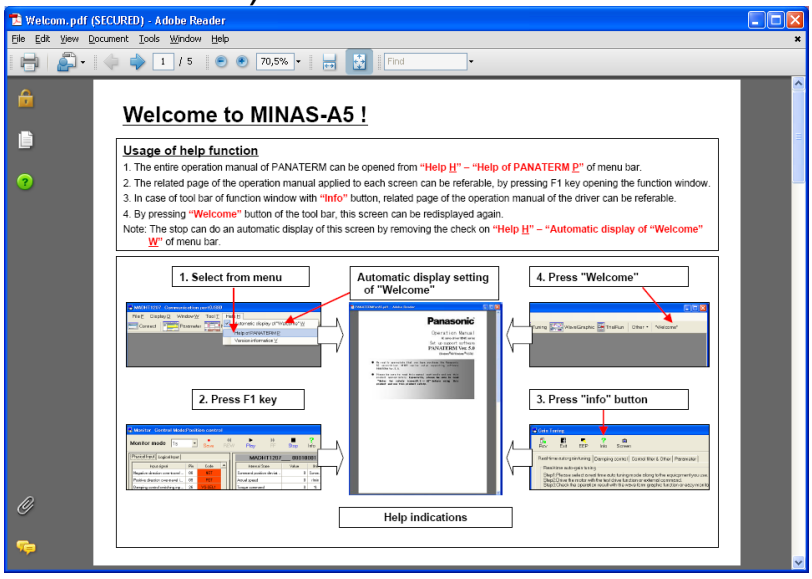
Note) For wireless connection, the displayed list only includes series that support wireless connection.

2 Select the driver's model from the list.



"OK" : Selected items are determined.
"Cancel" : Exits the screen without reflecting the selected contents.

3 The main screen is displayed, and you can use all kind of function. Select the series corresponding to "Welcome" and "Welcome" screen is displayed when automatic display setting of "Welcome" is enabled. (This screen is not displayed when using RS232 communication.)



Main screen

Once PANATERM start up, the main screen is displayed. Many PANATERM functions are used opening each function windows in this main screen. Some function windows cannot use being opened together.

You can display only valid function window.

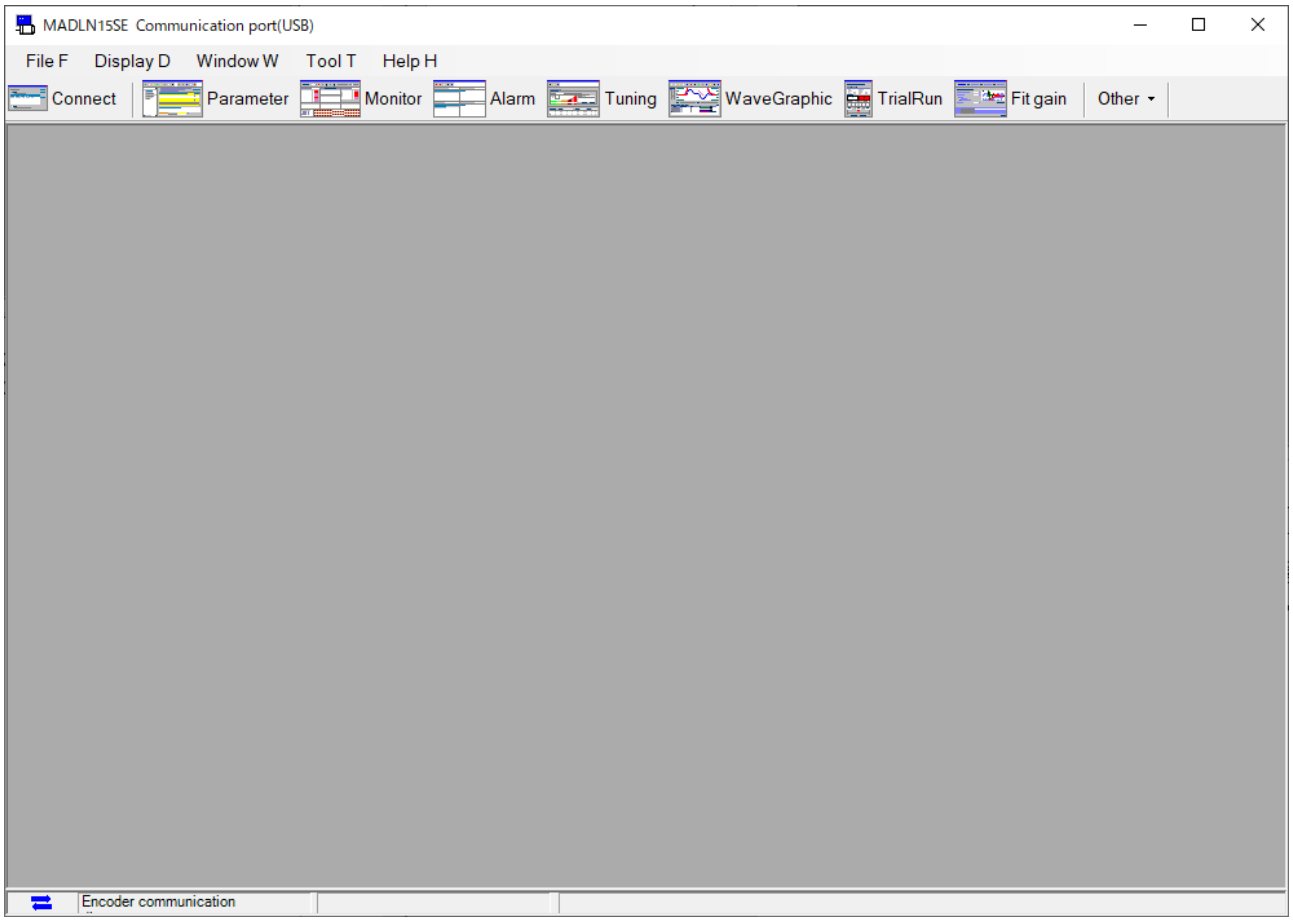
Series		MINAS-A5	MINAS-A5B	MINAS-A5BL	MINAS-A5II	MINAS-A5L	MINAS-A5L04(LA4)	MINAS-A5MN	MINAS-A5N	MINAS-A5ND1	MINAS-A5NL
Usable function window	Parameter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Monitor	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Alarm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Gain Tuning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Wave form graphic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Trial run	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency characteristics	✓	✓	✓ *1	✓	✓ *1	✓ *1	✓	✓	✓	✓ *1
	Pin assign	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Trouble shooting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Analogue input adjustment	✓			✓	✓	✓				
	Z phase search	✓	✓		✓			✓	✓	✓	
	Setup Wizard	✓			✓						
	Fit gain (standard)	✓			✓						
	Fit gain (2 degrees of freedom control)				✓						
	Object Editor		✓	✓							
	Battery refresh										
	Block operation editor										
	Block operation monitor										
	Deterioration diagnosis										
	RTEX Setup										
	Magnetic pole position estimation results copying										
	Welcome	✓									

(Continued on next page)

Series		MINAS-A6	MINAS-A6B	MINAS-A6BL	MINAS-A6L	MINAS-A6N	MINAS-A6NL	MINAS-A6(V-frame)
Usable function window	Parameter	✓	✓	✓	✓	✓	✓	✓
	Monitor	✓	✓	✓	✓	✓	✓	✓
	Alarm	✓	✓	✓	✓	✓	✓	✓
	Gain Tuning	✓	✓	✓	✓	✓	✓	✓
	Wave form graphic	✓	✓	✓	✓	✓	✓	✓
	Trial run	✓	✓	✓	✓	✓	✓	✓
	Frequency characteristics	✓*1	✓*1	✓*1	✓*1	✓*1	✓*1	✓*1
	Pin assign	✓	✓	✓	✓	✓	✓	✓
	Trouble shooting	✓	✓	✓	✓	✓	✓	✓
	Analogue input adjustment	✓			✓			✓
	Z phase search	✓	✓			✓		✓
	Setup Wizard	✓						✓
	Fit gain (standard)	✓	✓			✓		✓
	Fit gain (2 degrees of freedom control)	✓	✓	✓*2	✓*2	✓	✓*2	✓
	Object Editor		✓	✓				
	Battery refresh	✓	✓			✓		✓
	Block operation editor	✓			✓			✓
	Block operation monitor	✓			✓			✓
	Deterioration diagnosis	✓	✓	✓	✓	✓	✓	✓
	RTEX Setup					✓	✓	
	Magnetic pole position estimation results copying			✓	✓		✓	
	Welcome							

Some functions are restricted depending on software version of driver.
For details, refer to technical specification of driver.
*1 Analysis after frequency characteristic measurement cannot be used.
*2 Only linear type (LINEAR) is supported. Rotary type (DD) is not supported.

<When USB communication is used>

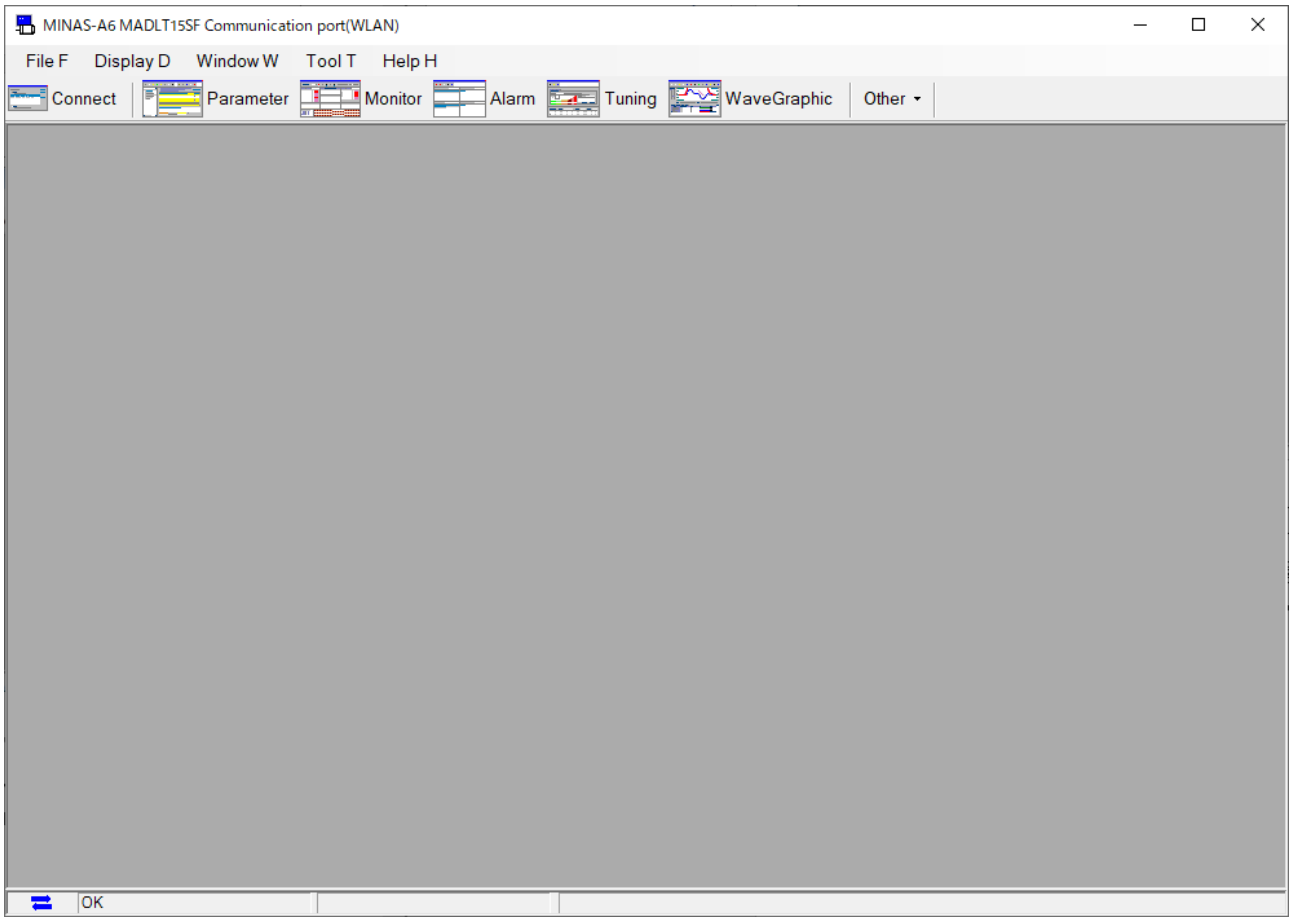


Note) Pin assign setting screen, setup wizard, and RTEX setup screen can be operated when all other windows are closed. Even outside the above function windows, combinations in the following is cannot use.
(See the next page's table.)

	Functions that cannot be opened simultaneously
Parameter	Gain tuning, Fit gain (Standard), Fit gain (2 degrees of freedom control), Object Editor, Block operation Editor, Deterioration diagnosis, Magnetic pole position estimation results copying
Gain tuning	Parameter, Fit gain (Standard), Fit gain (2 degrees of freedom control), Object Editor, Block operation Editor, Deterioration diagnosis, Magnetic pole position estimation results copying
Trial run	Fit gain (2 degrees of freedom control), Z phase search, Magnetic pole position estimation results copying
Frequency characteristics	Fit gain (Standard), Fit gain (2 degrees of freedom control)
Analogue input adjustment	Magnetic pole position estimation results copying
Z phase search	Fit gain (2 degrees of freedom control), Trial run, Magnetic pole position estimation results copying
Fit gain (Standard)	Parameter, Gain tuning, Frequency characteristics, Object Editor, Block operation Editor, Deterioration diagnosis, Magnetic pole position estimation results copying
Fit gain (2 degrees of freedom control)	Parameter, Gain tuning, Trial run, Frequency characteristics, Z phase search, Object Editor, Block operation Editor, Deterioration diagnosis, Magnetic pole position estimation results copying
Object Editor	Parameter, Gain tuning, Fit gain (Standard), Fit gain (2 degrees of freedom control) , Block operation Editor, Block operation Monitor, Deterioration diagnosis, Magnetic pole position estimation results copying
Block operation Editor	Parameter, Gain tuning, Fit gain (Standard), Fit gain (2 degrees of freedom control), Object Editor, Deterioration diagnosis, Magnetic pole position estimation results copying

	Functions that cannot be opened simultaneously
Block operation Monitor	Object Editor
Deterioration diagnosis	Parameter, Gain tuning, Fit gain (Standard), Fit gain (2 degrees of freedom control), Object Editor, Block operation Editor, Magnetic pole position estimation results copying
Magnetic pole position estimation results copying	Parameter, Gain tuning, Trial run, Fit gain (Standard), Fit gain (2 degrees of freedom control), Analogue input adjustment, Z phase search, Object Editor, Block operation Editor, Deterioration diagnosis

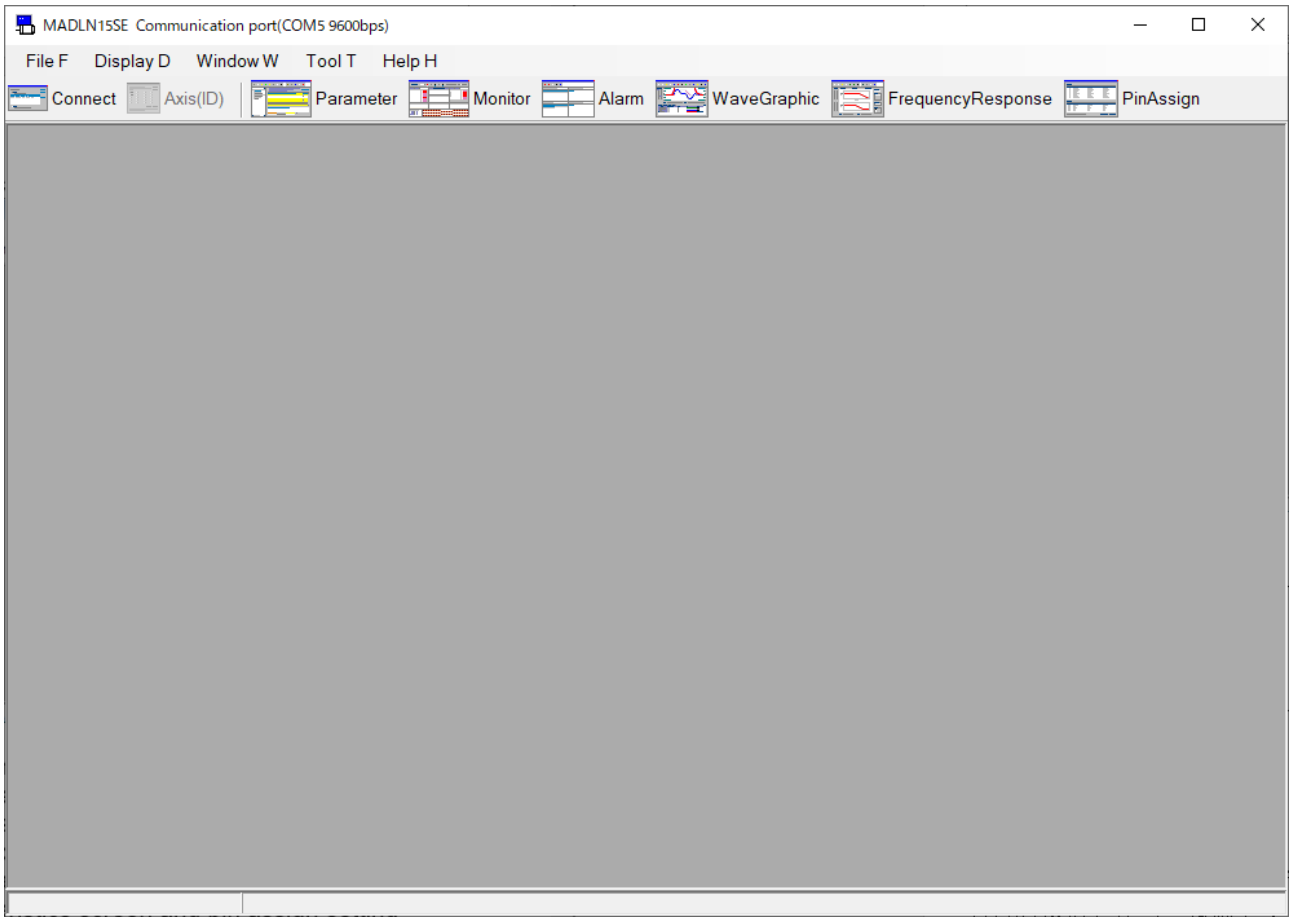
<When wireless communication is used>



Note) Trial run, frequency characteristics, Z phase search, and fit gain cannot used.
Pin assign setting, setup wizard, and RTEX setup can be operated when all other windows are closed.
Even outside the above function window, combinations in the following is cannot use.
(See the next page's table.)

	Functions that cannot be opened simultaneously
Parameters	Gain adjustment, Object Editor, Block operation Editor, Deterioration diagnosis, Magnetic pole position estimation results copying
Gain adjustment	Parameters, Object Editor, Block operation Editor, Deterioration diagnosis, Magnetic pole position estimation results copying
Analogue input adjustment	Magnetic pole position estimation results copying
Object Editor	Parameters, Gain adjustment, Block operation Editor, Block operation Monitor, Deterioration diagnosis, Magnetic pole position estimation results copying
Block operation Editor	Parameters, Gain adjustment, Object Editor, Deterioration diagnosis, Magnetic pole position estimation results copying
Block operation Monitor	Object Editor
Deterioration diagnosis	Parameters, Gain adjustment, Object Editor, Block operation Editor, Magnetic pole position estimation results copying
Magnetic pole position estimation results copying	Parameter, Gain tuning, Fit gain (Standard), Fit gain (2 degrees of freedom control), Analogue input adjustment, Object Editor, Block operation Editor, Deterioration diagnosis

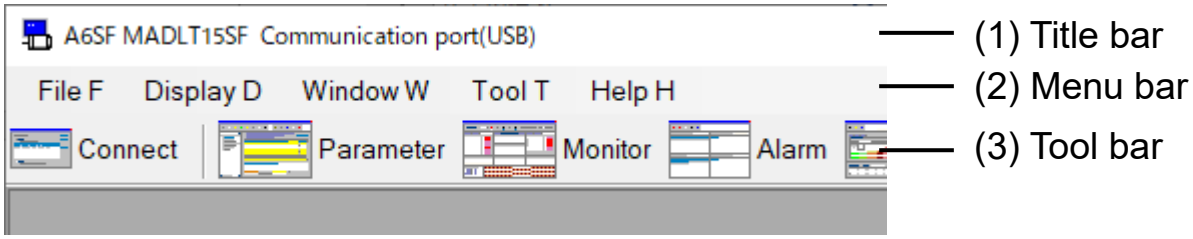
<When RS232 communication is used>



Note) Gain tuning, trial run, trouble shooting, analogue input adjustment, Z phase search, setup wizard, fit gain, object editor, battery refresh, block operation editor, block operation monitor, deterioration diagnosis, RTEX setup, and Magnetic pole position estimation results copying cannot used. Frequency characteristics screen and pin assign setting screen can be operated when all other windows are closed. Since detection of guide wire malfunction is not performed, during operation, please do not cut a communication cable or do not turn off the power supply of driver.

When connecting each driver with RS485 cable, it is possible to change connection driver from "Axis (ID)" of a tool bar.

Structure of main screen

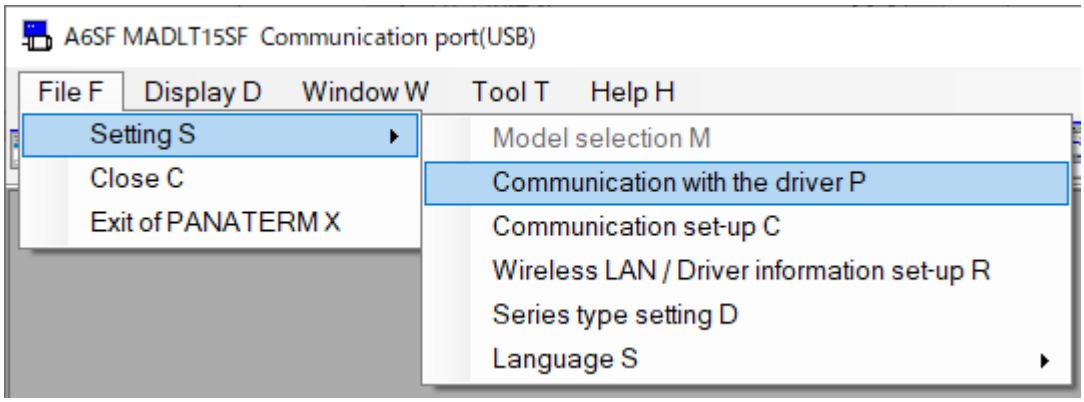


(1) Title bar

Model code and setting condition of communication port are displayed.
Driver nicknames are also displayed for wireless connection.

(2) Menu bar

The menu of “File”, “Display”, “Window”, “Tool” and “Help” are displayed. Click a command name to use a command. Some commands are divided by functions. And they changes by opening each function’s.



(3) Tool bar

Each function windows are called. Function windows can be called also out of the menu bar of the main screen.
Without communication with drivers, valid functions are limited.

In subsequent explanation, the functions that can call a function window with a tool bar are explained with the case using a tool bar for an example.

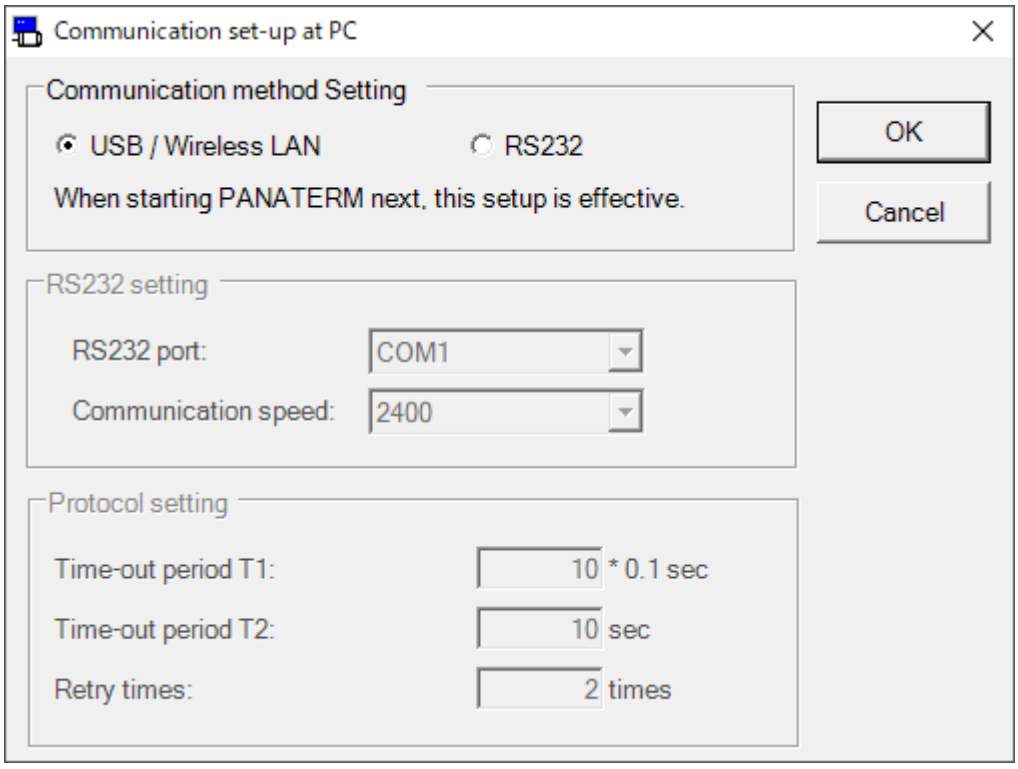
Communication set-up at PC screen

In a communication setup at PC screen, communication between driver and PANATERM is set up.

Note) Usually, please use initial setting. This setup becomes only the PC side and is not reflected in the driver side. Please be careful.

Open the Communication setup at PC window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “File” > “Setting” > “Communication with the driver” is selected on the menu bar on the main screen.
3 The Communication setup at PC window is opened.



“OK” : Selected items are determined.
“Cancel” : Exits the screen without reflecting the selected contents.

Communication method setting

Connection with driver select from “USB / Wireless LAN” communication or “RS232” communication.
When starting PANATERM next this setup is effective.

RS232 setting (When “RS232” is selected)

“RS232 port” : Initial value of the communication port at the time of automatic search is selected.

“Communication speed” : Initial value of the communication speed at the time of automatic search is selected.

Notes 1) Since the connection setup newest by this setup is memorized when it is under connection by RS232 communication, it cannot select except a setup in use now.

Protocol setting (When “RS232” is selected)

“Time-out period T1” : Specify timeout T1 between characters in 0.1 seconds.

“Time-out period T2” : Specify timeout T1 between protocols in seconds.

“Retry times” : Specify the number of communication retrials.
Setting range is from 1 to 8 times.

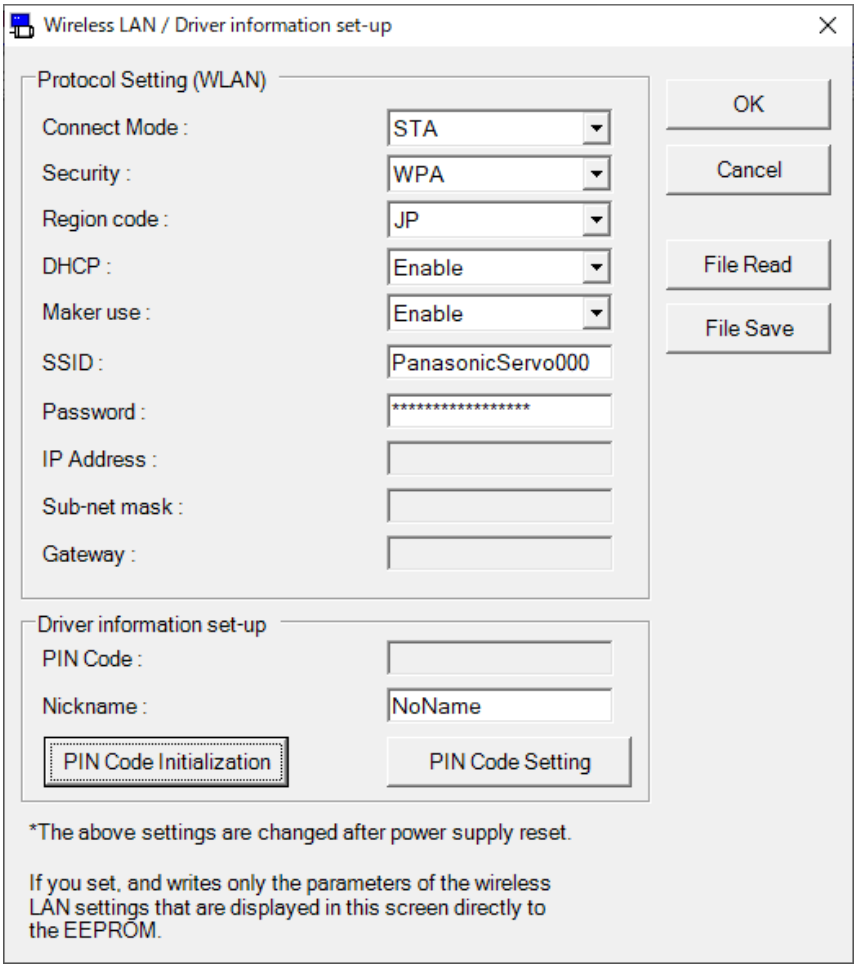
Wireless LAN / Driver information set-up screen

In the Wireless LAN / Driver information set-up screen, you make the setting of the wireless communication between PANATERM and the driver.

Note) To establish wireless communication, you must make wired connection to the driver and make wireless settings such as the IP address and PIN code on this functional screen beforehand.
Note that different drivers require different settings.

Open the Wireless LAN / Driver information set-up window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “File” > “Setting” > “Wireless LAN / Driver information set-up” is selected on the menu bar on the main screen.
3 The Wireless LAN / Driver information set-up window is opened.



Protocol Setting (WLAN)

Make the setting of the wireless connection.

“Connect Mode” Set the connection method for the wireless communication.
Select “STA” when you use wireless communication.

“Security” Set the encryption method.
Select “WPA” or “WPA2” depending on the setting of the computer and the access point.
Note) When using WPA, update the key in about 2 minutes to ensure security.

“Region code” Select the region in which this device is used.
JP : JAPAN CN : CHINA US : U.S.A.
TW : TAIWAN KR : KOREA

Note that setting a wrong region code is against the law.

“DHCP” Specify whether the DHCP protocol is used or not.
When DHCP is enabled, the setting of the IP address and other parameters are automatically allocated from the access point to connect to.
When DHCP is disabled, you must make the setting of the IP address and other parameters manually.

“Maker use” Do not change this setting.

“SSID” Set the SSID of the wireless connection access point. The configured SSID must coincide with that of the access point to connect to.
Use only single-byte characters.
Valid number of characters : 8 to 32
Valid characters : 0–9, a–z, A–Z, -, _

“PWD” Set the password of the access point to connect to.
The configured password must coincide with that of the access point to connect to. Use only single-byte characters.
Valid number of characters : 8 to 32
Valid characters : 0–9, a–z, A–Z, -, _, !, @, #, $, %, ^, *, ,, ., /

“IP Address” Set the IP address used for the wireless connection.
This parameter can be set when DHCP is disabled.

“Sub-net mask” Set the subnet mask used for the wireless connection.
This parameter can be set when DHCP is disabled.

“Gateway” Set the default gateway used for the wireless connection.
This parameter can be set when DHCP is disabled.

Driver information set-up

Set the driver information for wireless communication.

“PIN Code”	This field displays the PIN code that is required for wireless connection. This field is empty if a PIN code is not set, or displays “********” if a PIN codes is set. To set a PIN code, click “PIN Code Setting”.
“Nickname”	You can set any driver nickname, which appears on PANATERM. The nickname displays “NoName” if it is not set. Valid number of characters : 1 to 8 Valid characters : 0–9, a–z, A–Z, -, _
“PIN Code Initialization”	This action initializes the current PIN code. You can initialize the PIN code only through wired connection.
“PIN Code Setting”	This item displays the “PIN Code Setting” screen for PIN code setting. The PIN code must be a single-byte 8-character string. The PIN code must include at least one single-byte uppercase letter, one single-byte lowercase letter, and one single-byte numeric. Wireless communication does not start if an invalid PIN code or no PIN code is set.

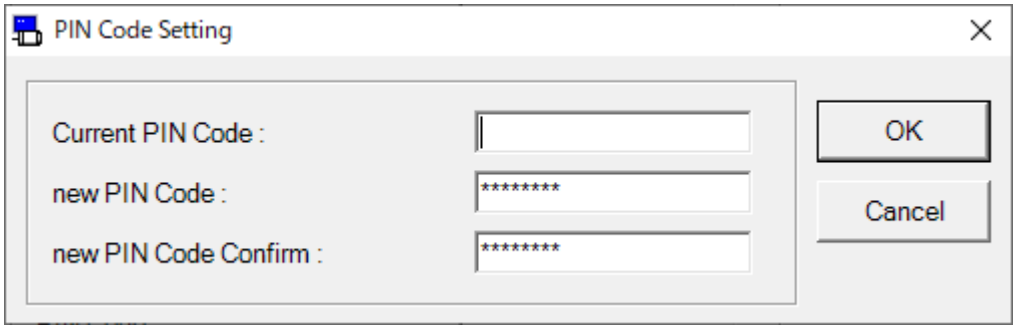
“OK”	: The setting is enabled and written into EEPROM.
“Cancel”	: The setting is not enabled and the screen is closed.
“File Read”	: Wireless settings are loaded from a file (.prw5). However, no PIN code is loaded.
“File Save”	: The current wireless settings are saved in a file. Note that this command saves the data entered on the screen, not the data configured in the driver.

Procedure of wireless setting

1 In “Protocol Setting (WLAN)”of the Wireless LAN / Driver information set-up screen, make wireless settings of “Connect Mode”, “Security”, “Region code”, “DHCP”, “SSID”, and “PWD” in accordance with the setting of the access point.
Set any values for “Driver information set-up” and “Nickname”

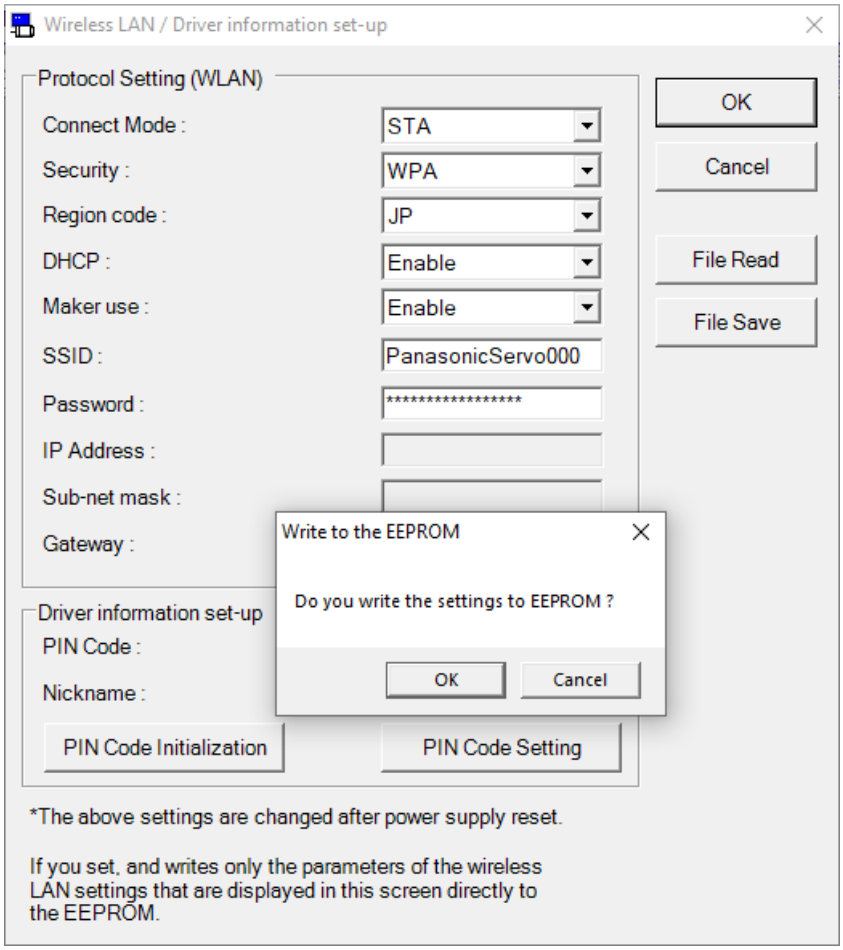
2 Click “PIN Code Setting” to display the PIN Code Setting screen.

3 Make the PIN code setting in the PIN Code Setting screen and click “OK”. The setting is enabled and the PIN code setting screen closes.



* An error message is displayed if you set an invalid PIN code.

4 Click “OK” in the Wireless LAN / Driver information set-up screen after the PIN Code Setting screen closes. The following confirmation dialog box is displayed.



5 Click “OK” in the confirmation dialog box to write the setting into EEPROM and close the Wireless LAN / Driver information set-up screen.

6 Close PANATERM and power off the driver.
The wireless connection setting of the driver is completed.

Notes 1) Wireless communication does not start if an invalid PIN code or no PIN code is set.
If you forget the PIN code, initialize the PIN code through a wired connection and set it again.
Notes 2) The Wireless LAN / Driver information set-up screen is not displayed for a RS232 connection. To make wireless settings, switch the communication method by selecting “USB / Wireless LAN” in the Communication set-up at PC screen of the computer.
Notes 3) The Wireless LAN / Driver information set-up screen is not displayed for a driver that does not support wireless LAN. For wireless setting, select a driver series that supports wireless connections.
Notes 4) Do not power off the driver or computer while data is written into EEPROM. The validity of the written data is not guaranteed if the power is turned off during data writing.
Notes 5) The new wireless settings are not enabled until they are written into EEPROM and the power is reset.
Notes 6) If you change the wireless settings during an active wireless connection, automatic connection establishment may fail next time you turn on the power. In such a case, select a connected-to driver again in the screen for selecting a driver to be connected.
Notes 7) Be careful not to be seen when you enter a PIN.
Notes 8) Encrypt the communication on the network to prevent third party intrusion. Disconnect the device from the network when the device is compromised.

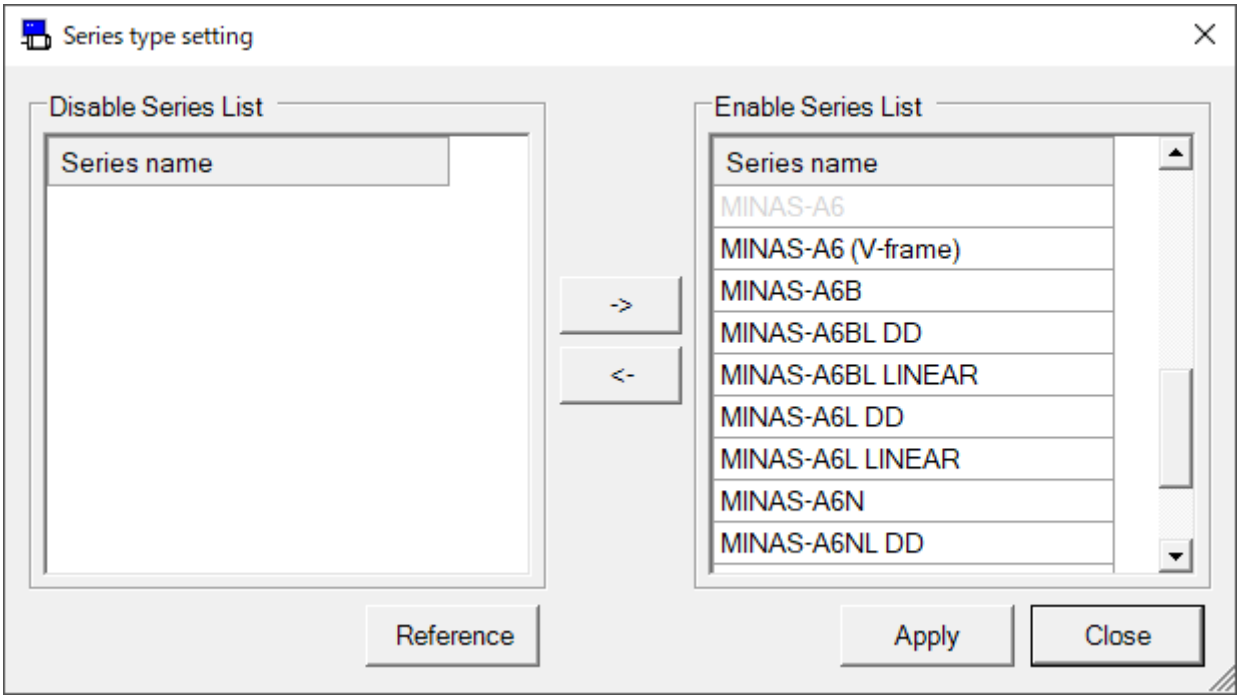
Series type setting screen

In a series type setting screen, you can use the driver of other series by adding a series definition to PANATERM.

Note) Please use the default setting normally.
For more information, please contact a distributor.

Open the Series type setting window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “File” > “Setting” > “Series type setting” of the menu bar on the main screen.
3 The Series type setting window is opened.



“->” : Move selected series in “Disable Series List” to “Enable Series List”.
“<-” : Move selected series in “Enable Series List” to “Disable Series List”.
“Reference” : You can add a new series to “Enable Series List” by referring to series definition file on the PC.
“Apply” : Apply the changes of the series definition setting.
“Close” : Close the series type setting window.

Enable Series List

The available series are displayed.
If you double click a series in this list or select series and click “<-” you can move it to “Disabled Series List”.

Disable Series List

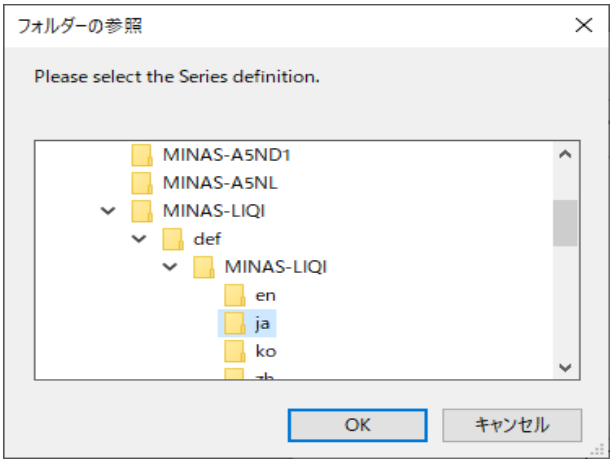
The unavailable series are displayed.
If you double click a series in this list or select series and click “->” you can move it to “Enabled Series List”.

Close the Series type setting window

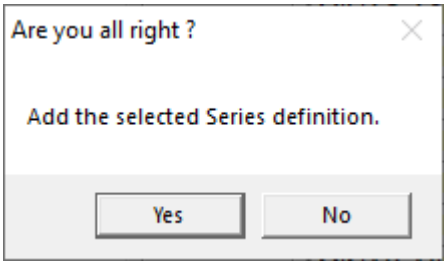
Click “Close” button or button at top right of the screen.
If you do not run "Apply" after changing the series definition, the exit confirmation dialog is displayed.

Adding and updating of the series definition by reference

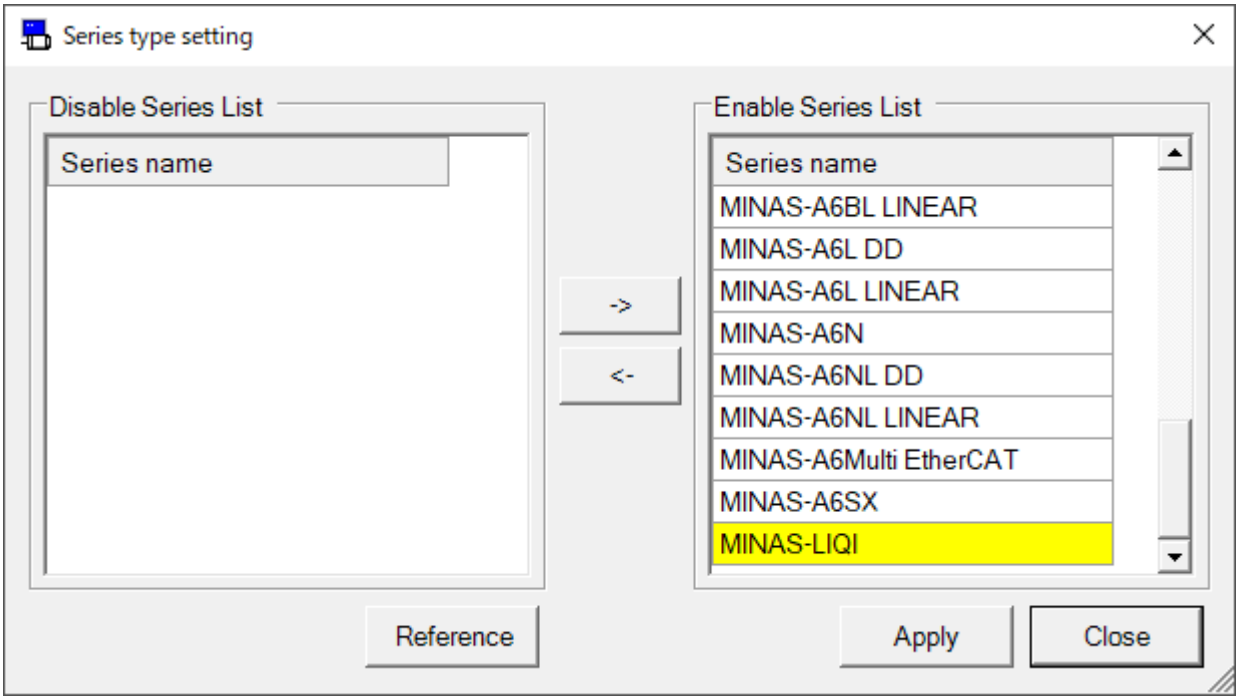
1. If you click "Reference", the Browse For Folder dialog box is displayed, and you can select folder.



2. Click “OK” after selecting the folder.
   If selected folder has a series definition file then a confirmation dialog is displayed.
   Click “Yes” then the series definition file is added.

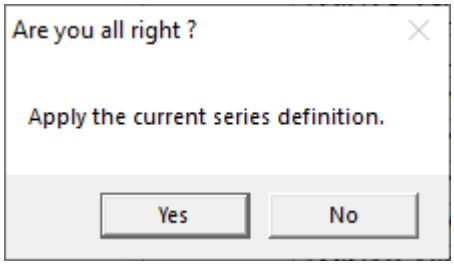


3. If adding a series definition is success, “Enable Series List” will be updated.



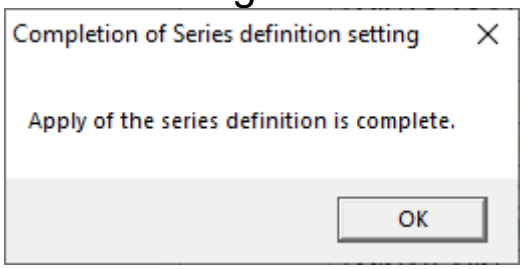
* The background color of the series definition that you added or updated will change.

4. Click “Apply”, in order to enable changes of the series definition.
If you change the series definition, the confirmation dialog will be displayed.
Click “Yes” then apply changes of the series definition.

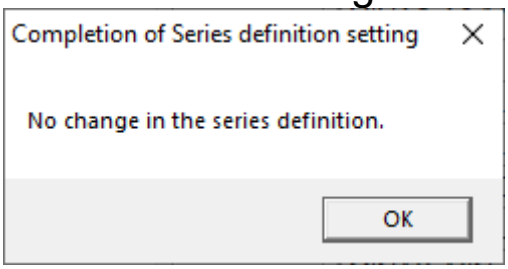


5. Completion of Series definition setting dialog will be displayed.

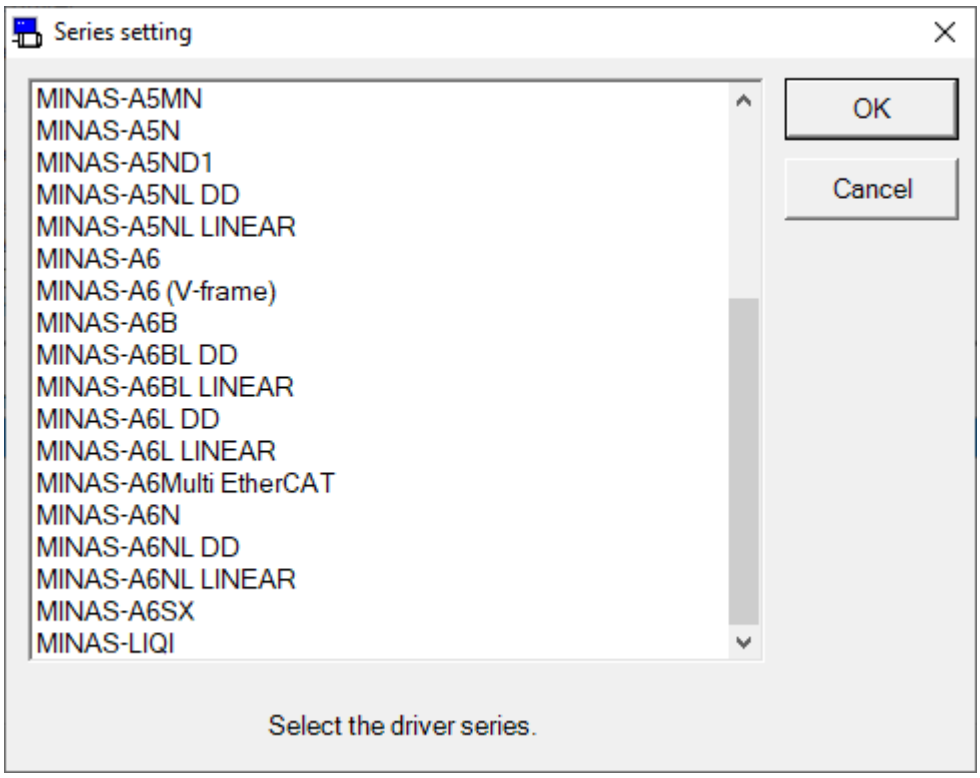
< When changed >



< When not changed >



6. The series that have been added are available for selection in the series setting screen.



Notes 1) You cannot delete the MINAS-A5 series, which is a standard model. However, update by “reference” is possible.
Notes 2) You cannot delete or update current selected series.
If you want to delete or update current selected series, please retry after switching to the other series.
Notes 3) The series definition in “Disable Series List” with a yellow background color does not exist in the installation folder of PANATERM.
So, if you delete that series, it will not be displayed “Disable Series List”. If you do not have a backup, you cannot restore.
Notes 4) When you update a series definition, some of the previous settings are initialized.

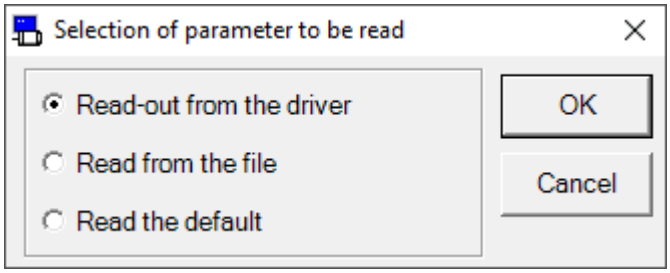
Parameter screen

In a parameter screen, parameter check of drivers, modification of parameters, saving parameters into files and some other operations on parameters are available.

Note) Please modify parameters with enough care after reading the driver's instruction manual or technical reference carefully, as some parameters give large effect to operations of drivers or motors.

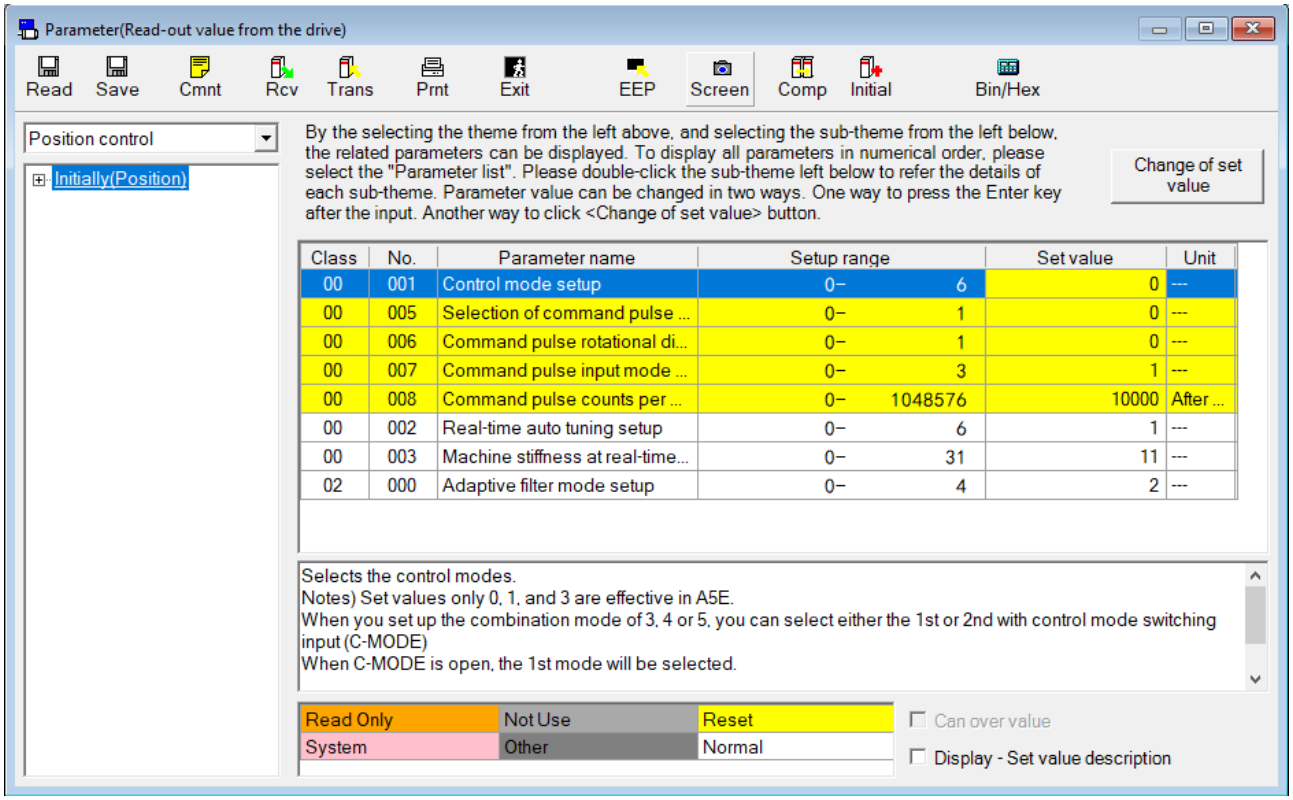
Open the Parameter window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Parameter” of the tool bar on the main screen.
3 Selection of parameter to be read window is displayed.



4 Select the origin of parameters, and click.
□“Read - out from the driver”
The parameters set in the driver are read communicating the driver connected. If this mode is selected, modifications of the parameter values are reflected to the driver immediately.
□“Read from the file”
Parameter files already edited (.prm5) are read. Parameter modifications are not reflected to the driver connected unless “Transmit the parameter to the driver” is executed when they are “Read from the file”.
□“Read the default”
Default set values saved at the time of installation is read. The parameter modifications are not reflected unless “Transmit the parameter to the driver” is executed as the case of “Read from the file”.

5 Click “OK”. The Parameter window is opened.

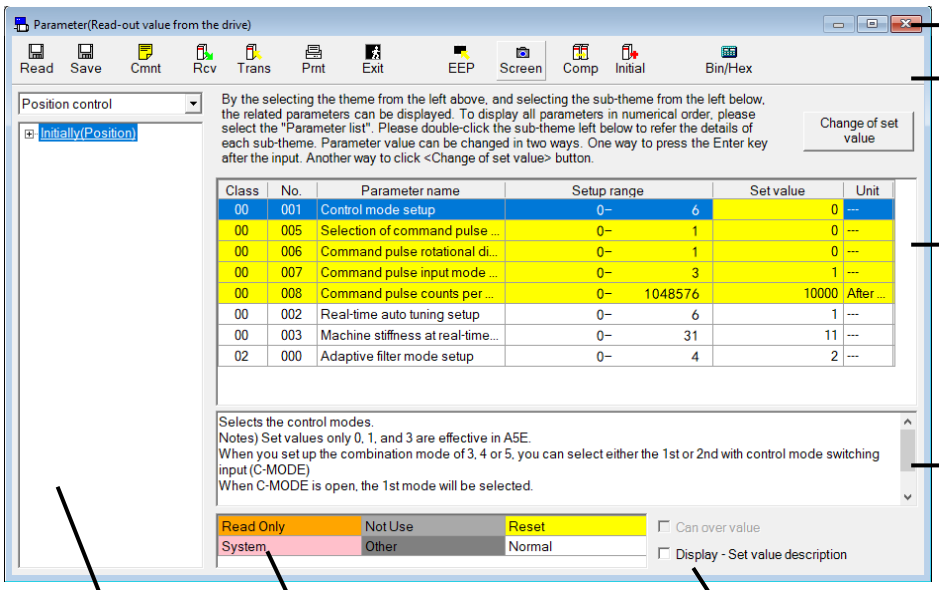


Close the Parameter window

Click

(Exit) on the tool bar.

Structure of Parameter screen



(1) Title bar

The origins of reference of parameters reference are displayed.
Following buttons are used to operate windows.

	Display the window in full screen
	Close the window

(2) Tool bar

Saving, reading, some other basic operation commands on parameters are listed.

	(Read)	Reads parameters from files (.prm5). When this button is effective, a parameter file can be specified by drag and drop.
	(Save)	Writes parameters to files (.prm5).
	(Comment)	Makes comments attached to parameters files.
	(Receive)	Receives parameters from the driver.
	(Transmit)	Sends parameters to the driver.
	(Print)	Prints parameters.

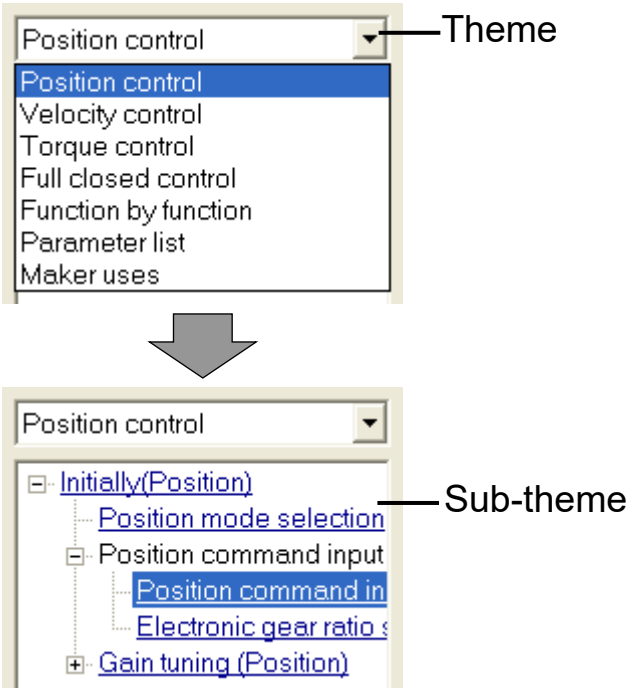
Exit	(Exit)	Closes parameter screen.
EEP	(EEPROM)	Write parameters to EEPROM of the driver.
Screen	(Screen)	Captures the screen and save into a file.
Comp	(Compare)	Compares parameters on editing with other parameters.
Initial	(Initialize)	Initialize parameters of the driver.
Bin/Hex	(Binary/ Hexadecimal)	Enter the number of binary and hexadecimal values of the selected setting.

(3) Theme selection

If the parameter classification is selected from the sub theme, related parameters are indicated in the parameter setting field.

The Help indicated by double clicking the underline of the sub theme.

Please refer to the manual of drivers or technical reference regarding the details of sub theme.



(4) Parameter setting field

Editing and setting of parameters are available.

“Class”	Parameter classifications are indicated.
“No.”	Parameter numbers are indicated.
“Parameter name”	Parameter names are indicated.
“Setup range”	Maximum & minimum value of parameter setting is indicated.

“Set value”	Parameter value. Its value can be modified. Parameters with on the set values are set with the combo boxes. After selecting the values from the combo boxes, input the [ENTER] key or click (modification of set value). Parameters without on the set values, are inputted with the number keys directly, or modified clicking and changing the values. To set the values, input the [ENTER] key or click (modification of set value). If the [ESC] key is inputted, the value is return to the original one.
“Unit”	Units of the parameter set values are indicated.

(5) Text indication box
Explanations regarding selected parameters.

(6) Parameter attributes explanation
Explanations regarding of parameter attribute. Back ground colors of parameters indicate the attributes.

(7) Can over value
Without communication with drivers, if a check mark is inputted on “Can over value”, settings out of bounds can be available. Setting with combo boxes is not available with check mark on “Can over value”.

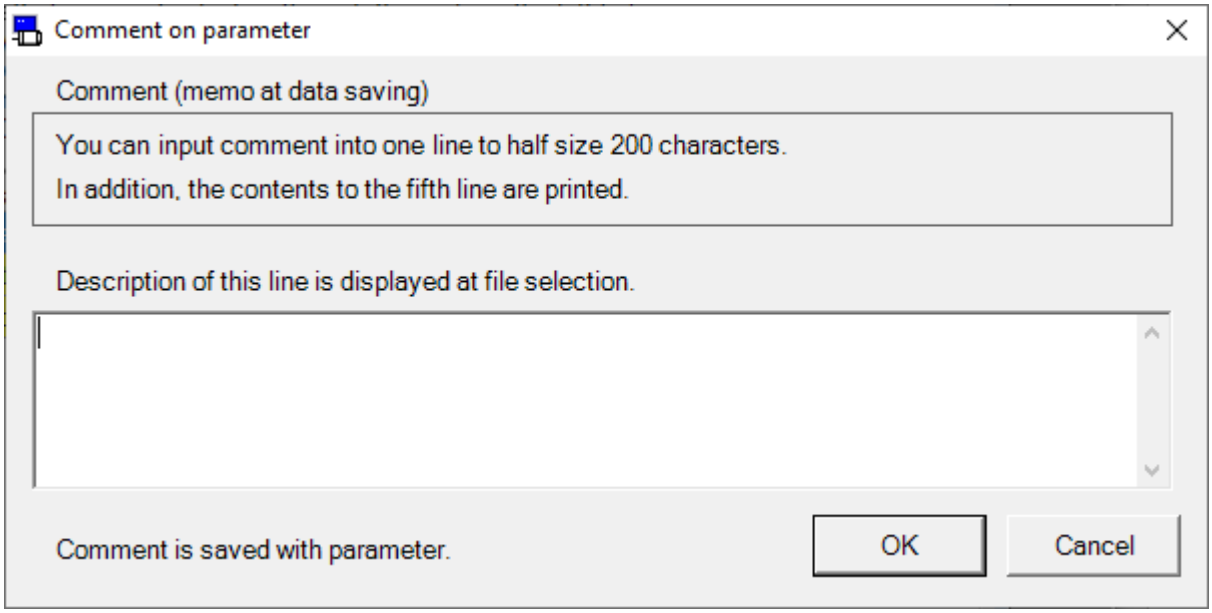
(8) Display - Set value description
The combo box and the decimal point are displayed when checking it. You can display more details of the parameters, when check on “Display - Set value description”.

Comment

On saving set parameters in a file, comments can be saved together. These comments do not effect operations of the driver.

Making Comment

1 Click Cmnt (Comment) on the tool bar, and open the comment window.



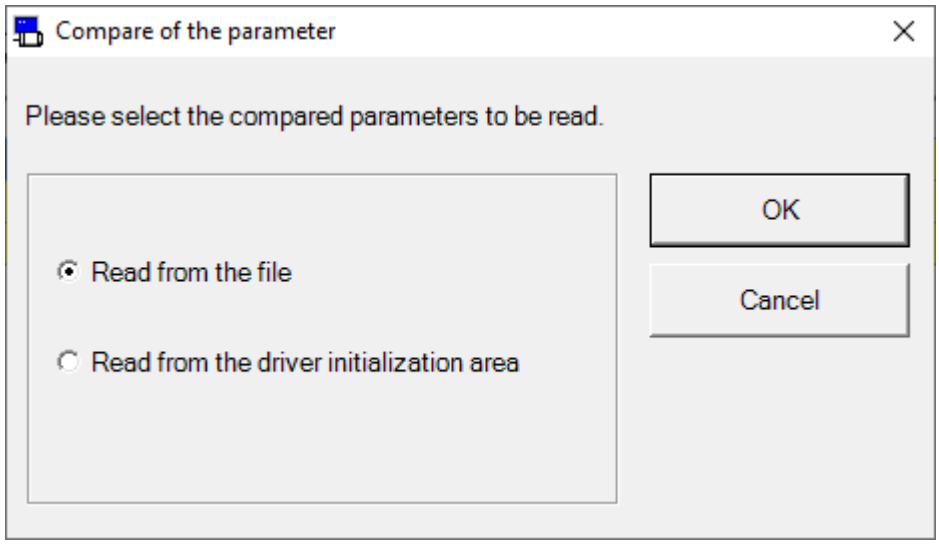
2 Click comment box and input comments.
3 After completing comment input, click “OK”.

Comparison

Parameters being edited can be compared with other parameters.

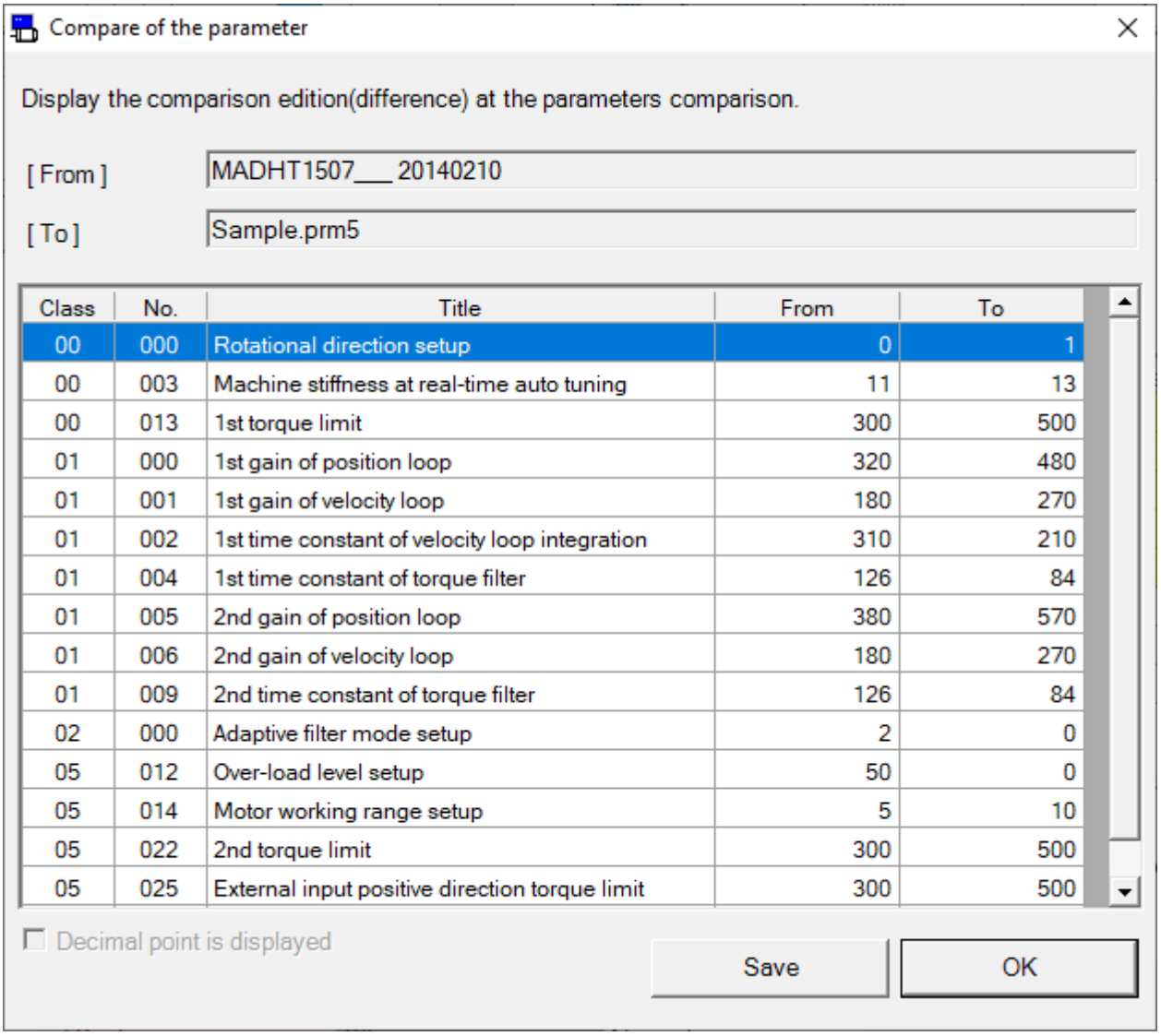
Comparison of parameters

1 Click Comp (Comparison) on the toolbar, and open the parameter comparison window.



2 Select “Read from the file” or “Read from the driver initialization area”, and click “OK”.
In case “Read from the file” is chosen, please select the file (.prm5) to be compared.

3 Comparison result of parameters is displayed.



4 Click “Save”, comparison result of parameters can be saved at a file.

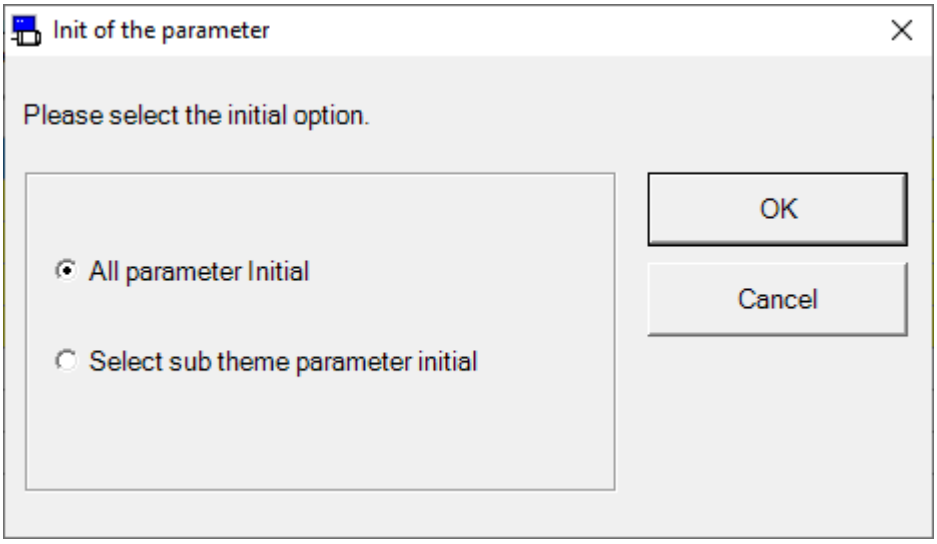
Initialization

Parameters can be initialized to the default values. The initialized parameters are written to also the EEPROM. To save current parameters, please save the parameters before initialization.

Initialization of parameters

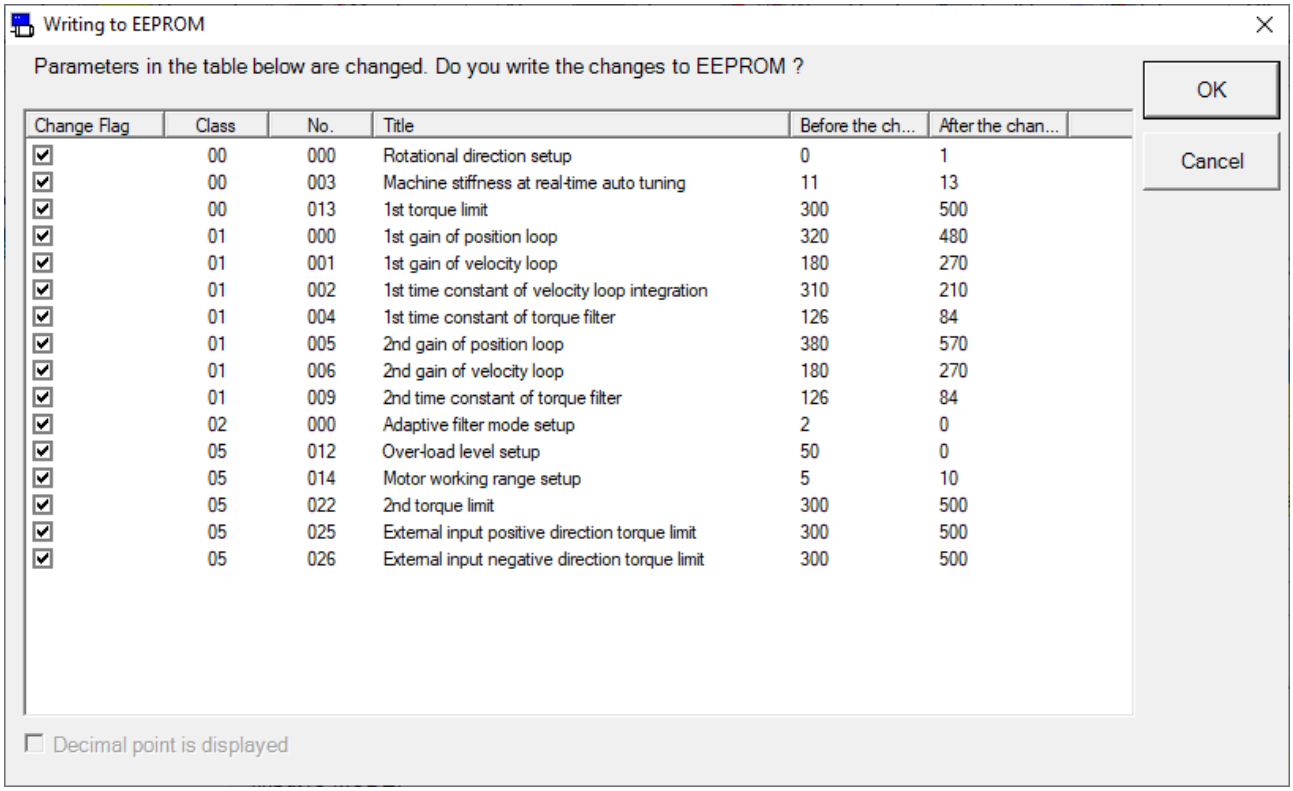
1 Click

(Initialization) and open the initialization window.



2 Select “All parameter initial” or “Select sub theme parameter initial”, and click “OK”.

3 Set “Change Flag”.



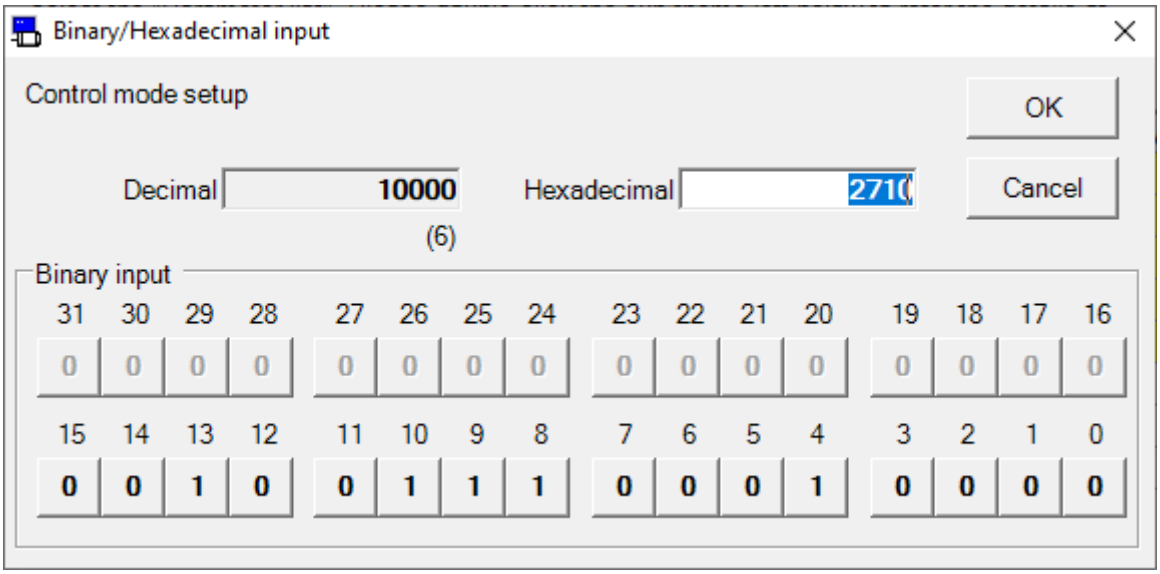
4 Click “OK” Button.

Binary/Hexadecimal

You can enter binary or hexadecimal values for the selected parameter.

Entered in binary/hexadecimal

1 Click Bin/Hex (Binary/Hexadecimal) and open the Binary/Hexadecimal input window.



2 When you enter hexadecimal numbers, please press the [ENTER] key after typing. When you enter binary numbers, please press the button for corresponding to each bit.

* If you enter beyond the parameter ranges is displayed within the limited value of the bottom of the decimal.

3 After completing value input, click “OK”.

Notes 1) Please refer to the manual of the driver or technical reference for details of each parameter's function and so on.
Notes 2) Even if parameters are sent to the driver, parameters are turned to the original value before modification if the power supply of the driver is turned off without writing to EEPROM of the driver. Parameter modifications list are displayed on EEPROM writing. Please check the modification carefully.
Notes 3) Do not turn off the power supply of the PC during writing to EEPROM of the driver. Data context cannot be guaranteed if the power supply is turned off during writing.
Notes 4) Some parameters become valid after modifications to the new data, writing EEPROM, and power supply reset. (On inputting, that issue is displayed. Please refer to the manual of the driver or technical reference and confirm on the objective parameters)
Notes 5) Parameter screen indication may be different from the actual parameter value of the driver in case PANATERM function windows which change the parameters (ex. Trial Run, Pin Assign, Analog Input) is opened. In such case, press the reception button and update the parameter of the driver to the latest one.
Notes 6) The parameter screen cannot open during opening some screens. For more information please refer to page 224 "Parameter screen behavior".

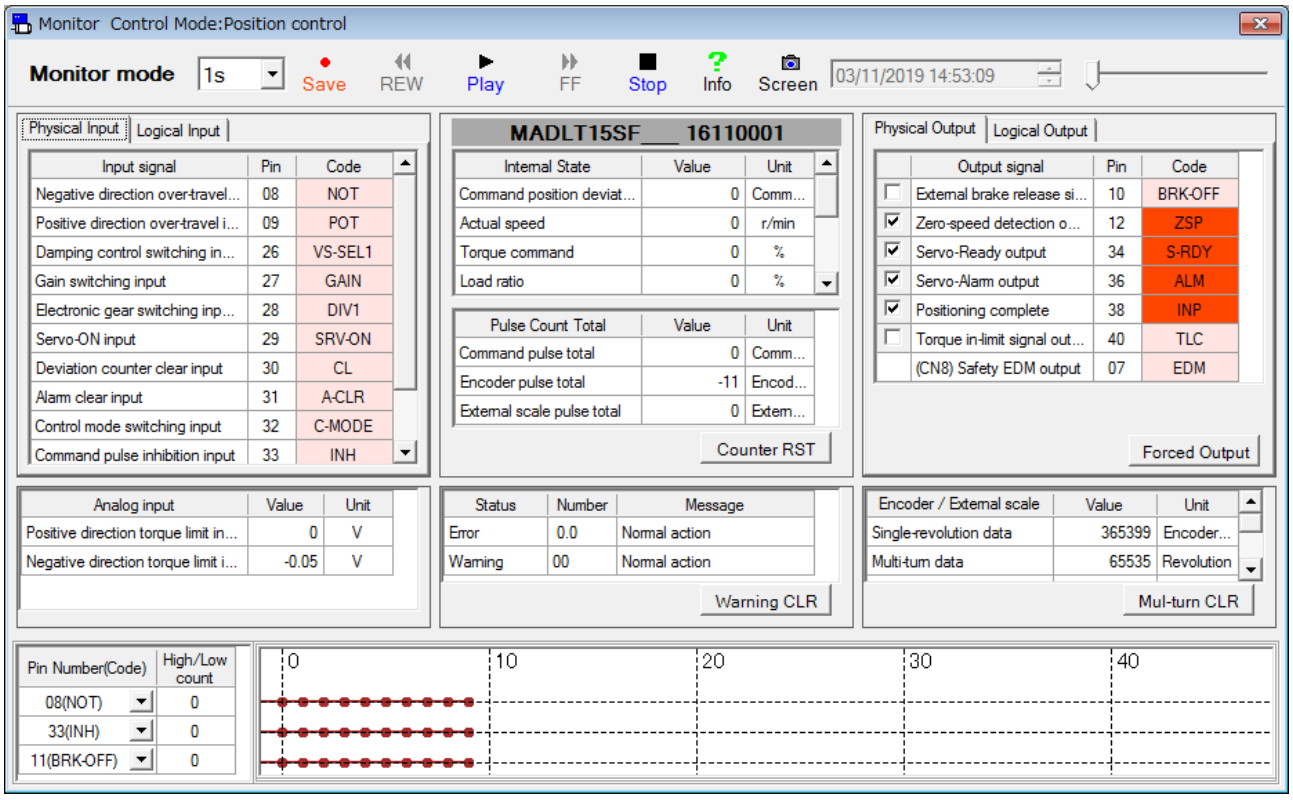
Monitor screen

You can display and check the operation conditions of Driver and motor, in - out put signal and internal status. And you can record the monitoring data in long times and play it back on the screen.

Note) When you use RS232 communication with the communication speed of less than 4800 bps, please do not make a monitor cycle into 1 second.

Open the Monitor window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Monitor” of the tool bar on the main screen.
3 The Monitor window is opened.

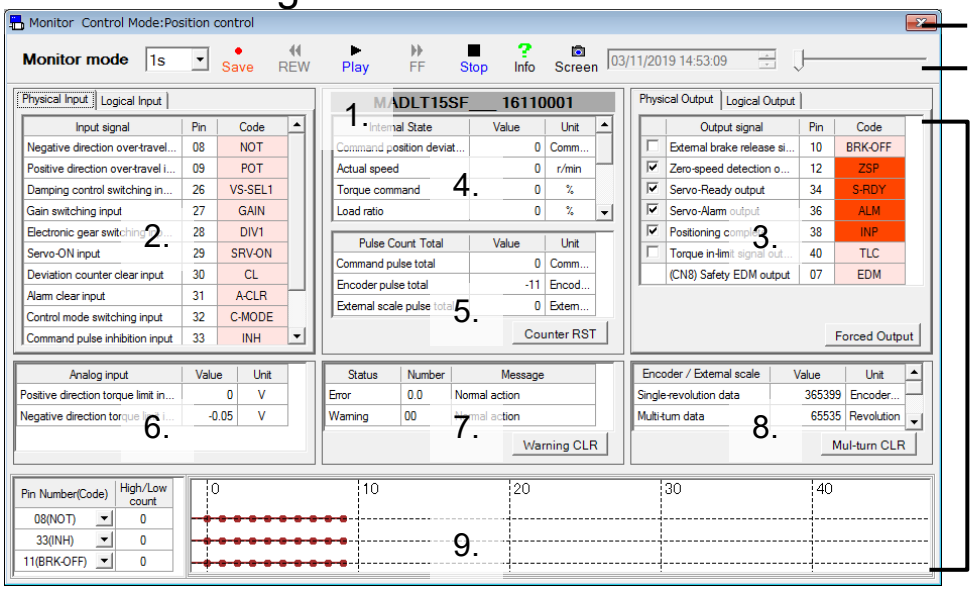


Close the Monitor window

Click ☒ of upright on the window.

Structure of Monitor screen

Indication of signal name is different in the motor model.



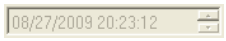
(1) Title bar

Control mode is displayed. You can operate window.

(2) Log function

You can record log of monitoring contents and play it back.

Monitor mode	(Display of operating conditions)	Display the log operating function.
1S	(Setting the communication of Opening time)	Set the communication of opening time between Driver and PC. You can chose 1s, 5s or 10s.
Save	(Start Log file output)	Start Log file output.
REW	(Rewind)	Rewind log file which is playing it back. You can shoes 2 times, 4 times, 8 times or 16 times.
Play / Pause	(Play back) /(Pause)	Select Log file and play back/stop. When this button is effective, a log file can be specified by drag and drop.
FF	(Fast forward)	Fast forward Log file. You can choose two times, 4 times, 8 times or 16times.

	(Stop)/(Start)	Stop/Restart of Monitoring operation. When you record Log and restart it, Record and restart is finalized.
	(Information)	The relevant page of the operating instructions for driver. (Only MINAS-A5 is supported)
	(Screen)	Captures the screen and save into a file.
	(Display of Time)	Display the present time. When you are play it back, recorded time is displayed.
	(Slider)	Display the present time in all log data.

(3) Monitoring Contents display area
Display monitoring information.

1. Driver Model name / Driver Serial Number
   Display Driver Model name and Serial Number.
2. Input signal conditions monitoring
   Display input signal condition. Using tab, you can select “Physical Input” and “Logical input”.
   Display Input signal condition to Physical Input - Driver.
   Red : COM (-) connection
   Pink: Open
   Logic input - Display signal condition of Driver.
   Red : Active
   Pink: Inactive
3. Output signal condition monitoring
   Display output signal condition. By using Tab, you can switch “Physical output” and “Logical output”.
   Physical output
   Display output signal condition from Physical output - Driver.
   Red : Output Transistor ON
   Pink: Output Transistor OFF
   Logical output
   Display Signal condition of Logical output - Driver Internal part.
   Red : Active
   Pink: Inactive

4. Internal State Monitoring
   Display the internal condition of Driver.
5. Pulse Count Total monitoring
   Display the Pulse count total of Command / Encoder / External Scale taken in by driver.
   “Counter RST” is toggle Button, with a timing of counter reset, PANATERM is recording 3 pulse count total as offset value and then, after that this shows value deducting this offset value. If you again click it, Offset value is clear and display the Pulse count total itself from original driver.
6. Analog input Monitoring
   Display the electric voltage value of Analog input.
7. Alarm / Warning Monitoring
   Display present alarm and warning of driver.
8. Encoder / External Scale information monitoring
   Display Encoder/External scale information.
   If you click “Mul-turn CLR”, Multi-turn data recorded by encoder is clear to 0, and all encoder error shall be cleared.
   Note) Please refer to the remarks when you use multi-turn clear. And it is necessary for you to restart when you clear the encoder error.
9. Digital input / output signal monitoring
   Display up to 3 the physical input / output signal’s changed number of times.
   As driver is counting changed number of times, you can find the shorter changed signal than communication intervals on monitor screen.
   Note) Standardly display signal level, display more than 2 times changed signal on communication interval in the red square.
   Note) If the display is not updated in time, it will be displayed at a low level.

Forced Output Button

When this button is pushed, and OK button is pushed with Dialogue of confirmation, is shifts to the Input / output confirmation mode. In the case of standard type, the front panel display is fixed to the monitoring display input / output display.
You can check only in Input / output confirmation mode. If you input Physical input, the driver is not operative. And against Physical output, with left check box, you can compulsorily turn On/Off the output signal.

Note) If you need the driver of Input / Output confirmation mode to be returned to the standard conditions, you shall restart the driver.

Notes 1) Using USB communication or RS232 communication as data receipt between Driver and PC, there are accidental errors, delay of display value on the screen, recoded monitoring value, and time on the log file and actual driver value and recoded time.
Notes 2) There are accidental errors of recoded time between monitoring display, recoded log file and many data in a time. If you need more detail information, please refer to the wave graphic.
Notes 3) The (+) and (-) symbols are not displayed even if the polarity is present.
Notes 4) Monitoring function is not precious measurement instrument. Monitoring display shall be used as rough estimate.
Notes 5) The monitor screen cannot open during opening some screens. For more information please refer to page 225 “Monitor screen behavior”.
Notes 6) Physical input and physical output signal names are displayed according to the current parameter settings.

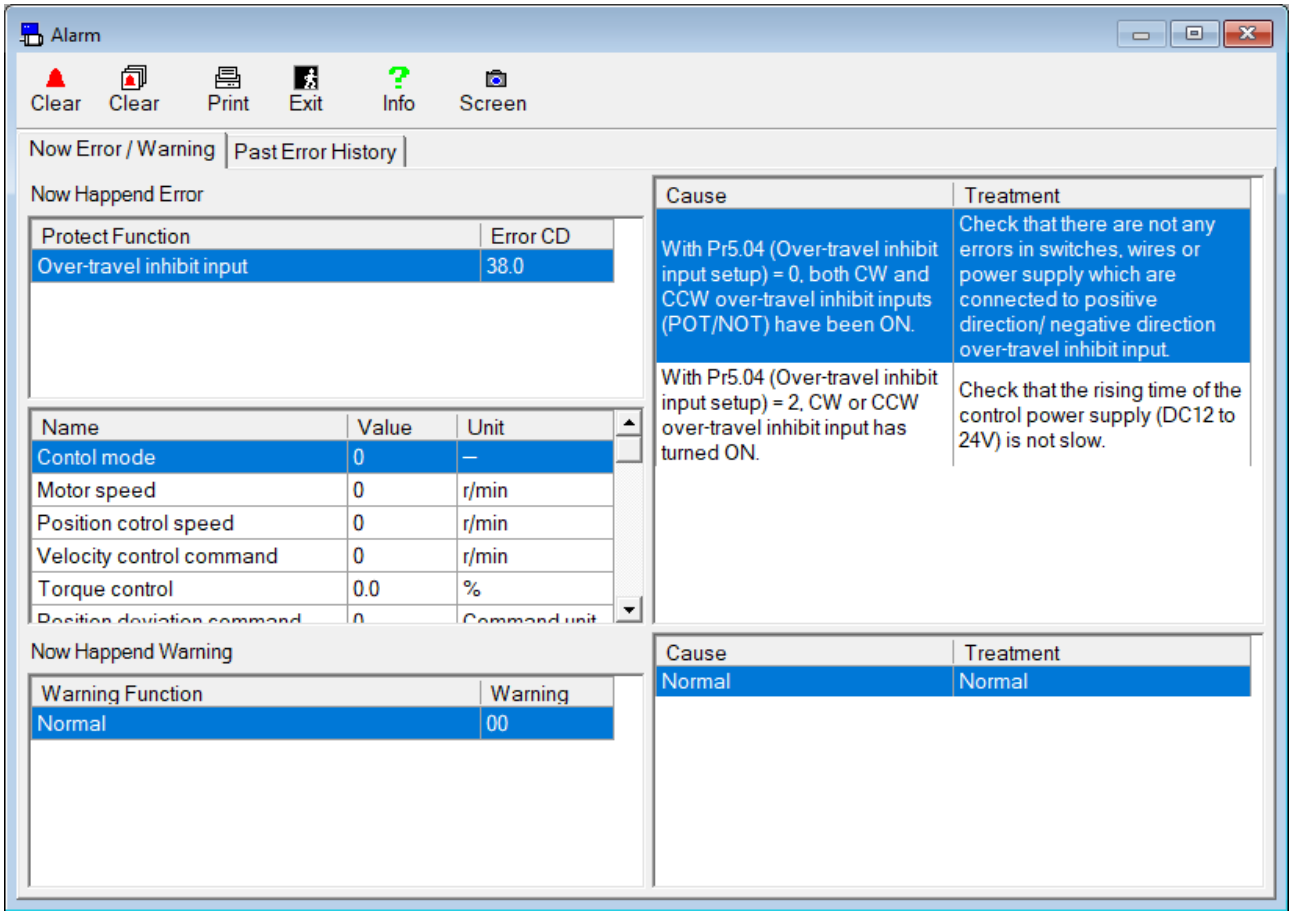
Alarm screen

In case that driver's front panel LED is flashing like that Motor is not operative etc., you can check the error conditions.

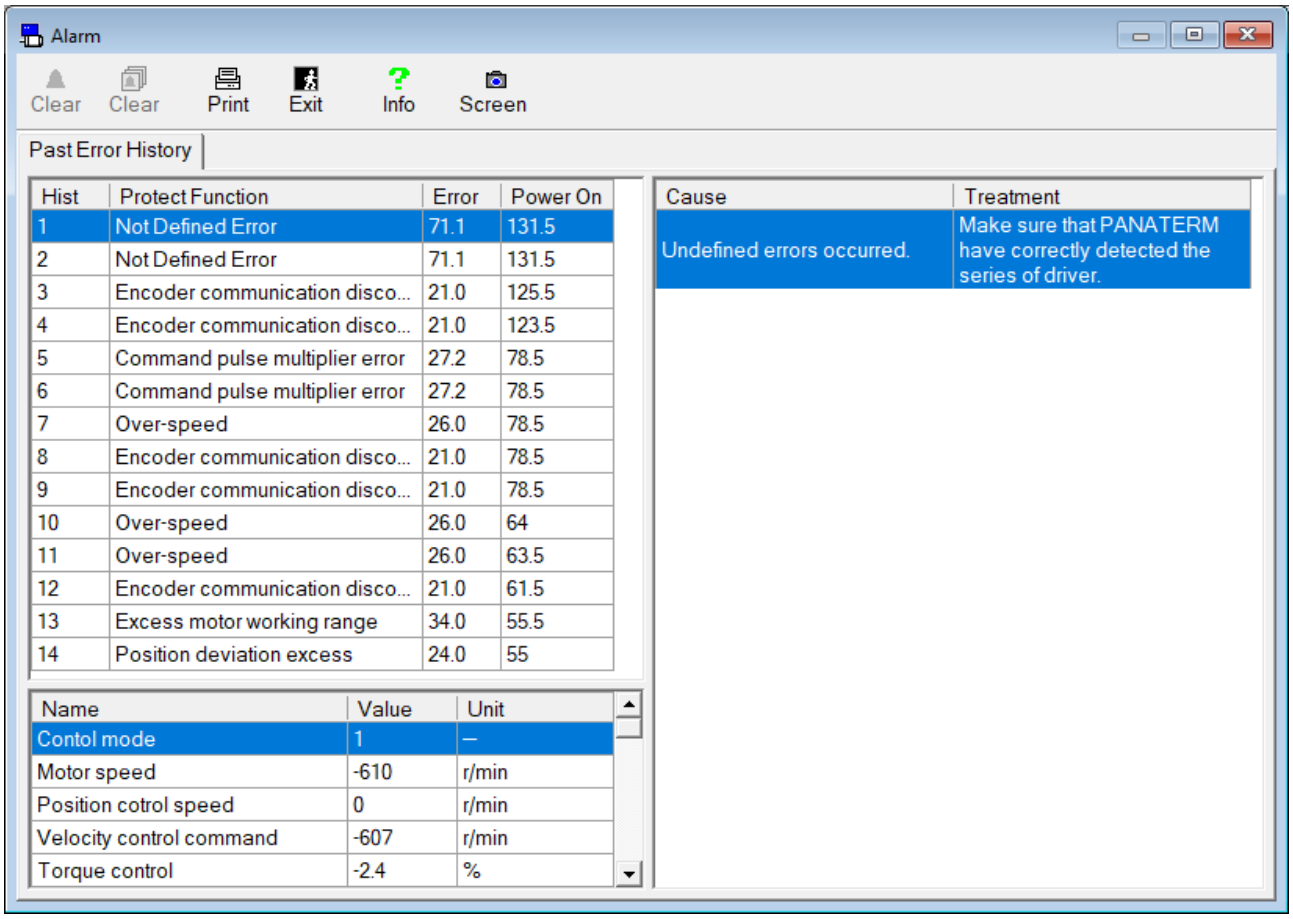
Open the Alarm window

1 Start "PANATERM".
(Please refer to Article 5. Start up and Close down in details)
2 Click "Alarm" of the tool bar on the main screen.
3 When not communicating with driver, the selection screen of a parameter is displayed. Please select the parameter file saved when alarm was reported.
4 The Alarm window is opened.

<When communication with driver>



<When not communication with driver>



Close the Alarm window

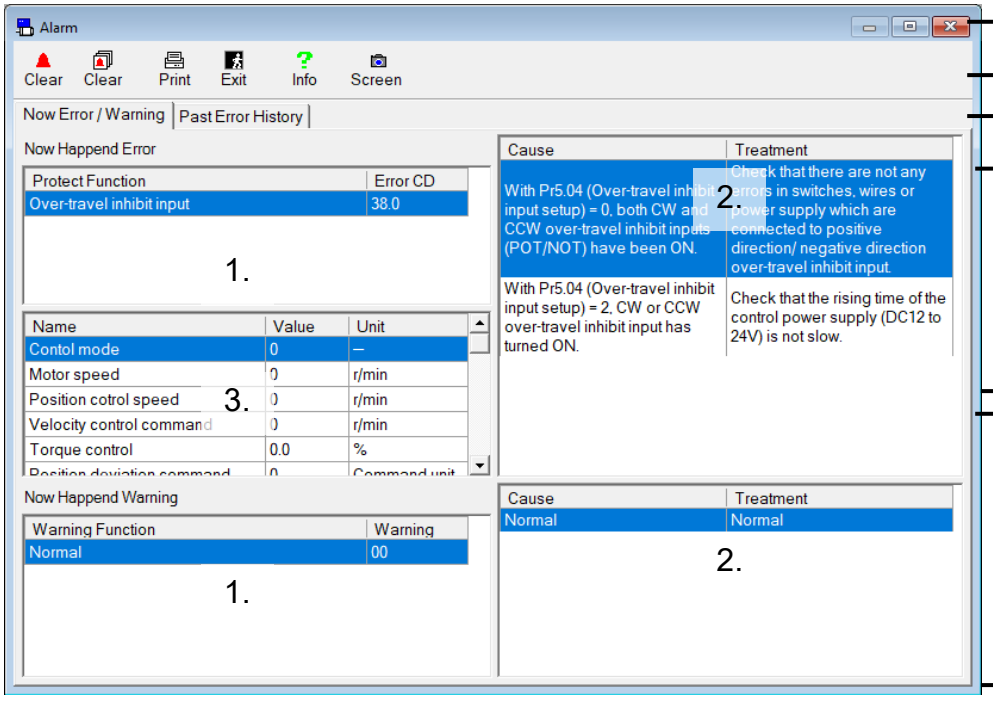
Click

(Exit) on the tool bar.

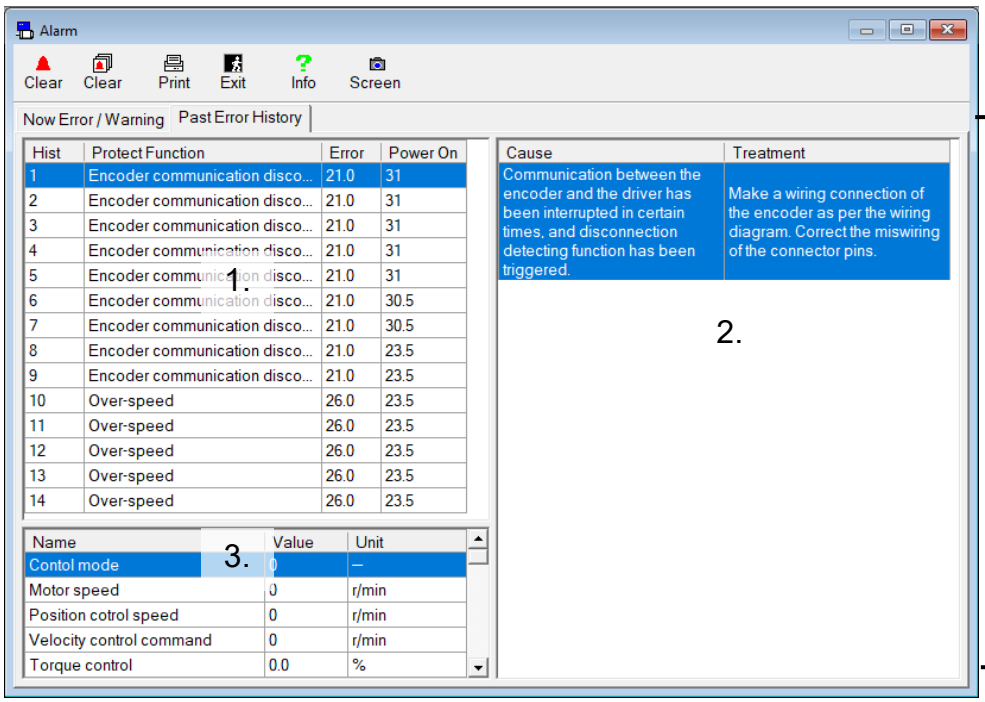
Structure of Alarm screen

Now Happened Error / Warning display

This is displayed when communication with driver only.



Past Error History display



(1) Title bar
You can operate this window.

(2) Tool bar

	(Alarm clear)	You can clear the present error. Removing the cause of errors, you click this button, present error is clear and it operates correctly. However, you cannot delete the error that you cannot clear by alarm clear input signal. Please turn off the driver and remove the cause of error, please turn on the electric power again.
	(Record clear)	You can delete error record.
	(Print)	Print out the information about the errors.
	(Exit)	Close the Alarm window.
	(Information)	The relevant page of the operating instructions for driver. (Only MINAS-A5 is supported)
	(Screen)	Capture the screen and record the screen into the file.

(3) Tab

Switch the display of “Now Error / Warning” and “Past Error History”

(4) Now Happened Error display area

1. Display present all happening error numbers and names. Displayed error on the top is an error displayed on the front panel.
2. Display the selected error’s causes and countermeasures.
3. Display the motor internal conditions on the selected alarm happening.

(5) Warning display area

1. Display all present happening warning numbers and names.
2. Display selected warning causes and countermeasures.

(6) Error record display area

1. Display error record order, error number and error names.
2. Display the selected error causes and countermeasures.
3. Display the motor internal conditions on the selected alarm happening.

Notes 1) There are some errors, which is tripped, but is not left as error record. Please refer to the driver manual or technical reference.
Notes 2) Error records are saved up to 14 times. If errors happen over 14 times, oldest record is deleted in order.
Notes 3) Internal conditions of motor is recorded up to 3 times on alarm happening. When the alarm is generated immediately after turning on of the power supply, an internal state of the motor might not be able to be acquired standardly.
Notes 4) The alarm screen cannot open during opening some screens. For more information please refer to page 226 “Alarm screen behavior”.
Notes 5) The control mode in the motor internal state at the time of the alarm indicates the state in the driver and does not match Pr0.01 of the driver.

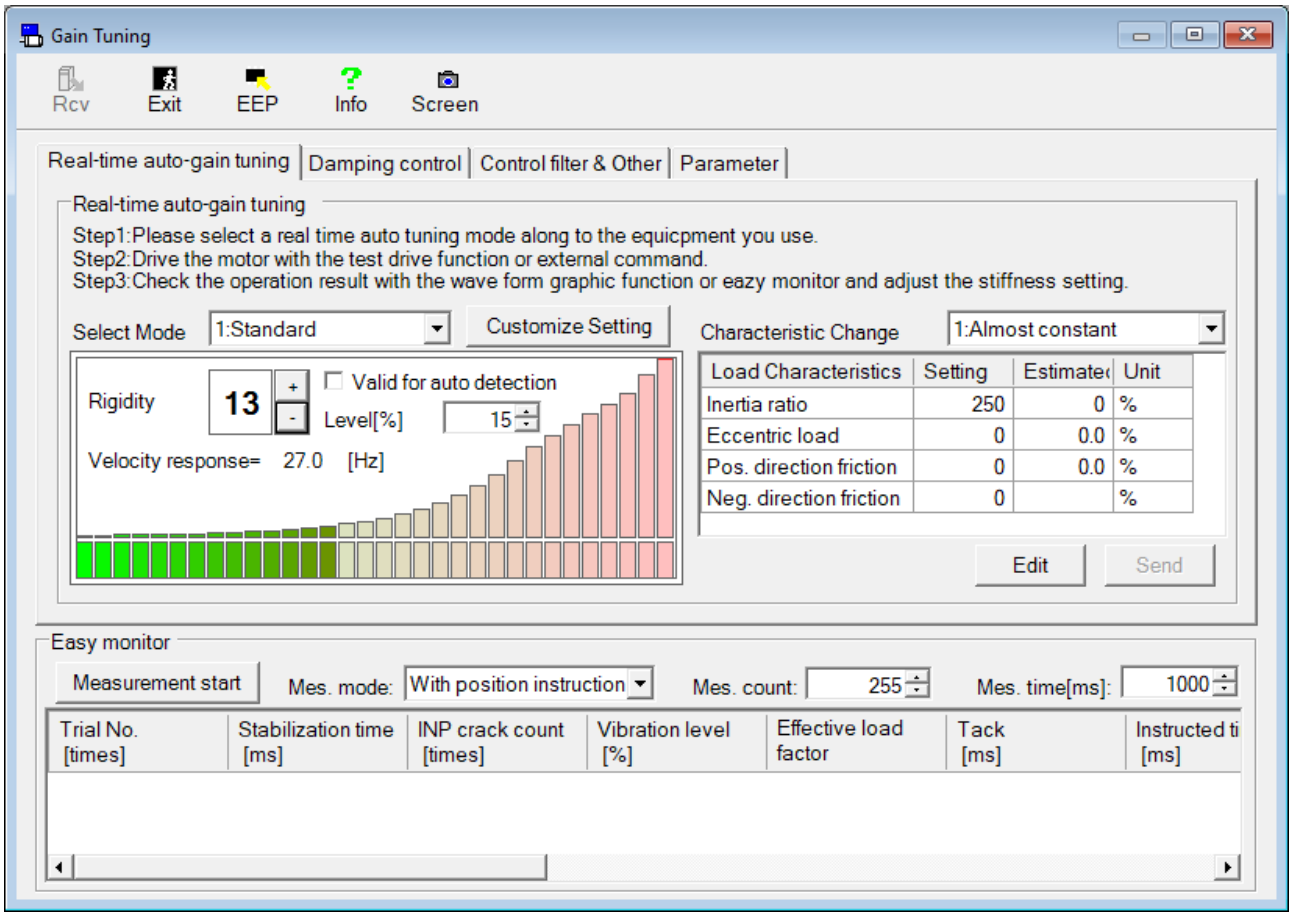
Gain Tuning screen

You can adjust servo gain parameter with the driver's auto adjustment function. And you can use easy monitoring that automatically measures the tuning index.

Note) If you adjust auto adjustment function of the driver please refer to application scope and remarks specified in the driver manual or technical reference.
Gain tuning cannot be performed through RS232 communication.

Open the Gain Tuning window

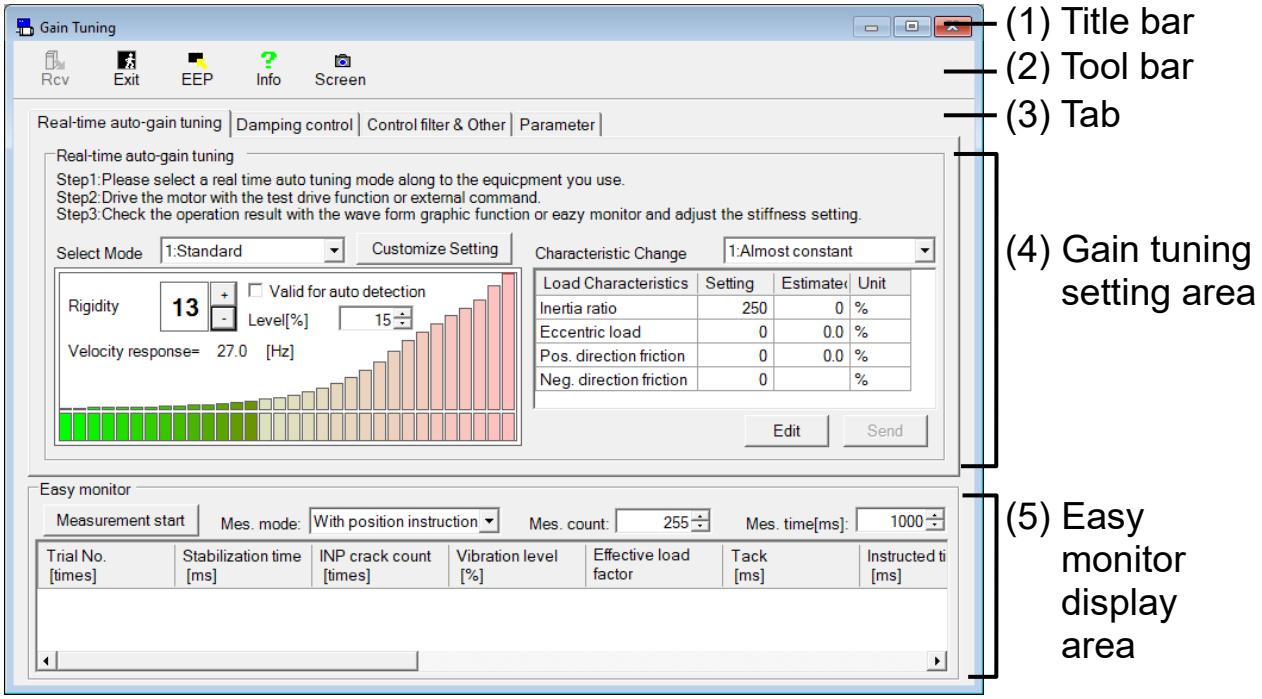
1 Start "PANATERM".
(Please refer to Article 5. Start up and Close down in details)
2 Click "Tuning" of the tool bar on the main screen.
3 The Gain Tuning window is opened.



Close the Gain Tuning window

Click Exit (Exit) on the tool bar.

Structure of Gain Tuning screen



(1) Title bar
You can operate this window.

(2) Tool bar

Rcv	(Receive)	Receives parameters from the driver. (Valid only when the Parameters tab is selected)
Exit	(Exit)	Close the gain tuning window.
EEP	(EEPROM)	Write parameter value to EEPROM of driver.
Info	(Information)	The relevant page of the operating instructions for driver. (Only MINAS-A5 is supported)
Screen	(Screen)	Capture the screen and record it to the file.

(3) Tab
Switch Gain tuning setting area display to “Real time auto-gain tuning”, “Damping control”, ”Control filter & Other”, “Parameter”.

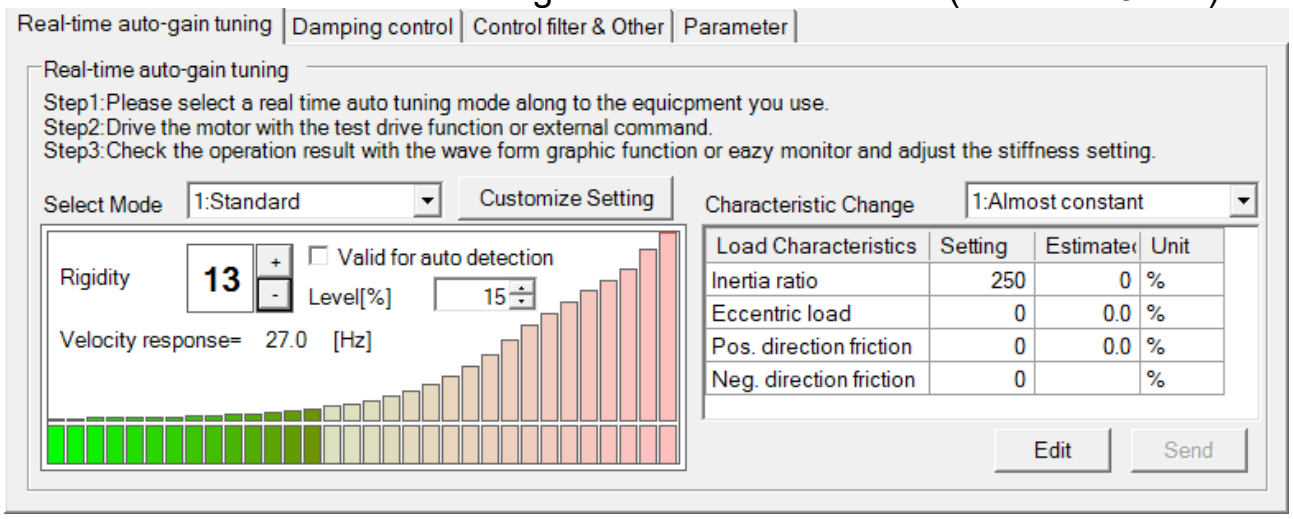
(4) Gain tuning setting area
You can perform Real time auto-gain tuning, Adaptive filter, Damping control, Control filter and the parameter setting.

(5) Easy monitor display area
You can measure the tuning index easily.

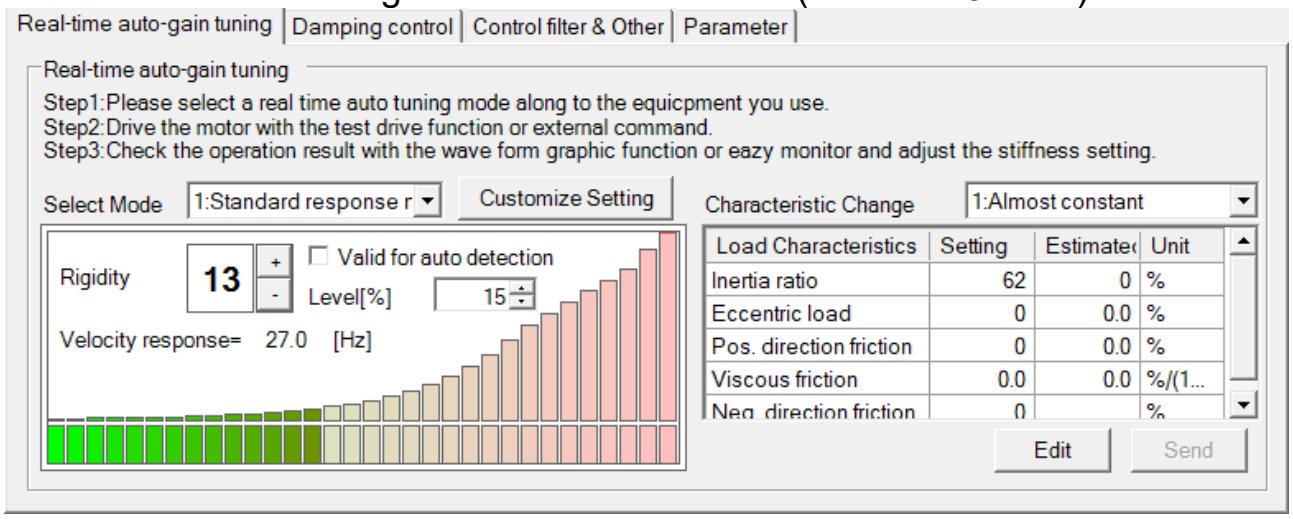
Method of performance of real time auto-gain tuning

1 Select a tab of “Real-time auto-gain tuning”.

<When driver doesn’t have 2 degrees of freedom control (MINAS-A5 etc.)>

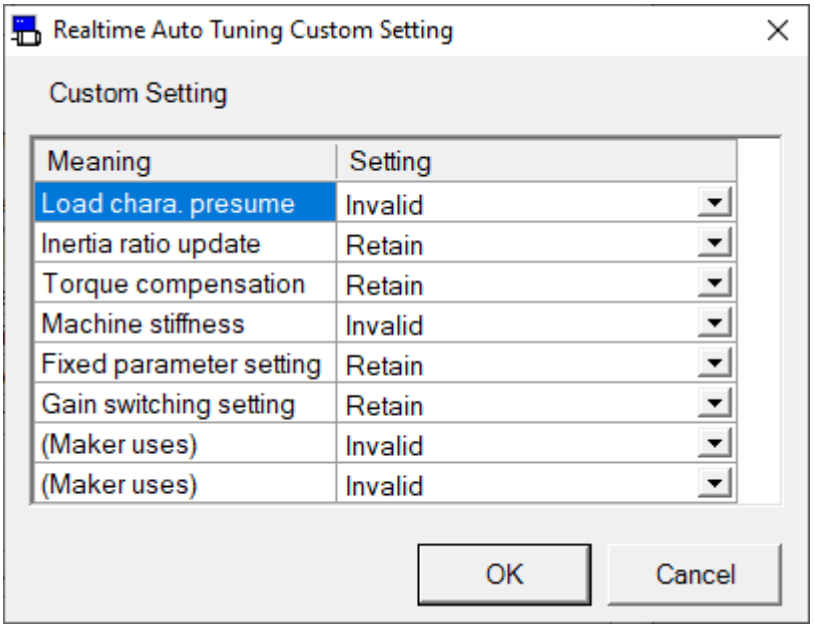


<When driver has 2 degrees of freedom control (MINAS-A5II etc.)>



2 In accordance with the usage of your machine, you can change the “Select Mode” and “Rigidity”.
If you select “6: Customize” in “Select Mode”, you can specify the detail function individually. In “Customized Setting”, “Real time Auto Tuning Custom Setting” window will open, please set the conditions.

* If you open customized setting window and push OK, at the same time, mode selection is changed to “6: Customize”.
* “Real time Auto Tuning Custom Setting” are not available in 2 degrees of freedom control mode.



3 You can operate the motor using “Trial Run” of PANATERM or external command. If motor revolves, presumed value of load characteristics is displayed.
4 Using wave graphic function of PANATERM or easy monitor, you can check the result of moving of motor and adjust the “Rigidity” setting. “Rigidity” setting can be performed by right side of figures + (+) or - (-).

Valid for auto detection

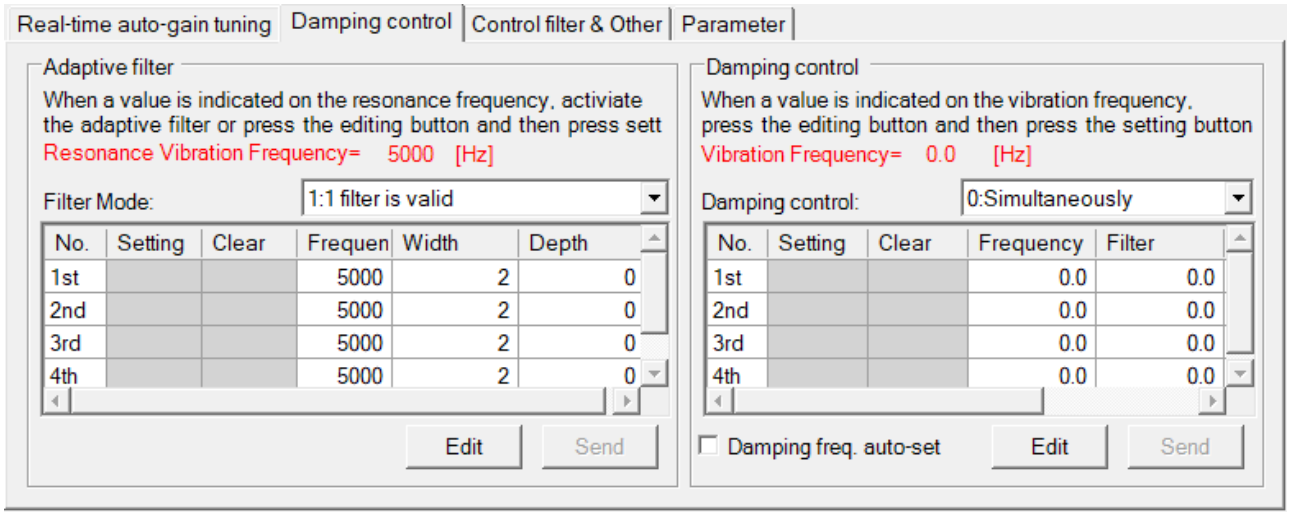
On the conditions that Gain Tuning screen is open, and the mode setting is from 1 to 4, you can use auto suppression of oscillation. Checking this check box, the rigidity setting is automatically down on motor oscillation happenings, and motor oscillation is suppressed.

Change of parameter about load characteristics

If you manually change the parameter of load characteristic, please click “Edit” button and change the setting value. After changing, you click “Send” button, all parameter shall be transmitted to driver. During editing, the block display is not renewed. Please click the “Monitor” button to restart monitoring.

Setting method of adaptive filter

1 Select the tab of “Damping control”.



2 For the adaptive filter to be effective, please change “1:1 filter is valid” or “2: 2 filters are valid”. If the vibration happens in motor speed, other figures except for 5000[Hz] as “Resonance Vibration Frequency” are displayed. And 3rd or 4th notch filter is automatically set.

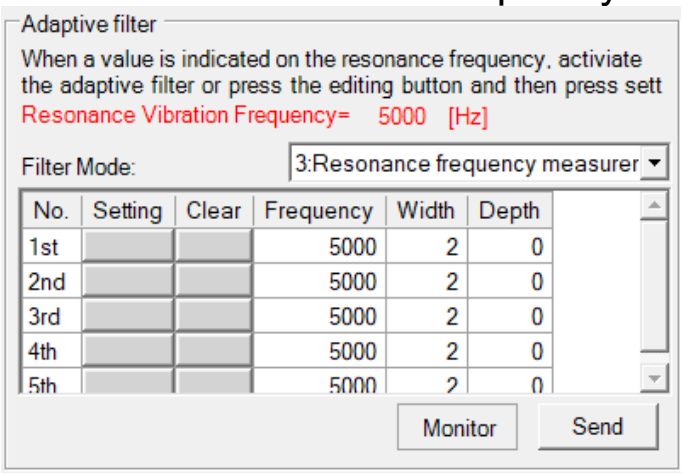
3 If you want to clear the adaptive result, please change the “Filter Mode” to “4: Clear result of adaptation”.

* “Resonance Vibration Frequency” display shows the latest frequency when the vibration is detected by adaptive operation.

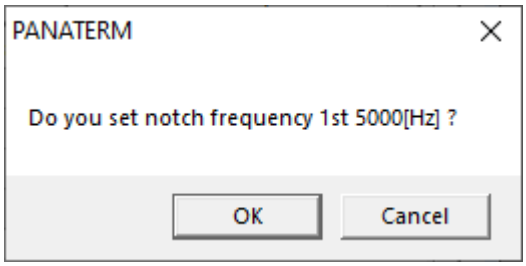
Resonance frequency measurement mode

1 If you measure only the resonance frequency without notch filter setting, please change Adaptive filter mode to “3: Resonance frequency measurement”.

2 If the vibration happens in motor speed, the figures except for 5000[Hz] as “Resonance Vibration Frequency”.



3 If you set this frequency with notch filter, after push the “Edit” button, please click the “setting” button, check the contents of following confirmation screen and click “OK”.



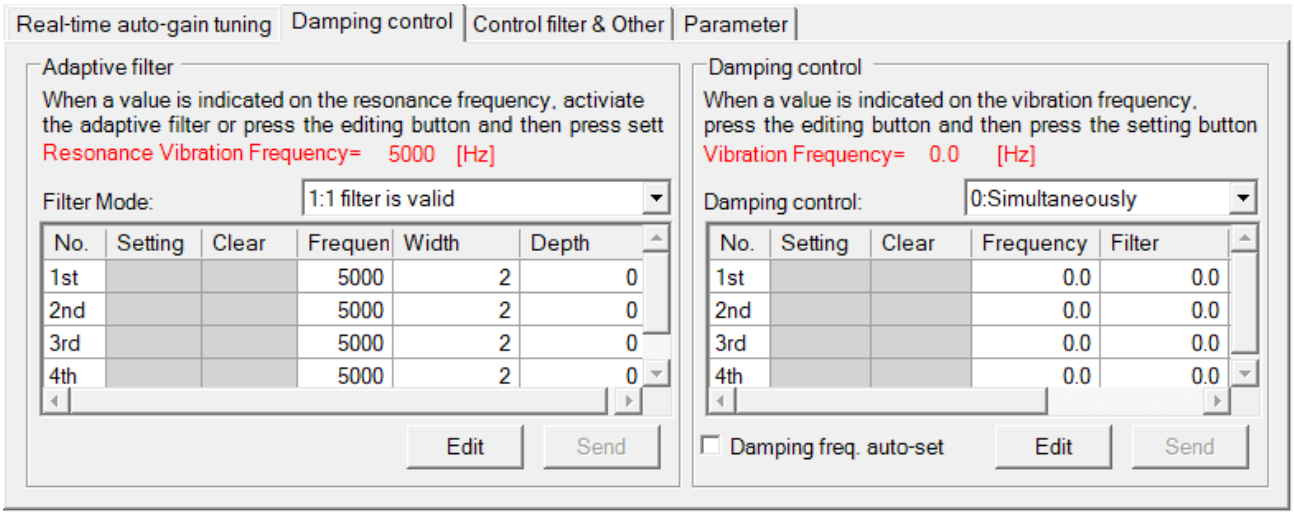
4 If you clear resonance frequency you set, after push the “Edit” button, please click the “Clear” button whose number you want to clear. As same confirmation screen is displayed, if ok, please click the “OK” button.

Change of parameter about Notch filter etc.

If you need to manually change the parameter about notch filter etc., please click ”Edit” button and change the setting value. After changing them, if you click “Send” button and all parameter in this block shall be transmitted to the driver. During editing, as the display of this block is not renewed, please click “Monitor” button again.

Setting method of damping control

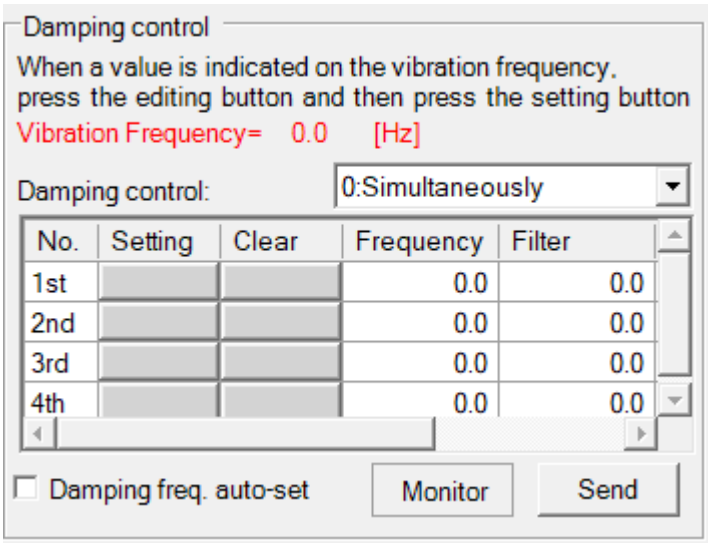
1 Select the tab of “Damping control”.



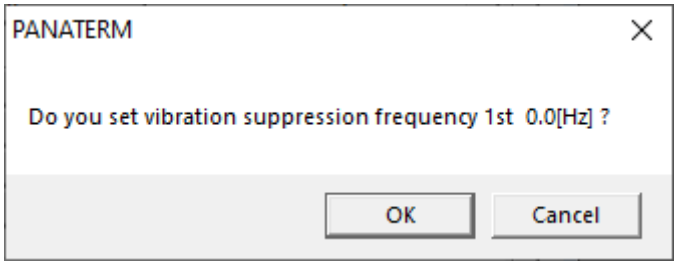
2 You can use max 2 sets of filters in damping control at the same time. You can set which one is effective according to the operation conditions from the 4 sets of “Damping control” setting.
Note) Please refer to the driver manual or technical reference as to this parameter specification.

3 When you operate the positioning by position control or full closed control, trial operation function or external command, if the vibration in position deviation at settling time, the other figures except for 0.0[Hz] shall be displayed in “Vibration Frequency”.

4 If you want to suppress this vibration, after push the “Edit” button, please click “setting “button next to effective vibration filter number in operation.



5 As the confirmation screen of vibration frequency setting, if ok, please click “OK”.



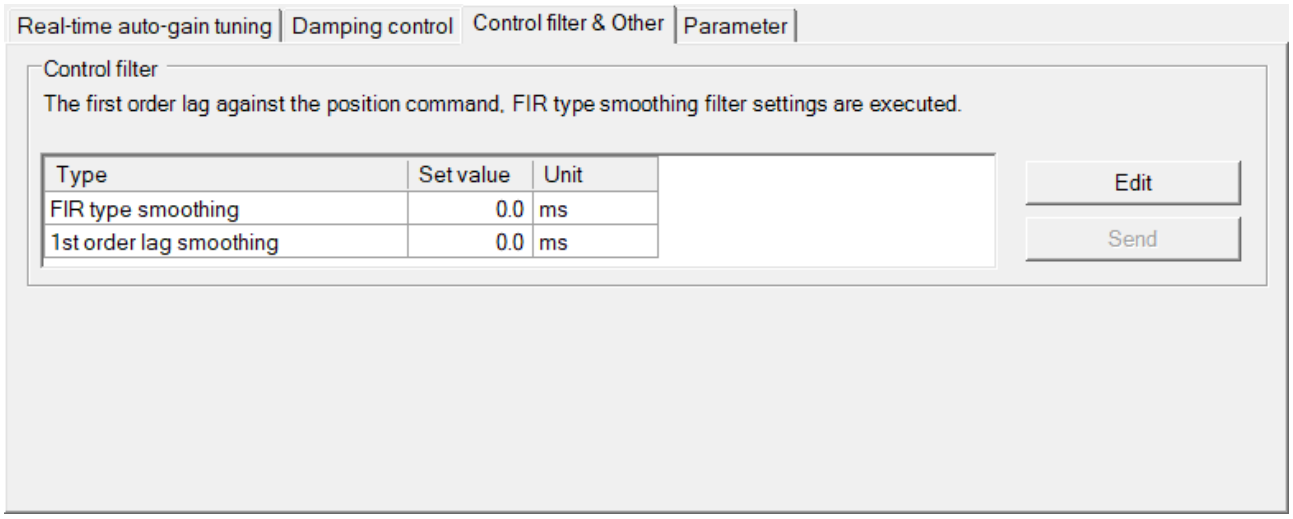
6 If you clear vibration frequency you set, after push the “Edit” button, please click “Clear” button whose number you want to clear. If ok, please click “OK” button.

Change of vibration control parameter

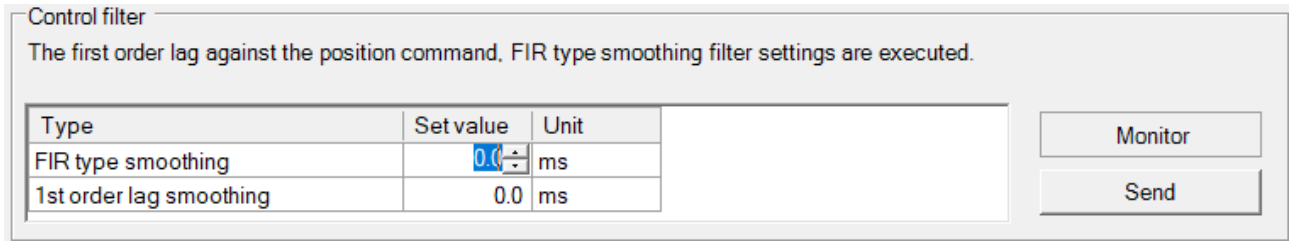
If you manually change the damping control parameter, please click “Edit” button and change the setting value. After change of them, you click “Send” button, all parameter in this block shall be transmitted to the driver. During editing, as this block display is not renewed, please click “Monitor” button again.

Setting method of Position command filter

1 Select the tab of “Command filter & Other”.



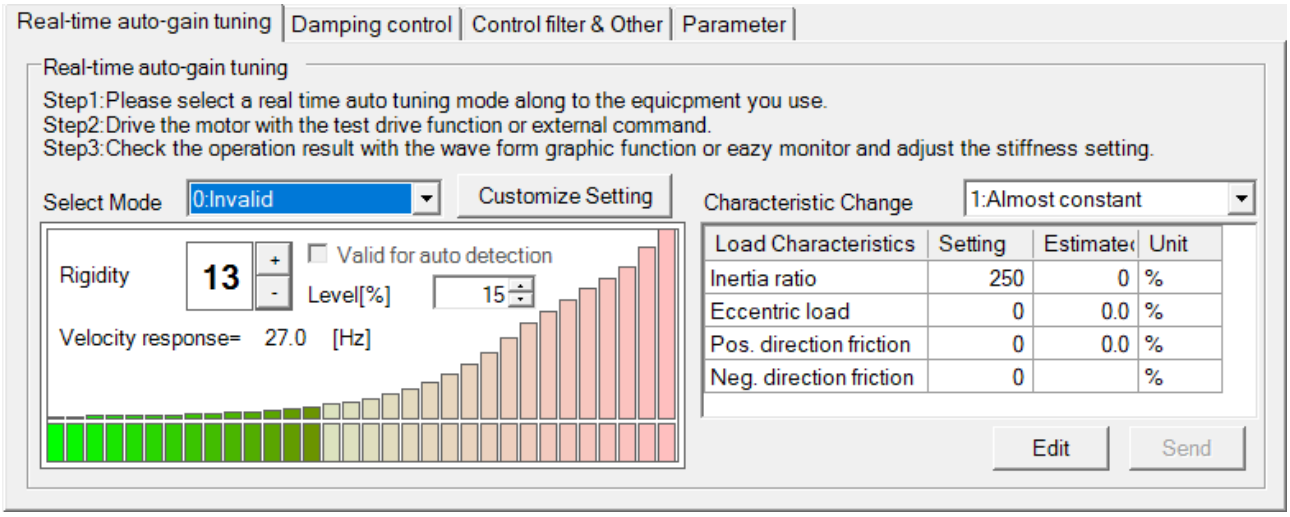
2 If you change the parameter of position command filter, please click “Edit” button and change the setting value.



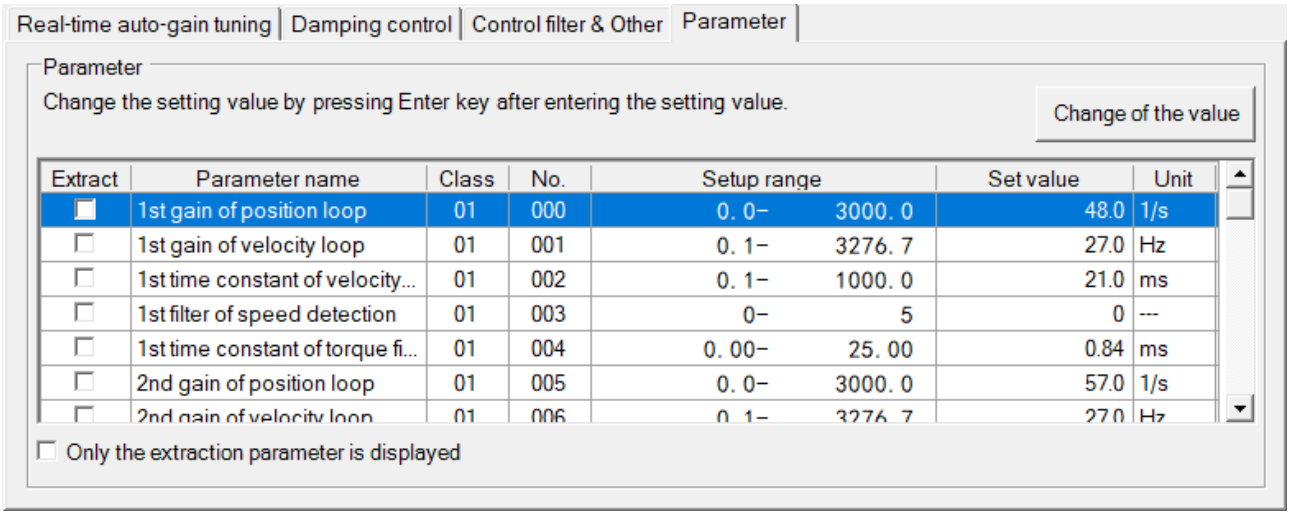
3 After changing them, when you click “Send” button, all parameter in this block shall be transmitted to the driver. During editing, as this block display is not renewed, please click “Monitor” button again.

Manual setting method of the gain tuning parameter

1 Select the tab of “Real-Time auto-gain tuning”, and select the mode of “0: Invalid”.

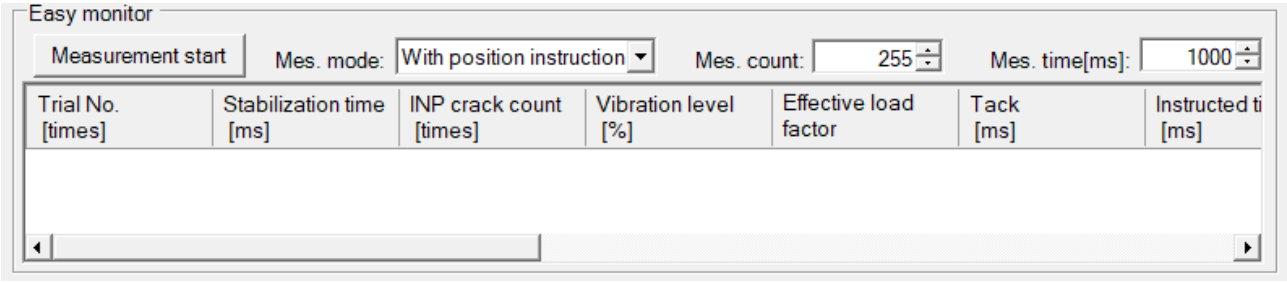


2 Select the tab of “Parameter”.



3 Please select the setting value of parameter you want to edit. After changing the setting value of the parameter you want to edit, enter the [ENTER] key or click the “Change of the value” button.
Note) Only the parameter that checks “Extract” is displayed when “Only the extraction parameter is displayed” is checked.

Measurement the tuning index by easy monitor



1 Set the easy monitor setting.

"Mes. mode" : Set the measurement mode.

With position instruction: Measure the tuning index from the start of position commanded to next start of position command or shorter measurement time.

Uniformity time: Measure the tuning index from the each time data set by measurement time.

With speed instruction: Measure the tuning index from the start of speed command to next start of speed command or shorter measurement time.

"Mes. count" : Set the measured number of time.

"Mes. time[ms]" : Set the maximum measuring time period [ms].

2 Click "Measurement start"

Note) If you click "Measurement start", the displayed index shall be cleared.

3 The measured results shall be renewed until the trial No. meets the measured number of time, or you click "Measurement stop".

【Monitoring Item】

The tuning indices are as below.

Stabilization time	Times [ms] from the finalization of positioning command passing to the range of completion of positioning of the position deviation. Or times[ms] from the below speed command still value to Zero speed range of Motor speed
INP crack count	Count [times] is a number in which two times (the on signal that entered range of in-position first and the off signal when starting) are pulled from the number of times into which INP1 output changes between tact.
Vibration level	Conversion value from vibration level to torque value[%]
Effective load factor	Torque command effective value among tact[%]
Tact	Measured time[ms] for one trial
Instructed time	Time[ms] from the trial start to final position command or the time by detecting more than speed command sill value
Speed zero cross	Count [times] is a number in which two times (the on signal that entered range of in-position first and the off signal when starting) are pulled from the number of times into which ZSP output changes between tact.
Instructed speed min	Command speed minimum value [r/min] during trial
Instructed speed max	Command speed maximum value [r/min] during trial
Motor speed min	Motor speed minimum value [r/min] during trail
Motor speed max	Motor speed maximum value [r/min] during trail
Torque instruction min	Torque command minimum value [%] during trial
Torque instruction max	Torque command maximum value [%] during trial
Pos. following error min	Positioning deviation minimum value during trial [Command unit]
Pos. following error max	Positioning deviation maximum value during trial [Command unit]

The following indices are expressed as a model with 2 degrees of freedom control (MINAS-A5II, MINAS-A6 etc.).

Micro vibration count	The number of times that the mark of actual speed with a blind sector changed [Times]
Overshoot	The overshoot amount of an instruction position deviation [Command unit]
Command movement	The amount of instruction position change between tact [Command unit]
INP crack count of settling	The number of times of an INP crack after instruction ejection [Times]

Notes 1) If you click “Measurement start” or servo on the driver during the measurement, Trial No. shall be starting from 1.
Notes 2) If the measurement time is shorter than the tact, there is possibility that the results of settling time etc. are not correctly measured. Please assure the enough measurement time.
Notes 3) If you record the monitoring results, please select the cell of the monitoring result you need to record and select “Ctrl+C” and make a copy. Please paste and record the table calculation soft or text editor.
Notes 4) If you operate it with quicker tact by the 1s of easy monitor interval, trial No. may be skipped value. Please operate it with more than 1 s of tact command as long as possible.
Notes 5) Parameter set on this screen is inputted into Driver. As PANATERM does not maintain this value, please perform the recording it to EEPROM of driver after completion of adjustment.
Notes 6) The gain tuning screen cannot open during opening some screens. For more information please refer to page 226 “Gain tuning screen behavior”.

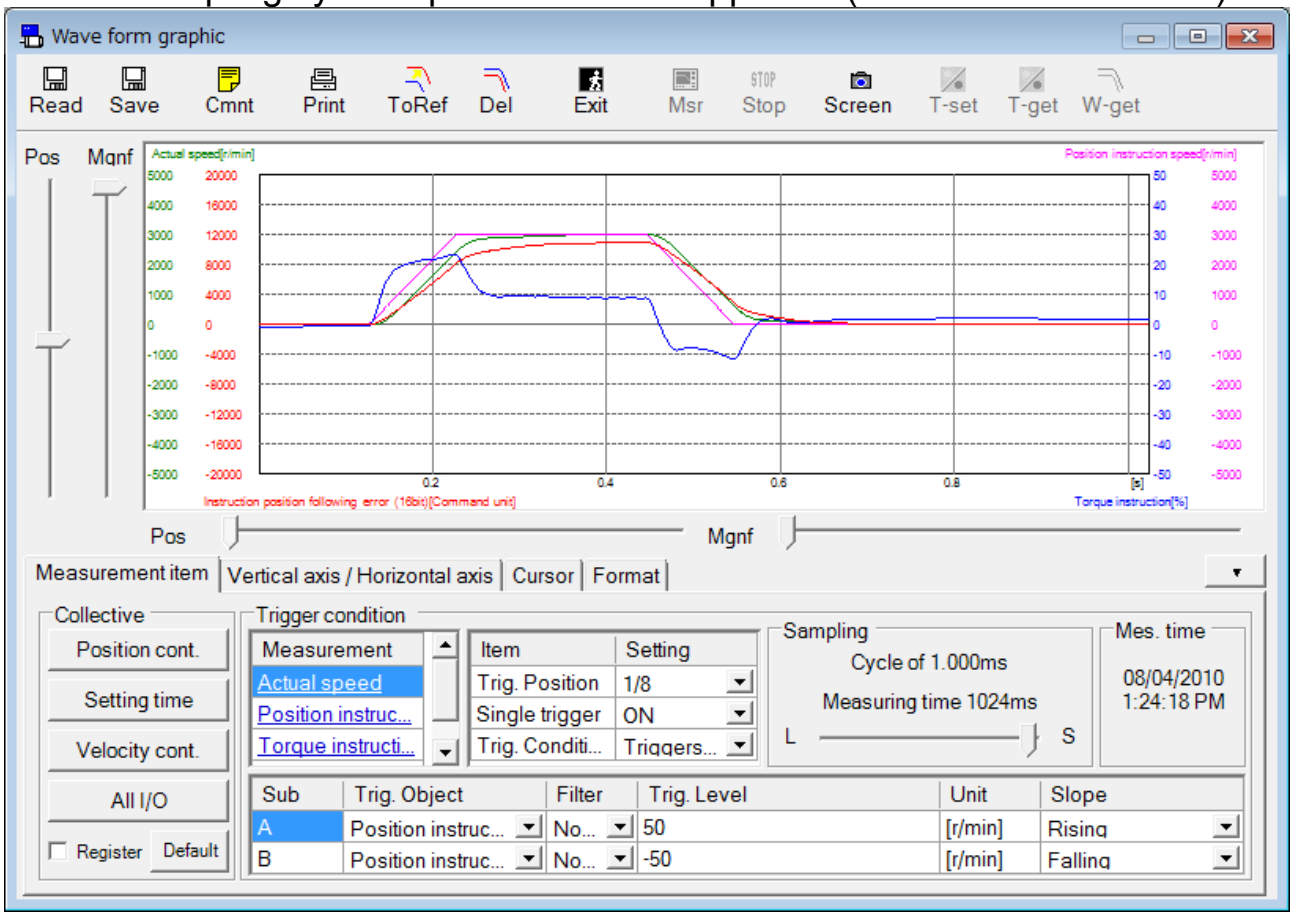
Wave form graphic screen

You can measure the motor operative waveform and display the results by the graphic. And these measurement conditions, results and parameters can be recorded in the wave form data file.

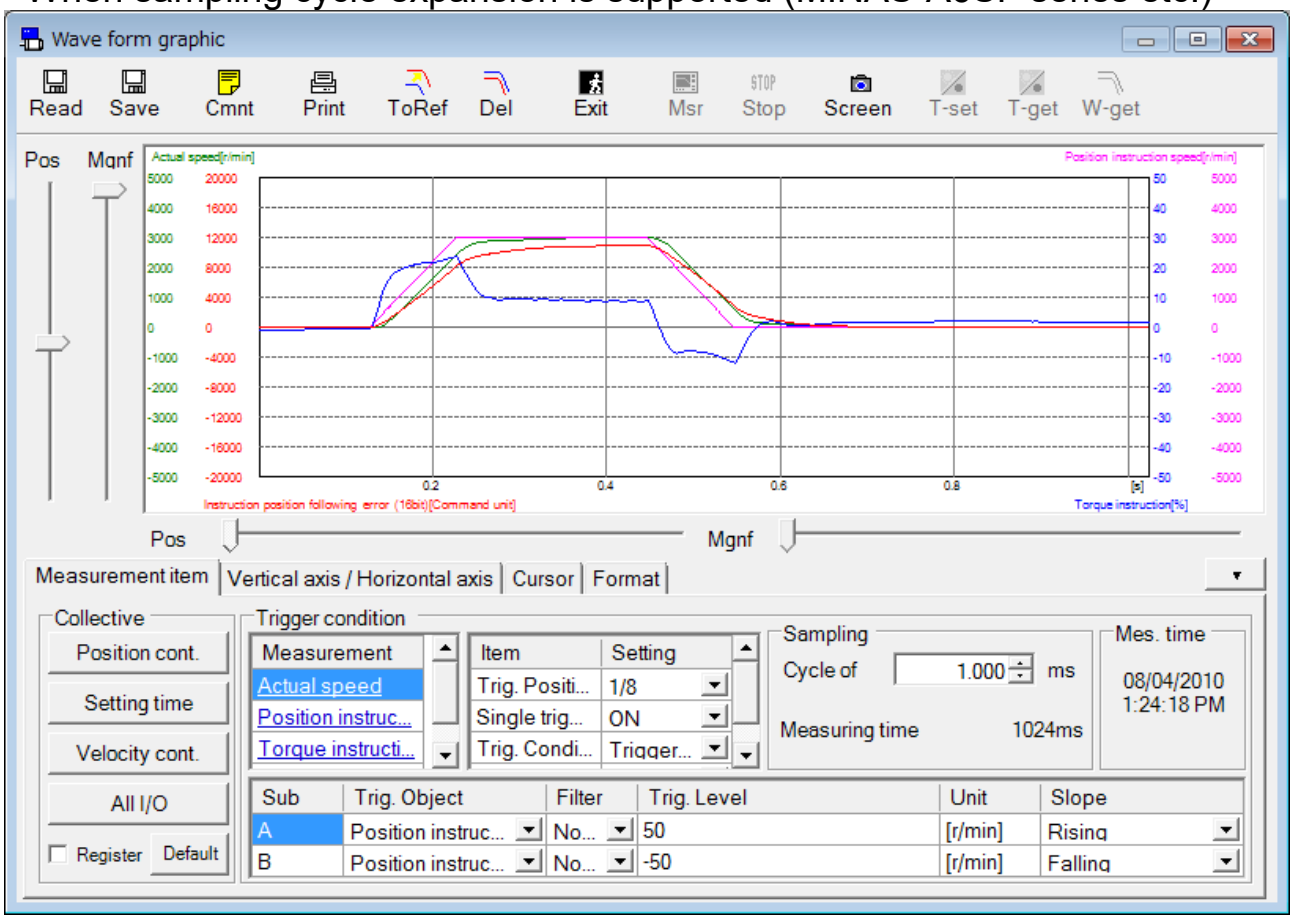
Open the Wave form graphic window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Wave Graphic” of the tool bar on the main screen.
3 The Wave form graphic window is opened.

<When sampling cycle expansion is not supported (MINAS-A5 series etc.)>



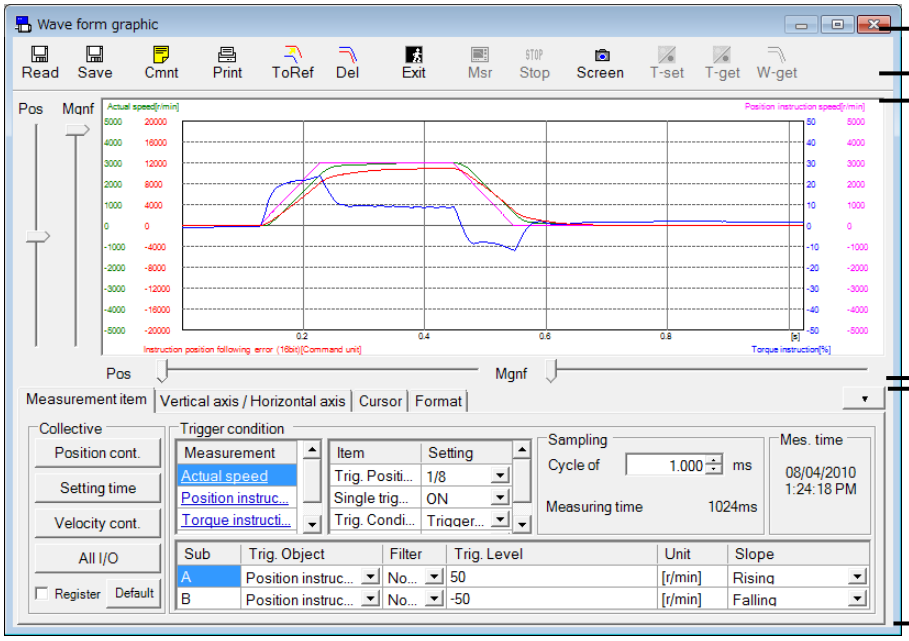
<When sampling cycle expansion is supported (MINAS-A6SF series etc.)>



Close the Wave form graphic window

Click Exit (Exit) on the tool bar.

Structure of Wave form graphic screen



(1) Title bar

(2) Tool bar

(3) Waveform graphic display area

(4) Waveform graphic setting area

(1) Title bar
You can operate title bar window.

(2) Tool bar
The operation commands are listed up.

Read	(Read)	Read the file to record the measurement data. When this button is effective, a file can be specified by drag and drop.
Save	(Save)	Save the measurement data into the file
Cmnt	(Comment)	Make the comments to be attached on the wave form graphic file.
Prnt	(Print)	Print out the results of wave form graphic measurement
ToRef	(Copy to reference)	Make a copy of observed wave form to reference wave form
Del	(Delete the reference)	Delete the reference wave form
Exit	(Close)	Close the wave form graphic window

	(Measurement)	Start the measurement of wave form graphic. Wait until the measurement conditions are met, and then execute a series of operations to acquire and display the measurement results from the driver.
	(Stop)	Stop the wave form graphic measurement
	(Screen)	Capture the screen and record the file
	(Trigger set)	Set the measurement conditions to driver and start measurement
	(Trigger acquisition)	Acquire and display the measurement conditions set in the driver
	(Wave data acquisition)	The measurement results and the measurement conditions are acquired and displayed from driver

(3) Waveform graphic display area
In accordance with setting contents on (4) Wave form graphic operation setting area, the operation wave form of the measurement subject is displayed.

(4) Waveform graphic setting area
Designate the graphic display conditions and select the tab and set each items.
If you click the upper right of waveform graphic setting area, the wave form graphic setting area shall be hided. If you click , wave graphic setting area shall be displayed again. You can record these measurement conditions in the file.

Note) Please refer to the “Record and loading of wave form graphic measurement conditions” about the record method.

Operation of the wave form graphic display area

In the wave form graphic display area, you can enlarge or scale down the graphic display with following pointed out mouse pointer and horizontal / vertical slider bar.

(1) In case you use mouth pointer

Use the mouse pointer when you enlarge or scale down overall wave form.

If you select the tab of “Measurement item” ”Vertical axis / Horizontal axis” ”Format”, Mouse pointer is a reading glass icon. At that time, following operation is effective.

Left click : enlarge the position of mouth pointer
Right click : scale down the position of mouth pointer
Drag : enlarge the selected rectangle scope

When you select tab of “Cursor”, Mouse pointer is Star icon. At that time, the following operation is effective.

Left click : designate the position of cursor 1
Right click : designate the position of cursor 2
Drag : enlarge the selected rectangle scope

When mouth pointer is near cursor, it shall be arrow icon. At that time, the following operation is effective.

Drag : move the nearby cursor

(2) In case that you use slider bar

By operation of the slider bar on wave graphic display area right edge (vertical axis), you can enlarge, scale down, move only the selected operation wave form subjects by tab.

Vertical axis “Pos” Slider bar:

If you drag the bar upright, operated subject wave form display is moving up, if you drag it down, the wave form is also moving down. And if you click the bar up and down, or if you push the key [↑] [↓] on the selected conditions of slider bar, the wave form is moving by one scale on vertical axis

Vertical axis “Mgnf” Slider bar:

If you drag the bar up, you can enlarge the operation subject vertical axis on the center of the screen. If you drag it down, it is to scale down.

If you operate the low edge (horizontal axis) slider bar, you can enlarge / scale down / move the time axis of total wave form.

Horizontal axis “Pos” Slider bar:

If you drag the bar to the right side, the overall wave form is moving to the left, the wave form is moving to the right. If you click the left right of the bar or push the key [←] [→] in the selected slider bar condition, you can move the wave form left right by 1/32 on the screen.

Horizontal axis “Mgnf” Slider bar:

If you drag the bar to the right, you can enlarge the operation subject horizontal axis on the middle of the screen. If you drag it to the left, it shall be scaled down.

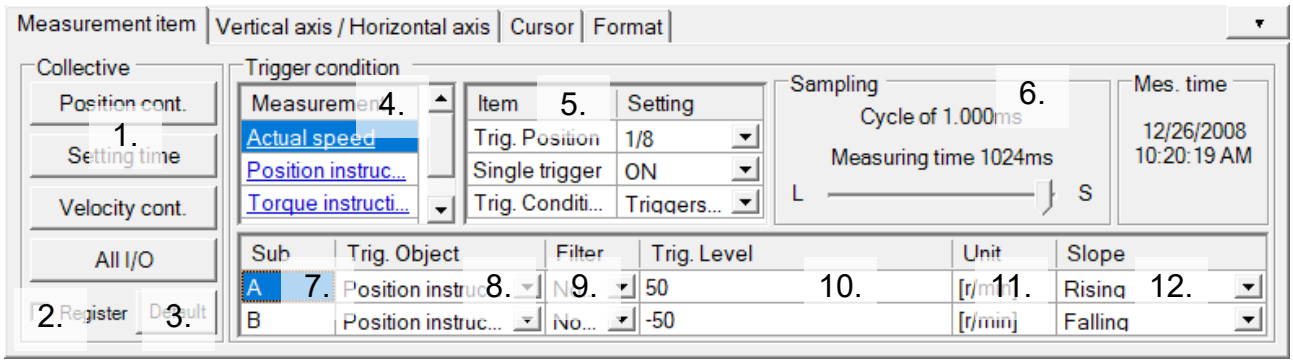
Notes 1) If you cannot find the wave form, it cannot be displayed so well, please push the “Auto range” button of “Vertical axis / Horizontal axis” tab and bring back to the overall display.

Notes 2) When you confirm the detail data of signal size 32 bits, once you display the overall wave form and move the part you want to watch to the middle of the screen with position slider.

Wave form graphic setting area

<Measurement Item Tab>

Designate the measurement item, trigger conditions, sampling cycle.



“Collective”

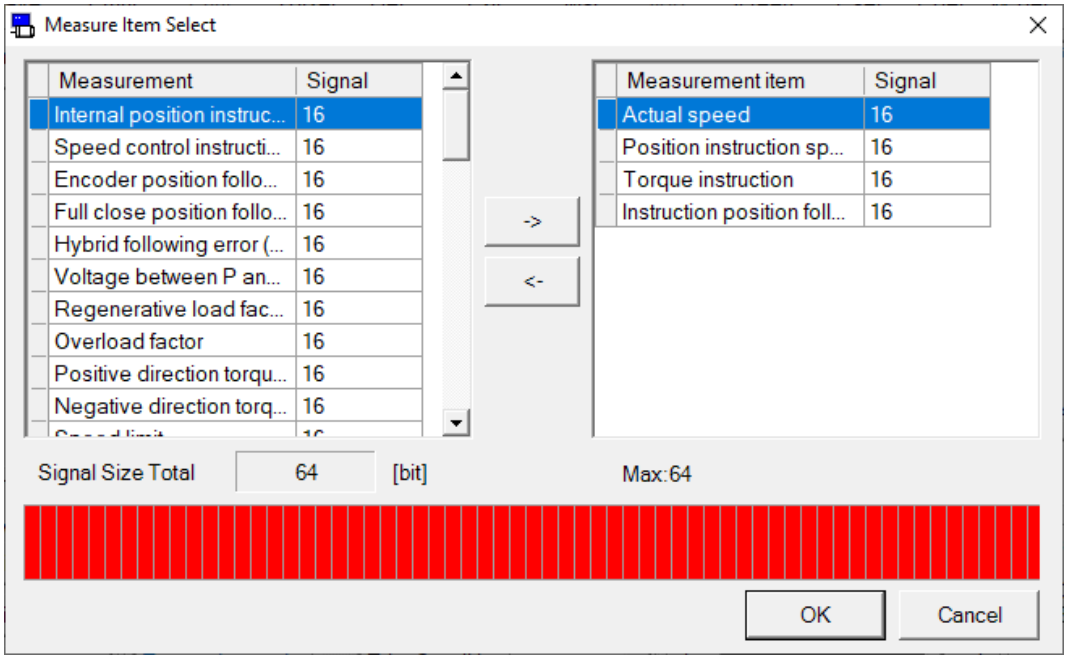
1. Setting button:
   The measurement condition is set from the wave form graphic file registered in button.
2. Register:
   When you check “Register” and push the button that registers, selection of the file window is displayed. Please select the file where the measurement condition that you want to register is included.
3. Default:
   The content of each setting button is read from the following files.

Position cont. : Measure the signal related to position control as position command speed trigger.
Settling time : Measure a signal related to the measurement of settling time as a trigger of position command passing completion.
Velocity cont. : Measure a signal related to the speed control as a trigger of the speed control command.
All I/O : Measure the analog input and physical input / output signal without trigger

“Trigger condition”

4. Measurement item:

You can measure the subject that you want to measure in your choice. If you double click the measurement items, you can open the window of the “Measure Item Select”. You can select the signal size up to total 64[BIT].(In MINAS-A6 series, you can select the signal size up to total 128[BIT]. Digital signal can be selected up to 16[BIT])
If you select the digital signal on the measurement items, analog signal and digital signal shall be displayed on the wave form graphic display area.



5. Trigger Item:

Perform the setting related to the trigger.

Trig. Position - Set the trigger happening position during the measured period.

Single trigger - When single trigger is on, the measurement can be performed only one time. If it is “Off”, until you click “Stop” button, we will continuously perform the measurement.

Trig. Condition - Set the trigger conditions.

Data average - Set the enable / disable of the data averaging function during the measurement.

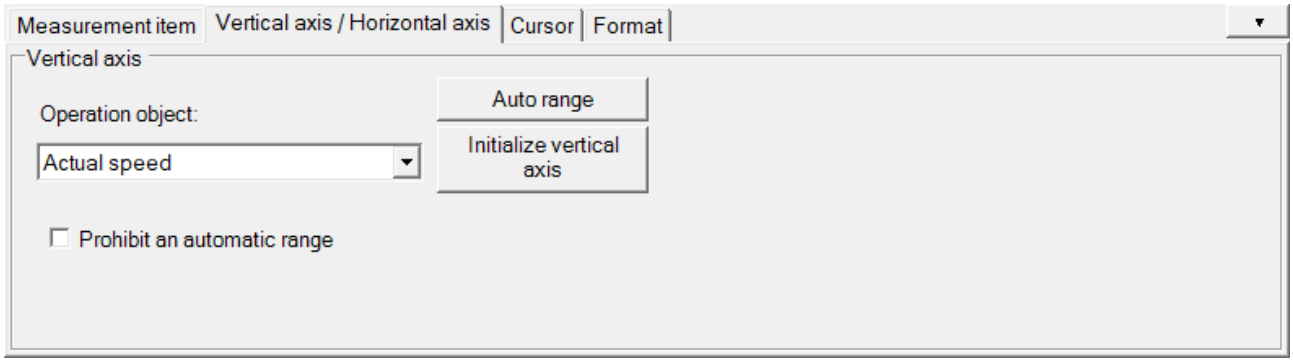
* Data average can be set only when sampling cycle expansion is supported.

6. Sampling: Set the sampling cycle. (When sampling cycle expansion is supported, the sampling setting method changes from the slider method, enabling the setting of a longer sampling cycle.)
7. Sub: You can set the trigger conditions to 2 kinds (A / B).
8. Trig. Object:
   Set the trigger subjects. You can select one of the analog signal or digital signal.
9. Filter:
   Set the filter the number of the time for the subjected number of the times signal. Depending on the trigger subjects, there are the items that you cannot set. If you cannot set the filter, “---” is displayed.
10. Trig. Level:
    Set the level of the trigger. If the trigger subject is analog signal, it is displayed by figures. If it is digital signal, it sets ON / OFF.
11. Unit: Display the trigger subjected unit to be selected.
12. Slope:
    Set the slope to be triggered. You can select it from “Leading”, “Trailing”, “Matched”, “Mismatched”, “Greater”, “Less”.

* If you use digital signal for trigger subject, slope setting is “Matched” or “Mismatched”.

<Vertical axis / Horizontal axis Tab>

Designate the wave form graphic conditions



“Operation object”

You can select the operation subject to be designated position and magnification by vertical axis slider bar. You can use analogue signal only.

“Auto range button”

Adequate value shall be automatically adjusted from all the wave form vertical axis position and magnification on the screen display. And minimum (display all data) of horizontal magnification is set.

“Initialize vertical axis button”

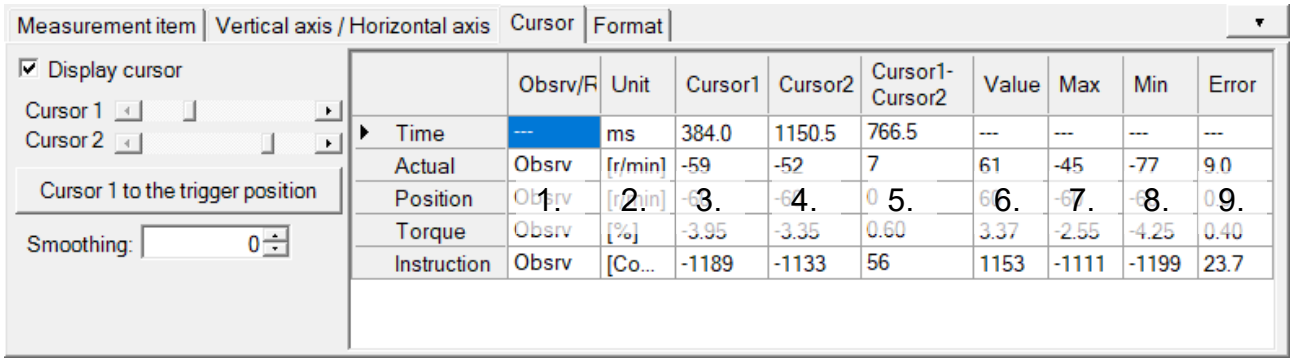
All wave form’s vertical magnification is itself and 0 is moving to middle of the screen.

“Prohibit an automatic range check box”

If you check the mark, Auto range is prohibited at the measurement. When measurement conditions are the same, the auto range of a horizontal axis is also forbidden. If there is no check mark, Auto range shall be performed on the wave from each graphic measurement.

<Cursor Tab>

Display cursor and the measured value of cursor 1 and cursor 2.



“Display cursor”

When checked, cursor 1 and cursor 2 is displayed.

"Cursor1"

The position of cursol1 can be moved.

You can also specify the position with the left mouse button. You can also click the cursor to move it.

"Cursor2"

The position of cursol2 can be moved.

You can also specify the position with the right mouse button.

You can also click the cursor to move it.

"Value display"

The value of the selected measurement item is displayed.

1. Obsrv/Ref:
   Displays whether the waveform is observation or reference.
2. Unit:
   The unit of the selected item is displayed.
3. Cursor 1:
   The value of the selected item at the time of cursor 1 is displayed.
4. Cursor 2:
   The value of the selected item at the time of cursor 2 is displayed.
5. Cursor 1-Cursor 2:
   Displays the difference between the values of cursor 1 and cursor 2 of the selected measurement item.

6. Value:
   The effective value of the section from cursor 1 to cursor 2 of the selected measurement item is displayed.
   If there is no check mark in "Display", the value of all sections is displayed.
7. Max:
   The maximum value of the section from cursor 1 to cursor 2 of the selected measurement item is displayed.
   If there is no check mark in "Display", the max of all sections is displayed.
8. Min:
   The minimum value of the section from cursor 1 to cursor 2 of the selected measurement item is displayed.
   If there is no check mark in "Display", the min of all sections is displayed.
9. Error:
   The standard deviation of the section from cursor 1 to cursor 2 of the selected measurement item is displayed.
   If there is no check mark in "Display", the error of all sections is displayed.

“Cursor 1 to the trigger position button”

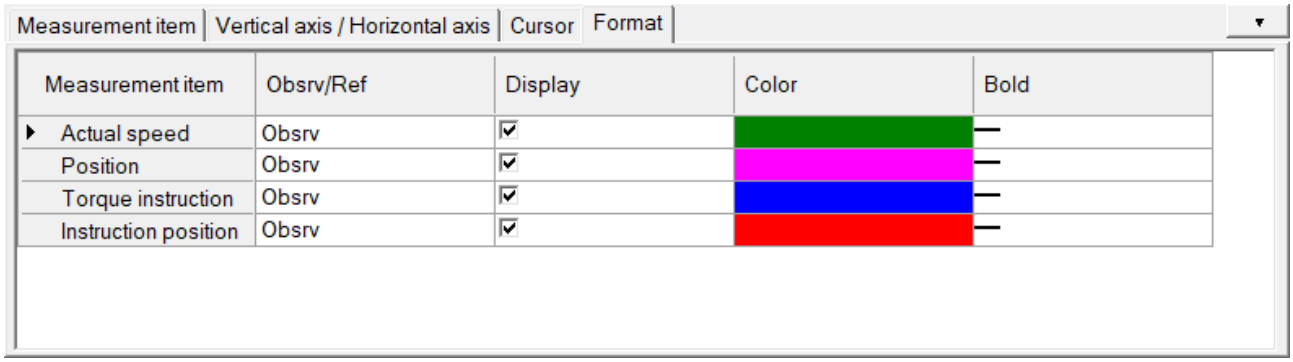
Cursor 1 sets the trigger position.
This is displayed when “Display cursor” is checked only.

“Smoothing”

The analog signal is smoothing.

<Format Tab>

Set the display format of the measured wave form.



"Measurement item"

Selected measurement item is displayed.

"Obsrv / Ref"

The type of item is displayed (Observed or Reference).

"Display"

Select this item is displayed or is not displayed.

"Color"

Set the waveform color of the measurement item.
Select the color of this item when color cell is double-clicked.

"Bold"

Set the thickness of the waveform of the measurement item.
Select the thickness of this item when color cell is double-clicked.

Measurement of wave form

1 Set the wave form graphic setting.

2 Click

(Measure) of the tool bar.
When the measurement starts, status of measurement is displayed on status bar.

Notes 1) If "T-set" or "Msr" (Measure) button is once clicked, even if you close the wave form graphic display or exit the PANATERM, the driver continues measurement by the trigger condition last set. In this case, the measured data which is trigged by the setting is acquired by pushed the "W-get" button. But if the driver is yet waiting for trigger, displayed communication error dialog box.

Notes 2) When wave form graphic display is closed, measurement condition is saved, and same condition is applied next time.

Reference data

1 After measuring wave form graphic, click

(To Reference) button on the tool bar, and observed data is copied to reference data.

2 Check the “Display” of Reference data from “Format” tab and reference data can be displayed on screen.

Notes 1) The reference data is registered up to 10 sets. If you copy with all the reference waveforms filled, reference 10 will be overwritten.

Notes 2) When measurement item is changed, the reference data is cleared.

Notes 3) The time (horizontal) scale of reference data is fixed at the condition of measurement. Don’t read the reference data which has different time scale from wave file.

Save and read the wave graphic data

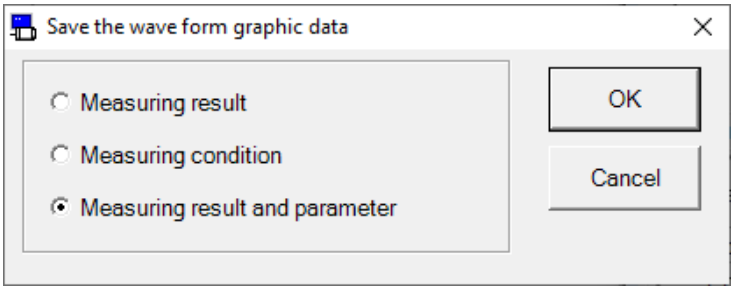
It is possible to use, and to refer when the parameter setting value at the measurement condition, the result of a measurement, and that time specified when measuring it is preserved in the file, and the measurement is executed again under this condition.

Wave graphic data file : ***.wgd5 or ***.wgd6
Wave graphic condition file : ***.wgc5 or ***.wgc6
Wave graphic data and parameter file : ***.wgp5 or ***.wgp6

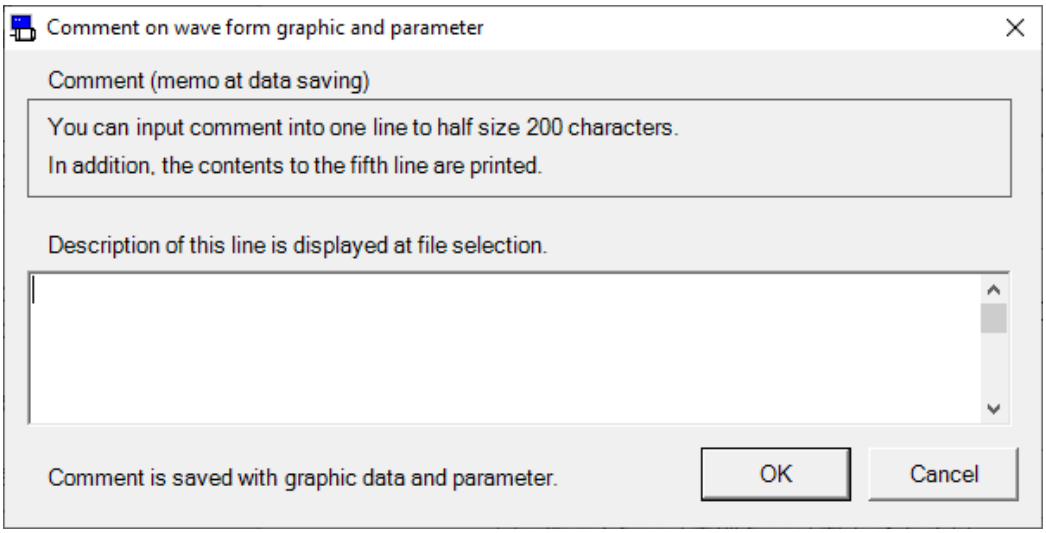
* When sampling cycle expansion is supported, files are saved with extensions wgd6, wgc6, and wgp6.

Save to wave graphic data

1 Click “Save” button from tool bar.
2 “Save the wave form graphic data” window is displayed.



3 Select the save item, and click “OK” button.
4 Comment input window is displayed.

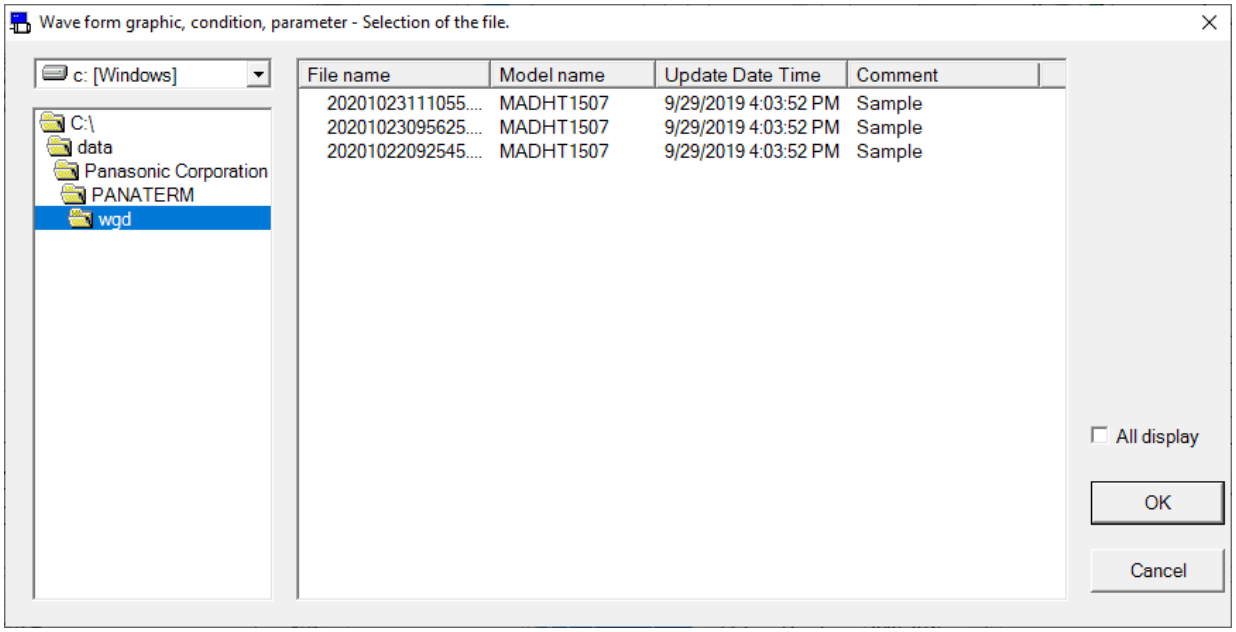


5 Click “OK” button, and the file dialog is displayed.

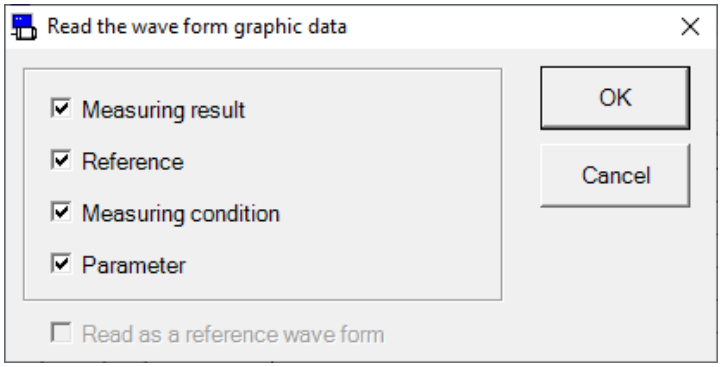
6 In the file dialog, specify the name of the file that you want to save.
7 Click “Save” button.

Read from wave graphic data

1 Click “Read” button from tool bar.



2 Select data file to read.
3 Click “OK” button.
4 Window for “Read the wave form graphic data” will appear.



5 Put checks on the items you would like to read, and click “OK”. The saved waveform for measurement result can be read as reference, if “Read as a reference wave form” is selected. However the measured condition, and parameters cannot be read, if this is selected.
6 Content that was selected will be read.

Notes 1) The detail of wave form data is referred the driver operation manual or technical reference.
Notes 2) When sampling cycle is not set minimum value, a part of analog signal are smoothing by the driver.
Notes 3) The aliasing might be caused and an actually different shape of waves be seen, when sampling cycle is longer than vibration data.
Notes 4) The communication error is displayed when the driver power supply is off while wave form graphic is measuring. Please close wave form graphic display.
Notes 5) The wave form graphic function is not precious measurement instrument. The wave form graphic data shall be used as rough estimate.
Notes 6) “Mes. time” (Measure time) display is the time of receive the wave form data from the driver. Note that the time is not the time of trigger time.
Notes 7) The wave form graphic screen cannot open during opening some screens. For more information please refer to page 228 “Wave form graphic screen behavior”.
Notes 8) In the case of network type (MINAS-A5N, MINAS-A5NL, etc.), if a network is established in the state of trigger standby, the detected trigger position may shift.

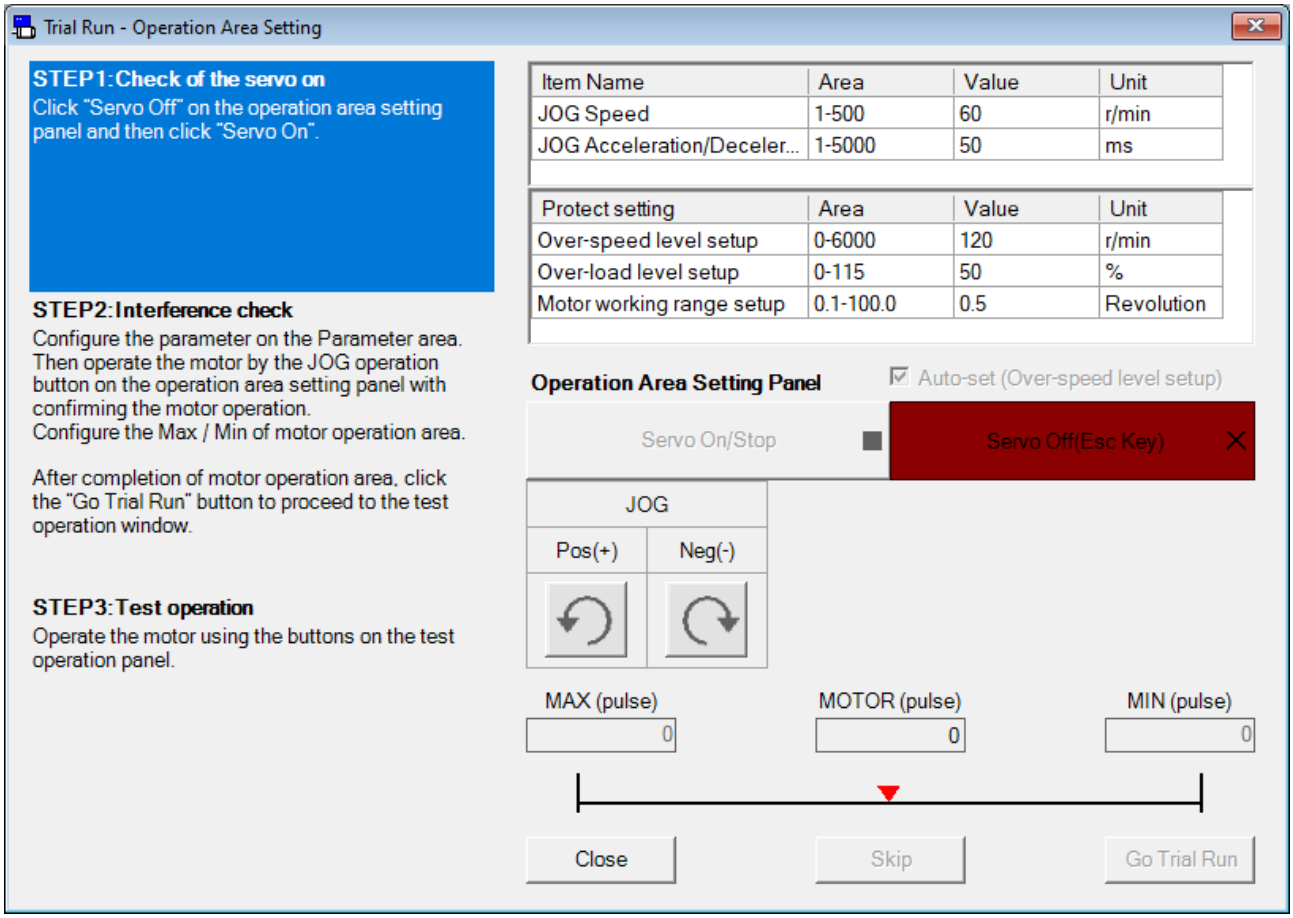
Trial run screen

Motor can be operated as test only with the Drive, and without connecting to the master level equipment.

Note) Parameter settings and Driver's gain tuning will be needed even at the trial run. Please read the operation manual or technical reference to understand the manual content prior to this operation.
Trial run cannot be performed through wireless or RS232 communication.

Open the Trial Run window

1 Start "PANATERM".
(Please refer to Article 5. Start up and Close down in details)
2 Click "Trial Run" of the tool bar on the main screen.
3 The Trial Run window is opened.

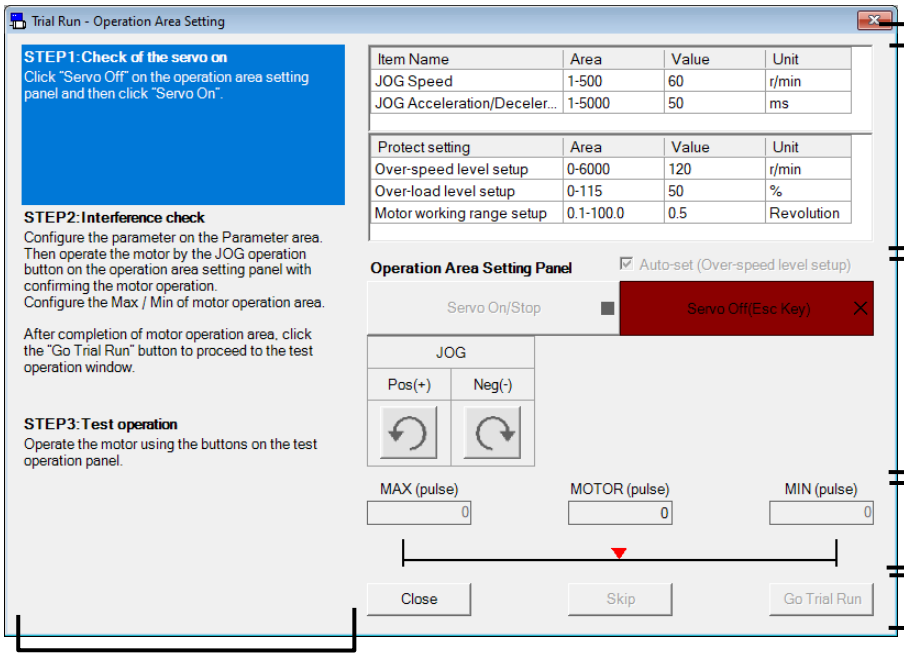


Close the Trial Run window

Click "Close" button on the window.

Structure of Trial Run screen

Operation Area Setting window



(1) Title bar

(2) Related parameter

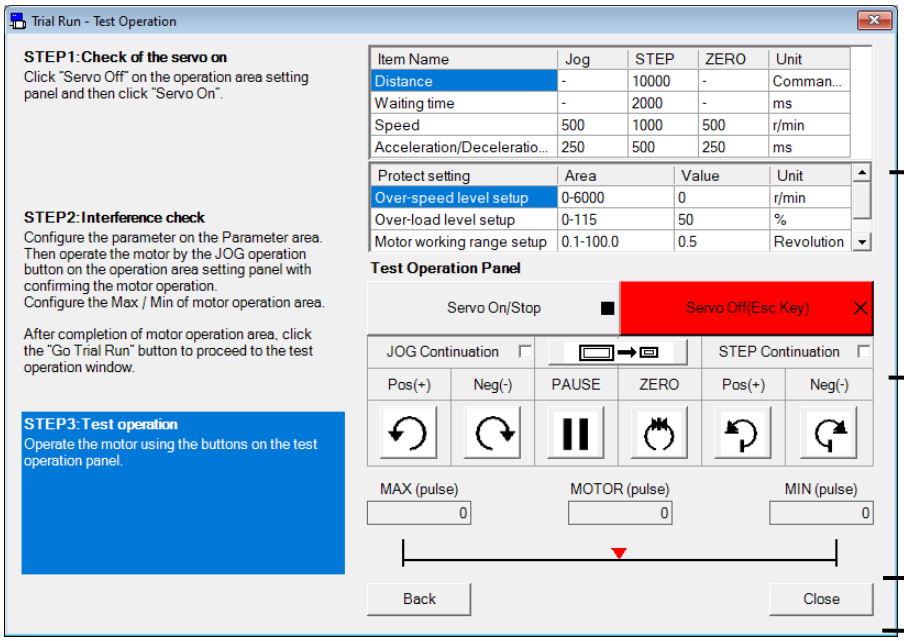
(3) Operation area setting panel

(4) Motor position data

(5) Operation button

(6) How to operation area

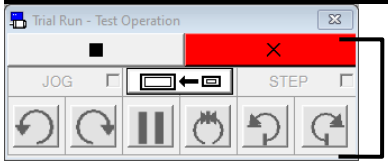
Test Operation window (Standard type)



(7) Test operation panel

(5) Operation button

Test Operation window (Shrink type)



(7) Test operation panel

(1) Title bar
Window can be operated.

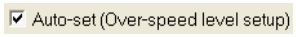
(2) Related parameter
Speed and Acceleration/Deceleration time can be operated at the Operation area settings window. Speed, Acceleration/Deceleration time, moving length, waiting time properties of JOG/STEP/ZERO can be set.

Notes 1) These parameters will be in PANATERM's default setting, when the Operation Area Setting window is opened. But these will be set the value before opening a Trial run, when the Test Operation window is opened.

Notes 2) Change of setting value will be reflected to the drive at the start of test operation.

Notes 3) Protection function setting will return back to the value before opening the window, when the Operation Area Setting window or the Test operation window is closed.

(3) Operation area setting panel
Test operation can be done with the button below

	Auto-set (Over-speed level setup)	If a check is put in, over-speed level will be changed the twice of JOG speed.
	Servo On / Immediate stop	Turn on the servo feature of motor.
	Servo Off	Turn off the servo feature of motor. Note) Servo feature can be turned off by the ESC key when the window is active.
	JOG Positive(+)	JOG operation can be done to the plus direction when JOG Positive (+) is pressed, and minus direction when the JOG Negative (-) is pressed with the speed on setting.
	JOG Negative(-)	

(4) Motor position information area
MAX : Maximum operation area
MOTOR: Current position
MIN : Minimum operation area
Note) Current position of the motor is the value in command unit with the position when the Servo On as 0.

(5) Operation button

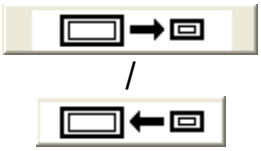
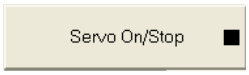
Close	: Close operation area configuration or test operation feature.
Skip	: Test operate without operation area being configured.
Go Trial Run	: Test operate based on configuration.
Back	: Stop test operation, and return to operation area configuration. Test operation window.

(6) How to operation area

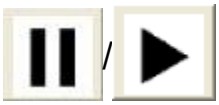
This area displays the explanation of the operation method.

(7) Test Operation panel

Test operation can be done with the button below

	Change to shrink type / Change to standard type	A test run screen is changed from standard type to shrink type. Or it is changed from shrink type to standard type.
	Servo On / Immediate stop	Servo function will be turned on. When motor is in “Servo On” condition, this button will enable an immediate stop or continuous operation.
	Servo off	Servo function will be turned off. When window is active the Servo function will be turned off when ESC key is pressed.
	JOG Positive(+)	When check is not on “JOG Cont”, then JOG operation will be active when button is pressed, and will be inactive when button is not pressed.
	JOG Negative(-)	If check is on the “JOG Cont” button, then JOG operation will continue until operation area becomes Max/Min. when button is pressed once. When “Servo On/Stop” is pressed, then motor will immediately stop without time to descend the speed. When “Pause” is pressed, then motor will stop after descending the speed. Time to descend the speed until stopping the rotation will vary depending on time

needed.
Note) If you would like to cancel the JOG continuous operation, then “Pause” the motor, and then press “Servo On/Stop” button.



PAUSE

Motor will pause and continue the operation.

ZERO

Motor will Step operate until the 0 position.

STEP Positive(+)

STEP Negative(-)

If check is not in the “STEP Cont” checkbox; Step operation will continue when for the configured operation distance when the button is pressed.
Motor will immediately stop without speed deceleration time, when the “Servo On/Stop” button is clicked during rotation.
Motor will pause after speed deceleration when “PAUSE” button is clicked. When “PAUSE” button is clicked again, then motor will operate towards the targeted position set before pausing.

When check is on the “STEP Cont” checkbox ;
When the button is clicked once, then the motor will operate the “Step operation” for the configured distance to the designated direction, and then operate for same distance to the opposite direction, which will continue this back and forth operation.

When “Servo On/Stop” button is clicked during this continuous operation, the motor will stop without deceleration time, and cancel the continuous operation.

When “PAUSE” button is clicked during the same continuous operation, then the motor will pause and will continue on with the operation when the button is clicked again.

Note) Push “Servo On/Stop” button after “PAUSE” button and STEP continuous operation can be canceled.

Maneuvering Test operation

1 Click “Servo Off” on test operation panel at Operation area settings window, and then click “Servo ON” (STEP 1) If there are alarms or errors occurring at this step, eliminate the cause, clear the alarm, and then re - start from step 1.
2 Configure the parameter on the Parameter area. Then operate the motor by the JOG operation button on the test operation panel with confirming the motor operation.
Configure the Max / Min. of motor operation area. (STEP 2)
3 After completion of motor operation area, click the “Next” button to proceed to the test operation window.
4 Operate the motor using the buttons on the test operation panel on the test operation window.

Notes 1) If warning or error occurs when the trial run window is open, then the communication error will appear on screen. After removing the cause, clear the alarm, and then restart the test run. Also, if a servo-on signal is input from the outside, a communication error will be displayed.

Notes 2) When open the trial run window, the parameter of protection function setting changes into a default value. When close the trial run window, it returns to the value before it opens. Therefore, please note that the argument value changed on trial run screen might be displayed when the parameter is written from other screens while the trial running.
Moreover, the parameter changed on the trial run screen is not preserved.

Notes 3) When “Go Trial Run” button is clicked without the operation area configured, and then the error will appear on screen. Please configure the operation area going by what specified above.

Notes 4) Please be noted that the configured operation area will be canceled, and there will be no limit to the operation area during the test operation.

Notes 5) Operation area will be cleared when “Servo OFF” is clicked.

Notes 6) When “Close” button is clicked when the Servo is ON, then the Drive Servo will be turned OFF, and test operation will be stopped.

Notes 7) When “Servo OFF” or “Back” is clicked, then the Drive Servo will be turned OFF, and operation area will be cleared.

Notes 8) The trial run screen cannot open during opening some screens. For more information please refer to page 229 “Trial run screen behavior”.

Notes 9) When drive is not in ready status (Alarm or Main power source is cut off), front panel is used except for monitor mode, or Servo ON is input from outside, then the trial run window will not be able to open or error will be on screen during execution. Please re - execute after these status is eliminated, and the trial run window is closed.

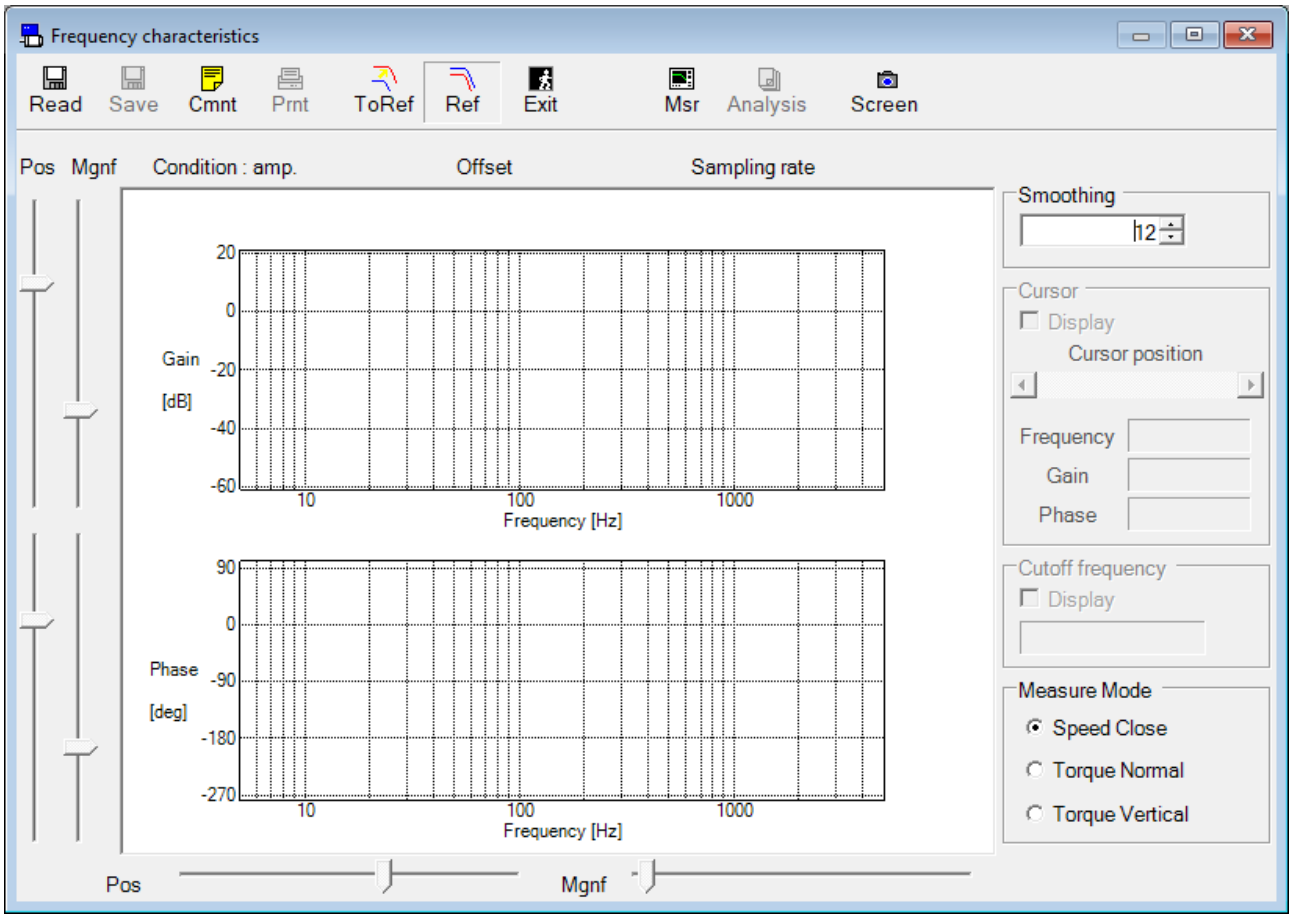
Frequency characteristics screen

Measures the wavelength characteristics including the load, and shows the result in bode plot Mechanical resonance point or response time can be measured. In addition, the measured result can be saved as file.

Note) Please check with the operation manual or the specification document.
Please execute the measurement in the condition that servo-off can be made anytime as a precaution.
This function should not be used in the case that blistering movement of a motor may break the machine.
Please execute the measurement in the condition of as low gain as possible.
Please note that large setting of offset value may cause exceeding movement limitation.
Frequency characteristics cannot be performed through wireless communication.

Open the Frequency characteristics window

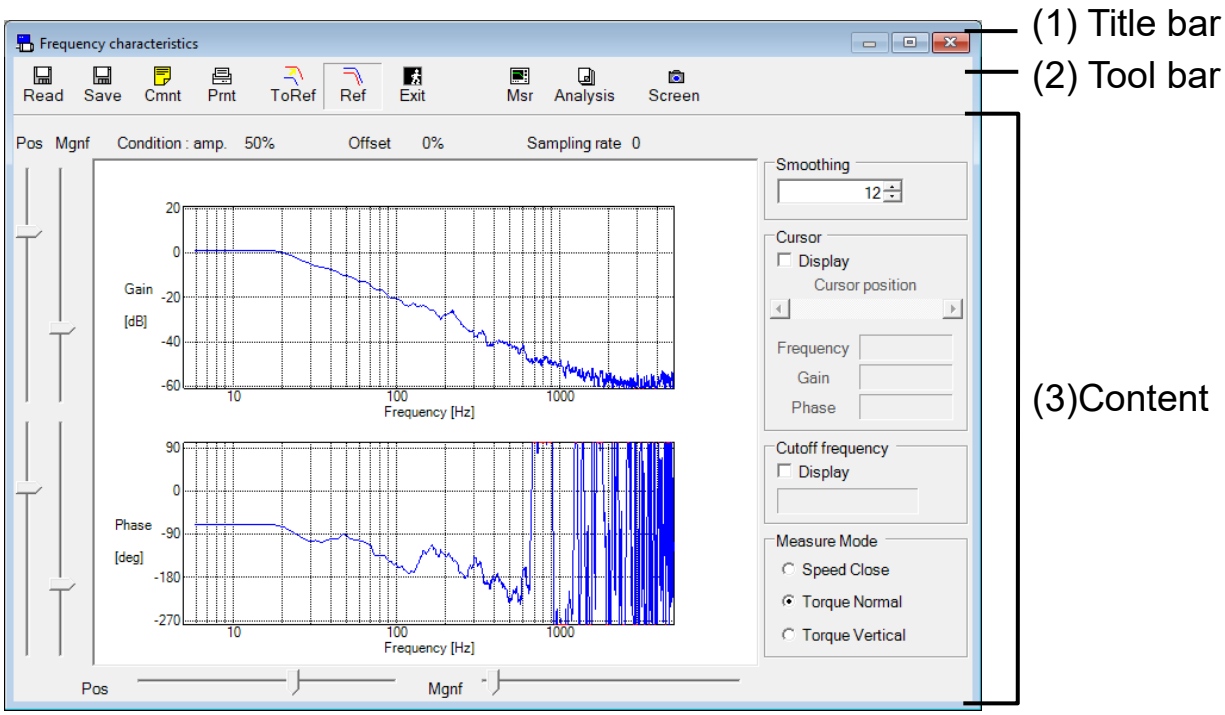
1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Other” > “Frequency Response” of the tool bar on the main screen.
3 The Frequency characteristics window is opened.
(The figure of the next page)



Close the Frequency characteristics window

Click Exit (Exit) on the tool bar.

Structure of Frequency characteristic screen



(1) Title bar
You can operate this window.

(2) Tool bar
Operation command such as Frequency characteristics measurement is on this bar.

Read	(Read)	Read frequency characteristics data. When this button is effective, a file can be specified by drag and drop.
Save	(Save)	Saves the frequency characteristics data.
Cmnt	(Comment)	Write comments to the Frequency characteristics file.
Prnt	(Print)	Print Bode plot.
ToRef	(Copy)	Copy measured wavelength to referenced wavelength.
Ref	(Reference)	Turn ON/OFF screen of reference wavelength.
Exit	(Exit)	Close Frequency characteristics window.

	(Measure)	Measure Frequency characteristics.
	(Analysis)	Analyze frequency characteristics. This cannot be used when using RS232 communication.
	(Screen)	Capture screen and save as file.

(3) Content area

Graph option

Configure items related to graph appearance or operation

Smoothing	Configure level of smoothing
Cursor	Switch appearance/disappear of cursor on screen. The cursor moves to the position you clicked with the mouse.
Cut off frequency	Shows frequency[Hz] which will enable Gain - 3db.
Measurement mode	Configure measurement mode.
Speed Close	Measure frequency response from Speed input to motor speed.
Torque Normal	Measure frequency response from Torque input to Motor speed.
Torque Vertical	Measure frequency response from Torque input to Motor speed. This function is used in loads that are asymmetric such as in vertical angle.

(In MINAS-A6 series, you can measurement the Position loop operation.)

Vertical axis slider

Change position, and magnification of vertical axis of bode plot.

Horizontal axis slider

Change position, and magnification of horizontal axis of bode plot.

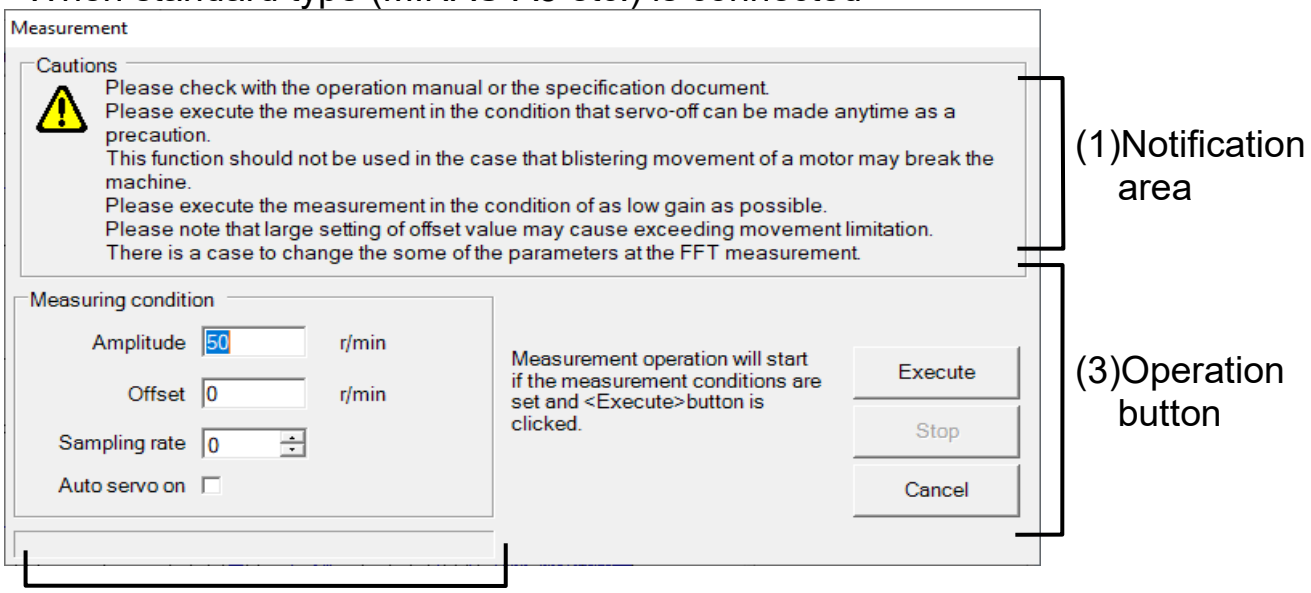
Bode plot

Creates bode plot of measured Frequency characteristics data.

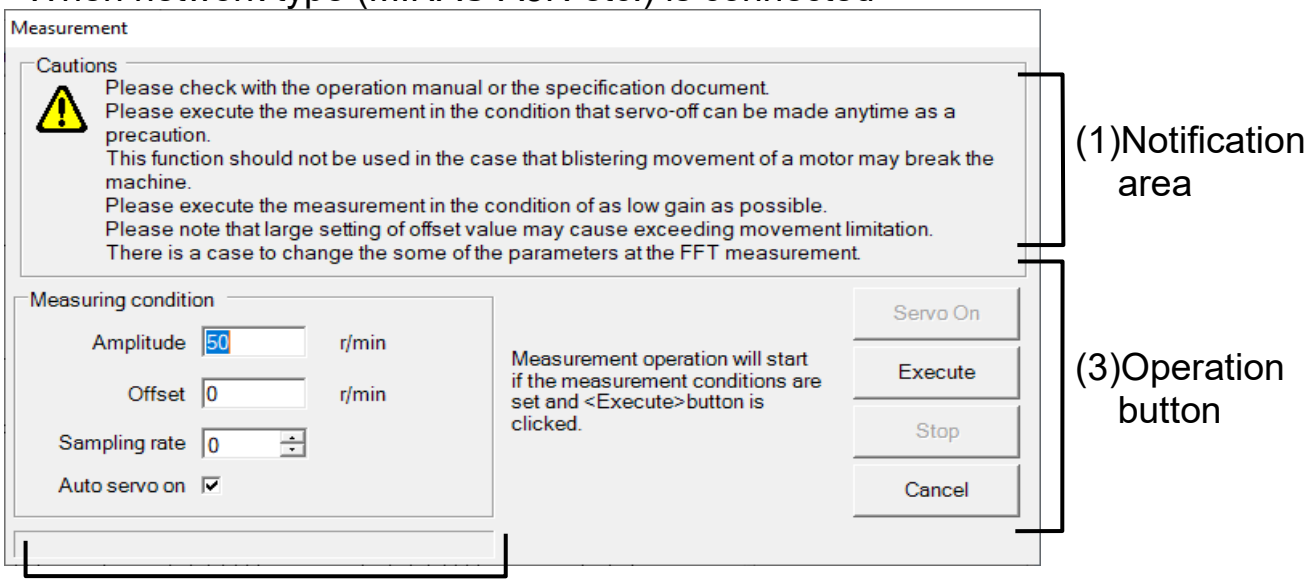
Measurement of Frequency characteristics

1 Click “Measure” on Frequency characteristics window, and then measurement window will open.

<When standard type (MINAS-A5 etc.) is connected>



<When network type (MINAS-A5N etc.) is connected>



2 Please confirm the content that is on the (1) notification area.

3 Specify (2) Measurement condition.

“Variation” The amplitude of noise waveform applied to the velocity command or the torque command is set when measurement of frequency characteristics.

* When measurement mode is at “Speed Close” sum of variation, and offset will be limited to 5,000r/min. When the measurement mode is “Torque Normal” or “Torque Vertical”, it is limited to a range that does not exceed 100%.
* When variation is increased the measurement will increase, however torque will be saturation, and torque precision will decrease. Please start with small values and increase with steps accordingly to the measurement result.

“Offset” The offset of noise waveform applied to the velocity command or the torque command is set when measurement of frequency characteristics.

* Sum of variation and offset will be limited to 5,000r/min. When measurement mode is in Torque – Speed, then setting is not possible.
* Motor will operate with offset being the average speed command during the measurement. Polarity of “+” is CW, and “-” is CCW. A good measurement result can be taken if the motor is rotating into one direction, while the offset is configured over the value of variation. However, please be careful when the “Rotation” is narrow, because the rotation may exceed the “Rotation”. Rotation of motor can be calculated by the below formula. Please confirm that the “Rotation” will not be exceeded before starting the measurement.

Rotation [r] = Offset [r/min] x 0.017 x (Sampling rate +1)

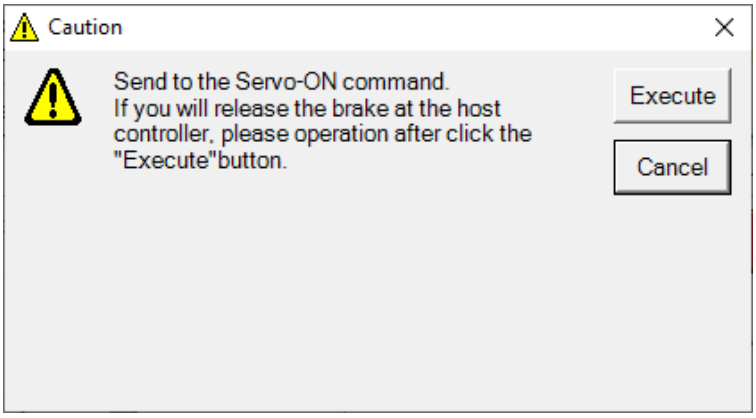
“Sampling rate” Can be configured to values from 0 to 7

* When sampling rate is large, then the measurement precision of low frequency will increase, however the measurement time will be longer. If small, then measurement precision of high frequency will increase. Please start from “0”, and adjust accordingly to the measurement result.
* When sampling rate is over 1, then the aliasing may occur.

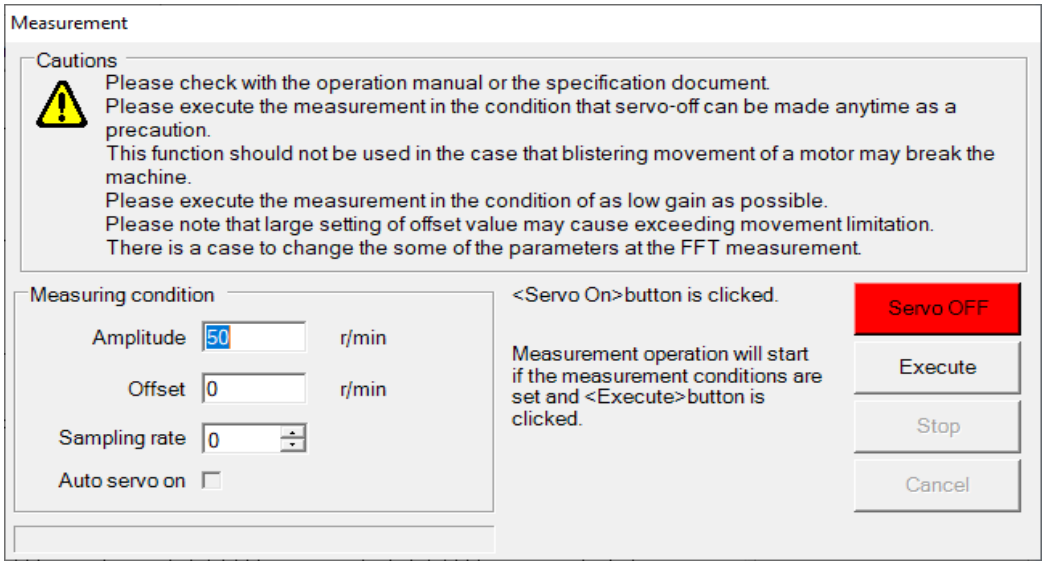
“Auto servo on” The driver does servo-on by automatic operation when measurement of frequency characteristics when “Auto servo on” is checked.

* In the case of standard type, please do not check it when servo-on by an external input.
  In the case of network type, please do not check it when brake release operation is being performed by host device.
* In the case of standard type, if close the measurement window, clear setting.

4 When the “Servo on” of (3) operation button is invalid, or when not displayed, please move on to the next.
When the “Servo on” is valid, please click on “Servo on”. Caution windows will appear. Confirm the window message carefully, and click “Execute”. To cancel, click “Cancel”.

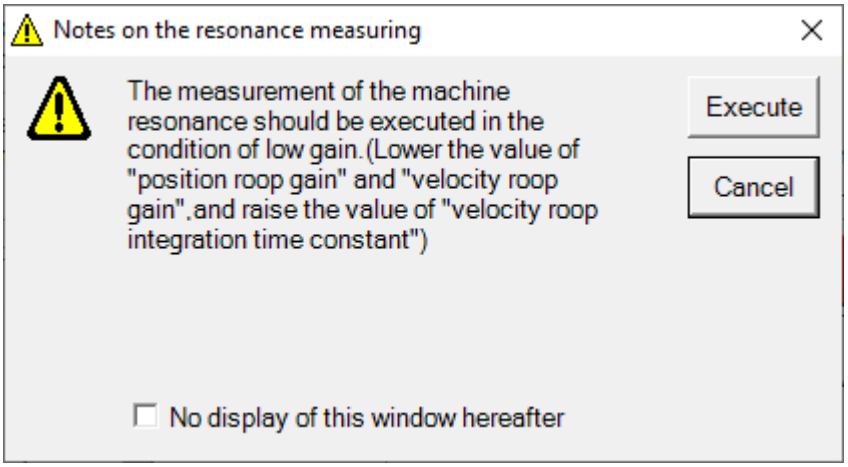


“Execute” of (3) operation button becomes effective after servo-on.



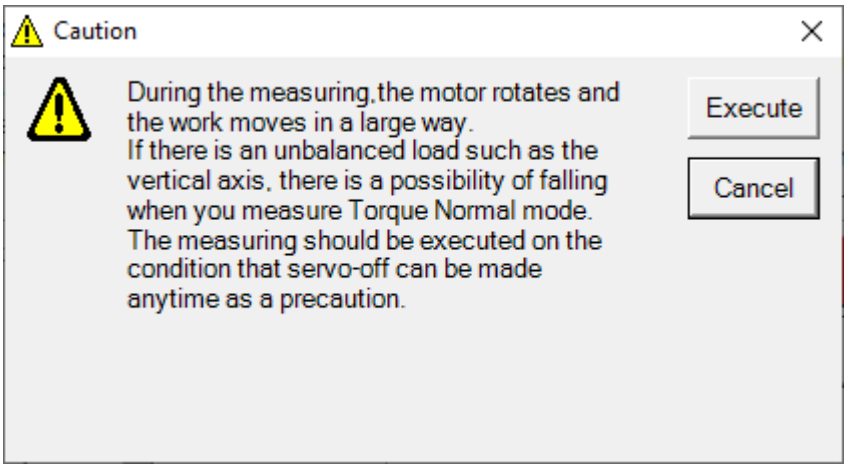
Please apply brakes by host device after servo-on.

5 Click on “Execute” on the (3) operation button, and notification window at resonance measure will appear. Confirm the window message carefully, and click “Execute”.

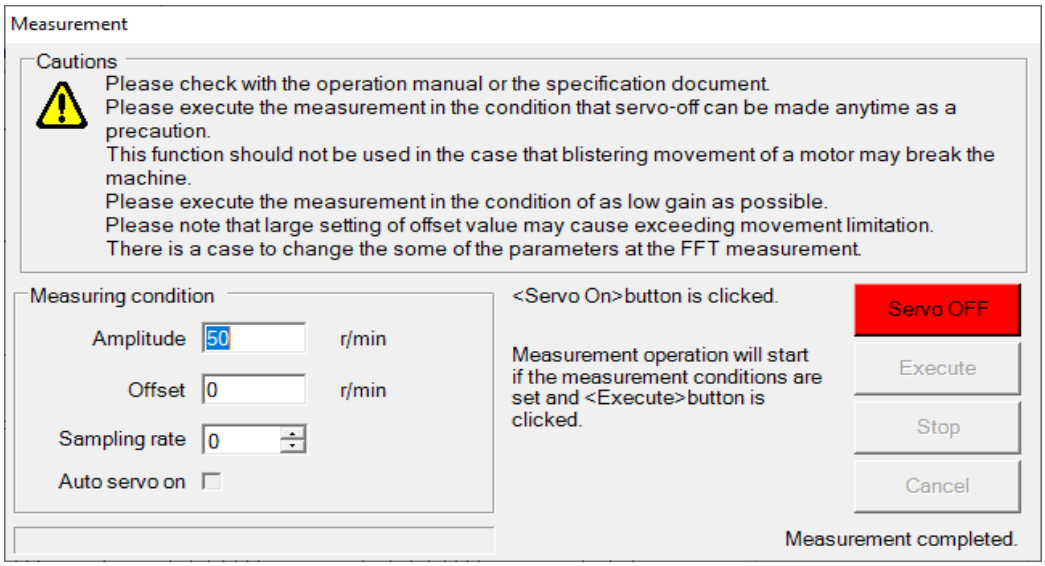


6 Caution windows will appear.
To turn on the servo by external input, turn on the servo.
Click “Execute” after servo-on, and the measurement will start.
To cancel, click “Cancel”.

Note) If you want to cancel while the measurement is in progress, click the “Stop” operation button in (3).

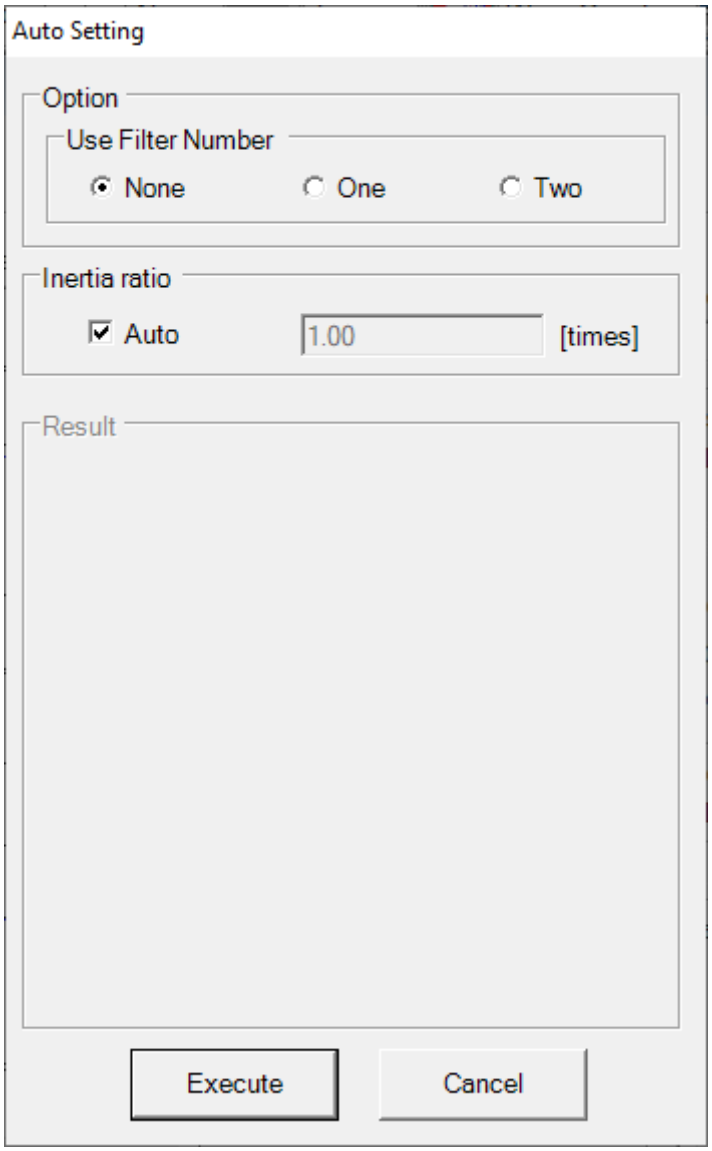


7 A measurement window closes automatically after the completion of measurement. Please click “Servo off”, when you do not close. Please apply brakes by host device before servo-off.



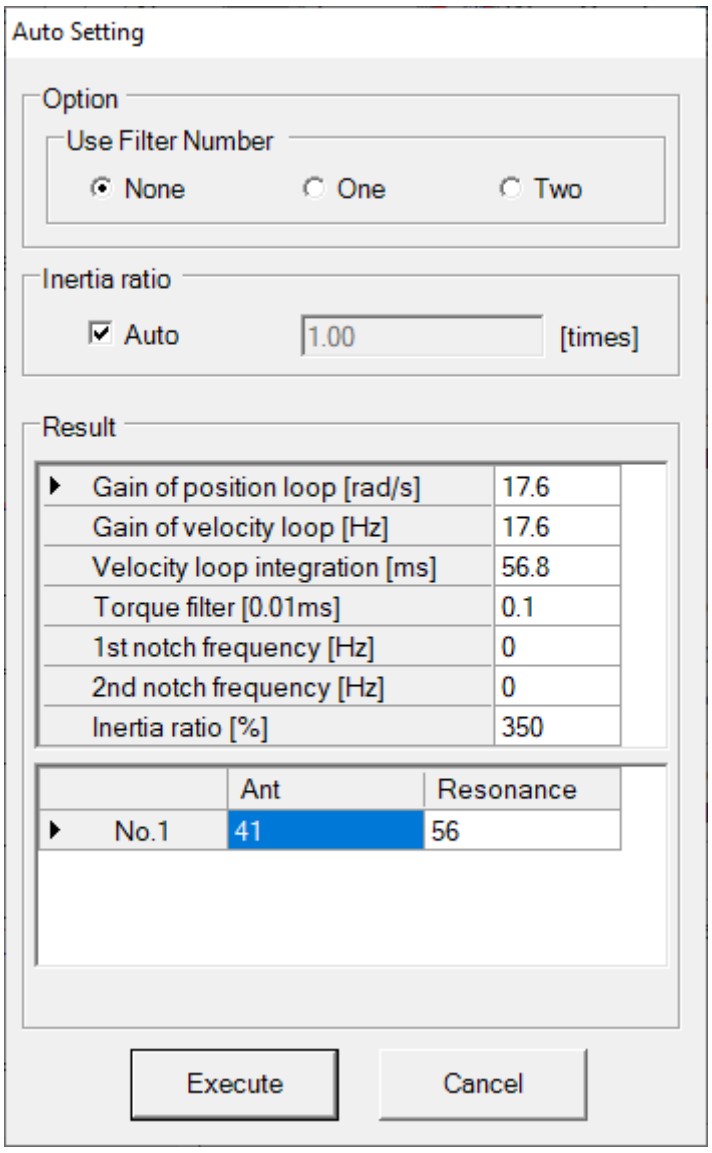
Analysis of frequency characteristics

1 Gain automatic adjustment window will open, when “Analysis” button of Frequency characteristics window is clicked.
   * This function cannot be used with the MINAS-A6 series.
   * Analysis can be done when communication with drive is connected, and after measurement is done at measurement mode “Torque Speed”. (Standard analysis cannot be done when communication is not connected)



2 Configure number of notch filter that will be used at analysis option.
3 Configure Inertia ratio. If inertia ratio is to be automatically assumed from the result of frequency characteristics measurement, then put the check on the automatic adjustment checkbox.

4 After “Execute” button is clicked, recommended control parameter will appear on the analysis result, and resonance & anti - resonance frequency and it’s opposite will appear on the bode plot frequency characteristics. (Yellow : Resonance, Green : Anti - resonance)



5 Close “Cancel” to close the Gain automatic adjustment window from the frequency characteristics.

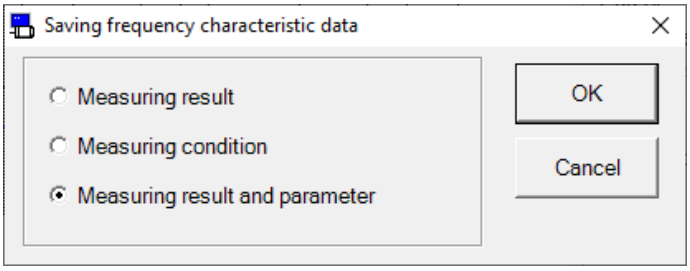
Save or reading frequency characteristics data

Measurement condition, result and parameter values at the time of measurement can be saved as file, and used again to measure with same condition, or read for reference.

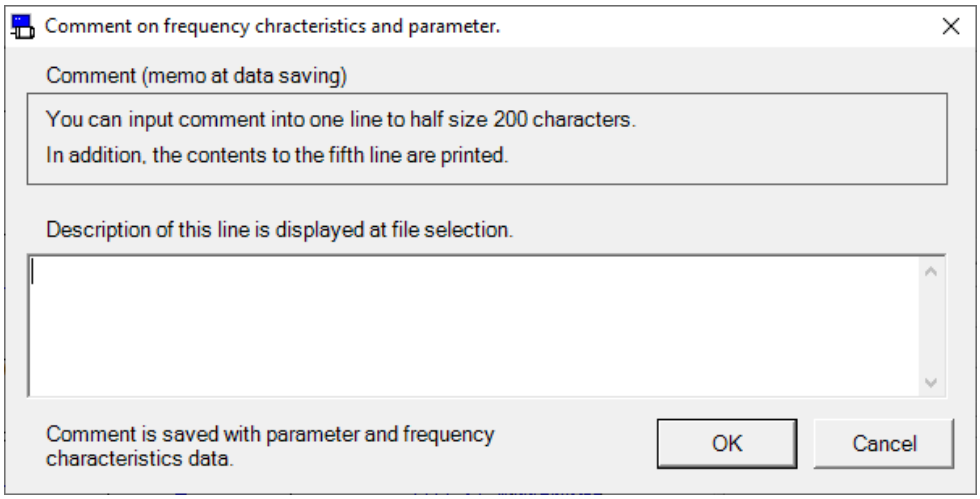
Frequency characteristics measurement result file	: ***.fcd5
Frequency characteristics measurement condition file	: ***.fcc5
Frequency characteristics measurement result & parameter file	: ***.fcp5

Saving frequency characteristics data

1 Click “Save” in toolbar.
2 Saving frequency characteristics data window will appear.



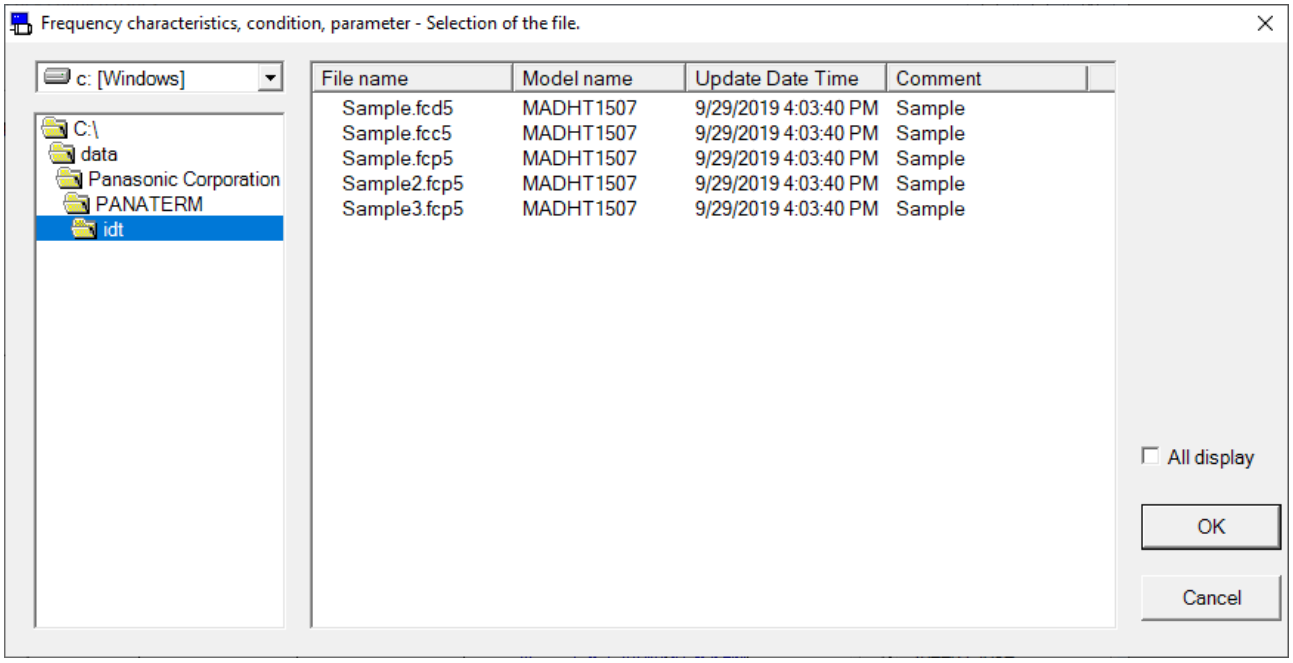
3 Select items to save, and click “OK”.
4 Comment window will appear. Below graphic shows the window when selecting “measurement condition”.



5 Click “OK”, and file dialogue will appear.
6 Input the file name to save, in this file dialogue
7 Click “Save”.

Reading Frequency characteristics data

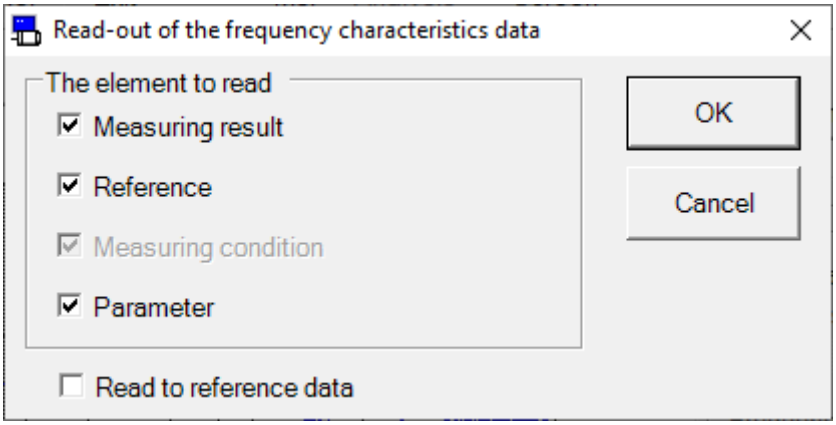
1 Click “Read” on the toolbar.



2 Select file name to read.

3 Click “OK”

4 Frequency characteristics read window will appear.



5 Select the content to read, and click “OK”
When check is put on “Read as reference data” you can read the saved measurement result as reference data. However, when the data is read as reference, the parameters will not be read. Also, data that are not once saved will not be read.

6 Content with check put on will be read.

Notes 1) For caution please execute measurement with condition where Servo can be turned on immediately.
Notes 2) Please measure the resonance of the machine, with the gain brought down to the minimum. (Lower the value of "position loop gain" and "velocity loop gain”. And raise the value of "velocity loop integration time constant")
Notes 3) Gain will be fixed to “1” at Frequency characteristics measurement.
Notes 4) The frequency characteristics screen cannot open during opening some screens. For more information please refer to page 231 “Frequency characteristics screen behavior”.
Notes 5) Result of frequency characteristics measurement can vary or show a mistaken value depending on characteristics of the equipment or measuring condition. Please take the analysis result of this feature as reference of gain adjustment.

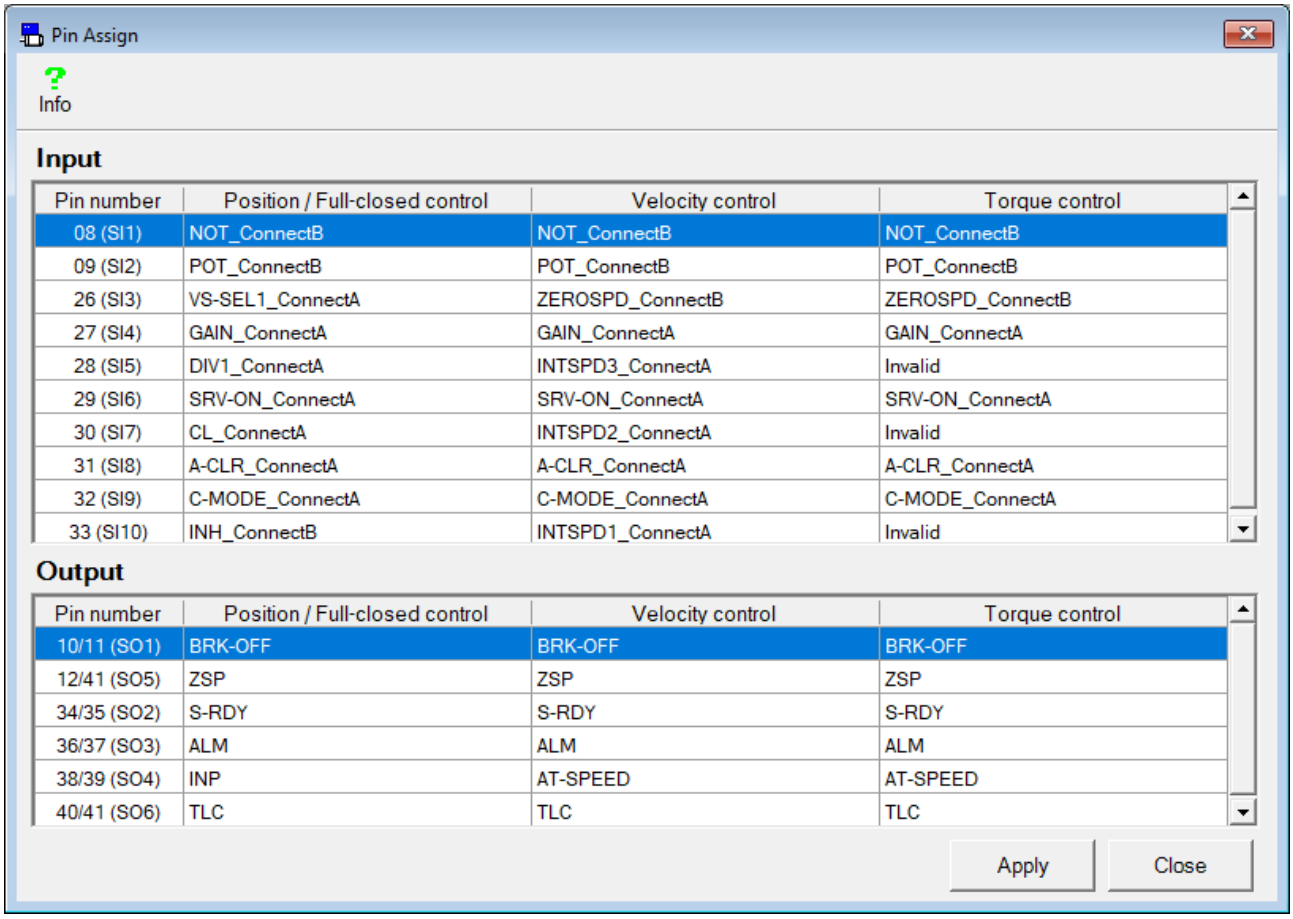
Pin assign setting screen

Assignment of input/output pin can be configured.

Open the Pin assign setting window

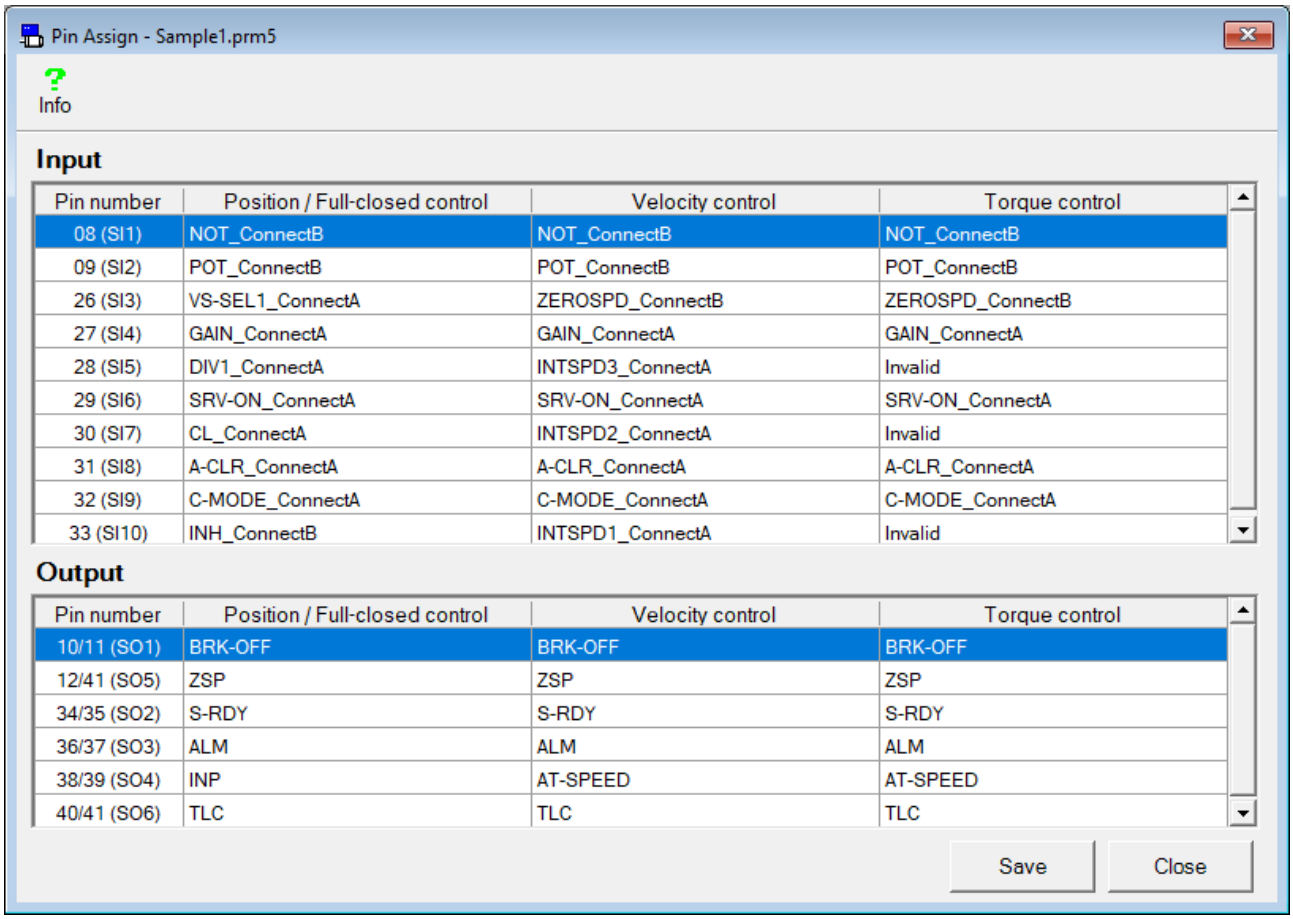
1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Other” > “Pin Assign” of the tool bar on the main screen.
3 When not communicating with driver, the selection screen of a parameter is displayed. Please choose the parameter file to edit.
4 The Pin assign setting window is opened.

<When communication with driver>



“Apply” : Sends pin assign setting to the driver.
“Close” : Close the pin assign setting window.

<When not communication with driver>

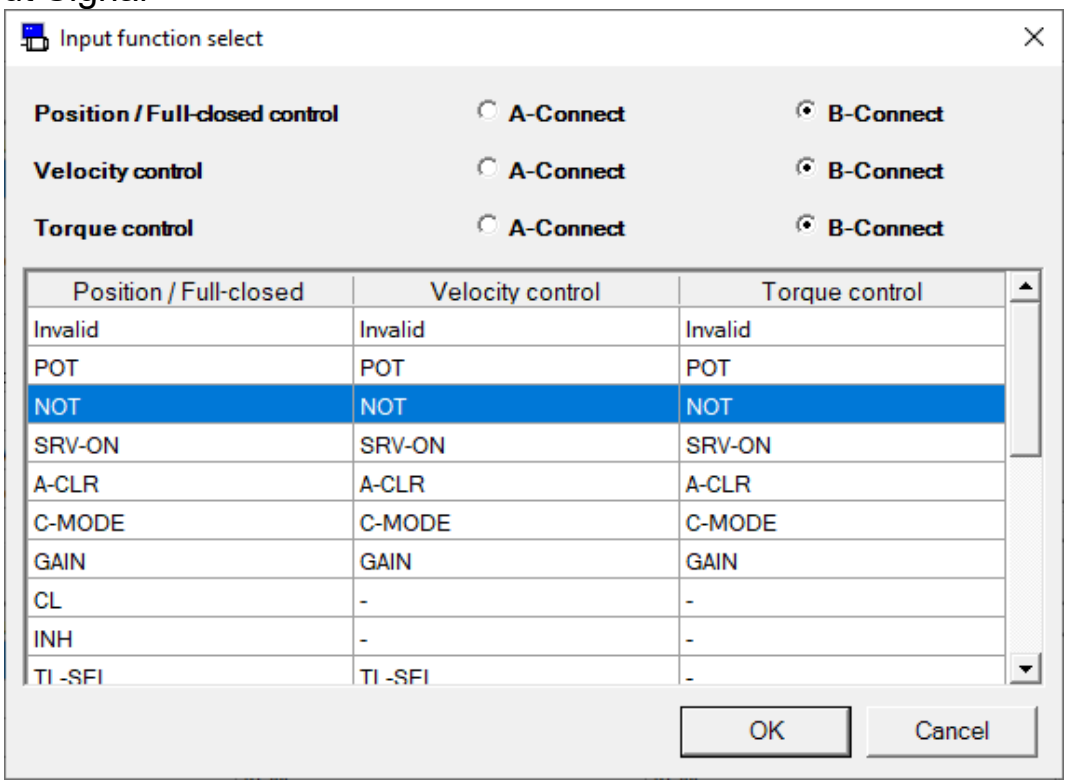


“Save” : Writes pin assign setting to the parameter files (.prm5).
“Close” : Close the pin assign setting window.

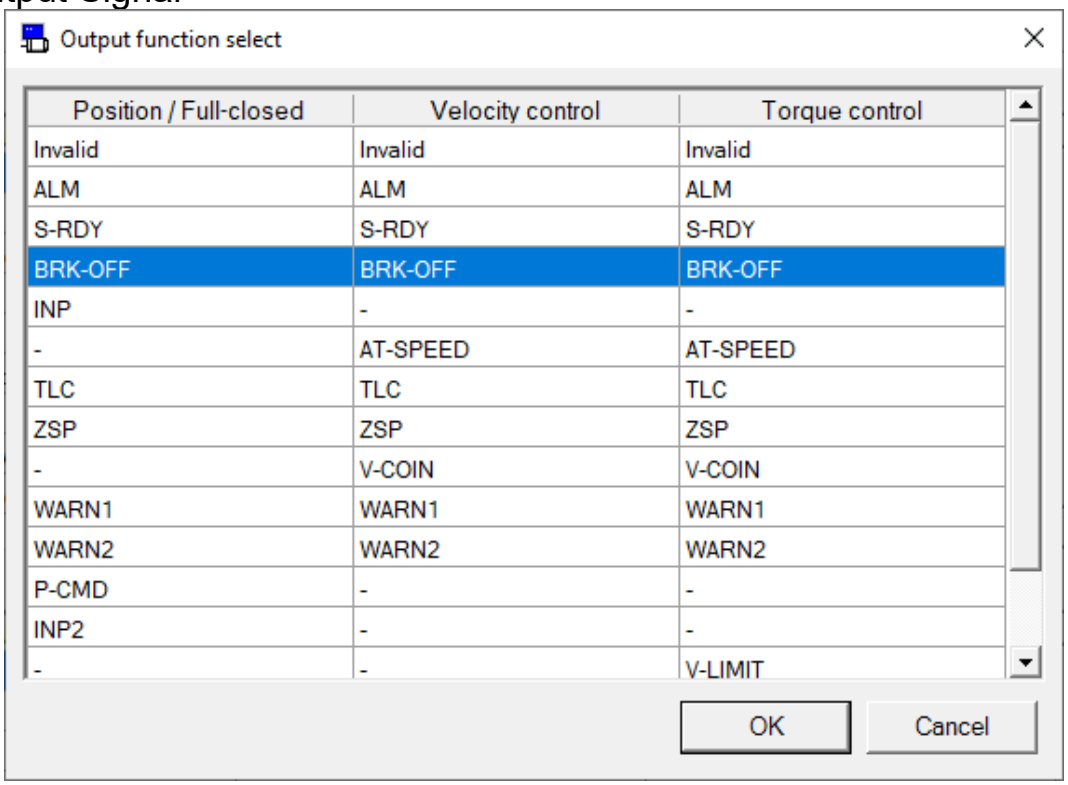
Configurations of pin assign setting

1 Double click the row of pin number to configure
2 Function select windows will appear

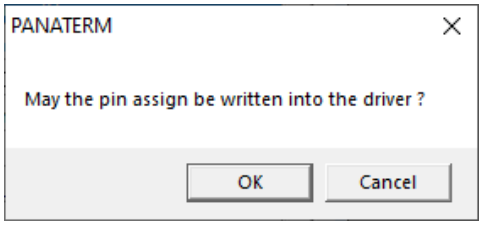
<Input Signal>



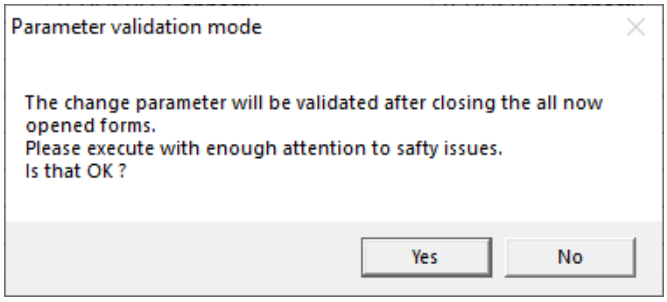
<Output Signal>



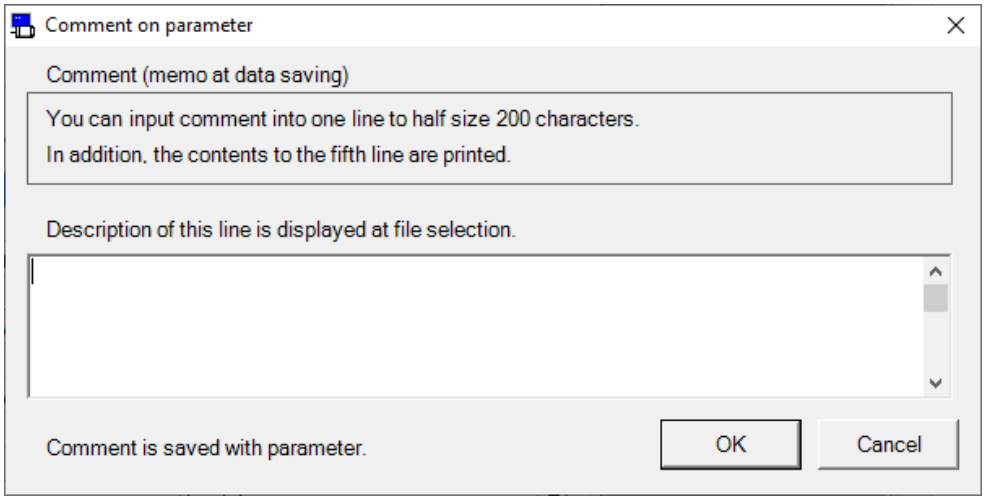
3 Select the assigning function to pin for each control mode, and connection method (When only input function is selected).
4 When “OK” is clicked at function selection window, window will go back to pin assign setting window.
5 When communication with driver, click on to “Apply”, and a screen to confirm prior to writing the drive will appear. Click “OK”, and parameters will be written onto the EEPROM of Drive. If “Cancel” is clicked, then the parameter will not be written on the Drive’s EEPROM.



Reboot the drive, and activate the new settings.



6 When not communication with driver, click on to “Save”, and a comment screen will appear.



A click of "OK" will display a file dialog. Please save to a file.

Notes 1) The pin assign setting screen can be operated when all other windows are closed. For more information please refer to page 232 “Pin assign setting screen behavior”.

Notes 2) Configuration of connection is needed for input signal. Please also unify a point of contact, when you assign the same signal to two or more control modes. For details of signal, please review the drive’s operation manual or technical reference.

Notes 3) A single input signal cannot be assigned to multiple pins. Output signal can be set to multiple pins. Moreover, when you assign the same signal to two or more control modes, please assign to the same pin.

Notes 4) New pin assign configuration will not be active unless the drive is rebooted.

Notes 5) An error message is displayed when a setup which cannot be assigned is performed. Please change a setup according to directions of a screen. Please read the operation manual of driver or technical reference about the details of a setup which cannot be assigned.

Trouble shooting screen

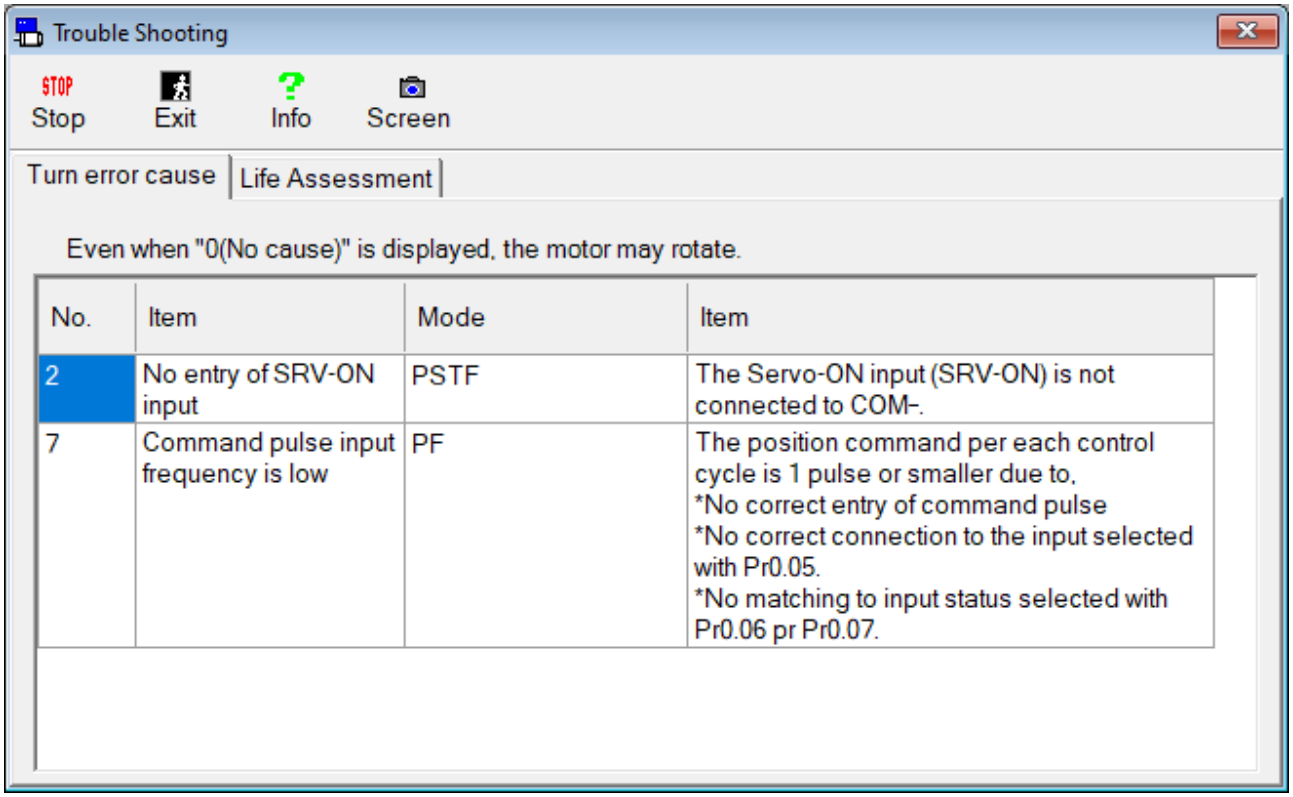
Elements causing motor not to rotate or drive's lifetime can be indicated this screen.

Note) Trouble shooting cannot be performed through RS232 communication.

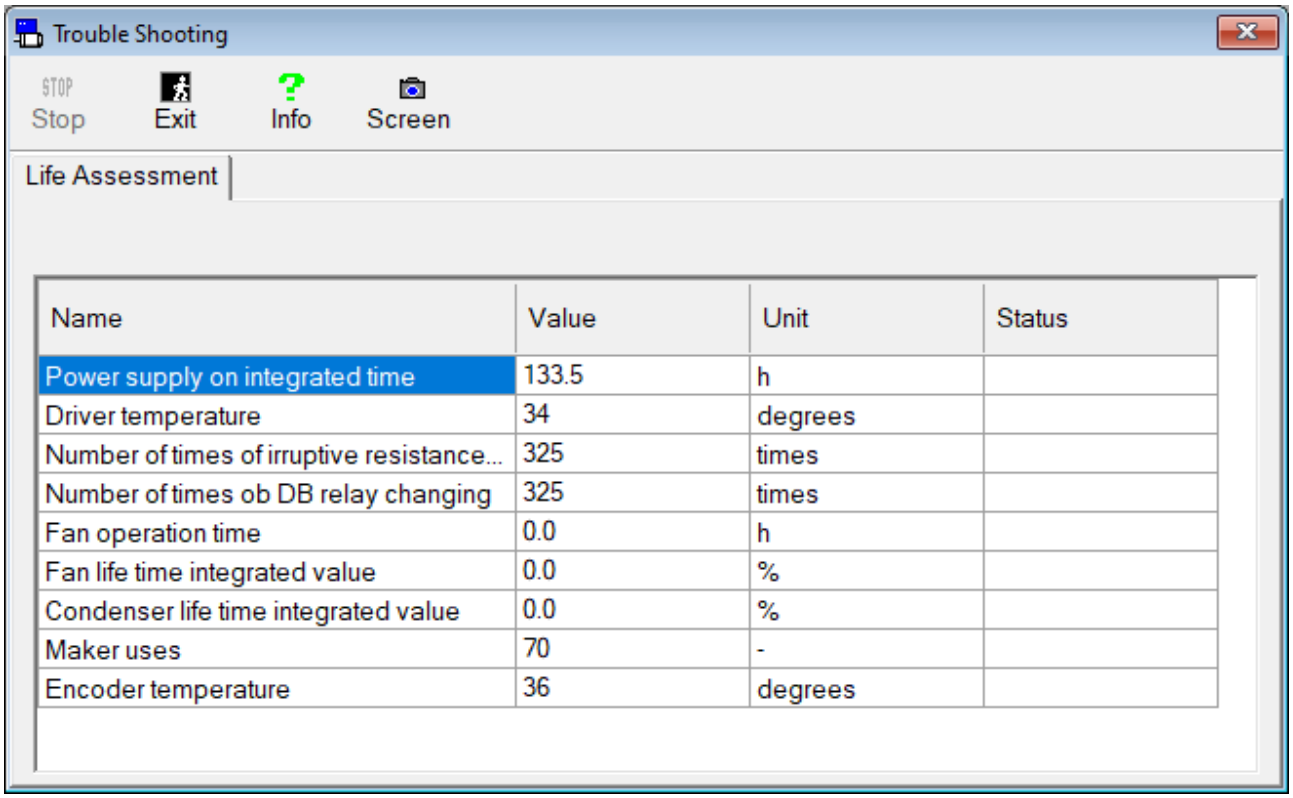
Open the Trouble shooting window

1 Start "PANATERM".
(Please refer to Article 5. Start up and Close down in details)
2 Click "Other" > "Trouble shooting" on the tool bar of the main screen.
3 When not communicating with driver, the selection screen of a parameter is displayed. Please select the parameter file.
4 The Trouble shooting window is opened.

<When communication with driver>



<When not communication with driver>



Close the Trouble shooting window

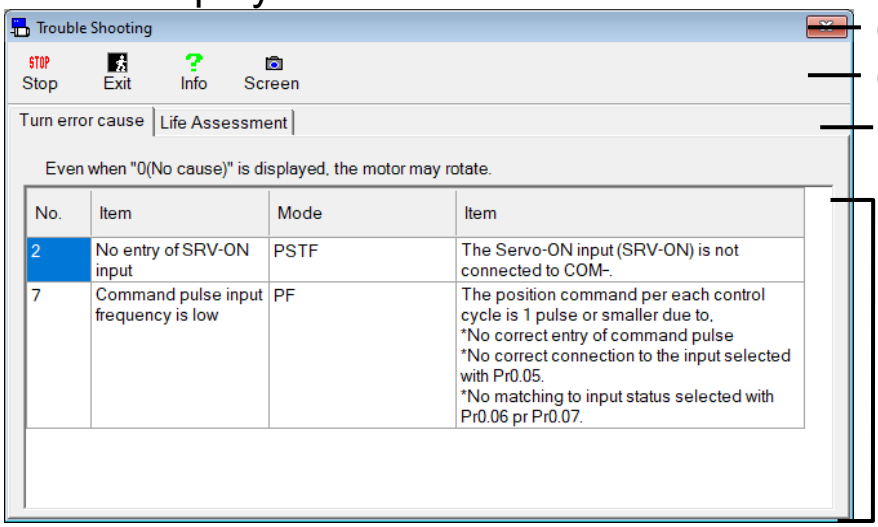
Click

(Exit) on the tool bar.

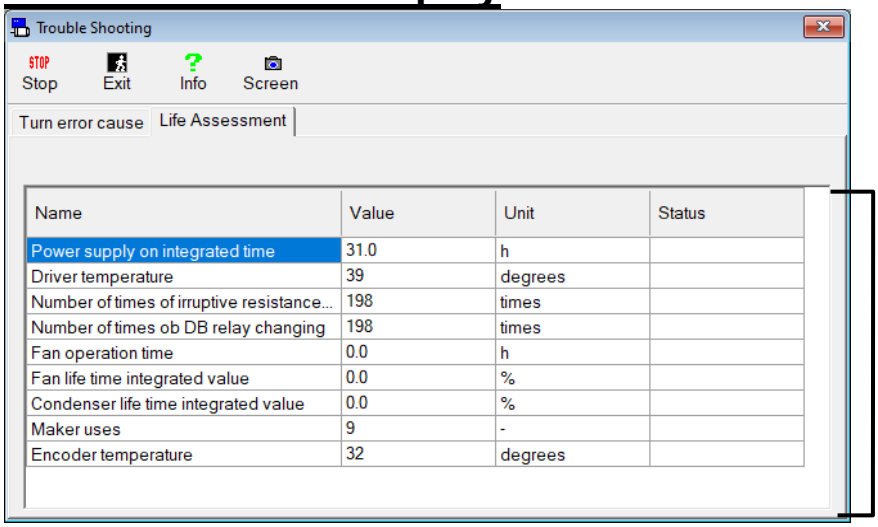
Structure of trouble shooting window

Turn error cause display

This is displayed when communication with driver only.

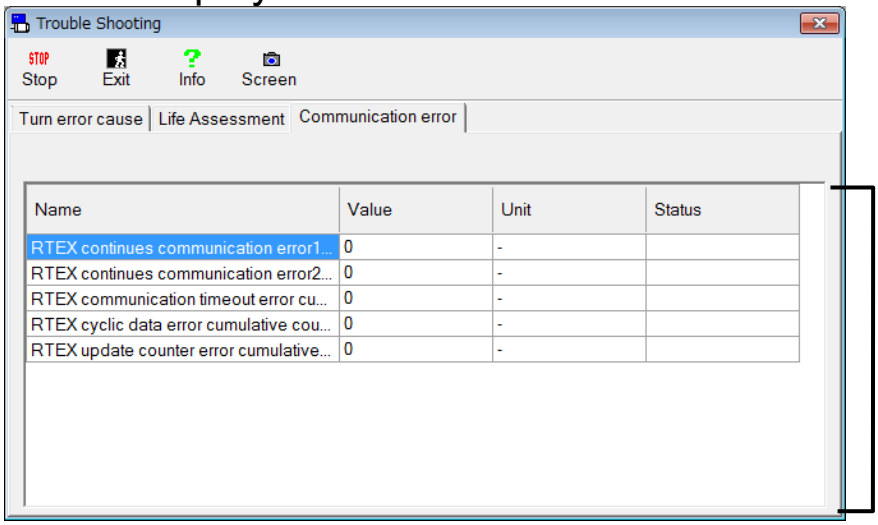


Life Assessment display



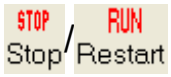
Communication error

This is displayed when communication with driver only.



(1) Title bar
Window operation can be done

(2) Tool bar

	Stop/Restart	Stop/Restart update of trouble shooting window.
	Exit	Close trouble shooting window.
	Information	The relevant page of the operating instructions for driver. (Only MINAS-A5 is supported)
	Screen	Capture screen and save as file.

(3) Tab
Switch to “Turn error cause”, “Life Assessment”, or “Communication error”.

(4) Content area
“Turn error cause”
Indicates element is being obstacle to rotation.
* There will be cases where “0” (No element) is indicated even with the motor rotating.

“Life Assessment”
Indicates element is lifetime evaluation.
The judged result will appear on the status as colored depending on the judged lifetime.
Green : Drive to be within standard operation.
Yellow : Drive is close to replacement
Red : Drive suggested for replacement
White : Judged level is out of configured range

* Accuracy of evaluated lifetime’s accuracy may be lowered when in application with control electricity being shutdown frequently, because the lifetime information is saved in 30 minute cycle. Drive may operate standardly even if the status is red. Please refer to this result as reference.

“Communication error”
Indicates element is RTEX communication error counter information.
* Communication error tab is displayed during communicating with network type driver (MINAS-A6NF etc.) corresponding the RTEX communication error counter monitoring function.

Notes 1) The trouble shooting screen cannot open during opening some screens. For more information please refer to page 232 “Trouble shooting screen behavior”.

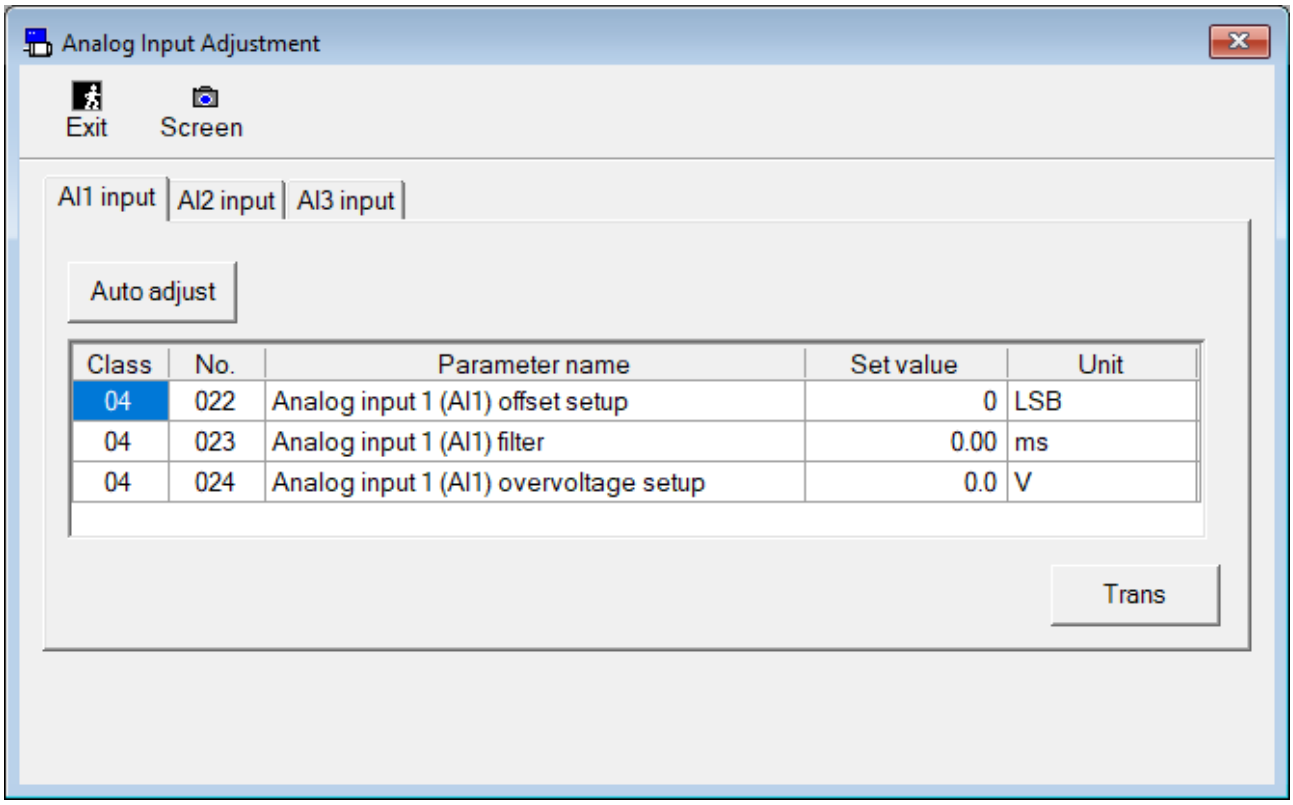
Analogue input adjustment screen

Offset of analogue input signal can be automatically adjusted.
Settings of filter or over voltage can be manually adjusted.

Note) Analogue input adjustment cannot be performed through RS232 communication.

Open the Analogue Input Adjustment window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Other” > “Analogue input” of the tool bar on the main screen.
3 The Analog Input Adjustment window is opened.

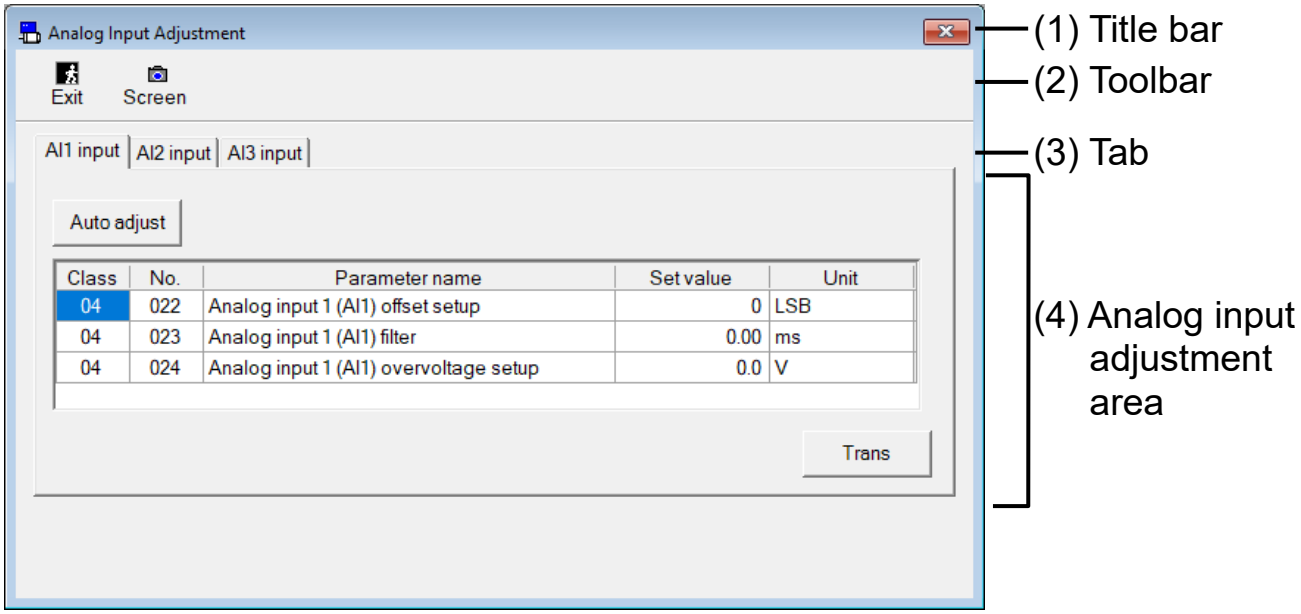


Close the Analogue Input Adjustment window

Click

(Exit) on the tool bar.

Structure of Analog input adjustment



(1) Title bar
Windows can be operated.

(2) Tool bar

Exit	Exit	Close analogue input adjustment window
Screen	Screen	Capture window, and save as file.

(3) Tab
Switch Analogue input signal

(4) Analog input adjustment area

“Automatic adjust”

Automatic measurement of offset and setting of analogue input can be done by clicking.

“Parameter”

Configured parameter will be indicated. Setting value can be directly changed.

* Parameter change will be cancelled when tab is switched without “Trans” button is clicked being pressed.

“Trans”

Write the indicated parameter into the drive’s EEPROM.

Notes 1) The analog input adjustment screen cannot open during opening some screens. For more information please refer to page 233 “Analogue input adjustment screen behavior”.

Z phase search screen

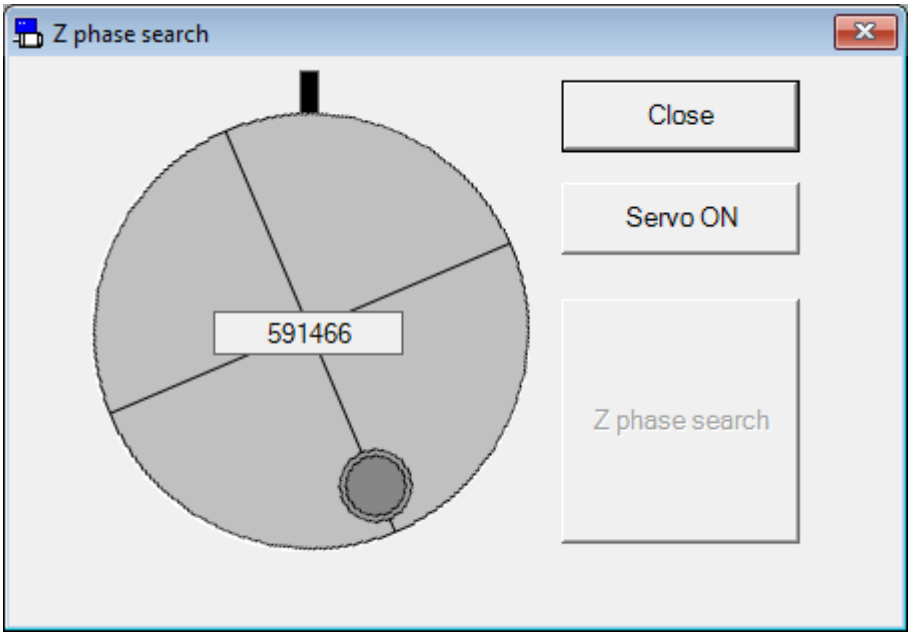
Will turn the Servo On automatically without input, and rotate motor to reach the point where Z phase output will turn on.

Note) Please make sure that the notification and implementation area written on the drive's operation manual or technical reference before using this feature.
It is very dangerous when connecting the motor to load with Servo being ON after Z phase search, because of the drastic change of inertia ratio may occur making the motor to have resonance. Please make sure that the Servo is turned OFF. Also, have the main power turned off, or have motor wire pulled off, to disable the motor's ability to rotate, and then conduct the operation.
Z phase search cannot be performed through wireless or RS232 communication.

Open the Z phase search window

1 Start "PANATERM".
(Please refer to Article 5. Start up and Close down in details)
2 Click "Other" > "Z phase search" of the tool bar on the main screen.
3 The Z phase search window is opened.

* Z phase search window cannot be used when Trial run window is opened, front panel is used, or Servo is turned ON by input from outside. Close the trial run function and front panel is free before using the Z phase search window.

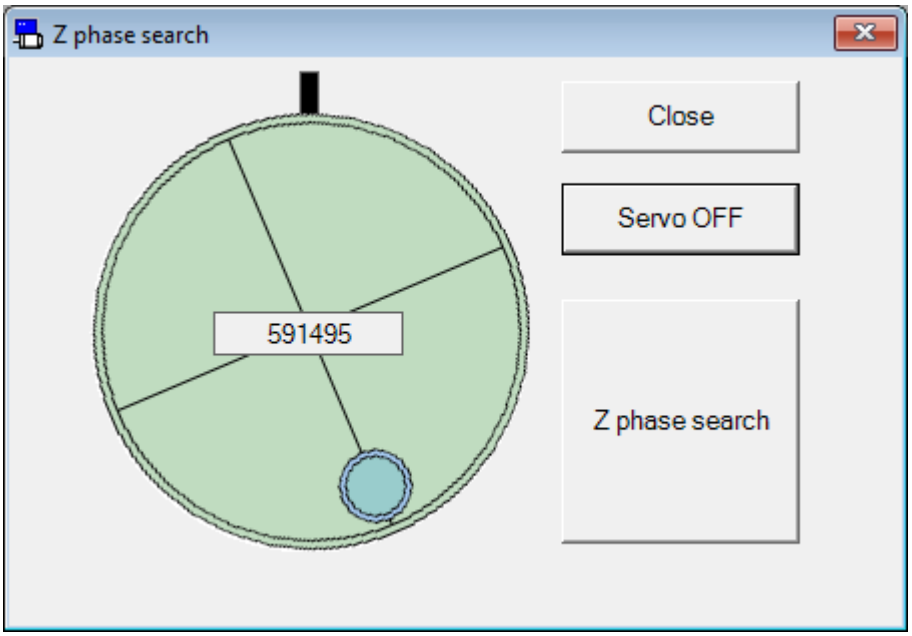


Close the Z phase search window

Click “Close” on the Z phase search window.

Procedure for Z phase search

1 Click “Servo ON”.
2 Click “Z phase search”.
3 Motor will rotate in CCW direction towards Z phase at 60 r/min speed.



Notes 1) For caution, please have the motor ready for power shutdown when conducting the above.
Notes 2) The Z phase search screen cannot open during opening some screens. For more information please refer to page 234 “Z phase search screen behavior”.
Notes 3) When drive is not in ready status (Alarm or Main power source is cut off), front panel is used except for monitor mode, or Servo ON is input from outside, then the Z phase search window will not be able to open or error will be on screen during execution. Please re - execute after these status is eliminated, and the Z phase search window is closed.

Setup Wizard

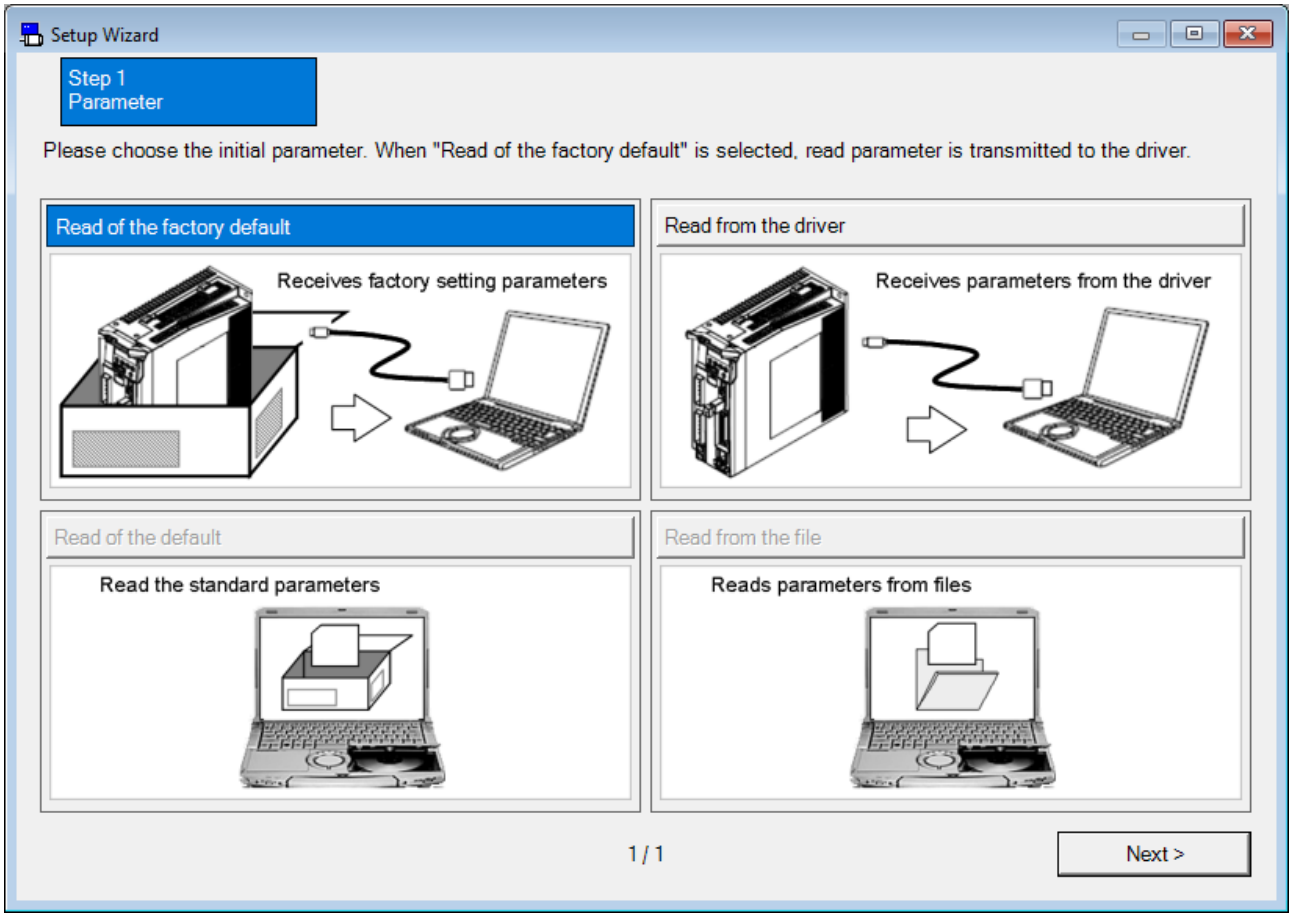
Please follow the instruction of the screen.
So a minimum parameter necessary for driver's operation can be set.

Note) The setup wizard cannot be performed through RS232 communication.

Open the Setup Wizard window

1 Start "PANATERM".
(Please refer to Article 5. Start up and Close down in details)
2 Click "Other" > "Setup Wizard" of the toolbar on the main screen.
3 The Setup Wizard window is opened.

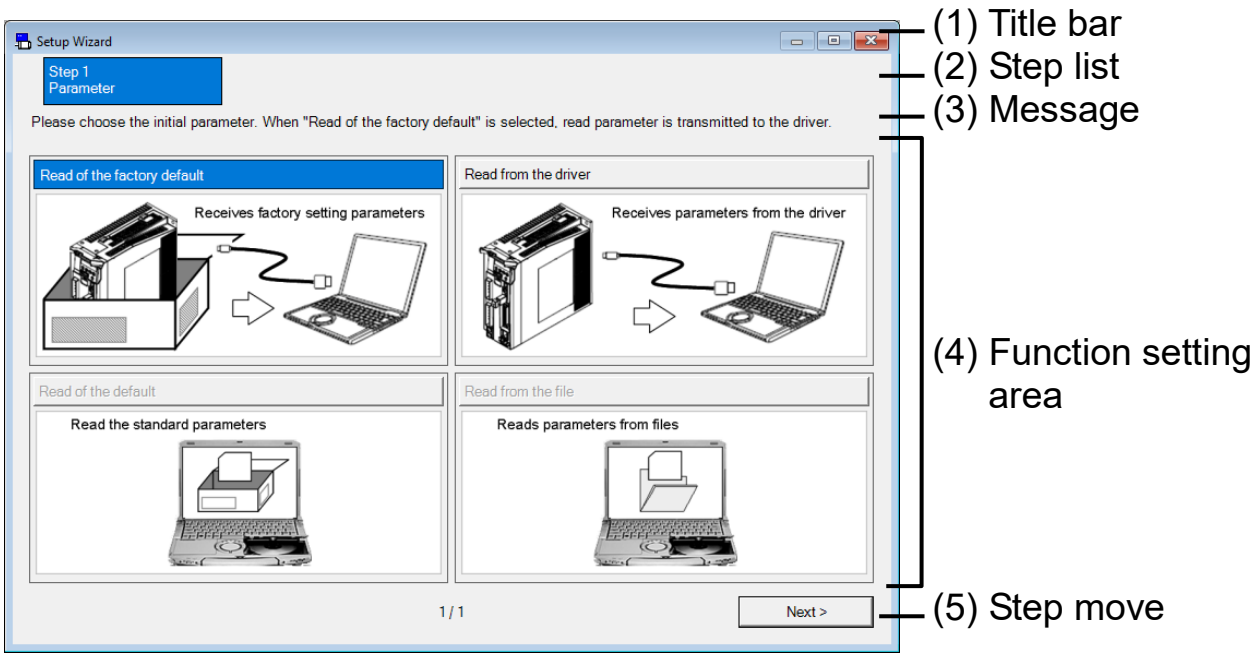
* The Setup Wizard window cannot be used when Servo is turned ON by input from outside.



Close Setup Wizard window

Click of upright on the window.

Structure of Setup Wizard Screen



(1) Title bar
The origins of reference of parameters reference are displayed.
Present control mode is displayed when communication with the driver.
And you can operate Window.

(2) Step list
The position seen from the whole of a present step is displayed.

(3) Message
An easy explanation of the content set in a present step is displayed.

(4) Function setting area
Each function is set.

(5) Step move
Switch to present step.

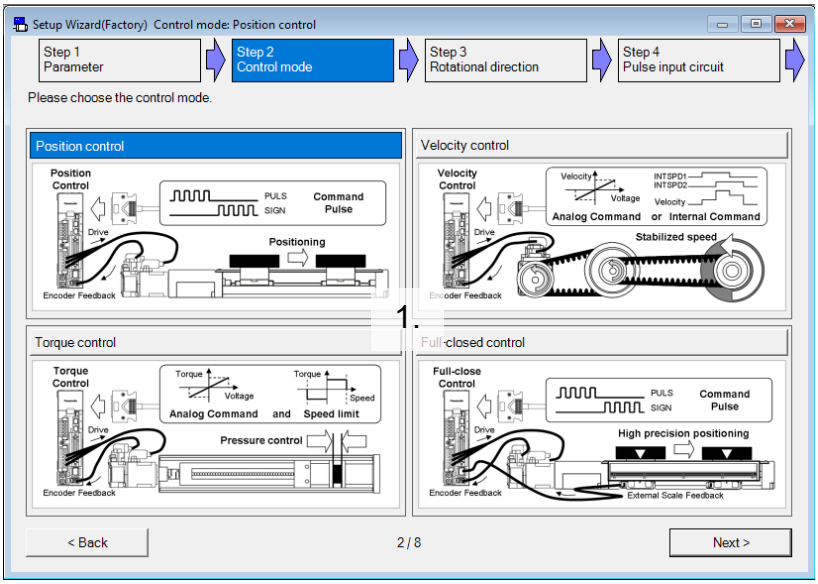
“Back”	The previous step is displayed.
“Next”	The next step is displayed.
“Interrupt”	Drive reset is interrupted, and close the setup wizard.
“Finish”	Close the setup wizard.

Setting method of Setup Wizard

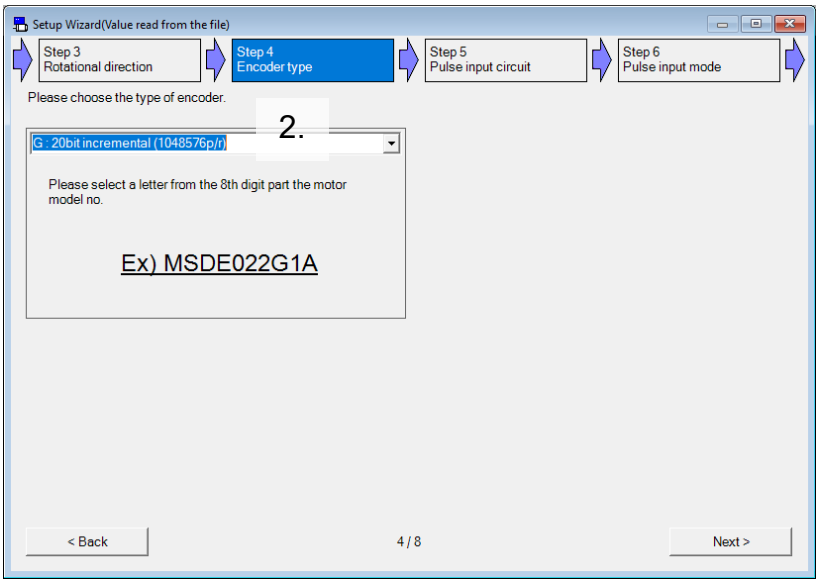
1 Select the origins of reference of parameters, and click “Next” button.

* When read from the default setting, the setting result is cleared. When start from present parameter, please select “Read from the driver” or “Read from the file”.

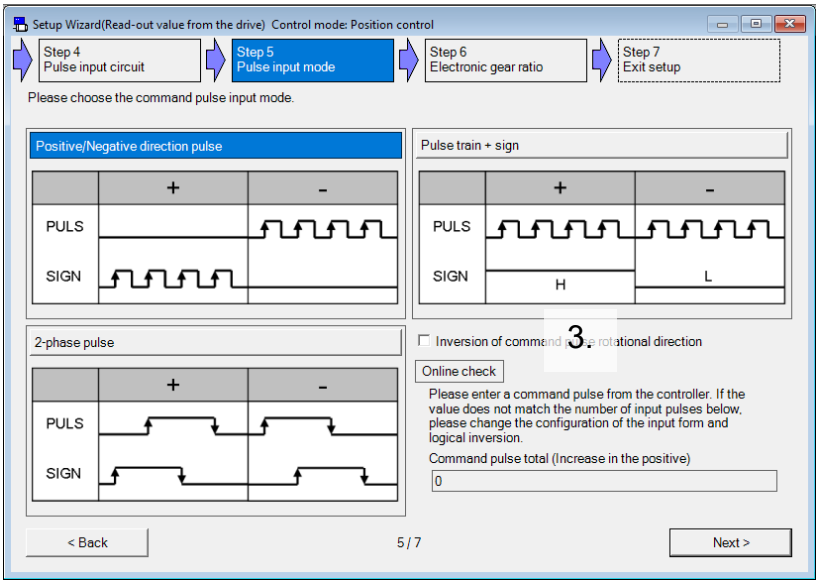
2 You set the functions according to usage. And please click “Next” button.
The setting method has the following pattern.



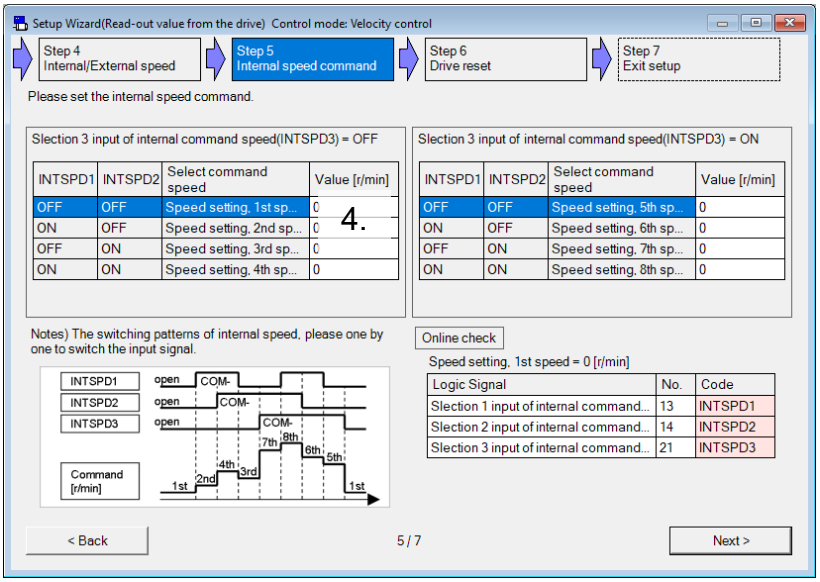
1. Select 2 – 4 panel:
You can select a radio button or image click.



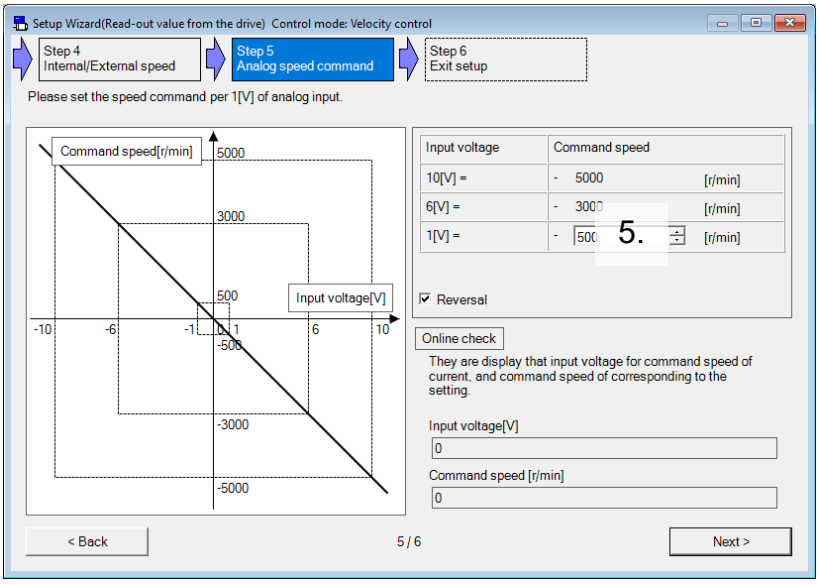
2. Combo box:
You can choose only one of the items.



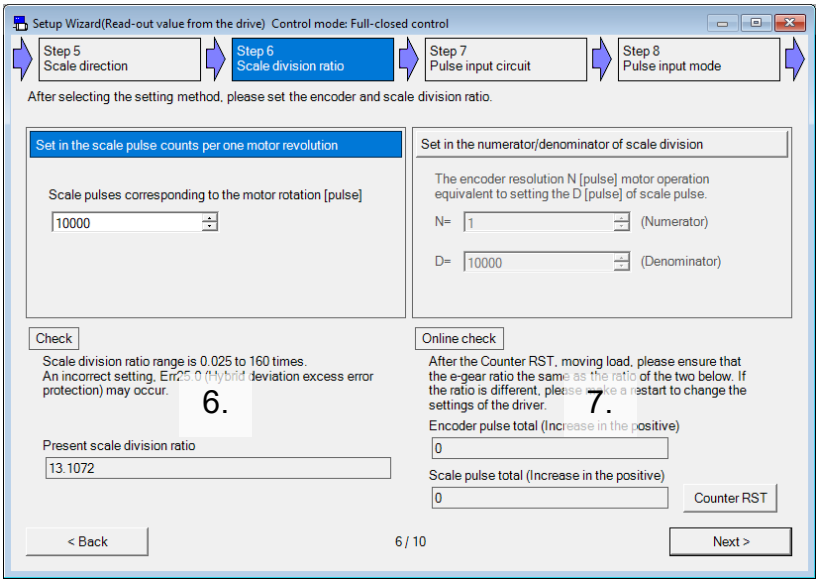
3. Check box:
You can switch the setting to check it.



4. Input value (cell):
Please move to the next cell after input. The setting will be saved.



5. Input value (single):
For keyboard input, please press [Enter] key to determine the setting value. If in the “Select 2-4 panel”, please enter after selecting the panel.

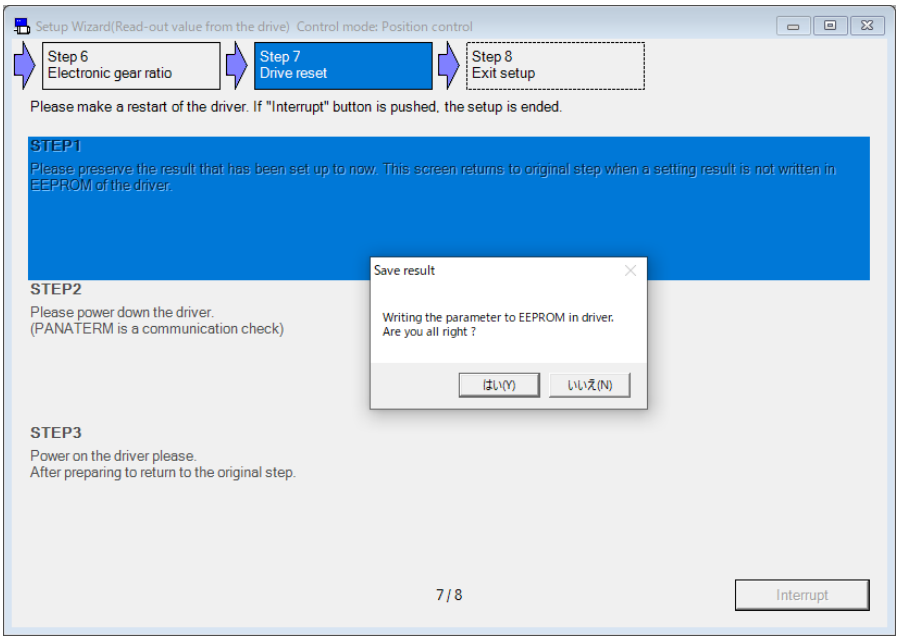


6. Check:
   This is the check item of setting contents.
   Please reference configuration.

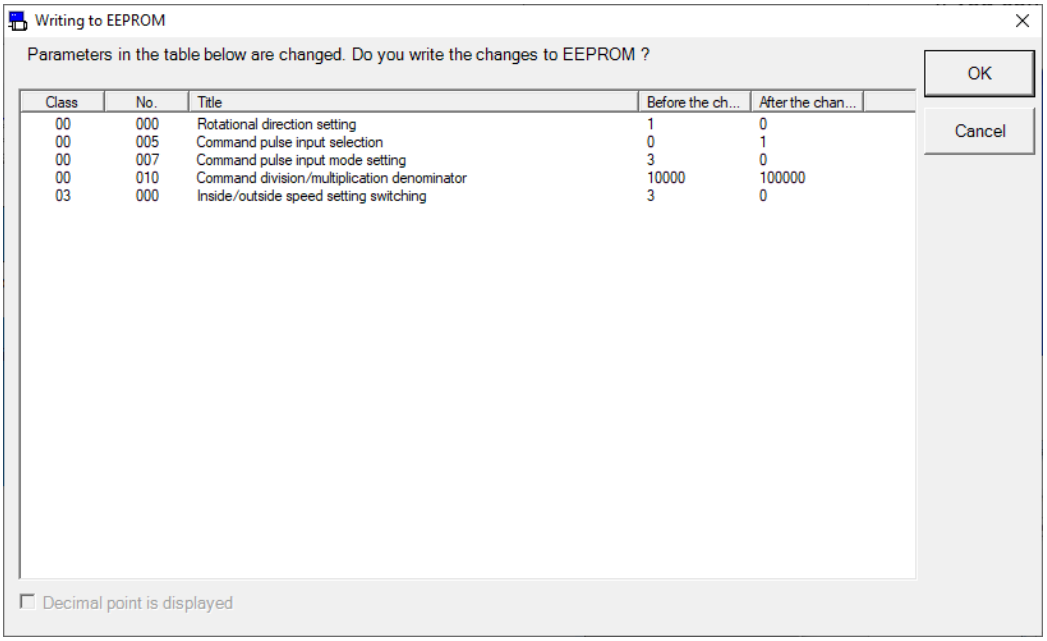
7. Online check:
   This is the check item of setting contents.
   This is displayed when communication with the driver.
   Please reference configuration.

* Step of the setup wizard displays the results change depending on the previous setting steps.

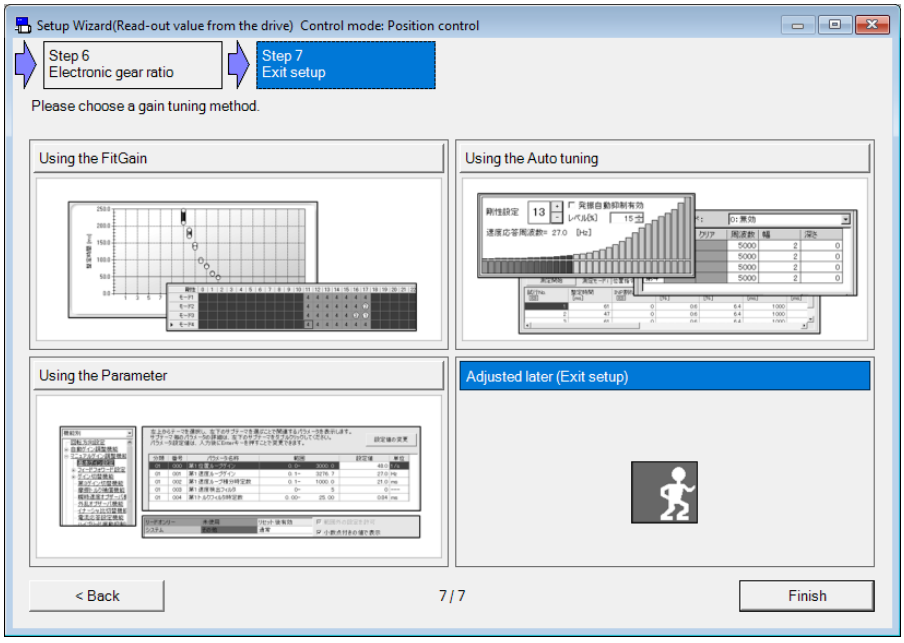
* When you change a parameter is valid after, may be inserted “Drive reset” into the step list. Please follow the instructions on the screen.



3 Please save your settings before you exit the setup.
If you do not communicate with the driver writes to a parameter file. (The extension is ".prm5").
If you communicate with the driver writes to EEPROM in the driver.



4 Please select a gain tuning method and click "Finish" button.



5 Setup wizard screen is closed, according to the result of the selection screen is displayed.

Notes 1) Your first step “Read from the driver” or “Read from the file” if you select, you may not work according to the configured of the wizard by the other parameters.
(Example)
- Selection input of internal command speed was changed to a different function by the pin assign setting
- Electronic gear switching function is valid and 1st numerator of electronic gear
- Etc.

Notes 2) The changes in the setup wizard will be reflected in the parameters at any time. To return to the state before starting the setup wizard, the driver without writing to EEPROM in the driver please does the power reset.

Notes 3) The online check item in the function setting area is displayed when communication with the driver.

Notes 4) Parameter set on this screen is inputted into the driver. PANATERM does not maintain this value, please perform the recording it to EEPROM of driver after completion of setting.

Notes 5) The setup wizard screen cannot open during opening some screens. For more information please refer to page 234 “Setup wizard behavior”.

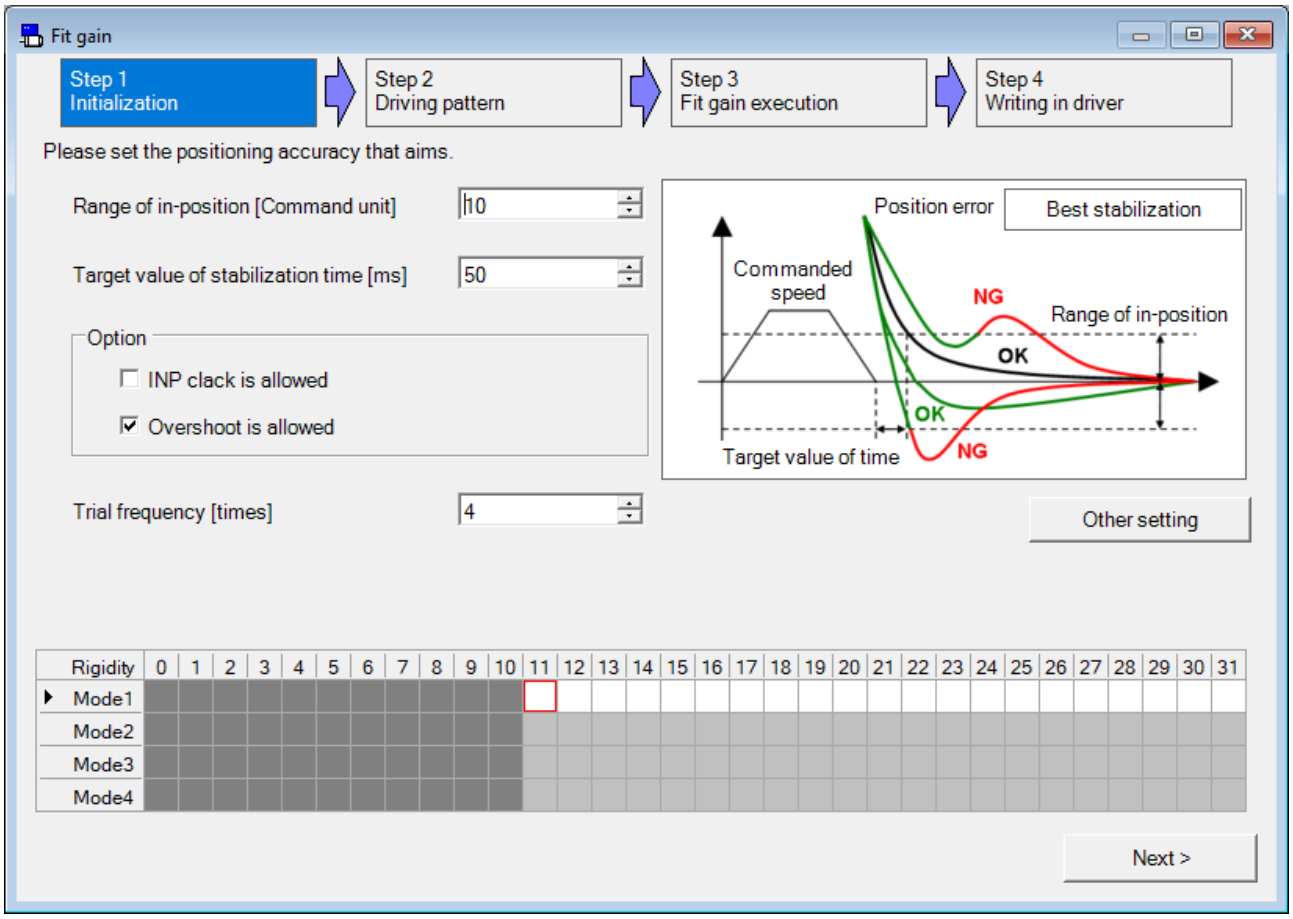
Fit gain screen (Standard)

Explore the best gain settings automatically by repeating the positioning between two points.

Note) The fit gain function is rigidity and mode at real-time auto-gain tuning may oscillate for a short time in the course of raising the load. May be suppressed by the adaptive filter and auto-oscillation detection, just in case, on ensuring the safety of the operating range, please execute in the condition that servo-off can be made anytime as a precaution. Please refer to application scope and remarks specified in the driver manual or technical reference.
The fit gain cannot be performed through wireless or RS232 communication.
In addition, the fit gain function is disabled for some special motors. For details, please contact the customer technical consultation desk.

Open the Fit gain window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Fit gain” of the tool bar on the main screen.
3 The Fit gain window is opened. (The figure of the next page)



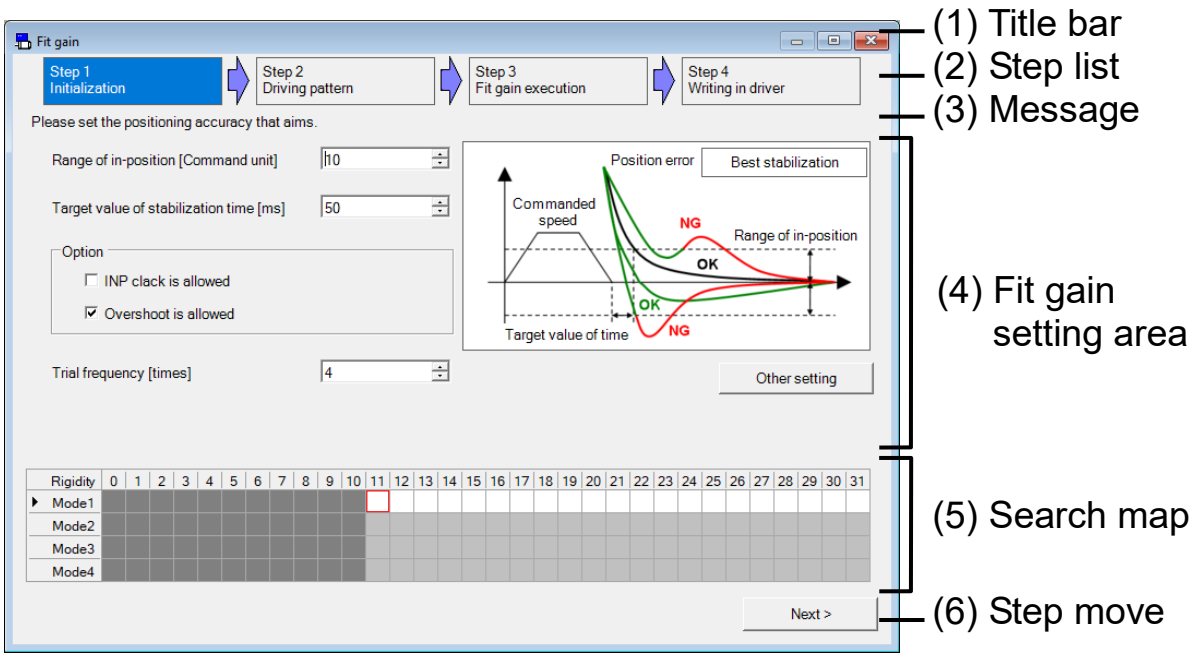
* If the log on of fit gain window is opened, please select “Standard position control”.

* The fit gain window cannot be used when velocity control mode and torque control mode.

Close the Fit gain window

Click ☒ of upright on the window.

Structure of Fit gain Screen



(1) Title bar
You can operate window.

(2) Step list
The position seen from the whole of a present step is displayed.

(3) Message
An easy explanation of the content set in a present step is displayed.

(4) Fit gain setting area
You can set from step 1 to step 4.

(5) Search map
A combination of rigidity and mode is displayed.
Each cell is displayed in a number of actual trials.
In addition, background color changes the meaning.

White: Explore	Silver: Unexplored	Gray: Excluded
Lime: Completion	Red: Vibration detection	Fuchsia: Failed

(6) Step move
Switch to present step.

“Back”	The previous step is displayed.
“Next”	The next step is displayed.
“Finish”	Close the fit gain window.

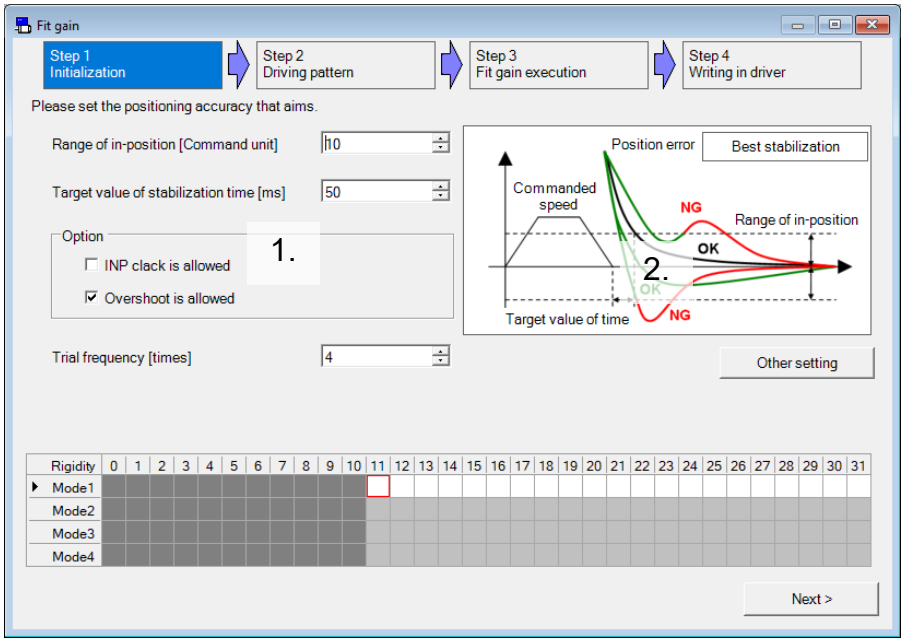
Applicable condition of fit gain

The fit gain must satisfy following conditions in order to execute.

- Real-time auto-tuning can be applied to the load and driving pattern.
  (The velocity more than 100[r/min], the acceleration more than 2000[r/min/s], the time more than 50[ms], and so on. For more information please refer to the driver manual or technical reference.)
- When you move the load, easy monitor on the gain tuning screen will must be updated correctly.
  (Command interval must be at least 1.5 seconds, Stabilization time can measure, and so on.)
- Adaptive filter can be applied the load and driving pattern.
  (Nonlinear effect is small, the acceleration less than 30000[r/min/s], and so on. For more information please refer to the driver manual or technical reference.)
- In addition, must work correctly in a state of motor control.

Method of performance of fit gain

1 Please set the positioning accuracy (Range of in-position, Target value of stabilization time) that aims.



1. Setting item: Set the positioning accuracy that aims.

“Range of in-position”

Set the range of in-position.

“Target value of stabilization time”

Set the target value of stabilization time.

“Option”: Specify the conditions of auto-search.

INP clack is allowed:

Adjustment index measure data for the shorter one either of the following time. That time from start of command to next start of command or measurement time.

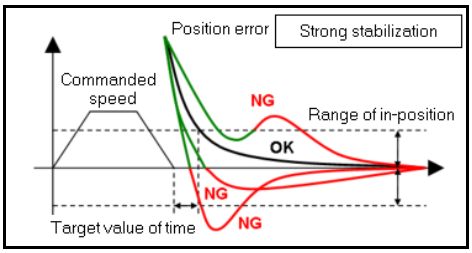
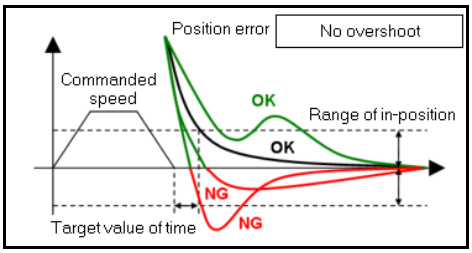
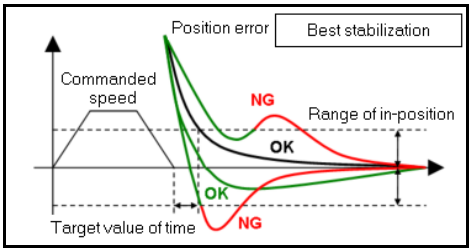
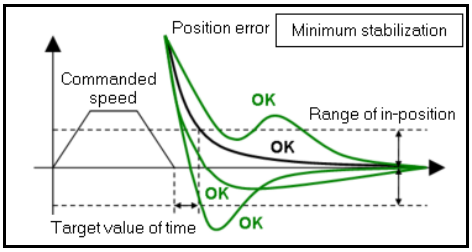
Overshoot is allowed:

Adjustment index measure data for measurement time.

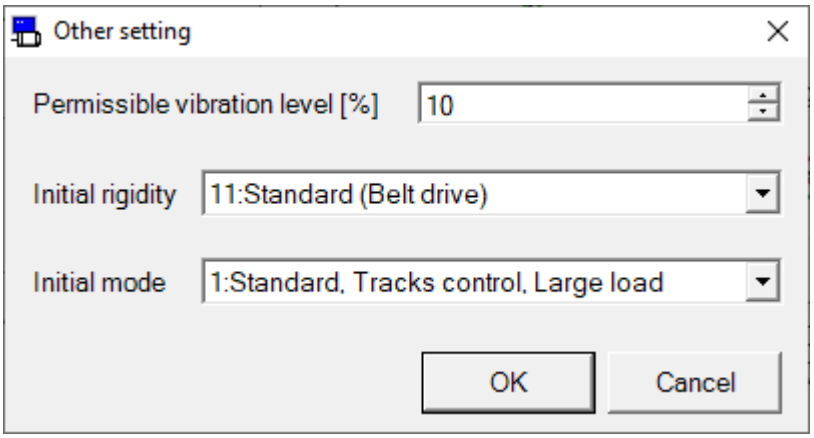
“Trial frequency”

Set the number of repeat to try for a combination of machine rigidity and mode.

2. Information figure: Switched according to “Option”.

	☐INP clack is allowed	☑INP clack is allowed
☐Overshoot is allowed		
☑Overshoot is allowed		

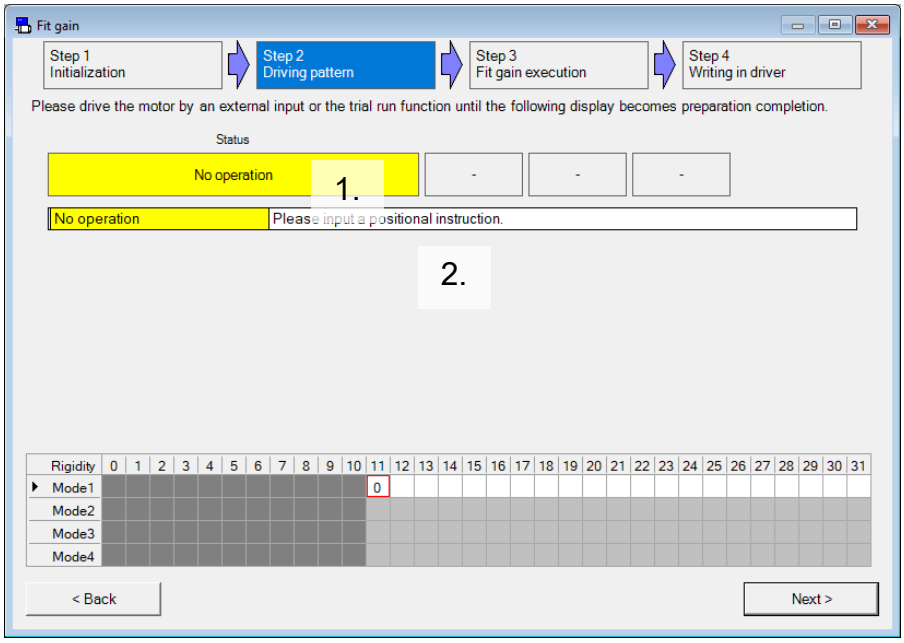
2 If you change the permissible vibration level, initial rigidity and initial mode, click “Other setting” button and set its.



“Permissible vibration level”
Set the permissible vibration level.
“Initial rigidity”
Set the real-time auto tuning rigidity of first measurement.
“Initial mode”
Set the real-time auto tuning mode of first measurement.

3 Please “Next” button click when you are finished setting, and go to Step 2.

4 Please drive the motor by an external command input or test drive function to confirm the driving pattern.



1. Status: The current status and the value associated with it are displayed.

2. Details: The current status and specific instructions to do next.

Status	Back color	Instructions
No operation	Yellow	Please input a positional instruction.
Trying	Yellow	Please repeat the operation command.
Search of initial rigidity	Yellow	Search of initial rigidity. Please repeat the operation command.
Fit gain preparation completion	Lime	Please move to the fit gain execution screen of STEP3 with a lower right button.
Stabilization time measurement failed	Fuchsia	Stabilization time measurement failed. Please do the following measures. - Please lengthen waiting time from the disbursement completion of a positional instruction to the following instruction input. - Please return to STEP1, and lower the initial stiffness below a left, present rigidity. - Please return to STEP1, and widen the range of the positioning completion.

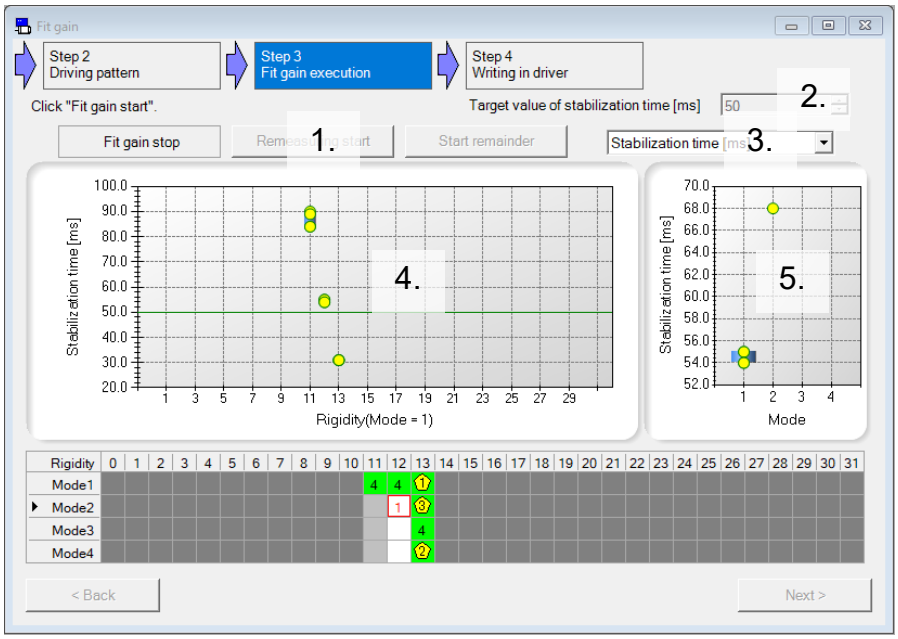
Status	Back color	Instructions
Effective load factor excessive	Fuchsia	The effect load factor of one operation is 80[%] or more. Please lower a left, maximum load factor referring to the following measures. - The acceleration and deceleration is made gradual. (The addition and subtraction velocity time is lengthened, and maximum speed is lowered.) - The dormant period of a positional instruction is lengthened. - The load is reduced. - The turbulence power (friction and offset load) is reduced.
Tack is short	Fuchsia	In the fit gain, time (tack) from a certain instruction input to the following instruction input is more necessary than that of short 1.5[s]. Please lengthen a left, minimum baton referring to the following measures. - The dormant period of a positional instruction is lengthened. - The instruction time is lengthened.
Instructed time is short	Fuchsia	In the fit gain, time that the instruction is continuously input (instruction time) is necessary for 0.1[s] or more. Please lengthen the left, minimum instruction time referring to the following measures. - Moved distance is lengthened. - The addition and subtraction velocity time is lengthened. - Maximum speed is raised.
Instructed speed is short	Fuchsia	In the fit gain, the instruction speed should be -500[r/min] or less and 500[r/min] or more. Please enlarge the absolute value at a left maximum and the minimum instruction speed referring to the following measures. - Maximum speed is raised. - Moved distance is lengthened. - The addition and subtraction velocity time is shortened.
Motor speed is short	Fuchsia	In the fit gain, the motor speed should be -500[r/min] or less and be 500[r/min] or more. Please enlarge the absolute value at a left maximum and the minimum motor speed referring to the following measures. - Maximum speed is raised. - Moved distance is lengthened. - The addition and subtraction velocity time is shortened. - Please return to STEP1, and lower the initial stiffness below a left, present rigidity. - Please return to STEP1, and an initial mode is assumed to be one.

Status	Back color	Instructions
Torque is saturated	Fuchsia	The torque instruction is saturated. Please reduce the absolute value of the maximum and the minimum torque instruction in the left referring to the following measures. - The acceleration and deceleration is made gradual. (The addition and subtraction velocity time is lengthened, and maximum speed is lowered.) - The load is reduced. - The turbulence power (friction and offset load) is reduced. - The torque limit switch is assumed to be invalid (the first fixation), and it enlarges it within the range where the first torque limit can be allowed with the equipment.
Real time estimation doesn't operate	Fuchsia	The load estimate of the real time auto tuning should operate standardly to execute the fit gain. Please meet the real time presumption operation requirement (*1) referring to the following measures. *1 The motor speed continues and the acceleration and deceleration continues 100[r/min] or more and the condition of 2000[r/min/s] or more continues and 50[ms] or more continues. - Maximum speed is raised. - The addition and subtraction velocity time is shortened securing 50[ms] or more. - Moved distance is lengthened. - Please return to STEP1, and lower the initial stiffness below a left, present rigidity.

5 Status is “Fit gain preparation completion” appears in, “Next” button click, and go to step 3.

6 Click “Fit gain start” button, please wait the measurement is completed.

* First of all, the fit gain function is performed search operation of rigidity. The search operation of rigidity repeats the same operation of the following. Setting of rigidity repeatedly measures a specified number of “Trial frequency”. And increase the setting of rigidity one.
  When stabilization time satisfied targets or oscillation of the motor detected, the fit gain function transition the search operation of mode. The search operation of mode could make the measurement while changing the mode in the range of measurement rigidity.
* The Load may oscillate in short. Just in case, on ensuring the safety of the operating range, please execute in the condition that servo-off can be made anytime as a precaution.



1. Measurement button

“Fit gain start” : Start to measure from “Initial rigidity” and “Initial mode” configuration.

“Remeasuring start” : Measure the rigidity and mode settings selected on the search map. This button is available after the search operation of rigidity.

“Start remainder” : Measure the rigidity and mode combination not measured. This button is available from end of the search operation of rigidity to end of the search operation of mode.

2. Stabilization time

Displays “Target value of stabilization time” set in Step 1.

3. Select index

Select index to display the chart. Index can be selected the same content of Monitoring Item (refer to page 86) of the Gain Tuning screen.

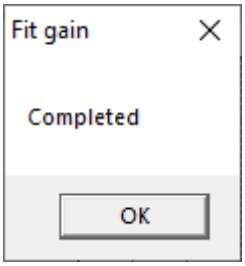
4. Chart of index data for each setting of rigidity

In the result of the search operation of rigidity, selected index by “3. Select index” is displayed. If measurement data is not, it is not displayed.

5. Chart of index data for each setting of mode
   In the result of the search operation of mode, selected index by “3. Select index” is displayed. It is not displayed until the end of the search operation of rigidity.

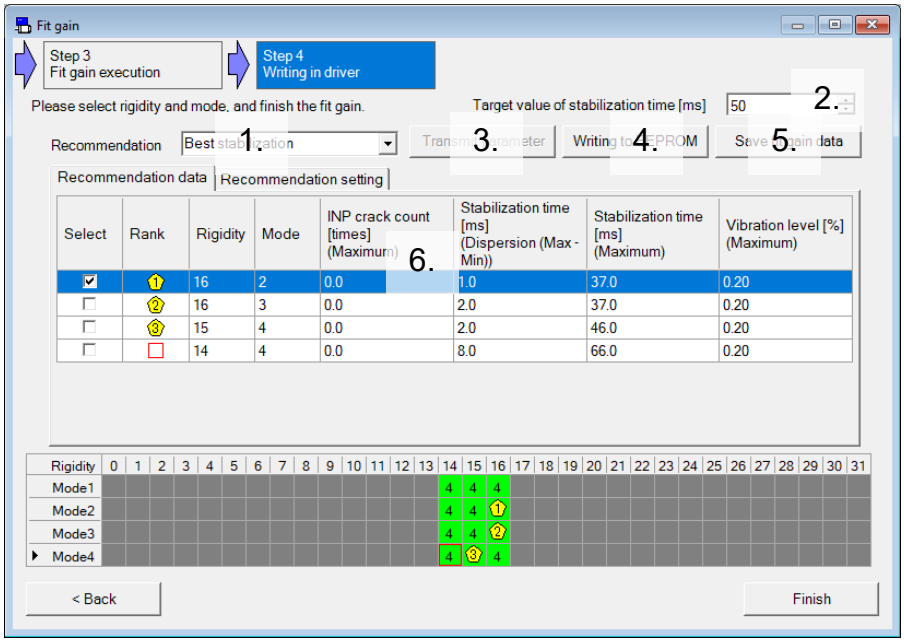
* Click on the “Search map” after measurement, measurement results can be displayed according to the rigidity it clicked.

7 When measure is completed, measurement completed screen is displayed. Please click “OK”.



8 When measurement completed screen is closed, please “Next” button click, and go to Step 4.

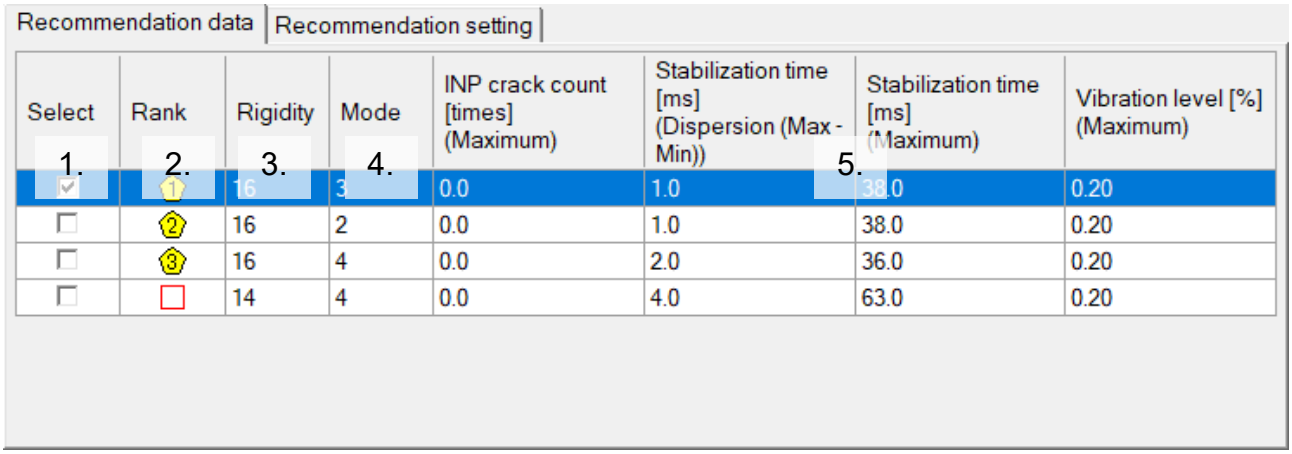
9 Please select rigidity and mode combination while referring to the recommendation data.



1. Recommendation
   You can refine the measurement data by rigidity and mode combination in Step 3 to the specified conditions. You can also sort it. Recommendation data tab displays the top three results.
   “Best stabilization”
   It find stabilization time stable configuration without INP crack.
   “No overshoot”
   It find stabilization time stable configuration without overshoot.
   “Strong stabilization”
   It find stabilization time stable configuration without INP crack and overshoot.
   “Minimum stabilization”
   It finds the minimum stabilization time configuration.
   “Manual setting”
   Use what you specify in the Recommendation setting tab.
2. Target value of stabilization time
   Displays the “Target value of stabilization time” set in Step 1. It can be changed at Step 4.

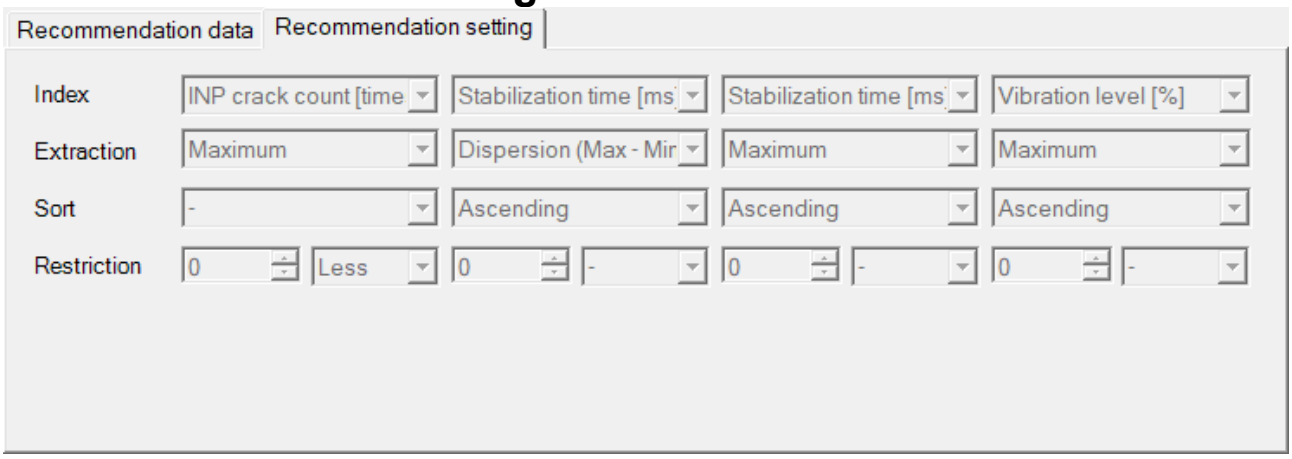
3. Transmit parameter
   Send to the driver to setting is checked. If the setting is sent, it will be disabled.
4. Writing to EEPROM
   Write parameters to EEPROM of the driver. If you do not transmit parameter, it will be disabled.
5. Save fit gain data
   Write parameters to fit gain measure result file (.fit5) to index data measured.
6. Tab
   Switch to “Recommendation data” or “Recommendation setting”.

<Recommendation data>



1. Select
   Please select setting to send to the driver.
2. Rank
   Displays rank of recommendation data. The rigidity and mode setting selected on the search map is displayed in line 4.
3. Rigidity
   Rigidity of recommendation data is displayed.
4. Mode
   Mode of recommendation data is displayed.
5. Index data
   Index of recommendation data is displayed. For more information please refer to Recommendation setting.

<Recommendation setting>



“Index”
Specify the target index to refine and be sort.

“Extraction”
Specify the kind of value to use to sort and refine.
You can select “Minimum”, “Maximum”, “Average”, “Dispersion (Max – Min)” and “Standard deviation”.

“Sort”
Use to determine the rank of the recommendation data.
You can select “- (Not set)”, “Ascending” and “Descending”.
In the following cases, the data on the larger rigidity and mode is given priority. It is if the same value or if you select “- (Not set)” on all.

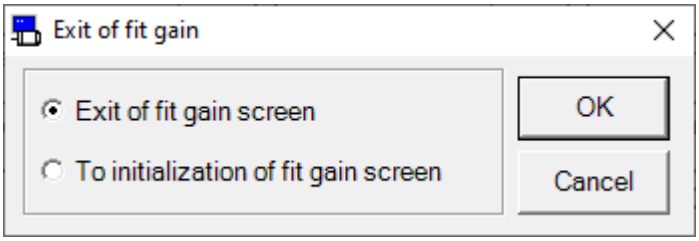
“Restriction”
Use to refine recommendation data.
You can select “- (Not set)”, “Greater” and “Less”.

* Maximum of stabilization time is greater than target value of stabilization time is not displayed.

* You should select “Manual setting” in Step 4 “Recommendation” to change the recommendation setting.

10 Click “Transmit parameter” and “Writing to EEPROM”, save setting to driver.

11 Click “Finish”, the Exit of fit gain window is displayed.



□“Exit of fit gain screen”
Close the fit gain window.
□“To initialization of fit gain screen”
Start again from scratch. Current settings are cleared.

Notes 1) Please refer to application scope and remarks specified in the driver manual or technical reference. Notes 2) Parameter set on this screen is inputted into Driver. As PANATERM does not maintain this value, please perform the recording it to EEPROM of driver after completion of adjustment. Notes 3) Parameter settings will be needed even at the fit gain. Please read the operation manual or technical reference to understand the manual content prior to this operation. Notes 4) The fit gain screen cannot open during opening some screens. For more information please refer to page 235 “Fit gain screen (Standard) behavior”.

Fit gain screen (2 degrees of freedom control)

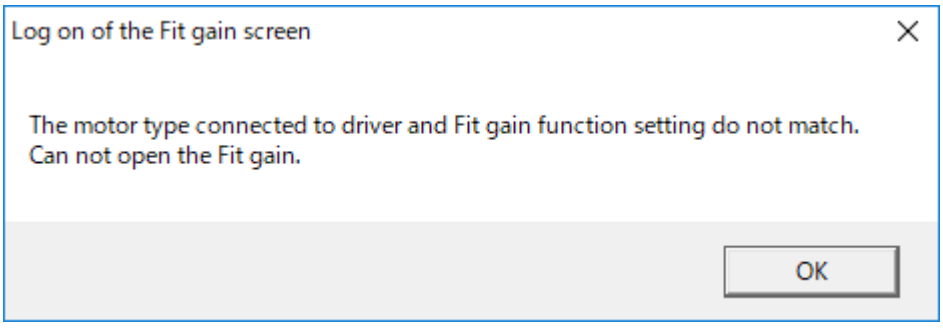
Explore the best gain settings automatically by repeating the positioning between two points. The fit gain function corresponding to 2 degree of freedom control generates a pattern of operation automatically by a test run function, and carries out full automatic adjustment of the load-characteristics and rigid setup / instruction response setup.

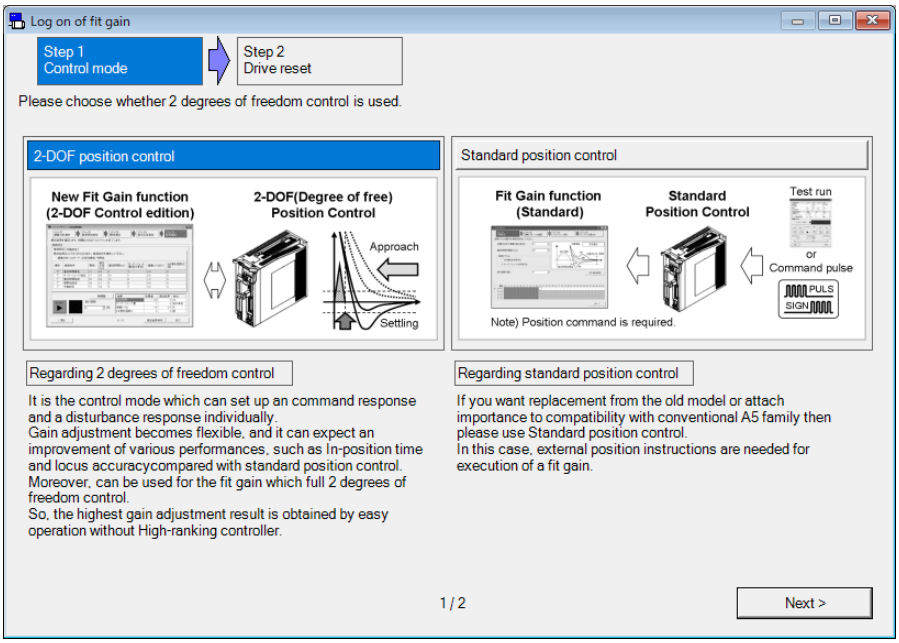
Note) The fit gain function is rigidity and mode at real-time auto-gain tuning may oscillate for a short time in the course of raising the load. May be suppressed by the adaptive filter and auto-oscillation detection, just in case, on ensuring the safety of the operating range, please execute in the condition that servo-off can be made anytime as a precaution.
Please refer to application scope and remarks specified in the driver manual or technical reference.
The fit gain cannot be performed through wireless or RS232 communication.
In addition, the fit gain function is disabled for some special motors.
For details, please contact the customer technical consultation desk.

Open the Fit gain window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Fit gain” of the tool bar on the main screen.
3 The Log on of fit gain window is opened.
Please select “2-DOF position control” and “Next” button click.
(The figure of the next page)

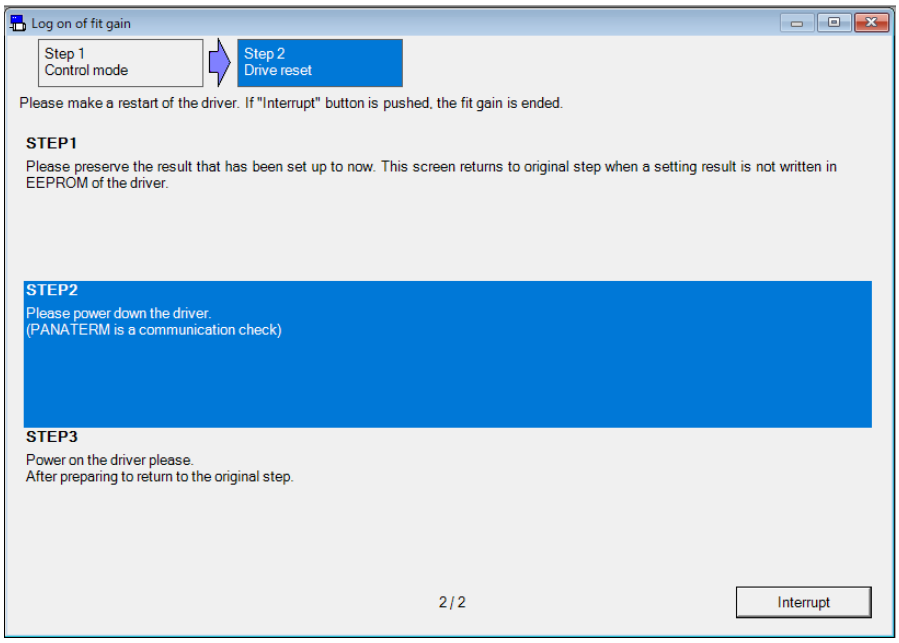
* If the motor type connected to driver and Fit gain function setting (Standard / Linear) do not match then, the following dialog is displayed and the fit gain function cannot be executed.
In that case, please use the after changing the combination of driver and selected series is correct.



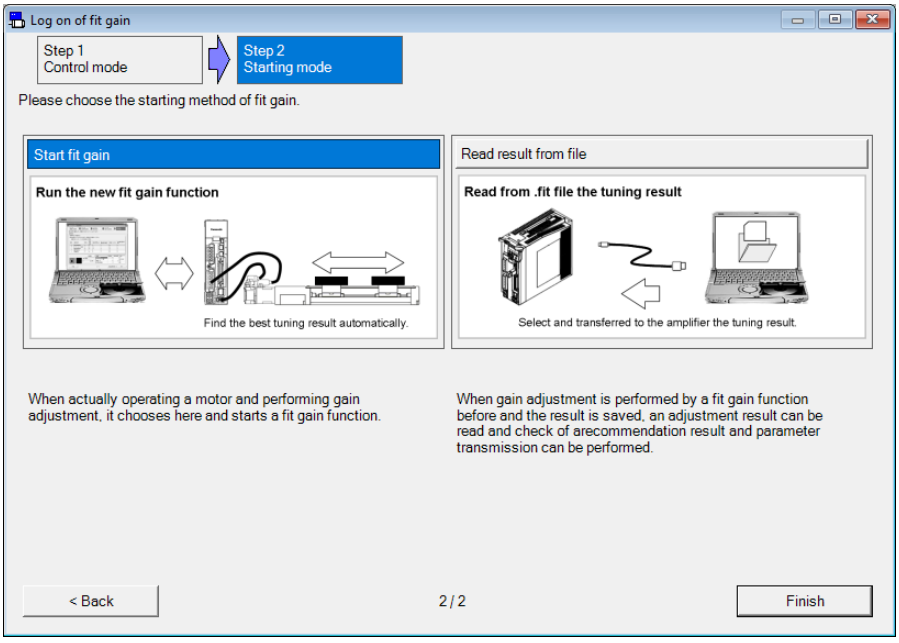


* When you select “Standard position control”, a standard fit gain window is opened.
* The log on of fit gain window cannot be used when velocity control mode and torque control mode. When full closed control mode, a standard fit gain window is opened.
  If the driver is Linear and DD Control Drive, the fit gain function cannot be used except for position control.
* When not communicating with driver, the selection screen of the fit gain measure result file is displayed. Please select the measure result, and the fit gain data window is opened.
* If the driver is Linear and DD Control Drive, Standard position control is not displayed.
  Only 2-DOF position control is displayed.

* “Drive reset” is inserted when selection changes into “2-DOF position control” from “Standard position control”. Please follow the instructions on the screen.

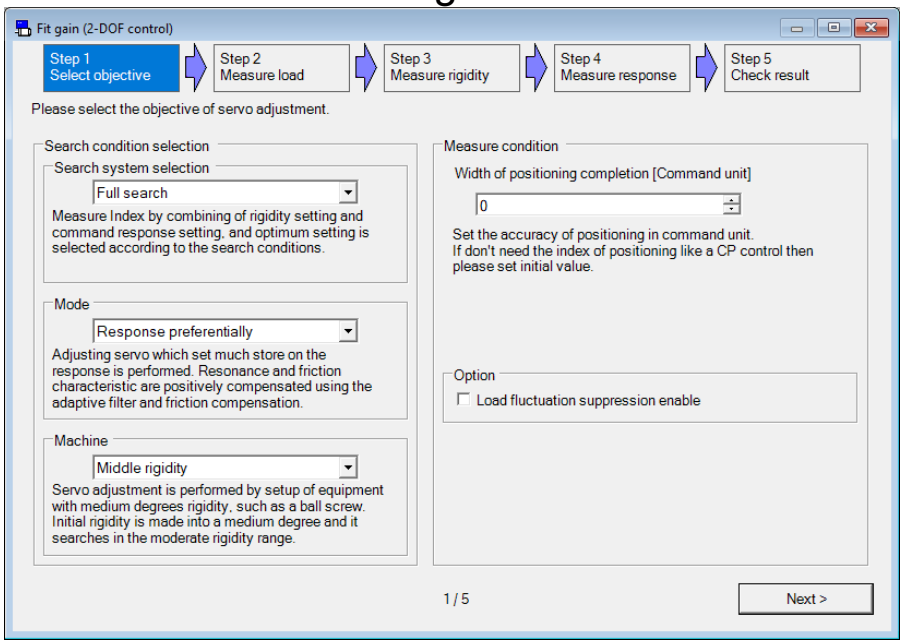


4 Please select fit gain with 2 degrees of freedom control, and “Finish” button click.

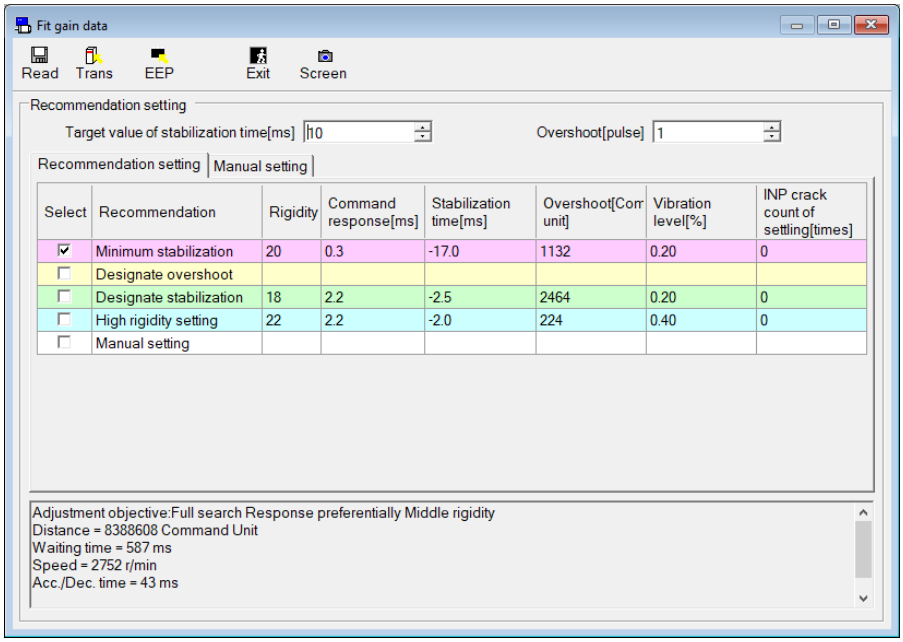


5 If you select “Start fit gain”, the fit gain (2-DOF control) window is opened.
If you select “Read result from file”, selection screen of the fit gain measure result file is displayed. Please select the measure result, and the fit gain data window is opened.

<When select “Start fit gain”>



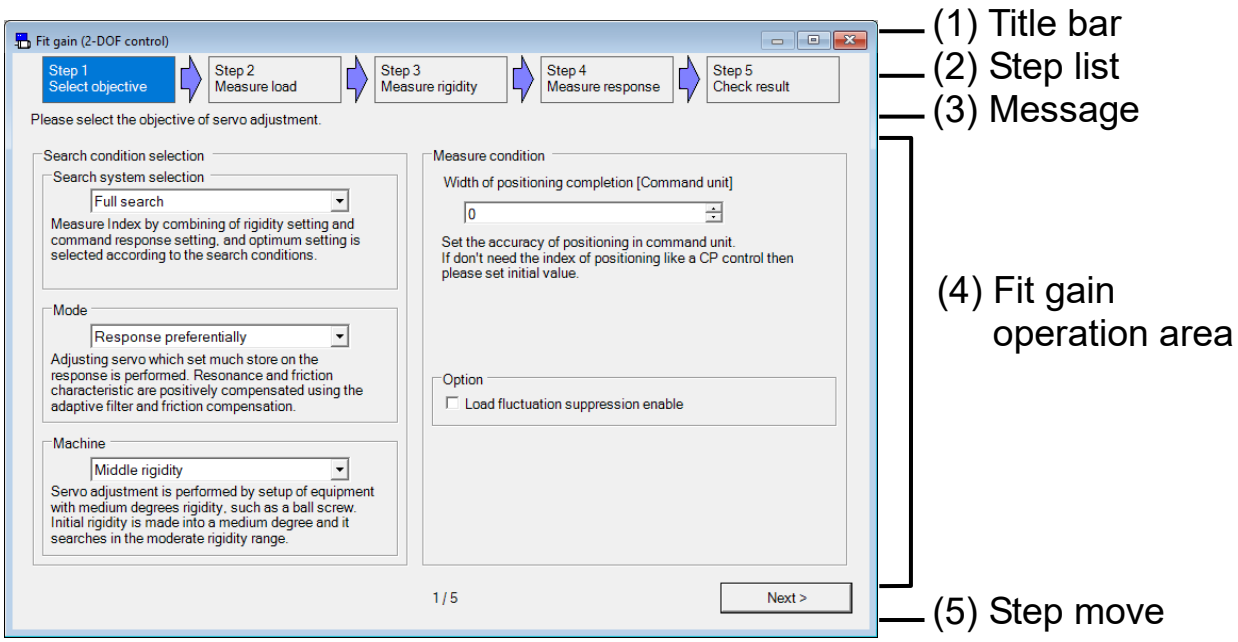
<When select “Read result from file”>



Close the Fit gain window

Click of upright on the window.

Structure of Fit gain Screen



(1) Title bar
You can operate window.

(2) Step list
The position seen from the whole of a present step is displayed.

(3) Message
An easy explanation of the content set in a present step is displayed.

(4) Fit gain operation area
Steps 1-5 can be operated.

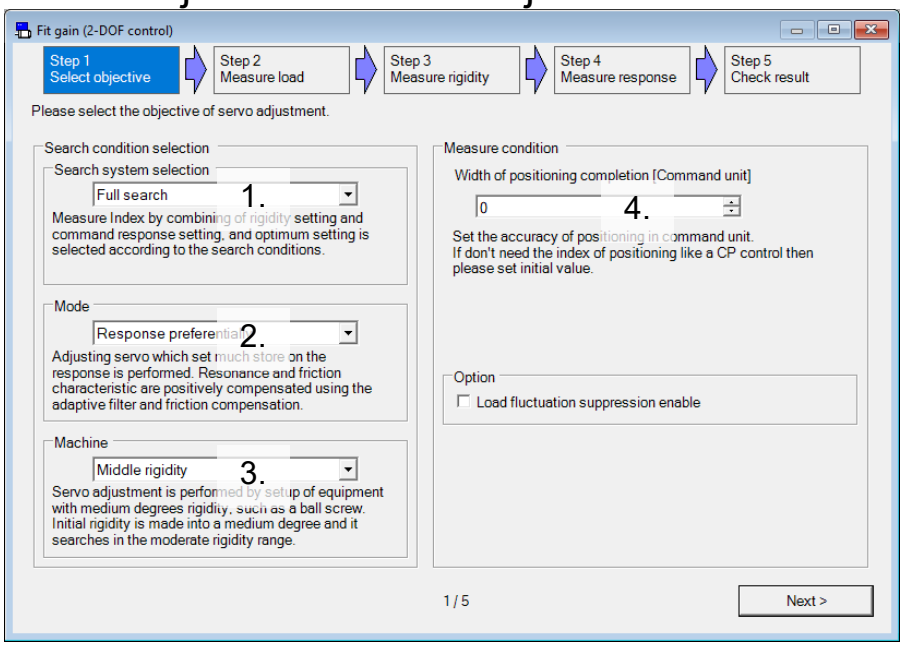
(5) Step move
Switch to present step.

“Back”	The previous step is displayed.
“Next”	The next step is displayed.
“Finish”	Close the fit gain window.

Method of performance of fit gain

Step 1: Select objective

Select objective of servo adjustment.



1. Search system selection

   Select search system.

   “Full search”

   Measure Index by combining of rigidity setting and command response setting, and optimum setting is selected according to the search conditions.

2. Mode

   Select “Response preferentially”, “Balanced” and “Stability preferentially”.

   “Response preferentially”

   Adjusting servo which set much store on the response is performed. Resonance and friction characteristic are positively compensated using the adaptive filter and friction compensation.

   “Balanced”

   Adjusting servo which was able to balance a response and stability is performed. Using the adaptive filter, resonance characteristic is controlled positively.

   “Stability preferentially”

   Adjusting servo which set much store on the stability is performed. Fundamental adjustment which does not use the adaptive filter and friction compensation is performed.

3. Machine

Rigidity is selected from “High”, “Middle” and “Low”.

“High rigidity”

Servo adjustment is performed by setup of equipment with high rigidity, such as coupling direct connection. Initial rigidity is made high and adjustment which raises rigidity as much as possible is performed.

“Middle rigidity”

Servo adjustment is performed by setup of equipment with medium degrees rigidity, such as a ball screw. Initial rigidity is made into a medium degree and it searches in the moderate rigidity range.

“Low rigidity”

Servo adjustment is performed by setting of equipment with low rigidity, such as belt driving. Initial rigidity is made low and adjustment which raises rigidity as much as possible is performed.

4. Width of positioning completion

Set the accuracy of positioning in command unit.

If don't need the index of positioning like a CP control then please set initial value.

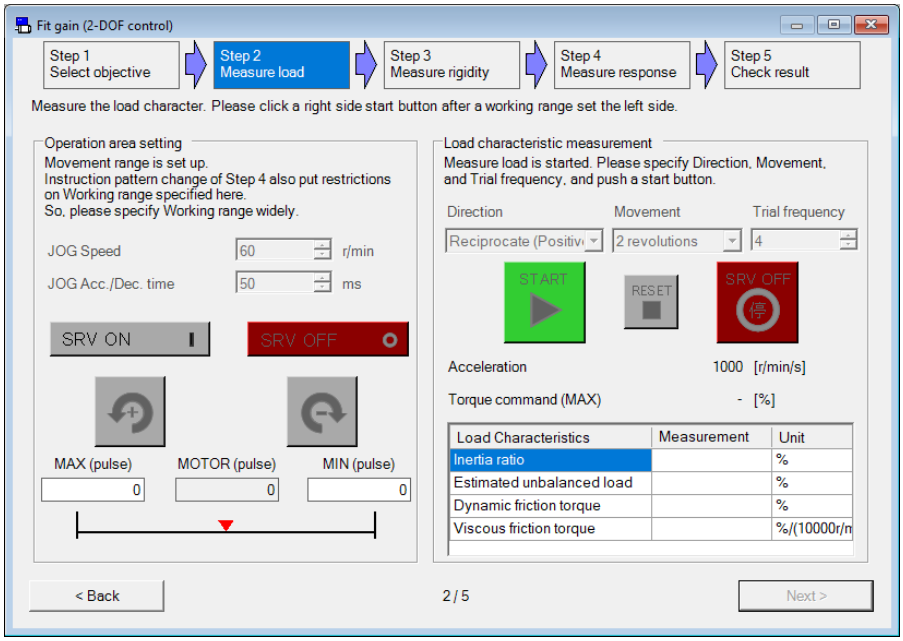
(In MINAS-A6 series, you can set the option control.)

1 Please set the objective (Search system, Mode, Machine) and width positioning completion.

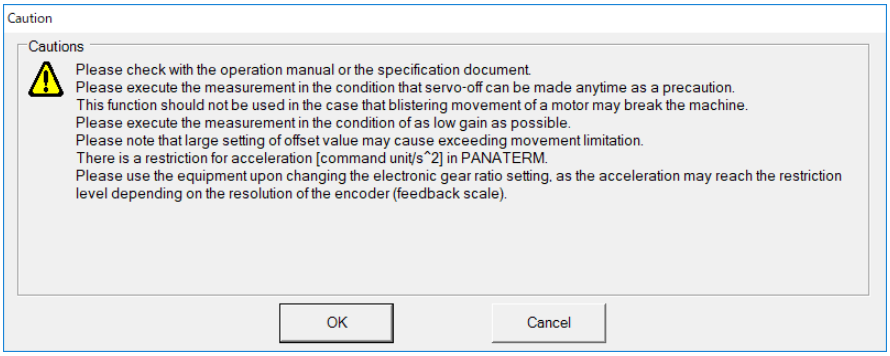
2 Please “Next” button click when you are finished setting, and go to Step 2.

Step 2: Measure load

Measure the load character.



1 Click on “SRV ON” button, and the caution window will appear. Confirm the window message carefully, and click “OK”.

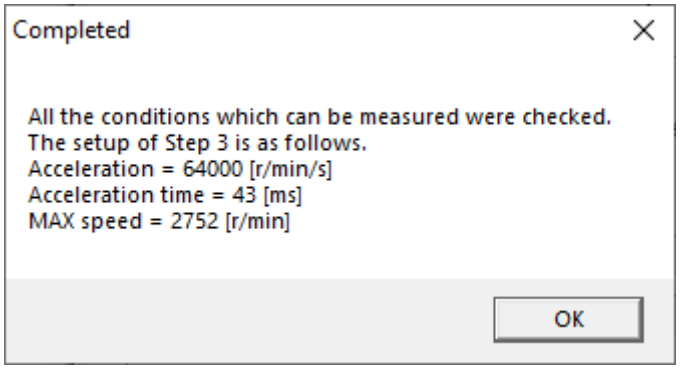


2 Please move load by (Positive) and (Negative), and set up a working range.

3 Please set direction, movement and trial frequency and click

button.

4 When measure is completed, measurement completed screen is displayed. Please click “OK”.



5 When measurement completed screen is close, please “Next” button click, and go to Step 3.

Step 3: Measure rigidity

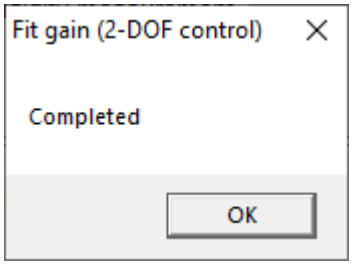
The operation for each rigidity setting is measured.

1 Click

button, please wait the measurement is completed.

* The Load may oscillate in short. Just in case, on ensuring the safety of the operating range, please execute in the condition that servo-off can be made anytime as a precaution.

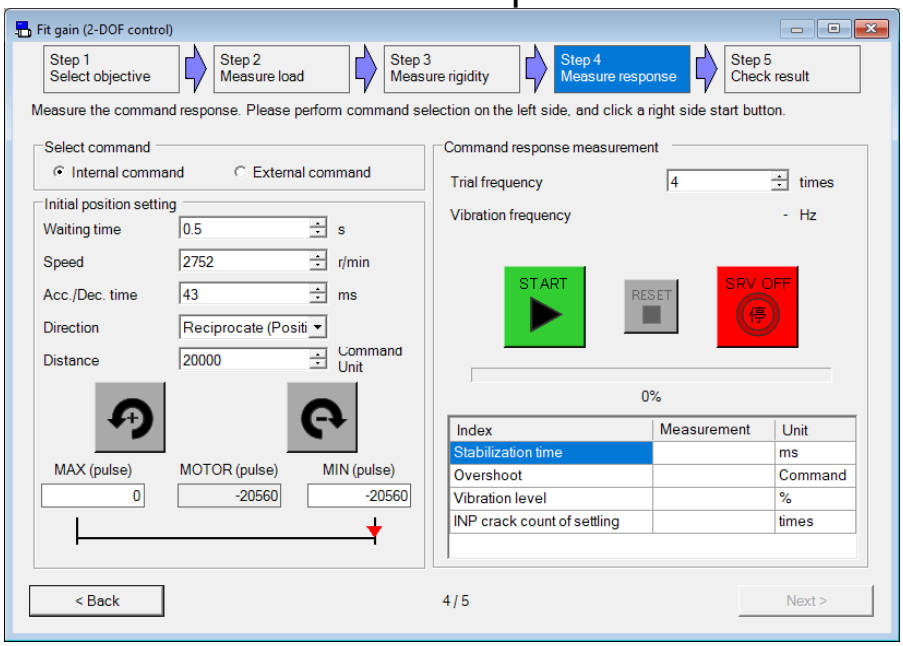
2 When measure is completed, measurement completed screen is displayed. Please click “OK”.



3 When measurement completed screen is close, please “Next” button click, and go to Step 4.

Step 4: Measure response

Measure the command response.



1 Please select internal command or external command if needed. In internal command, please set waiting time, speed, acceleration and deceleration time, direction and distance.

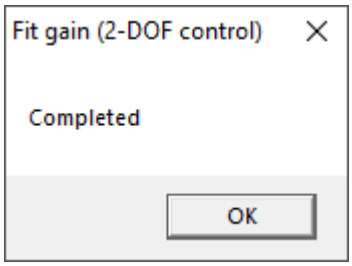
* Initial setting is an operation pattern of the internal command in Step 3.

* When external command is selected, select command cannot return to internal command. Please be careful.

2 Please click

button after setting trial frequency, and wait the measurement is completed.

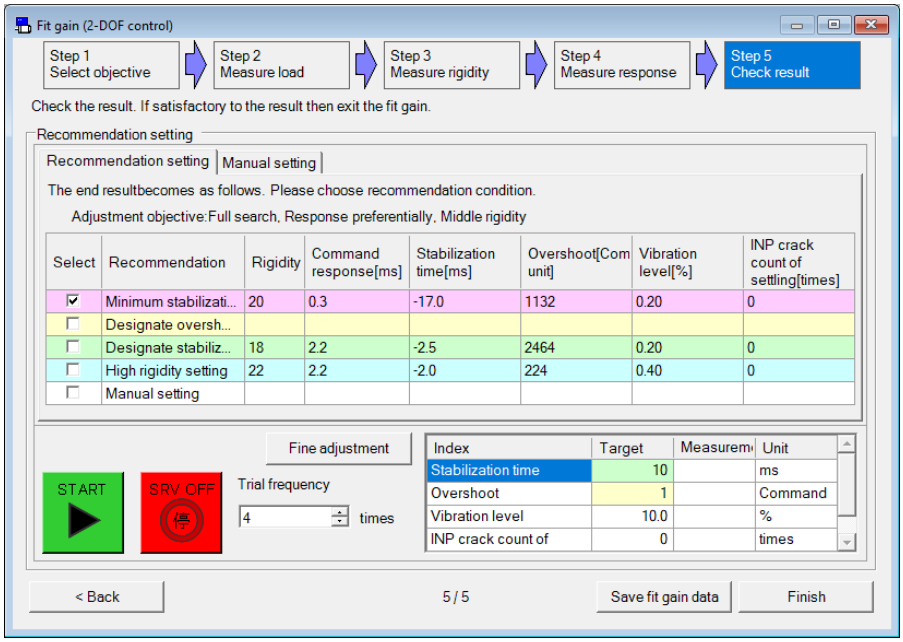
3 When measure is completed, measurement completed screen is displayed. Please click “OK”.



4 When measurement completed screen is closed, please “Next” button click, and go to Step 5.

Step 5: Check result

Check the result.



1 Please check a measurement result and put a check into recommendation conditions suitable for use.

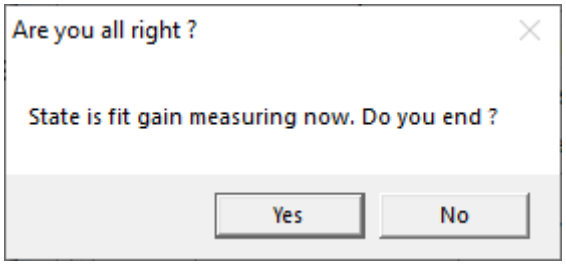
2 Click

button, perform test run and check a measurement result if needed.

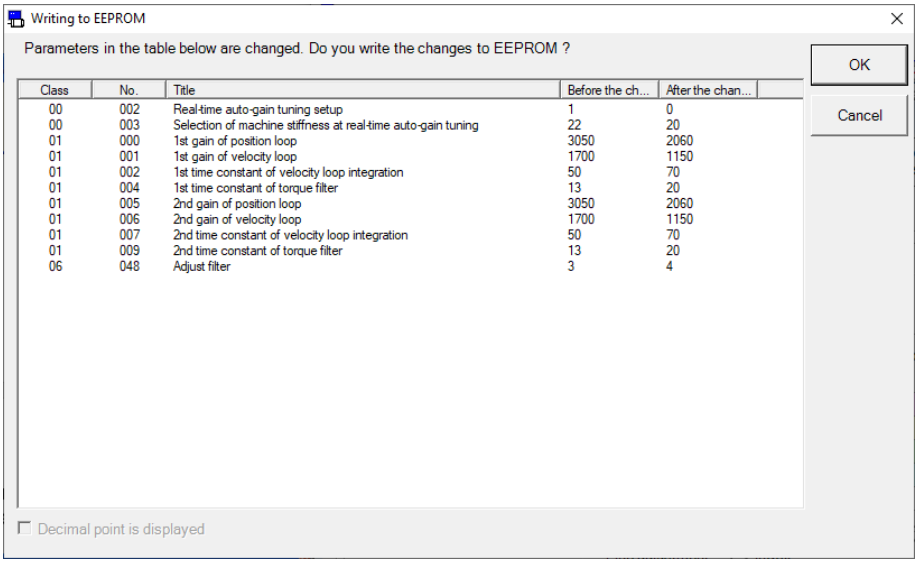
3 Click “Save fit gain data”, and please save the measurement result of all the steps.

* The saved file can perform check of a recommendation setting, and send to driver by selecting "Read result from file" as the start-up of fit gain.

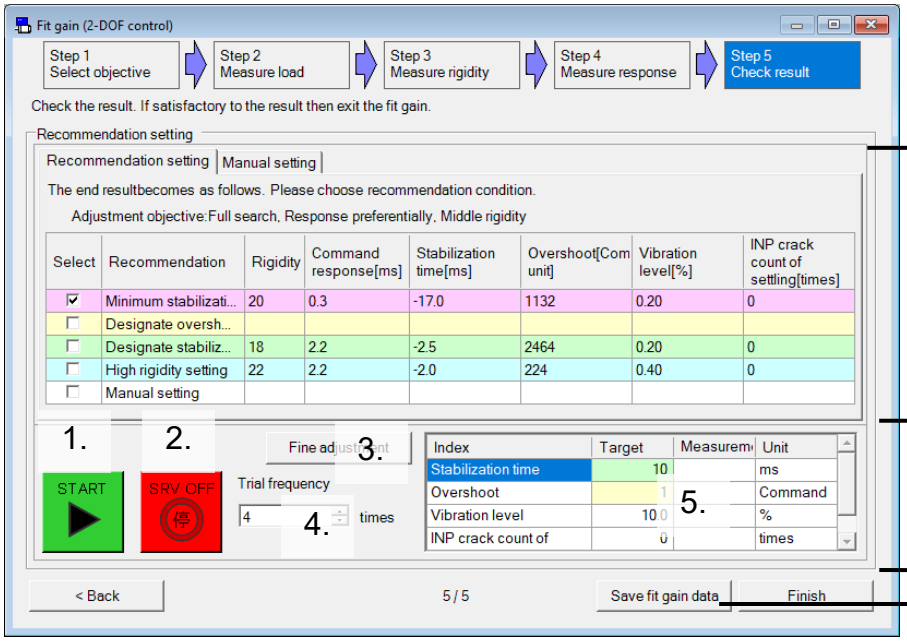
4 Click “Finish”, the exit of fit gain screen is displayed. Please click “Yes”.



5 When exit of fit gain screen is closed, and writing to EEPROM window will appear. Please click “OK”.



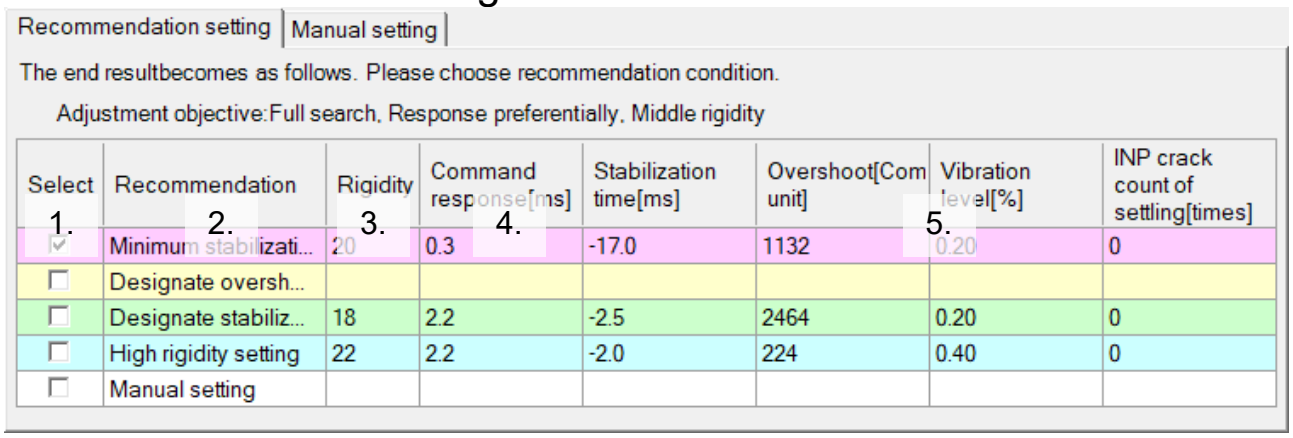
Recommendation setting



(1) Tab

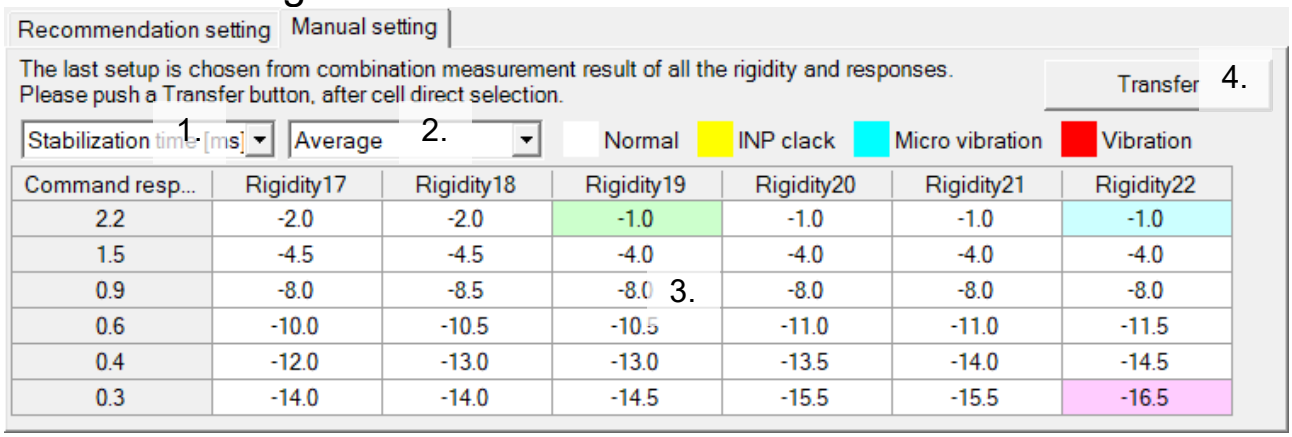
Switch to “Recommendation setting” or “Manual setting”.

<Recommendation setting>



1. Select
   Please select setting to send to the driver.
2. Recommendation
   The name of recommendation conditions is displayed.
3. Rigidity
   Rigidity of recommendation data is displayed.
4. Command response
   Command response of recommendation data is displayed.
5. Index data
   Index of recommendation data is displayed.

<Manual setting>



Command resp...	Rigidity17	Rigidity18	Rigidity19	Rigidity20	Rigidity21	Rigidity22
2.2	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0
1.5	-4.5	-4.5	-4.0	-4.0	-4.0	-4.0
0.9	-8.0	-8.5	-8.0	-8.0	-8.0	-8.0
0.6	-10.0	-10.5	-10.5	-11.0	-11.0	-11.5
0.4	-12.0	-13.0	-13.0	-13.5	-14.0	-14.5
0.3	-14.0	-14.0	-14.5	-15.5	-15.5	-16.5

1. Index
   Specify the target index to.
2. Extraction
   Specify the kind of value to use to. You can select “Minimum”, “Maximum”, “Average”, “Dispersion (Max – Min)” and “Standard deviation”.
3. Index data
   Index data corresponding to the combination of rigidity and command response is displayed.
4. Transfer
   The contents of the cell selected by “3.” are sending to the driver.

(2) Test runs area

Test run is performed.

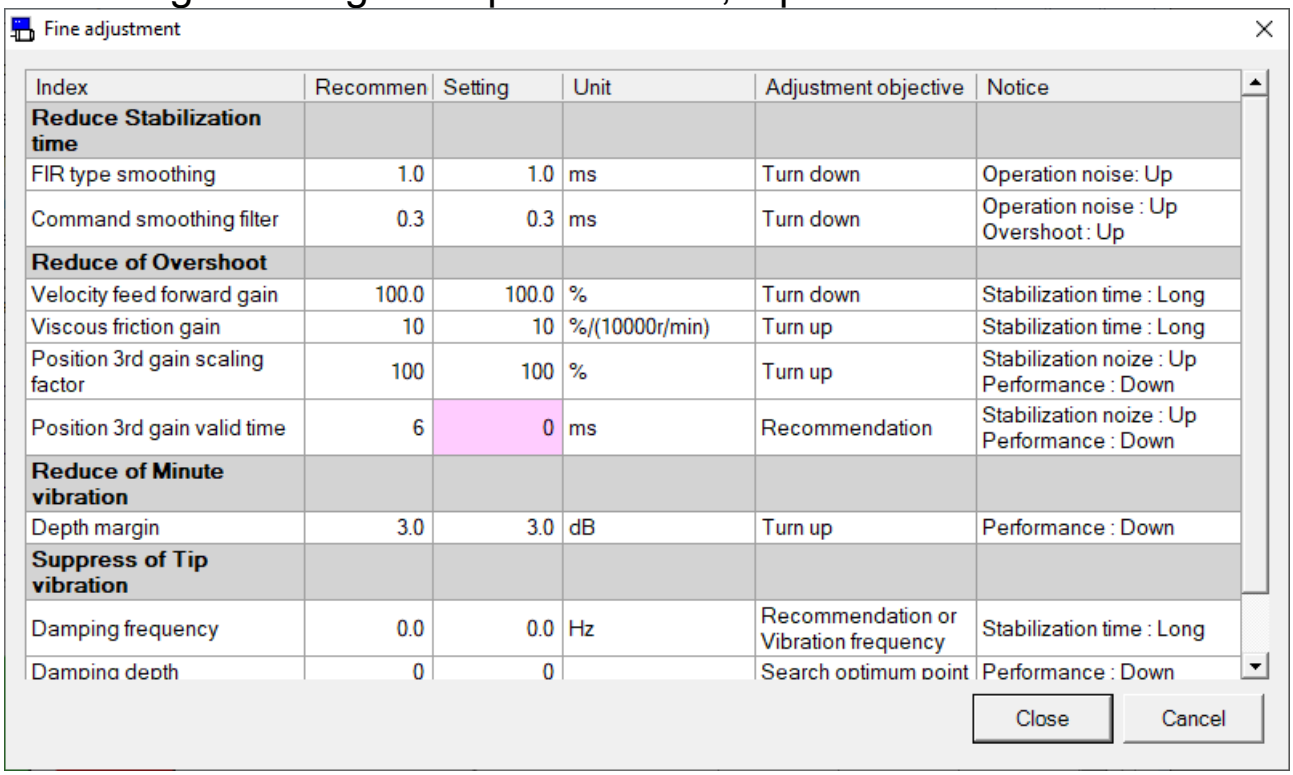
1. Test run
   Test run is performed using the same operation pattern as Step 4.
   * When having selected external command, please drive a motor by external command after button is clicked.
2. Emergency stop
   Do emergency stop by cut off electricity to a motor.
   * This becomes invalid when an external command is selected. Please use an external servo-on input etc. and enable it to perform an emergency stop.
3. Fine adjustment
   Can do fine adjustment from recommendation conditions.
4. Trial frequency
   Specifies the trial frequency when test run.
5. Measurement result
   Measurement result of test run is displayed.

(3) Save fit gain data button

The measurement result of all the steps is saved. The saved file can perform check of a recommendation setting, and send to driver by selecting "Read result from file" as the start-up of fit gain.

Fine adjustment

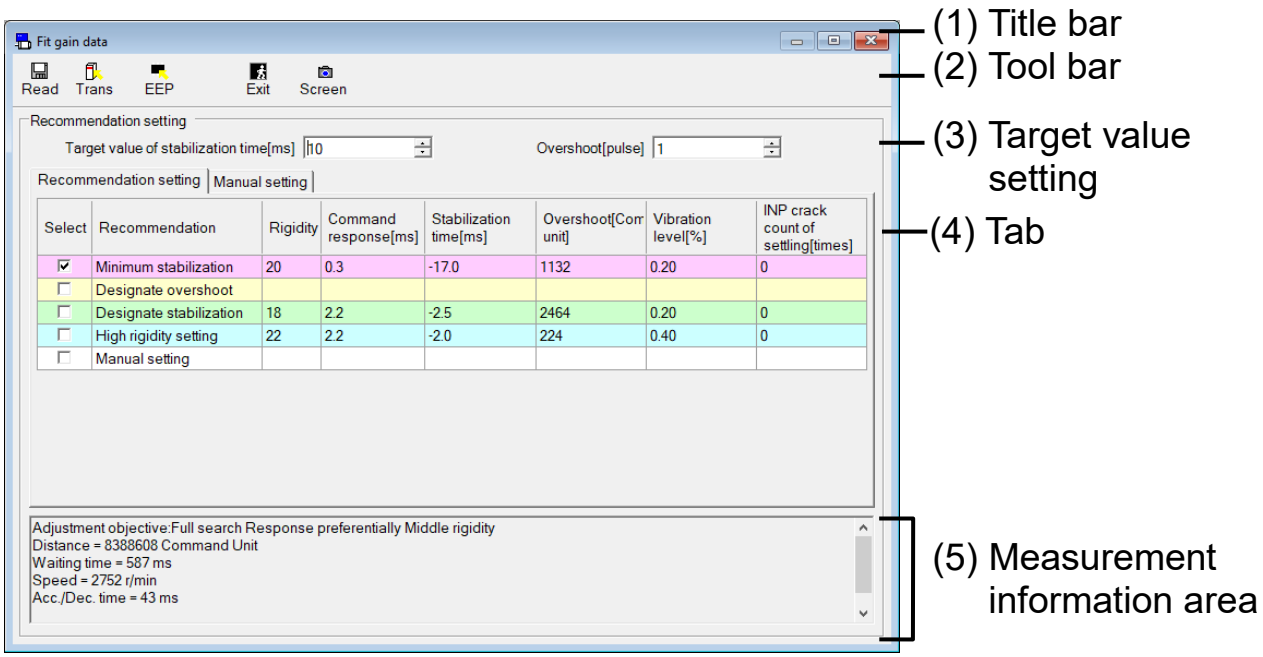
According to change of a preset value, a parameter is sent to driver.



Index	Recommen	Setting	Unit	Adjustment objective	Notice
Reduce Stabilization time					
FIR type smoothing	1.0	1.0	ms	Turn down	Operation noise: Up
Command smoothing filter	0.3	0.3	ms	Turn down	Operation noise : Up Overshoot : Up
Reduce of Overshoot					
Velocity feed forward gain	100.0	100.0	%	Turn down	Stabilization time : Long
Viscous friction gain	10	10	%/(10000r/min)	Turn up	Stabilization time : Long
Position 3rd gain scaling factor	100	100	%	Turn up	Stabilization noize : Up Performance : Down
Position 3rd gain valid time	6	0	ms	Recommendation	Stabilization noize : Up Performance : Down
Reduce of Minute vibration					
Depth margin	3.0	3.0	dB	Turn up	Performance : Down
Suppress of Tip vibration					
Damping frequency	0.0	0.0	Hz	Recommendation or Vibration frequency	Stabilization time : Long
Damping depth	0	0		Search optimum point	Performance : Down

“Close” : Activate the change, and exit the screen.
“Cancel” : Inactivate the change, and exit the screen.

Structure of Fit gain data Screen



(1) Title bar
You can operate window.

(2) Tool bar

Read	(Read)	Reads fit gain measure result from files (.fit5). When this button is effective, a fit gain measure result file can be specified by drag and drop.
Trans	(Transmit)	Sends parameters to the drivers.
EEP	(EEPROM)	Write parameters to EEPROM of the driver.
Exit	(Exit)	Closes fit gain data screen.
Screen	(Screen)	Captures the screen and save into a file.

(3) Target value setting

“Target value of stabilization time”

Set the target value of stabilization time.

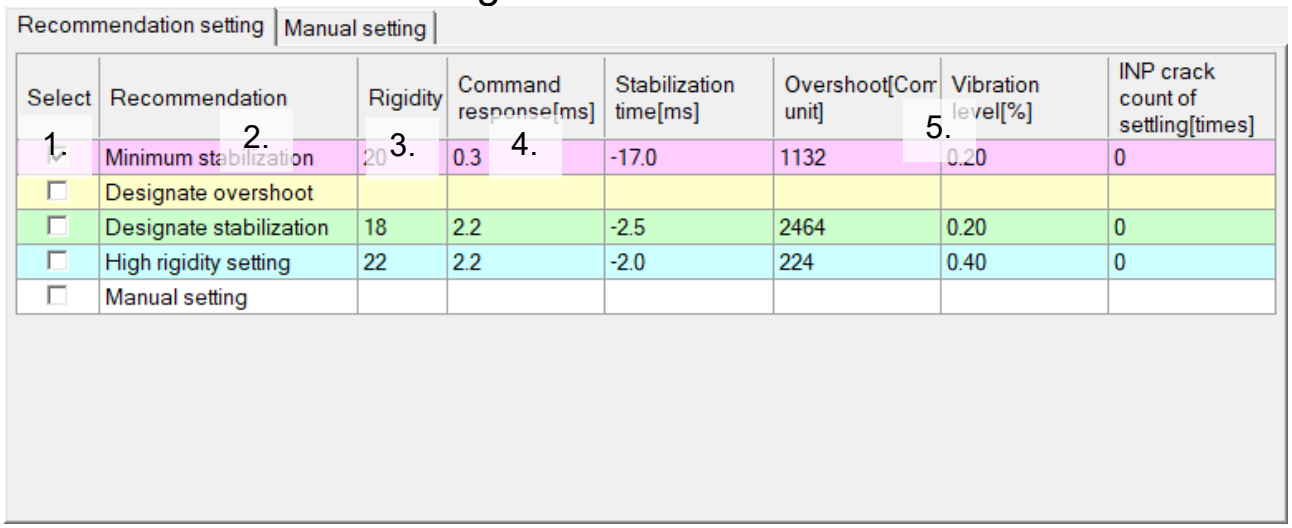
“Overshoot”

Set the target value of overshoot.

(4) Tab

Switch to “Recommendation setting” or “Manual setting”.

<Recommendation setting>



1. Select

Please select setting to send to the driver.

2. Recommendation

The name of recommendation conditions is displayed.

3. Rigidity

Rigidity of recommendation data is displayed.

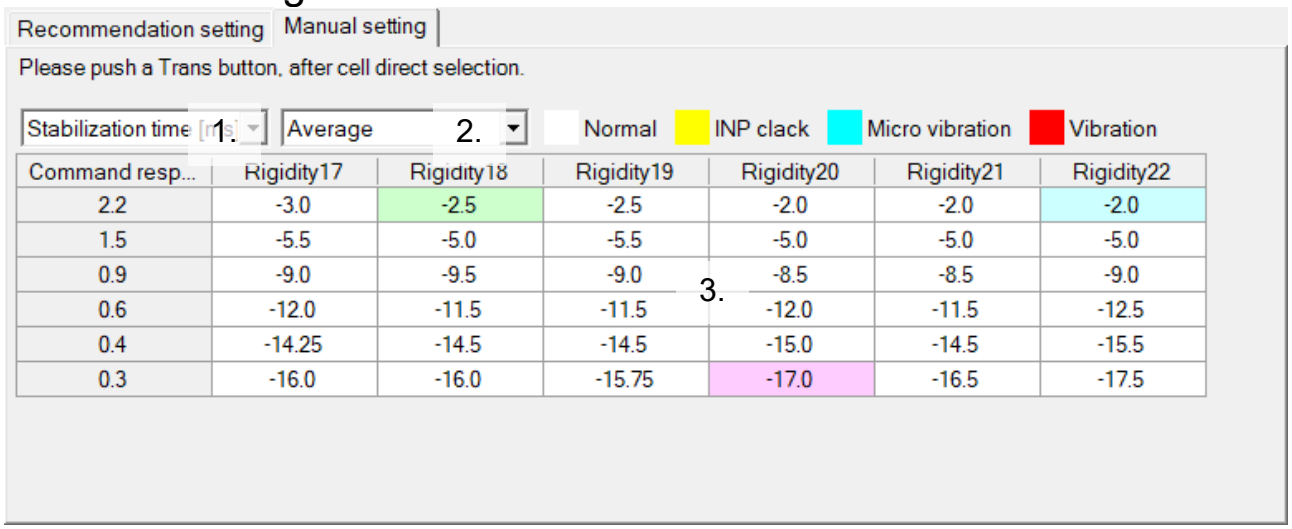
4. Command response

Command response of recommendation data is displayed.

5. Index data

Index of recommendation data is displayed.

<Manual setting>



Command resp...	Rigidity17	Rigidity18	Rigidity19	Rigidity20	Rigidity21	Rigidity22
2.2	-3.0	-2.5	-2.5	-2.0	-2.0	-2.0
1.5	-5.5	-5.0	-5.5	-5.0	-5.0	-5.0
0.9	-9.0	-9.5	-9.0	-8.5	-8.5	-9.0
0.6	-12.0	-11.5	-11.5	-12.0	-11.5	-12.5
0.4	-14.25	-14.5	-14.5	-15.0	-14.5	-15.5
0.3	-16.0	-16.0	-15.75	-17.0	-16.5	-17.5

1. Index
   Specify the target index to.
2. Extraction
   Specify the kind of value to use to. You can select “Minimum”, “Maximum”, “Average”, “Dispersion (Max – Min)” and “Standard deviation”.
3. Index data
   Index data corresponding to the combination of rigidity and command response is displayed.

(5) Measurement information area

Objective of servo adjustment and operation pattern at the time of measurement are displayed.

Notes 1) Please refer to application scope and remarks specified in the driver manual or technical reference. Notes 2) Parameter set on this screen is inputted into Driver. As PANATERM does not maintain this value, please perform the recording it to EEPROM of driver after completion of adjustment. Notes 3) Parameter settings will be needed even at the fit gain. Please read the operation manual or technical reference to understand the manual content prior to this operation. Notes 4) The fit gain screen cannot open during opening some screens. For more information please refer to page 236 “Fit gain screen (2 degrees of freedom control) behavior”.

Object Editor screen

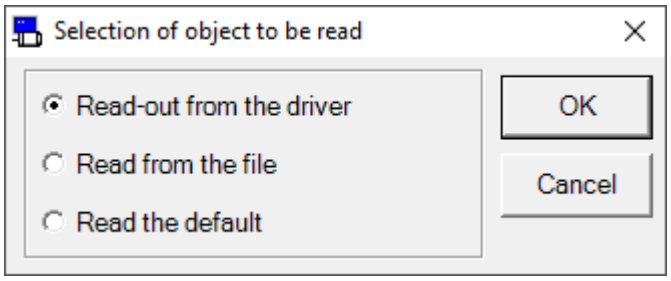
Realize easier troubleshooting without connecting to the host controller by displaying and editing the object list of the driver.

Note) Please modify objects with enough care after reading the driver's instruction manual or technical reference carefully, as some objects give large effect to operations of drivers or motors.
Object editor cannot be performed through RS232 communication.

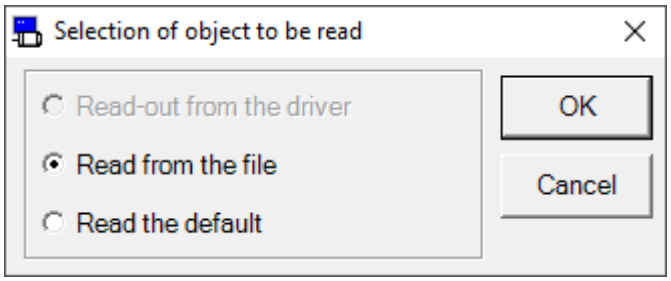
Open the Object Editor window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Other” > “Object Editor” of the tool bar on the main screen.
3 Selection of object to be read window is displayed.

<When communication with driver>



<When not communication with driver>



4 Select the origin of objects, and click.

□“Read - out from the driver”

The objects set in the driver are read communicating the driver connected. If this mode is selected, modifications of the object values are reflected to the driver immediately.

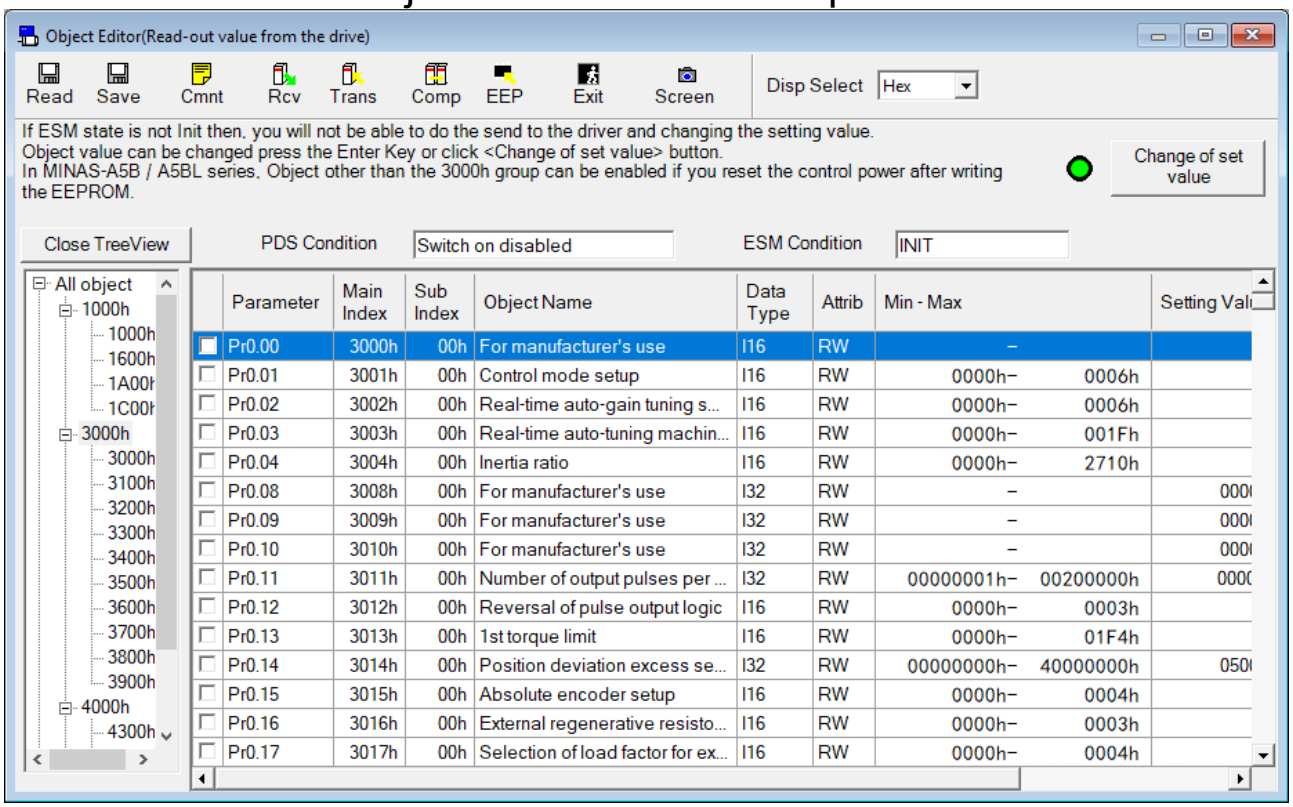
□“Read from the file”

Object Data files already edited (.obj5) are read. Object modifications are not reflected to the driver connected unless “Transmit the object to the driver” is executed when they are “Read from the file”.

□“Read the default”

Default set values saved at the time of installation is read. The object modifications are not reflected unless “Transmit the object to the driver” is executed as the case of “Read from the file”.

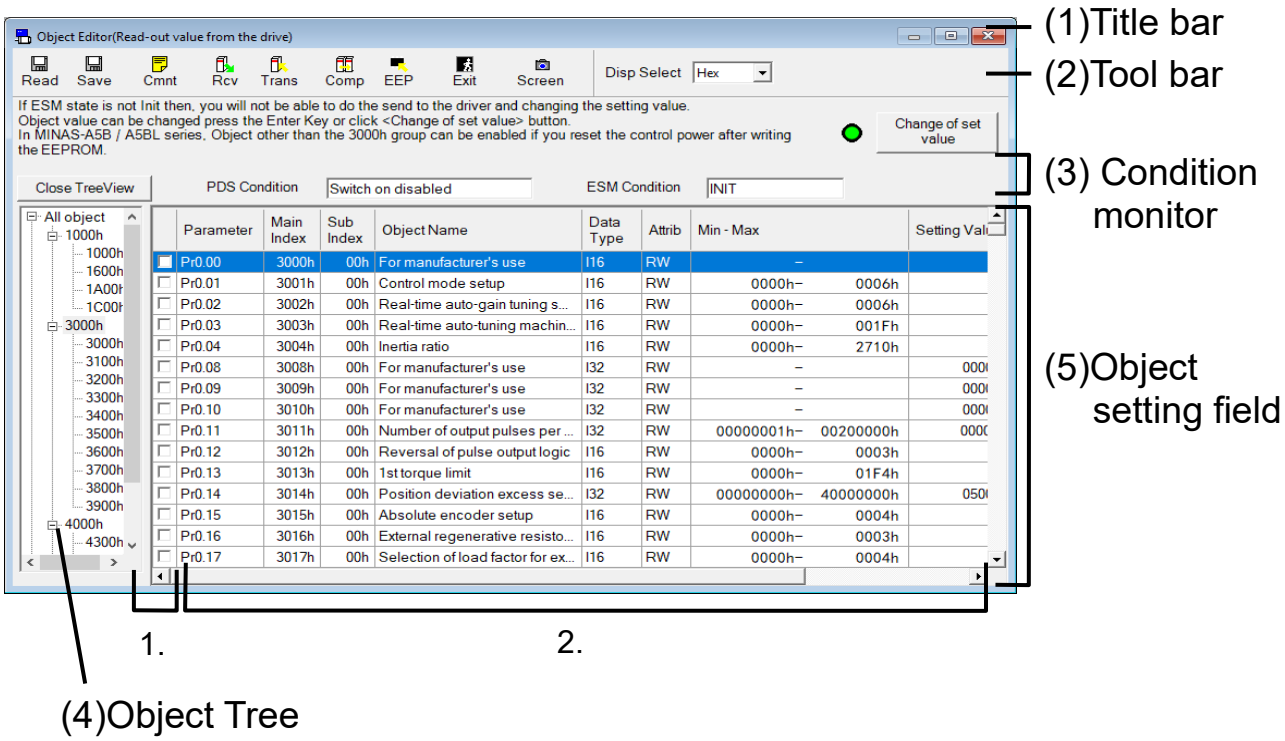
5 Click “OK”. The Object Editor window is opened.



Close the Object Editor window

Click Exit (Exit) on the tool bar.

Structure of Object Editor screen



(1) Title bar

The origins of reference of objects reference are displayed.
Following buttons are used to operate windows.

	Display the window in full screen
	Close the window

(2) Tool bar

Saving, reading, some other basic operation commands on objects are listed.

	(Read)	Reads objects from files (.obj5). When this button is effective, an object file can be specified by drag and drop.
	(Save)	Writes objects to files (.obj5).
	(Comment)	Makes comments attached to objects files.
	(Receive)	Receives objects from the driver.
	(Transmit)	Sends objects to the driver.

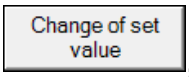
	(Compare)	Compares objects on editing with other objects.
	(EEPROM)	Write objects to EEPROM of the driver.
	(Exit)	Closes object editor screen.
	(Screen)	Captures the screen and save into a file.
	(Disp Select)	Change the numerical display of objects being displayed. Hex: Displayed in hexadecimal, add "h" to the end of the number. Dec: Displayed in decimal number, and sign is set. Bin : Displayed in binary number, add "b" to the end of the number. Min-Max columns are displayed in hexadecimal.

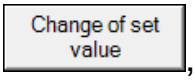
(3) Condition monitor

(PDS Condition) Show the PDS Condition of the Driver.
The condition is changed depending on the value of the object of 6041h-00h.

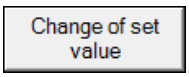
(ESM Condition) It shows condition whether rewriting objects in the driver is possible or not.

<When communication with driver>

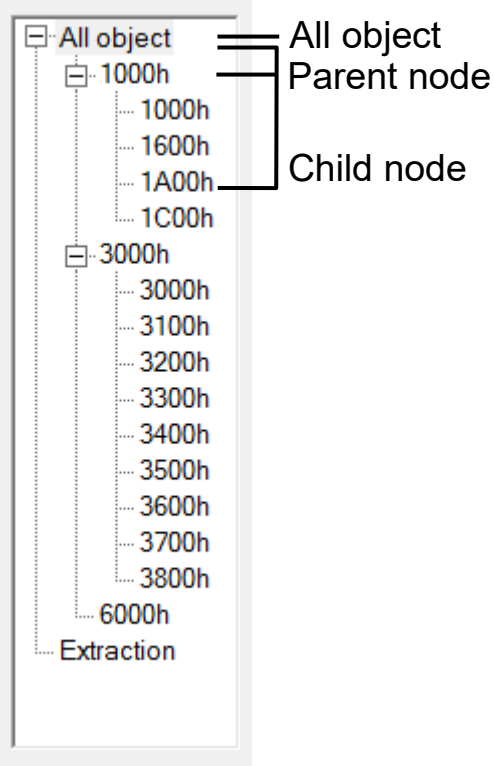
INIT — In this condition, you can rewrite the driver object.
is displayed next to  , and becomes possible to edit and send the object setting value.

other than INIT — In this condition, you cannot rewrite the driver object.
is not displayed next to  , and becomes impossible to edit and send the object setting value.

<When not communication with driver>

\- is displayed next to  , and becomes possible to edit and send the object setting value.

(4) Object Tree

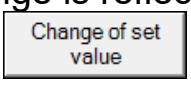


If you select a node from the object tree, related objects are displayed at object setting field.
If you click “Close TreeView” / “Disp TreeView” button, switch the Hide / Show of Object tree.
If you select “All object”, all objects are displayed.
If you select a parent node, objects of all the child nodes are displayed which following selected parent node.
If you select a child node, objects of the selected node are displayed.
If you select “Extraction”, the extracted objects are displayed .
The objects selected in the object setting field are displayed.
Refer to the instruction manual of the driver or technical reference for more information about each object.
Note) If you receive or transmit the object during the extraction display, targets are only extracted objects.
If the object is read during the extraction display, “All object” is selected and extraction display will be canceled.

(5) Object setting field

1. Extraction selection check box
   It is possible to extract the object by checking ON.
   Extraction selection is saved at the end of object editor, and read automatically when the object editor startup.

2. You can edit and set the object.

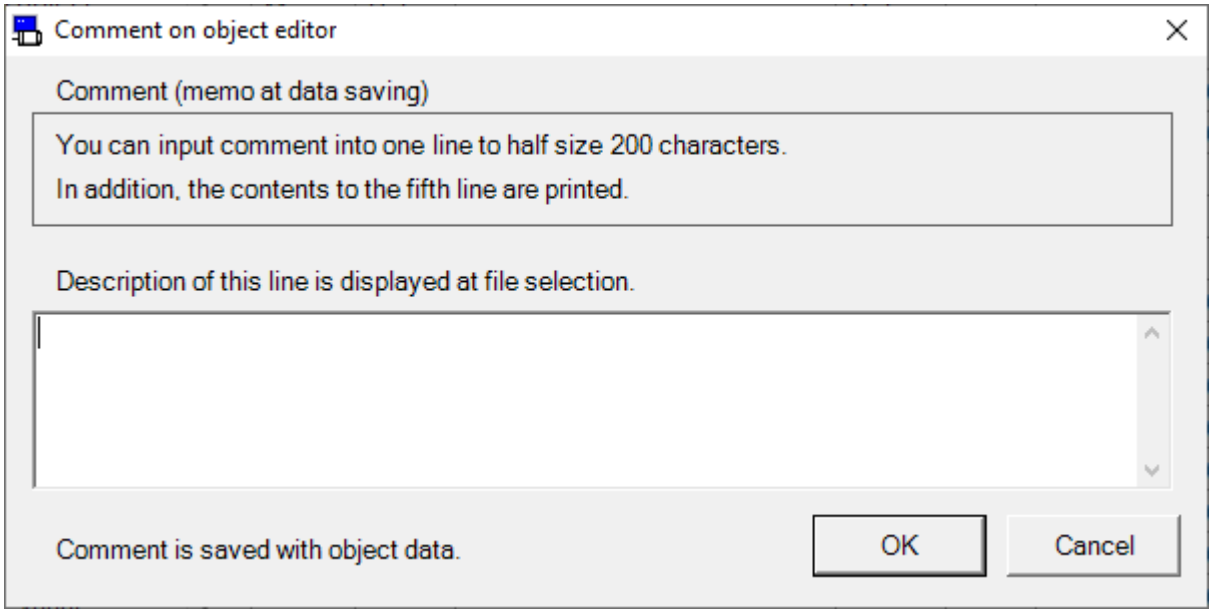
“Parameter”	Show the parameter classification and number corresponding to the object. Not displayed if you select “All object” or if the corresponding parameter does not exist.
“Main Index”	Show the Main Index of the object.
“Sub Index”	Show the Sub Index of the object.
“Object Name”	Show the Object Name.
“Data Type”	Show the Data Type of the object. I8 : Integer 8 I16 : Integer 16 I32 : Integer 32 U8 : Unsigned 8 U16 : Unsigned 16 U32 : Unsigned 32 Bool : Boolean OS : Octet String VS : Visible String
“Attrib”	Show the attribute of the object. RO : Read-Only attribute RW : Read-Write attribute
“MIN-MAX”	Show the setting range of the object. If “Data Type” is OS or VS, setting range is not displayed.
“Setting Value”	Show the setting value of the object. If “Attrib” is RW and “Setting Value” is number, you can change the setting value of the object. Depending on the choice of “Disp Select”, there is an input limit. Hex : 0 to 9, “A” to “F” (after editing, “h” is automatically added to the end.) Dec : 0 to 9, “-”sign Bin : 0 to 1 (after editing, “b” is automatically added to the end.) After changing the setting value, the change is reflected by pressing the [ENTER] key or clicking the  (Change of set value). Press the [ESC] key to return to the original value.
“Units”	Show the unit of the setting value of the object.

Comment

On saving set objects in a file, comments can be saved together.
These comments do not effect operations of the driver.

Making Comment

1 Click Cmnt (Comment) on the tool bar, and open the comment window.



2 Click comment box and input comments.
3 After completing comment input, click “OK”.

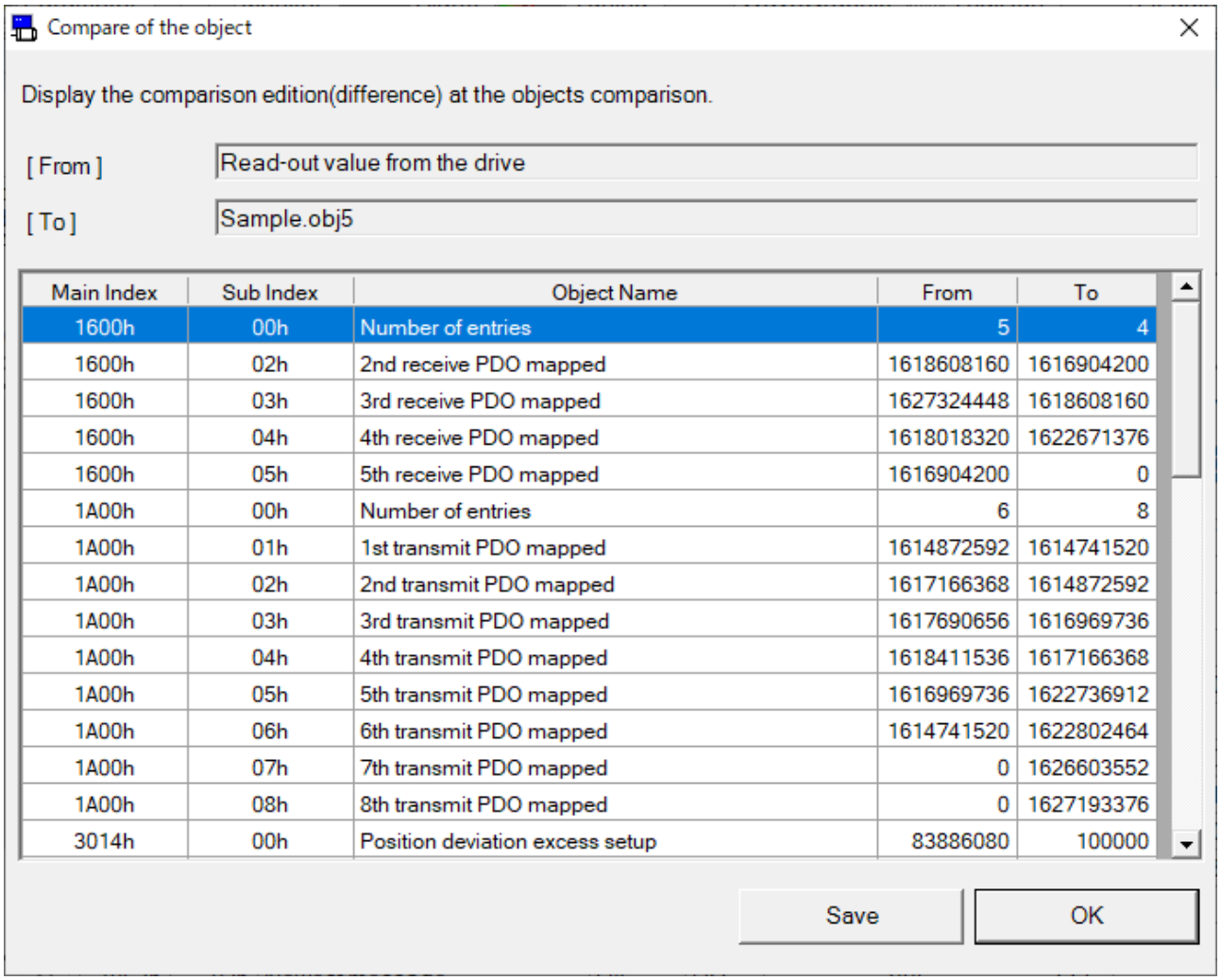
Comparison

Objects being edited can be compared with other objects.

Comparison of objects

1 Click Comp (Comparison) on the toolbar, please select the file (.obj5) to be compared.

2 Comparison result of the objects is displayed.



3 Click “Save”, comparison result of the objects can be saved at a file.

Notes 1) Please refer to the manual of the driver or technical reference for details of each object's function and so on.
Notes 2) Even if objects are sent to the driver, objects are turned to the original value before modification if the power supply of the driver is turned off without writing to EEPROM of the driver. Object modifications list are displayed on EEPROM writing. Please check the modification carefully.
Notes 3) Do not turn off the power supply of the PC during writing to EEPROM of the driver. Data context cannot be guaranteed if the power supply is turned off during writing.
Notes 4) Some objects become valid after modifications to the new data, writing EEPROM, and power supply reset. (On inputting, that issue is displayed. Please refer to the manual of the driver or technical reference and confirm on the objects)
Notes 5) Object editor screen indication may be different from the actual object value of the driver in case PANATERM function windows which change the objects (ex. Trial Run, Pin Assign, Analog Input) is opened. In such case, press the reception button and update the object of the driver to the latest one.
Notes 6) If you cannot edit object value during the communication with driver, the driver may be in condition which is not rewritable.
In this case, please check "ESM Condition" is "INIT" and also the driver is in condition which is rewritable.
Notes 7) The object editor screen cannot open during opening some screens. For more information please refer to page 237 "Object editor screen behavior".

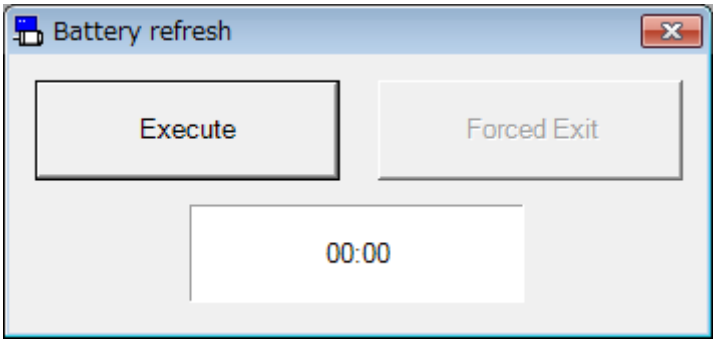
Battery Refresh screen

Will perform a battery forced discharge of the encoder.

Note) Battery refresh can be executed only by the corresponding encoder.
Please note that there is a possibility that the battery alarm occurs during the refresh operation.
Battery refresh cannot be performed through RS232 communication.

Open the Battery refresh window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Other” > “Battery Refresh” of the tool bar on the main screen.
3 The Battery Refresh window is opened.

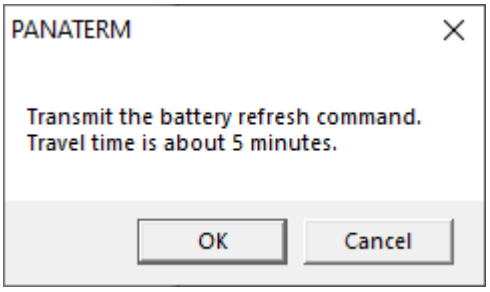


Close the Battery refresh window

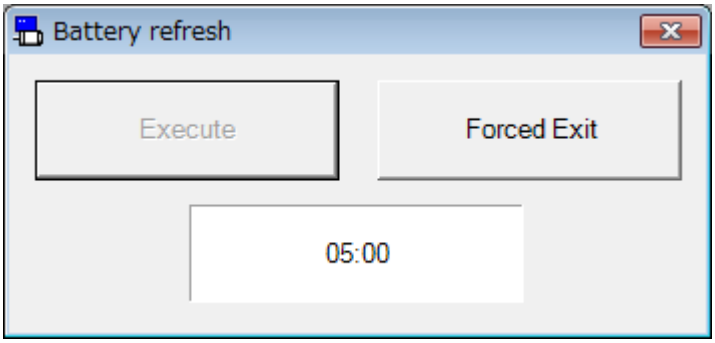
Click of upright on the window

Procedure for Battery refresh

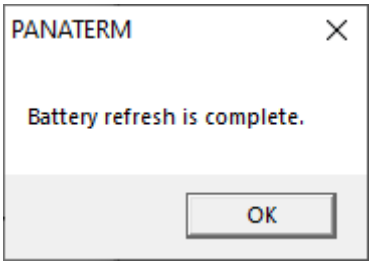
1 Click “Execute”.
2 Confirmation dialog is displayed.
Click “OK” then Battery refresh is executed.



3 The remaining time is displayed as "05:00".
Will be gradually countdown.



4 When the remaining time reaches "00:00", the battery refresh is complete.



Interruption of Battery refresh

Click “Forced Exit” then exit forcibly battery refresh.

Notes 1) Remaining time of the countdown after the battery refresh execution, please note that after the end of the battery refresh screen is also continuing.
Notes 2) The battery refresh screen cannot open during opening some screens. For more information please refer to page 238 “Battery refresh screen behavior”.

Block operation Editor screen

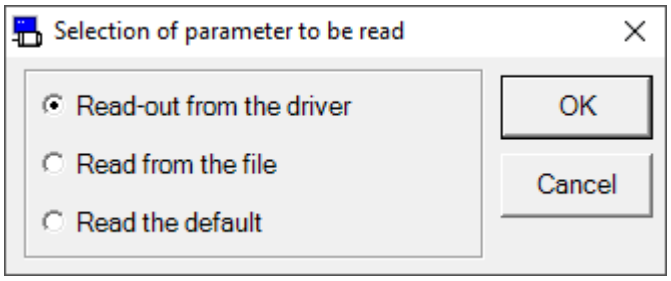
Realize easier block operation by displaying and editing the block operation and block parameter of the driver.

Note) Please modify parameters with enough care after reading the driver's instruction manual or technical reference carefully, as some parameters give large effect to operations of drivers or motors.
Block operation cannot be performed through RS232 communication.

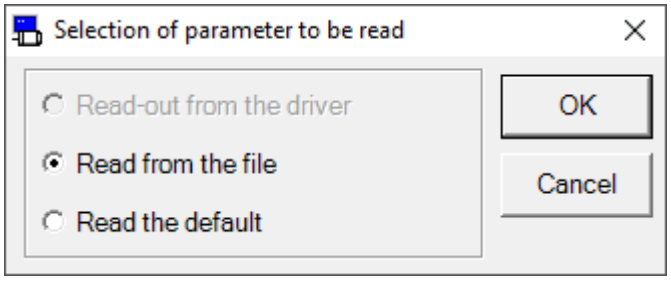
Open the Block operation Editor window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Other” > “Block operation Editor” of the tool bar on the main screen.
3 Selection of parameter to be read window is displayed.

<When communication with driver>



<When not communication with driver>



4 Select the origin of parameters, and click.

□“Read - out from the driver”

The parameters set in the driver are read communicating the driver connected. If this mode is selected, modifications of the parameter values are reflected to the driver immediately.

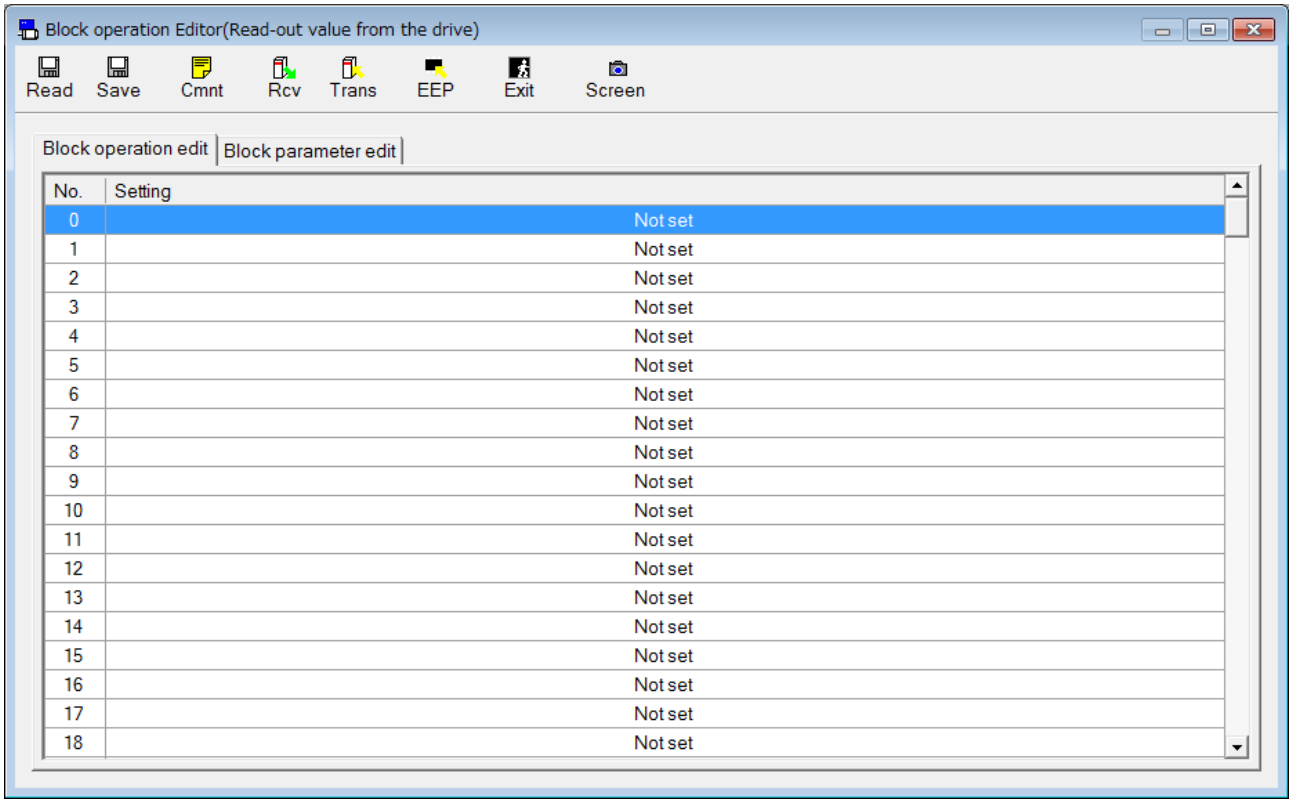
□“Read from the file”

Parameter files already edited (.obj5) are read. Parameter modifications are not reflected to the driver connected unless “Transmit the parameter to the driver” is executed when they are “Read from the file”.

□“Read the default”

Default set values saved at the time of installation is read. The parameter modifications are not reflected unless “Transmit the parameter to the driver” is executed as the case of “Read from the file”.

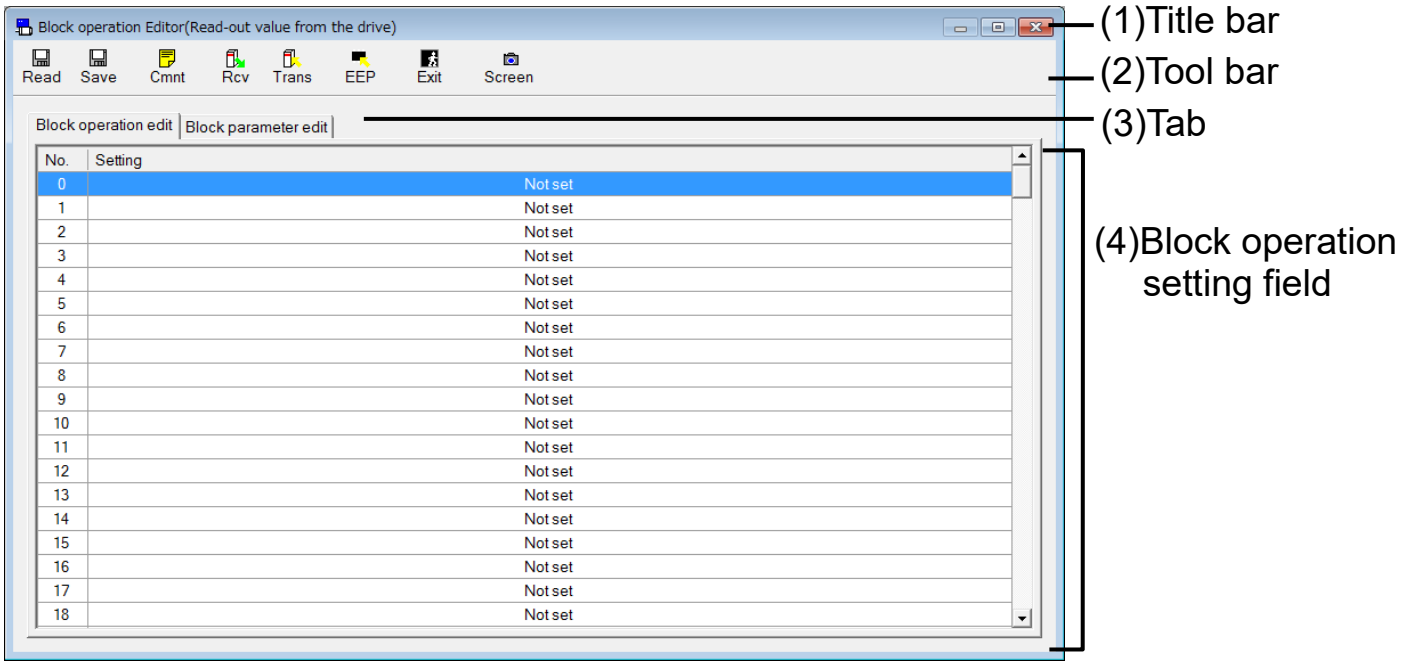
5 Click “OK”. The Block operation Editor window is opened.



Close the Block operation Editor window

Click Exit (Exit) on the tool bar.

Structure of Block operation editor screen



(1) Title bar

The origins of reference of parameters reference are displayed.
Following buttons are used to operate windows.

	Display the window in full screen
	Close the window

(2) Tool bar

Saving, reading, some other basic operation commands on parameters are listed.

Read	(Read)	Reads parameters from files (.obj5). When this button is effective, a parameter file can be specified by drag and drop.
Save	(Save)	Writes parameters to files (.obj5).
Cmnt	(Comment)	Makes comments attached to parameters files.
Rcv	(Receive)	Receives parameters from the driver.
Trans	(Transmit)	Sends parameters to the driver.
EEP	(EEPROM)	Write parameters to EEPROM of the driver.

Exit	(Exit)	Closes Block operation editor screen.
Screen	(Screen)	Captures the screen and save into a file.

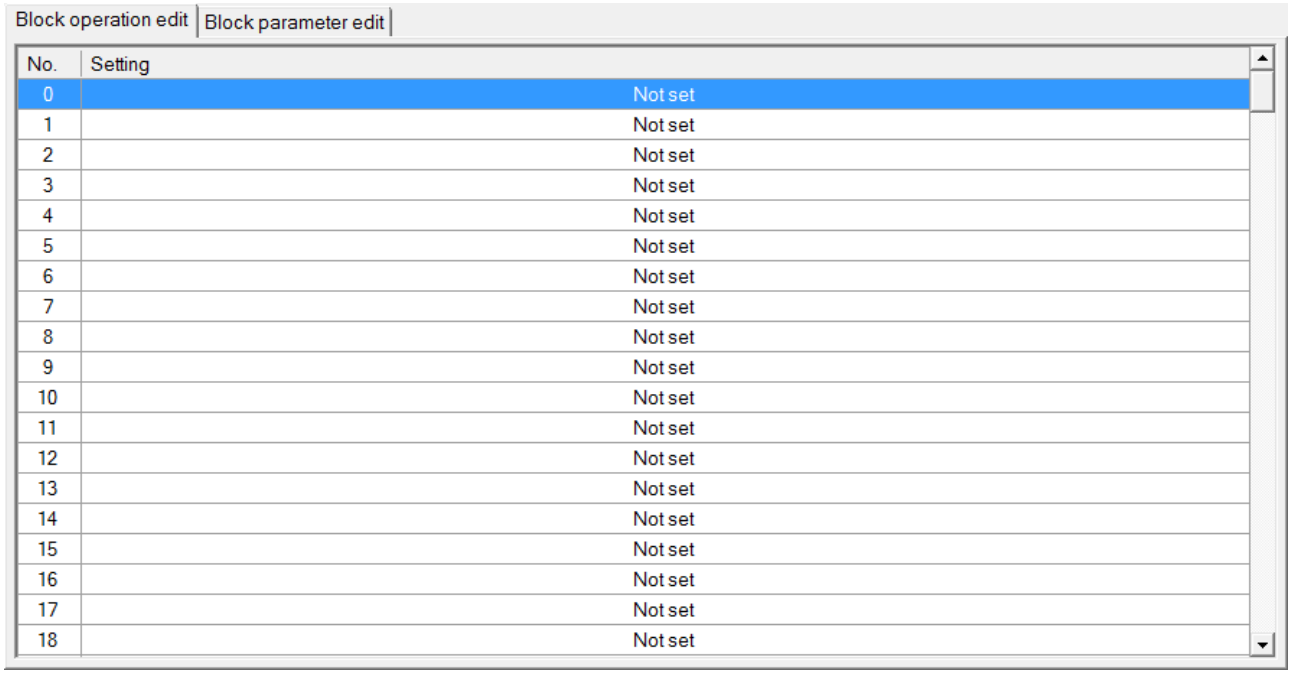
(3) Tab
Switch Block operation setting field display to “Block operation edit”, “Block parameter edit”.

(4) Block operation setting
Editing and setting of block operation command parameters and block operation parameter are available.

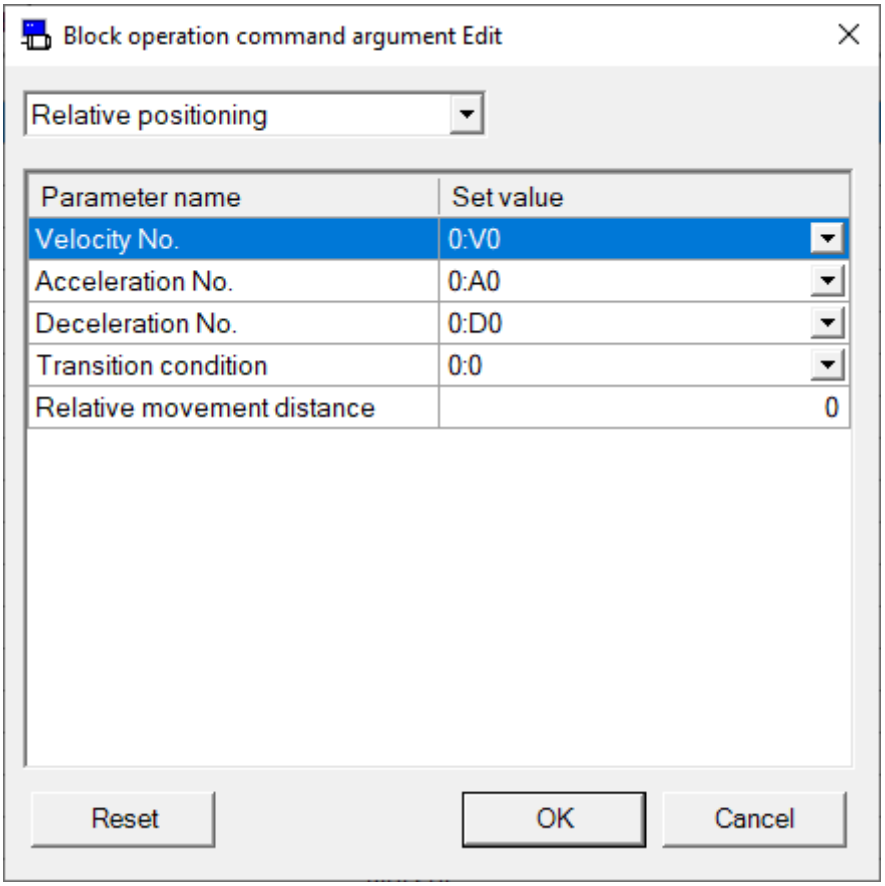
Setting method of Block operation command

1 Select the tab of “Block operation edit”.

* The settings row is displayed current block operation command. When block operation command is not set then, it is displayed “Not set”.
When the command cannot convert to block operation command then, it is displayed “Not defined command” or “Unusual command settings”.



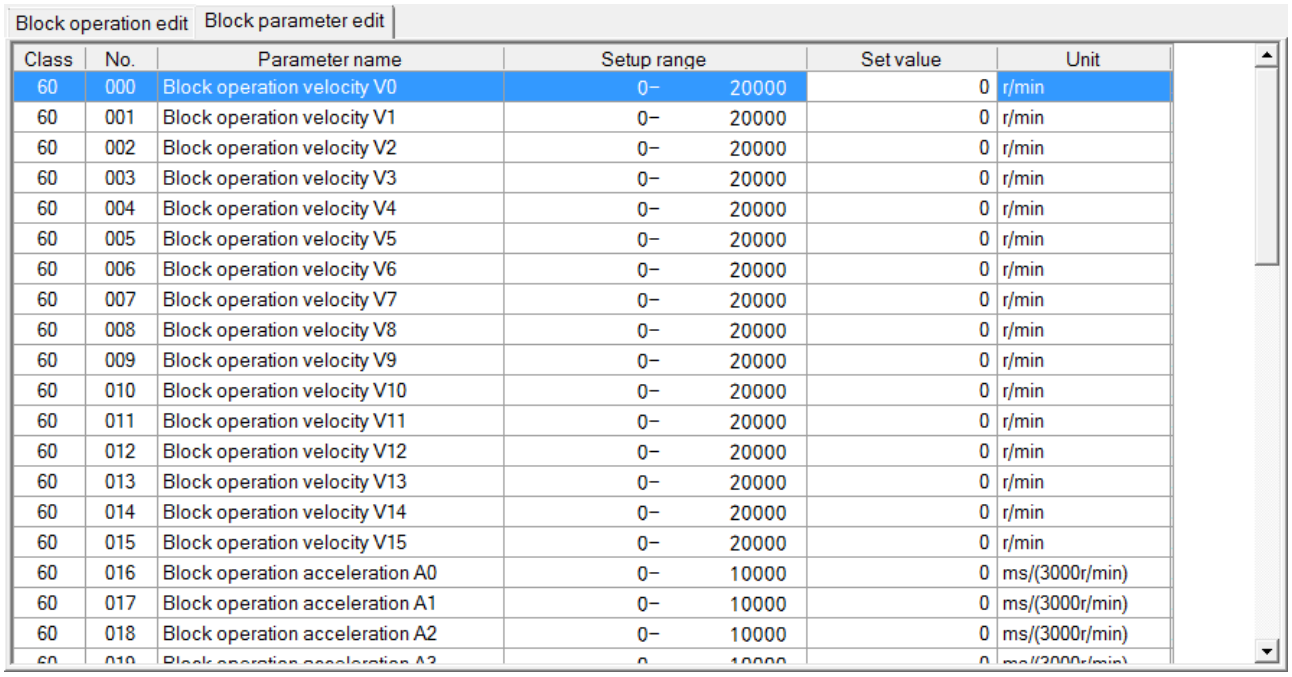
2 Double-click the block command row to want be set.
3 Block operation command argument Edit window is displayed.



4 Select the block operation command from the combo box, and please set each argument.
5 Click “OK”. Set the block operation command with the current settings.
Click “Reset”. Set the “Not set” and close this screen.
Click “Cancel”. Inactivate the change, and exit the screen.

Setting method of Block operation command

1 Select the tab of “Block parameter edit”.



Class	No.	Parameter name	Setup range		Set value	Unit
60	000	Block operation velocity V0	0–	20000	0	r/min
60	001	Block operation velocity V1	0–	20000	0	r/min
60	002	Block operation velocity V2	0–	20000	0	r/min
60	003	Block operation velocity V3	0–	20000	0	r/min
60	004	Block operation velocity V4	0–	20000	0	r/min
60	005	Block operation velocity V5	0–	20000	0	r/min
60	006	Block operation velocity V6	0–	20000	0	r/min
60	007	Block operation velocity V7	0–	20000	0	r/min
60	008	Block operation velocity V8	0–	20000	0	r/min
60	009	Block operation velocity V9	0–	20000	0	r/min
60	010	Block operation velocity V10	0–	20000	0	r/min
60	011	Block operation velocity V11	0–	20000	0	r/min
60	012	Block operation velocity V12	0–	20000	0	r/min
60	013	Block operation velocity V13	0–	20000	0	r/min
60	014	Block operation velocity V14	0–	20000	0	r/min
60	015	Block operation velocity V15	0–	20000	0	r/min
60	016	Block operation acceleration A0	0–	10000	0	ms/(3000r/min)
60	017	Block operation acceleration A1	0–	10000	0	ms/(3000r/min)
60	018	Block operation acceleration A2	0–	10000	0	ms/(3000r/min)

2 Block parameter edit screen is displayed.

“Class” Parameter classifications are indicated.

“No.” Parameter numbers are indicated.

“Parameter name” Parameter names are indicated.

“Setup range” Maximum & minimum value of parameter setting is indicated.

“Set value” Parameter value. Its value can be modified.
Parameters with on the set values are set with the combo boxes. After selecting the values from the combo boxes, input the [ENTER] key.
Parameters without on the set values, are inputted with the number keys directly, or modified clicking and changing the values. To set the values, input the [ENTER] key
If the [ESC] key is inputted, the value is return to the original one.

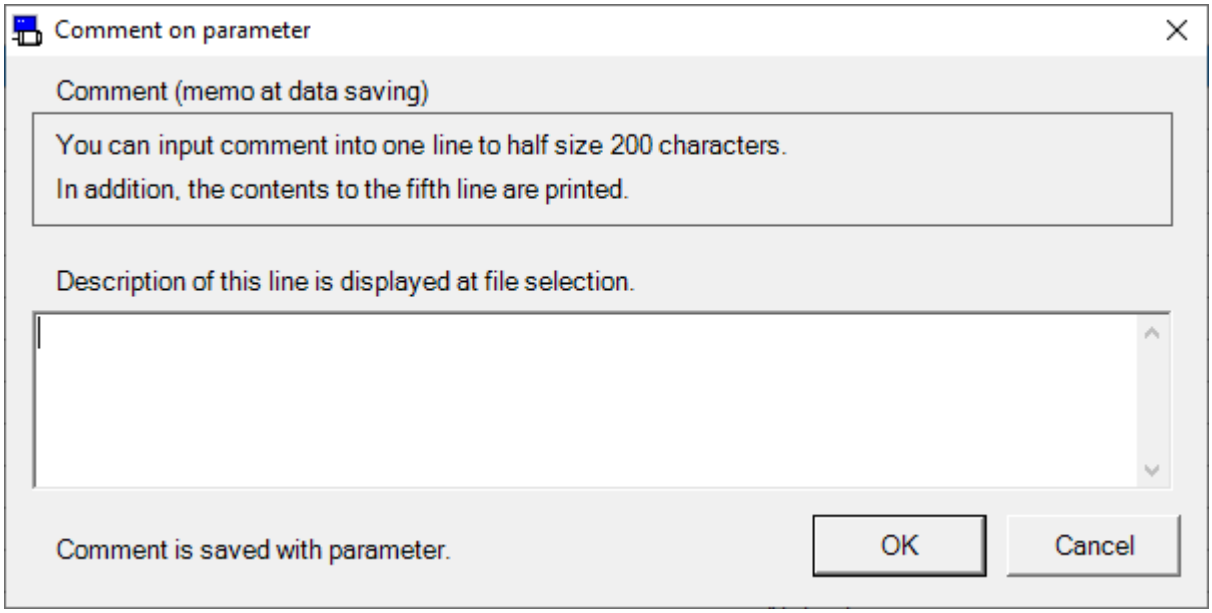
“Unit” Units of the parameter set values are indicated.

Comment

On saving set parameters in a file, comments can be saved together. These comments do not effect operations of the driver.

Making Comment

1 Click Cmnt (Comment) on the tool bar, and open the comment window.



2 Click comment box and input comments.
3 After completing comment input, click “OK”.

Notes 1) Please refer to the manual of the driver or technical reference for details of each parameter's function and so on.
Notes 2) Even if parameters are sent to the driver, parameters are turned to the original value before modification if the power supply of the driver is turned off without writing to EEPROM of the driver. Parameter modifications list are displayed on EEPROM writing. Please check the modification carefully.
Notes 3) Do not turn off the power supply of the PC during writing to EEPROM of the driver. Data context cannot be guaranteed if the power supply is turned off during writing.
Notes 4) Some parameters become valid after modifications to the new data, writing EEPROM, and power supply reset. (On inputting, that issue is displayed. Please refer to the manual of the driver or technical reference and confirm on the objective parameters)
Notes 5) The block operation editor screen cannot open during opening some screens. For more information please refer to page 238 "Block operation editor screen behavior".

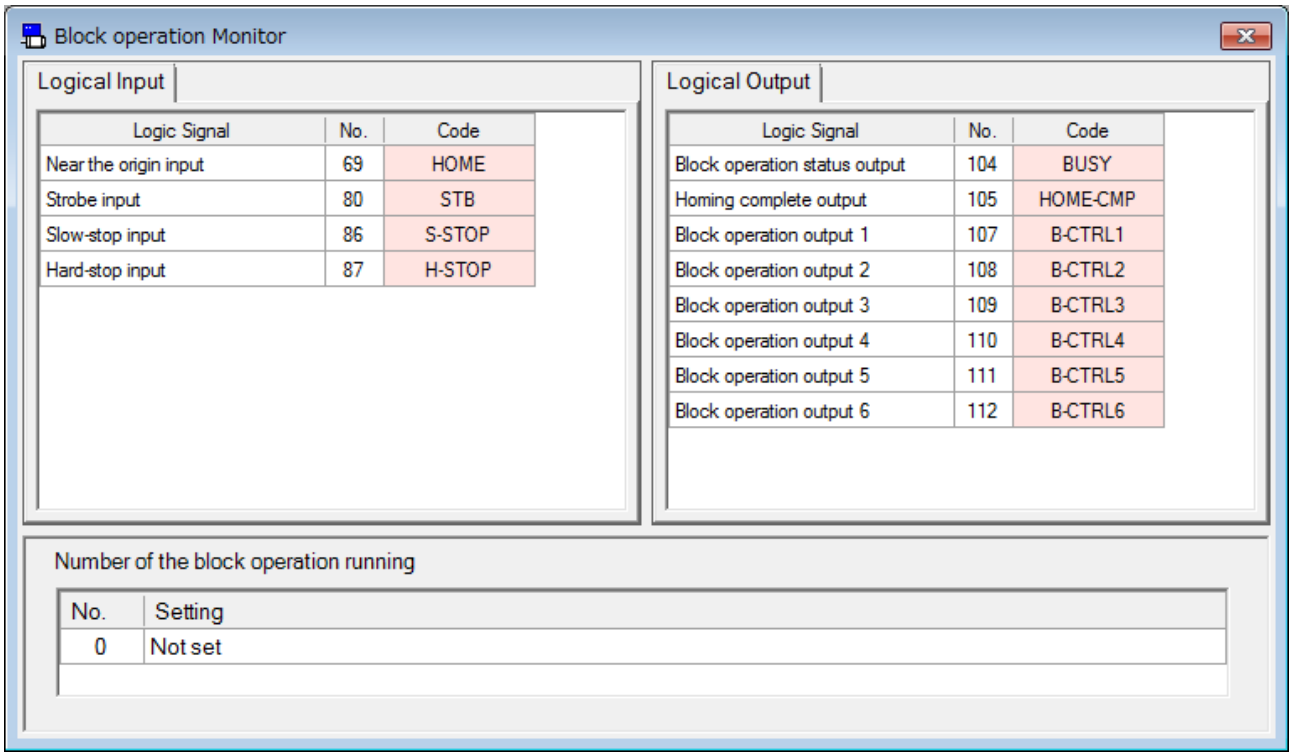
Block operation Monitor screen

You can display and check the execution status of the block operation.

Note) Block operation monitor cannot be performed through RS232 communication.

Open the Block operation Monitor window

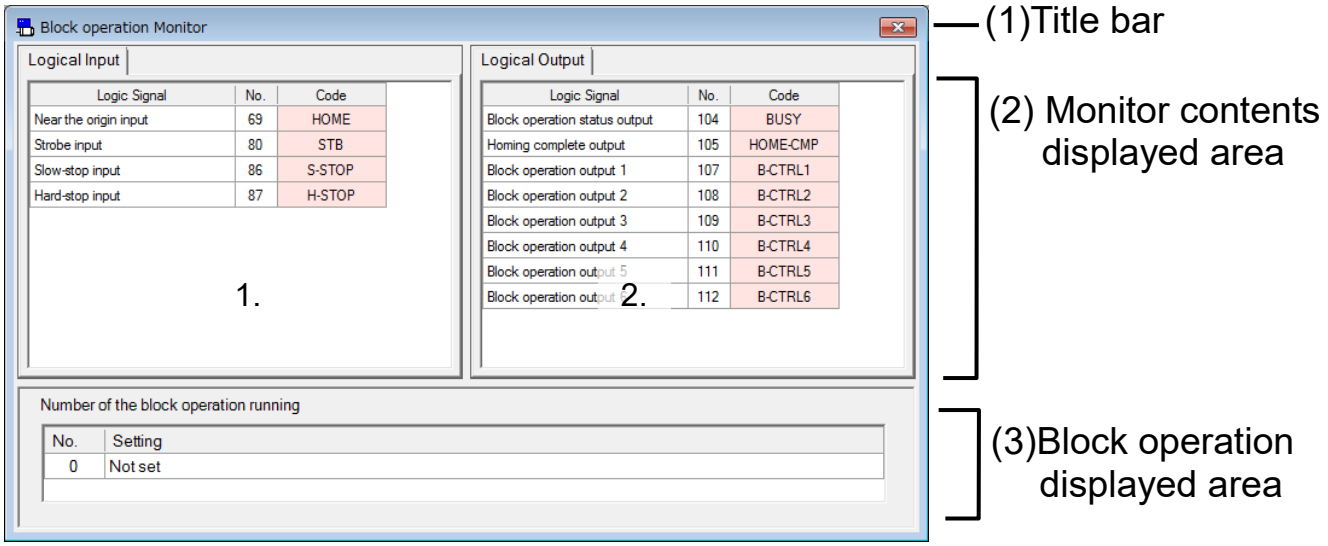
1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Other” > “Block operation Monitor” of the tool bar on the main screen.
3 The Block operation Monitor window is opened.



Close the Block operation Monitor window

Click of upright on the window

Structure of Block operation monitor screen



(1) Title bar
You can operate window.

(2) Monitor contents displayed area
Display monitoring information.

1. Input signal conditions monitoring
   Display signal condition of input.
   Red : Active
   Pink: Inactive
2. Output signal condition monitoring
   Display Signal condition of output
   Red : Active
   Pink: Inactive

(3) Block operation displayed area
Display the number of the block operation running.

Notes 1) Using USB communication as data receipt between Driver and PC, there are accidental errors, delay of display value on the screen and actual driver value and recoded time.
Notes 2) If polarity is (+), (+) signal is not displayed.
Notes 3) Block operation monitoring function is not precious measurement instrument. Block operation monitoring display shall be used as rough estimate.
Notes 4) The block operation monitor screen cannot open during opening some screens. For more information please refer to page 239 “Block operation monitor screen behavior”.

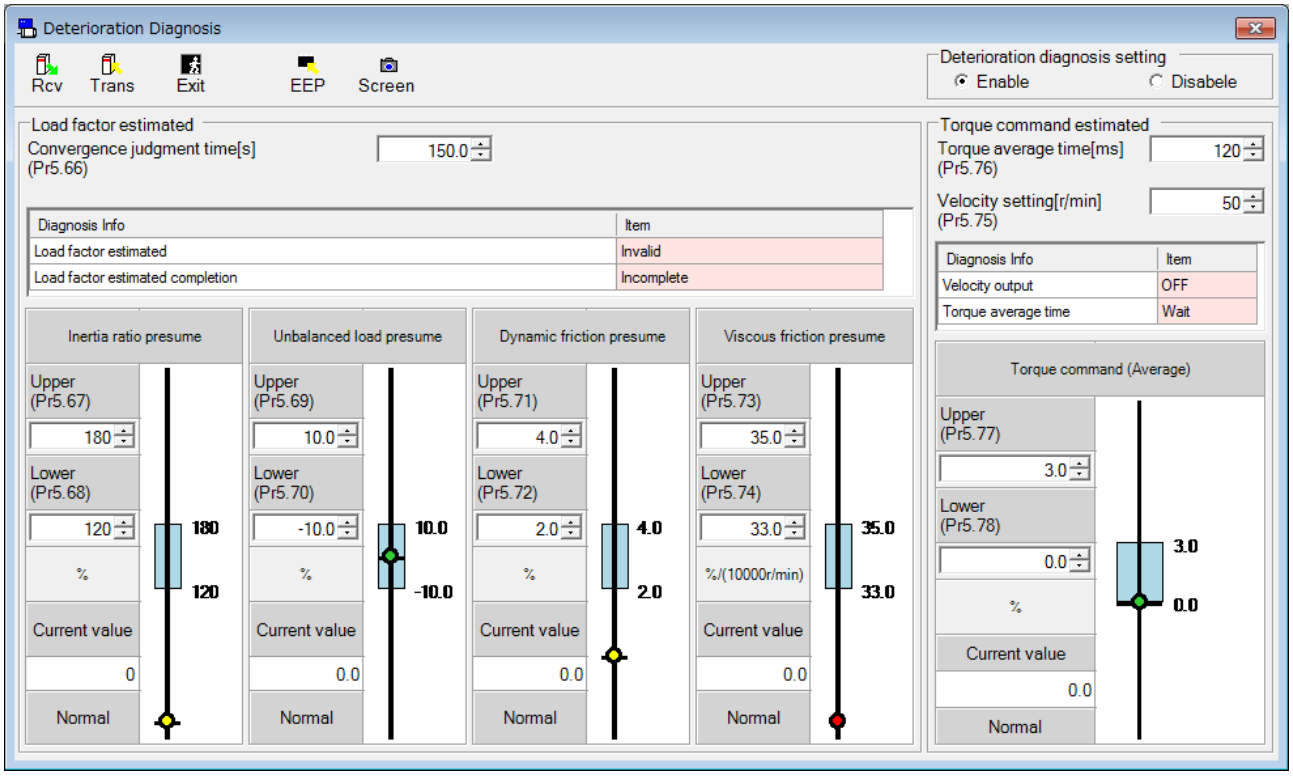
Deterioration diagnosis screen

You can display and check the deterioration and aging state of the equipment from the detection apparatus capable of information by the motor.

Note) Deterioration diagnosis cannot be performed through RS232 communication.

Open the Deterioration diagnosis window

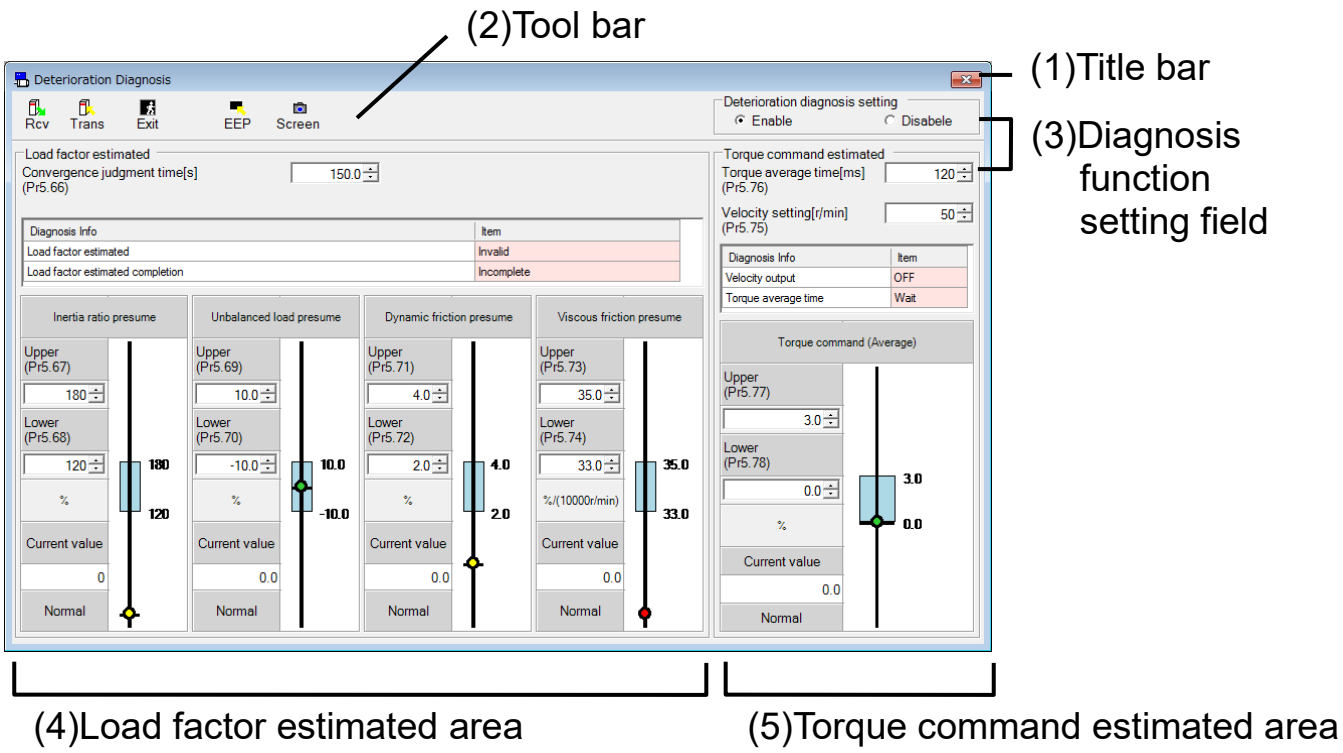
1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Other” > “Deterioration diagnosis” of the tool bar on the main screen.
3 The Deterioration diagnosis window is opened.



Close the Deterioration diagnosis window

Click Exit (Exit) on the tool bar.

Structure of Deterioration diagnosis screen

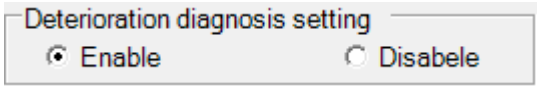


(1) Title bar
You can operate window.

(2) Tool bar
Receiving, transmitting, some other basic operation commands on parameters are listed.

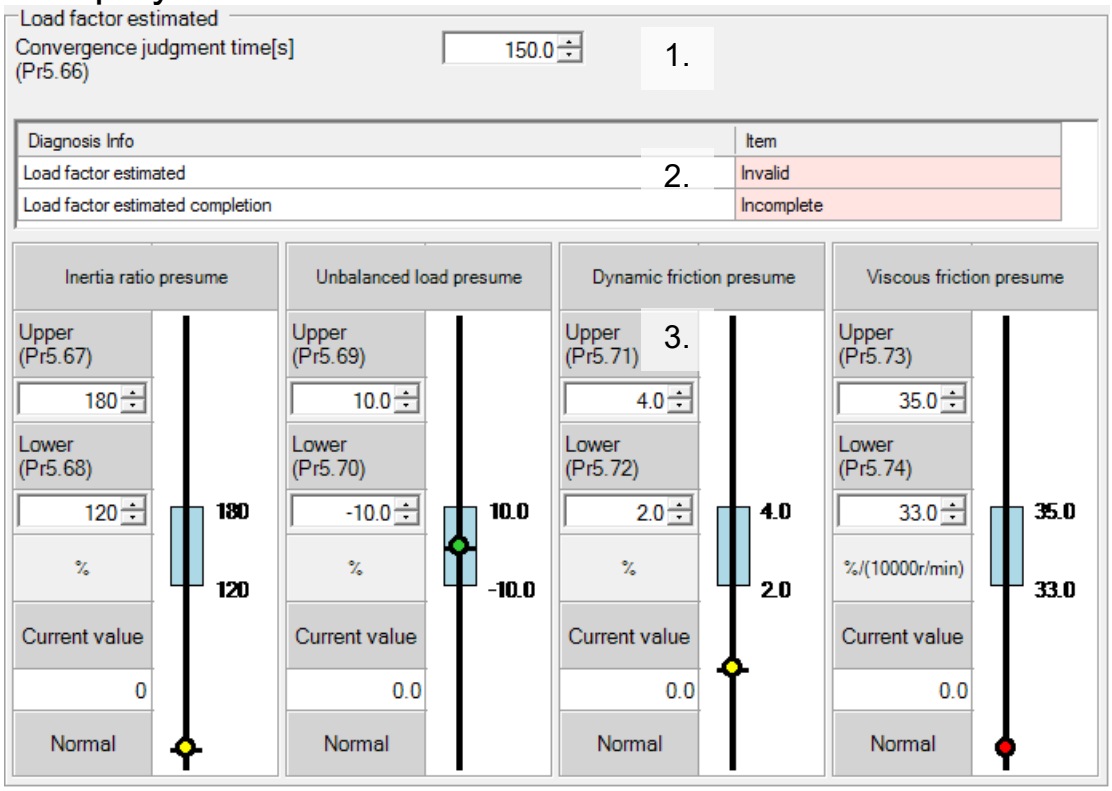
Rcv	(Receive)	Receives parameters from the driver.
Trans	(Transmit)	Sends parameters to the driver.
Exit	(Exit)	Closes parameter screen.
EEP	(EEPROM)	Write parameters to EEPROM of the driver.
Screen	(Screen)	Captures the screen and save into a file.

(3) Diagnosis function setting field
To enable / disable the deterioration diagnosis function.
When the screen is displayed, it is set to the current state of the driver.



Enabled : Deterioration diagnosis function is enabled.
Disabled : Deterioration diagnosis function is disabled.

(4) Load factor estimated area
It displays the estimated information about the load characteristics.



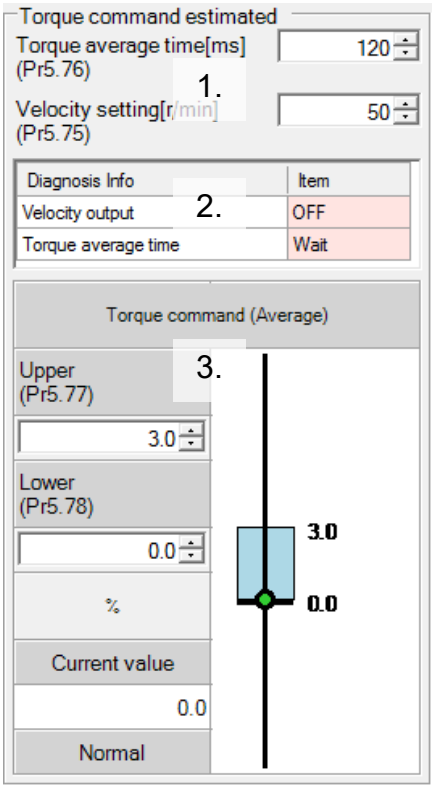
1. Estimated information setting
Set the estimated condition of the load factor estimation.
"Convergence judgment time"
Sets time for deemed convergence of real-time auto tuning load characteristics estimate.

2. Diagnosis information Monitor
Display the diagnostic status of the load characteristics estimation.
"Load factor estimated"
Display the load factor estimated of real time auto tuning indicates whether valid.

“Load factor estimated completion”
If load factor estimate is valid and it was possible that the data necessary to estimate is to get more than convergence determination time, will be completed.

3. Diagnostic slider
Display the slider that indicates the diagnostic state of deterioration diagnostic information related to the load factor.
“Inertia ratio presume”
Display the diagnostic state of inertia ratio.
“Unbalanced load presume”
Display the diagnostic state of unbalanced load.
“Dynamic friction presume”
Display the diagnostic state of dynamic friction.
“Viscous friction presume”
Display the diagnostic state of viscous friction.

(5) Torque command estimated area
It displays the estimated information about the torque command.



1. Estimated information setting

Set the estimated condition of the torque command estimation.

“Torque average time”

Sets time required to compute the torque command average (weighted frequency).

“Velocity setting”

Sets deterioration diagnosis velocity output (V-DIAG).

2. Diagnosis information Monitor

Display the diagnostic status of the torque command estimation.

“Velocity output”

It turned on when the motor speed matches the velocity setting.

“Torque average time”

It will be completed when the velocity output is on and has passed more than the torque average time.

3. Diagnostic slider

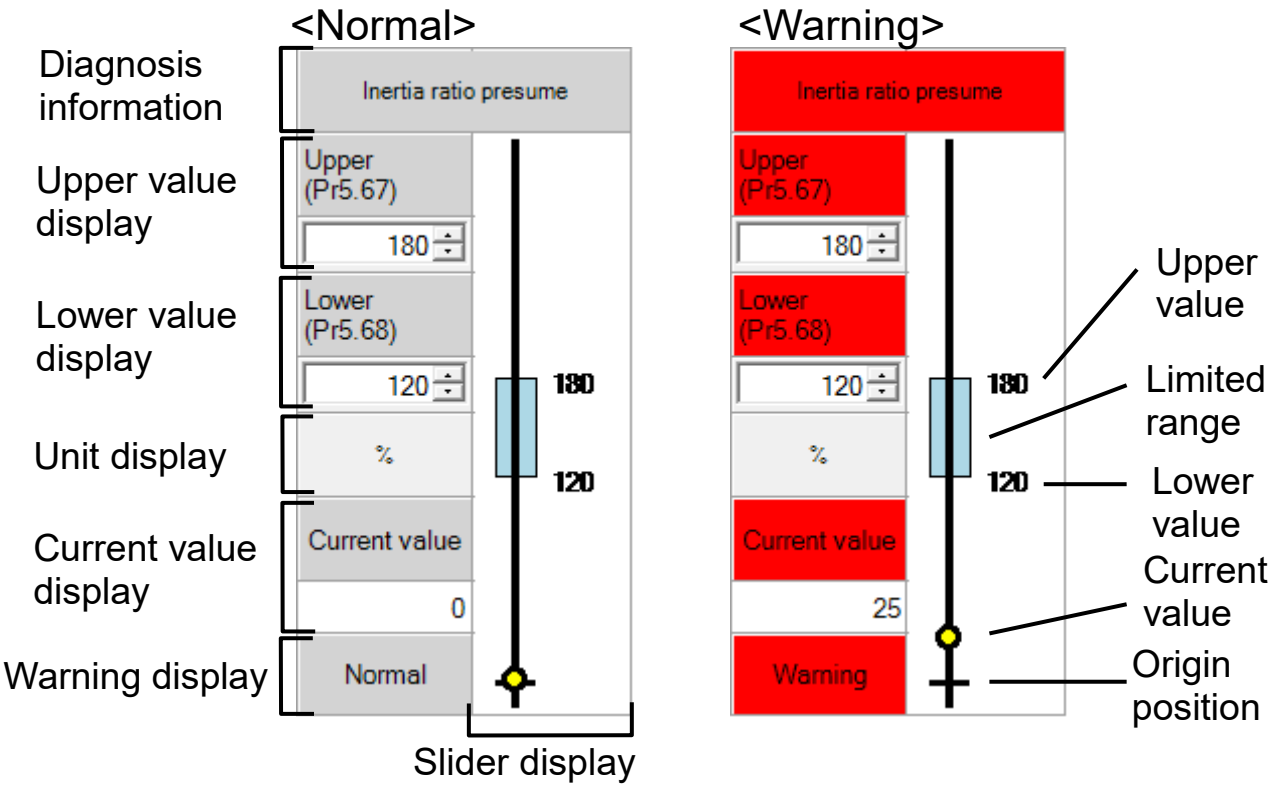
Display the slider that indicates the diagnostic state of deterioration diagnostic information related to the torque command.

“Torque command (Average)”

Display the diagnostic state of torque command (average).

Structure of Diagnostic slider

Diagnostic slider is composed of the following elements.
Warning during the occurrence of the deterioration diagnostic information of interest, background color as a warning display is displayed in red.



(Diagnosis information)	Display the name of diagnosis information.
(Upper value display) (Lower value display)	Set upper limit and lower limit of diagnosis information. Upper values and Lower values, are inputted with the number keys directly, or modified clicking and changing the values from each setting area. To set the values, input the [ENTER] key or click Trans (Transmit) on Toolbar.
(Unit display)	Display the unit of diagnosis information.
(Current value display)	Display the current value of diagnostic information acquired from the driver.
(Warning display)	Display the occurrence of deterioration diagnosis warning.
(Slider display)	Display estimation result of diagnosis information with slider. The drawing range of the slider changes according to the setting of the upper limit value and lower limit value.

Current value	Display the current value of diagnostic information with ○. In the limit range :Displayed as 🟢 Out the limit range :Displayed as 🟡 Out the drawing range :Displayed as 🔴
Upper value	Display the upper limit value of diagnostic information. If lower limit value > upper limit value then, it not displayed.
Lower value	Display the lower limit value of diagnostic information. If lower limit value > upper limit value then, it not displayed.
Limited range	Display the limit range by the upper limit value and lower limit value. If deterioration diagnosis function is enabled and the current value exceeds the limit range, diagnosis warning will be generated. If lower limit value > upper limit value then, it not displayed.
Origin position	Display the position of the current value = 0. It is not displayed when there is no 0 position within the drawing area.

Notes 1) Please refer to the manual of the driver or technical reference for details of each parameter's function and so on.
Notes 2) Even if parameters are sent to the driver, parameters are turned to the original value before modification if the power supply of the driver is turned off without writing to EEPROM of the driver. Parameter modifications list are displayed on EEPROM writing. Please check the modification carefully.
Notes 3) Do not turn off the power supply of the PC during writing to EEPROM of the driver. Data context cannot be guaranteed if the power supply is turned off during writing.
Notes 4) The deterioration diagnosis screen cannot open during opening some screens. For more information please refer to page 239 "Deterioration diagnosis screen behavior".

RTEX Setup screen

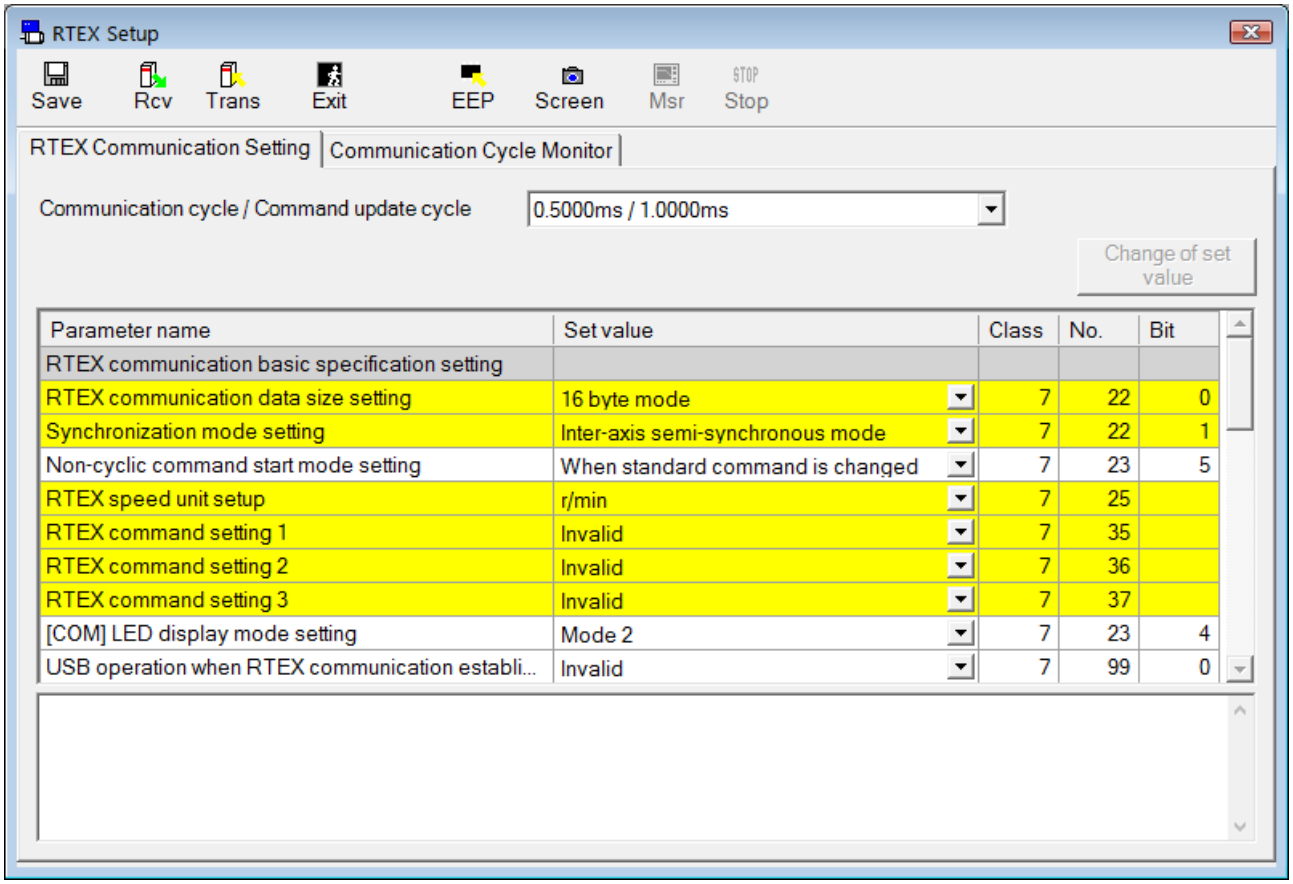
Set the RTEX communication between the driver and the host device.

Note) RTEX Setup cannot be performed through RS232 communication.

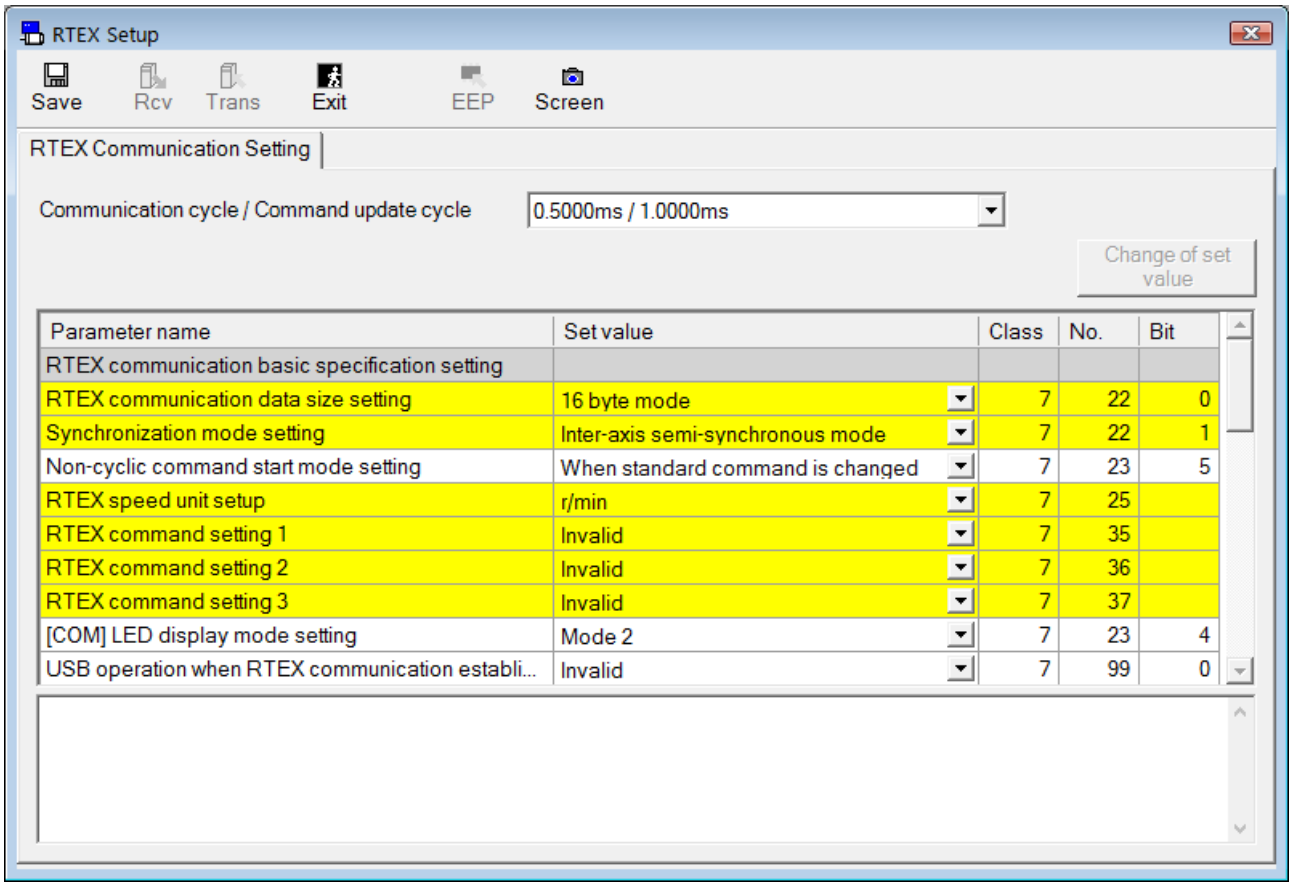
Open the RTEX Communication Setting window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Other” > “RTEX Setup” of the tool bar on the main screen.
3 When not communicating with driver, the selection screen of a parameter is displayed. Please choose the parameter file to edit.
4 The RTEX Setup window is opened.

<When communication with driver>



<When not communication with driver>

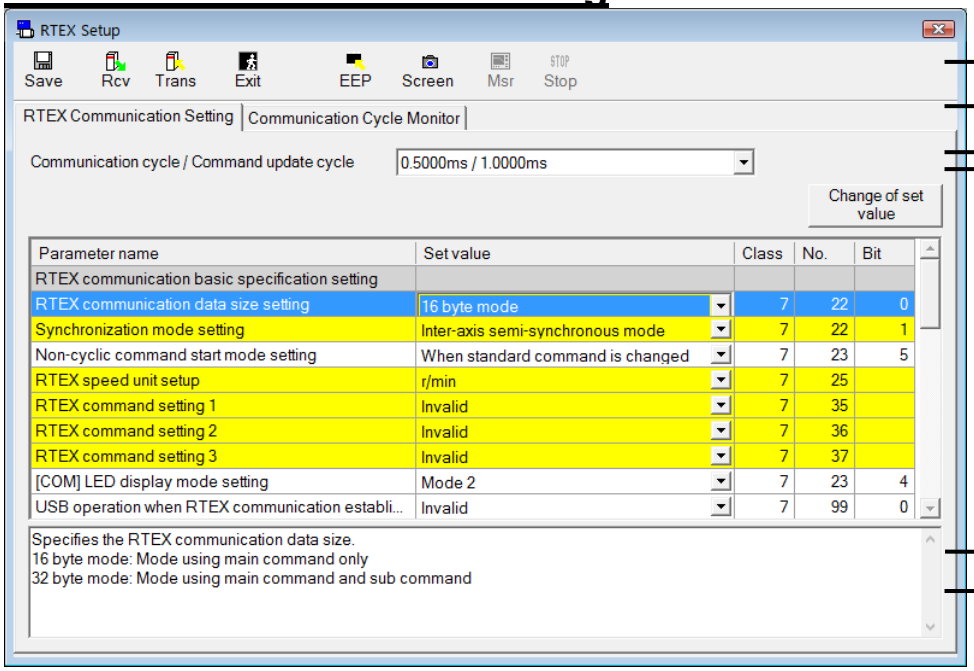


Close the RTEX Communication Setting window

Click Exit (Exit) on the tool bar.

Structure of RTEX Setup screen

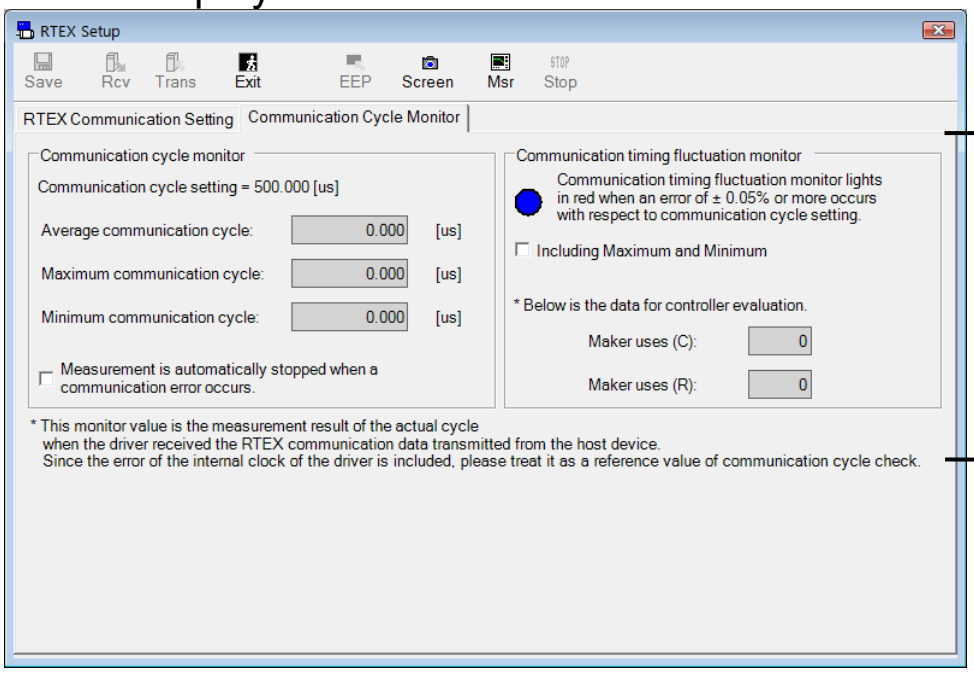
RTEX Communication Setting



(1) Title bar
(2) Tool bar
(3) Tab
(4) Parameter setting field
(5) Text indication box

Communication Cycle Monitor

This is displayed when communication with driver only.

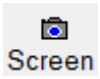


(6) Monitoring Contents display area

(1) Title bar　You can operate this window.

(2) Tool bar

(Save)　Moves to the parameter screen.

	(Receive)	Receives parameters from the driver.
	(Transmit)	Sends parameters to the driver.
	(Exit)	Closes RTEX Setup screen.
	(EEPROM)	Write parameters to EEPROM of the driver.
	(Screen)	Capture the screen and record the file
	(Measurement)	Starts the communication cycle measurement/re-measurement.
	(Stop)	Stops the communication cycle measurement.

(3) Tab

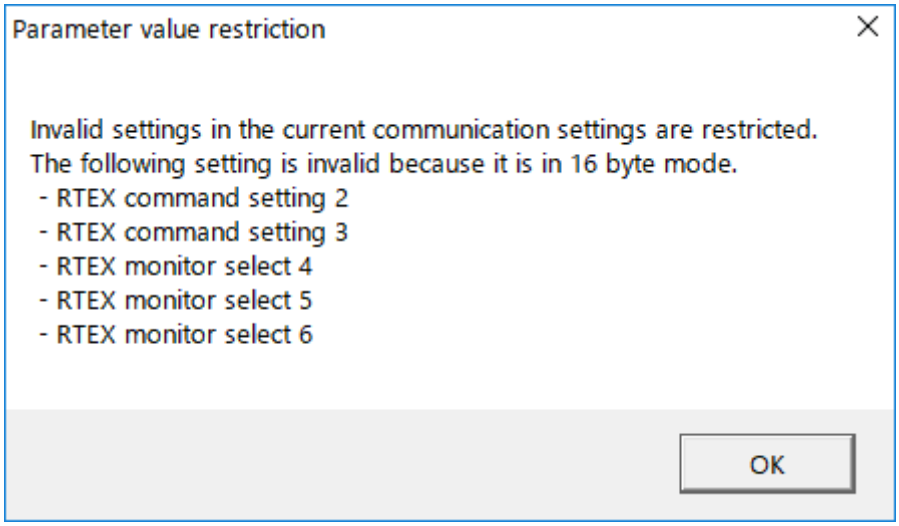
Switch the display of “RTEX Communication Setting” and “Communication Cycle Monitor”

(4) Parameter setting field

Editing and setting of parameters are available.

“Communication cycle / Command update cycle”	This parameter sets the communication cycle and the command update cycle of the driver. You can set the communication cycle and the command update cycle by changing this parameter.
“Parameter name”	Parameter names are indicated.
“Set value”	Parameter value. Its value can be modified. For a parameter value represented by a button, press the button to set the parameter. Parameters with on the set values are set with the combo boxes. After selecting the values from the combo boxes, input the [ENTER] key or click Change of set value (modification of set value). Parameters without on the set values, are inputted with the number keys directly, or modified clicking and changing the values. To set the values, input the [ENTER] key or click Change of set value (modification of set value). If the [ESC] key is inputted, the value is return to the original one.
“Class”	Parameter classifications are indicated.
“No.”	Parameter numbers are indicated.
“Bit"	Displays the relevant bit.

* When you are editing parameters, if there are parameter settings invalid for the current communication setting, the following dialog box appears with the reasons for restriction and the list of parameters.



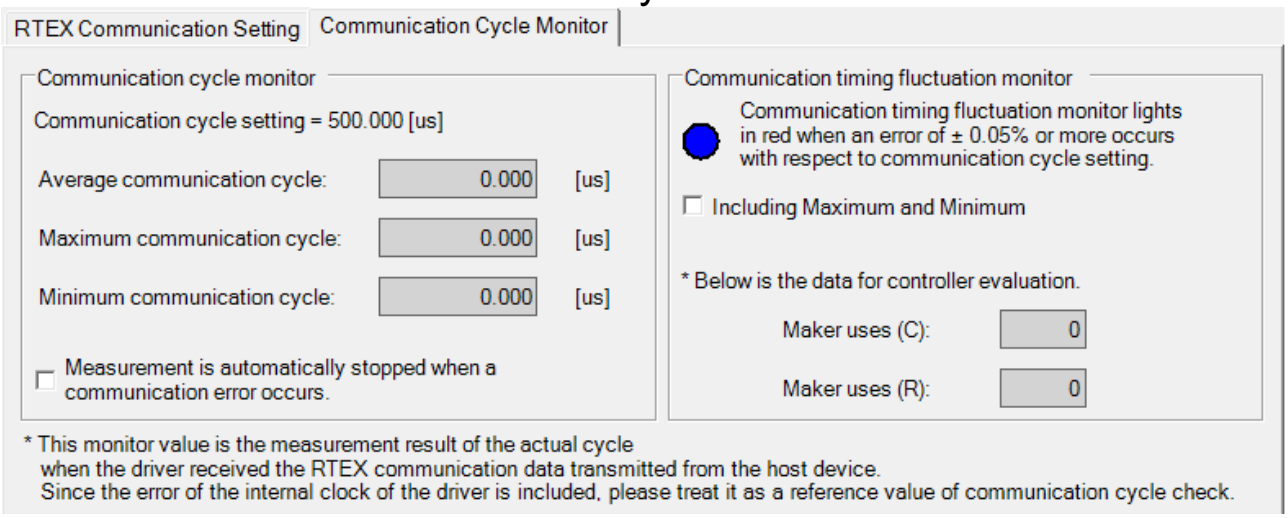
(5) Text indication box
Explanations regarding selected parameters.

(6) Monitoring Contents display area
This area displays the real-cycle representation of the measurement results of the RTEX communication data that the driver received from the host device.

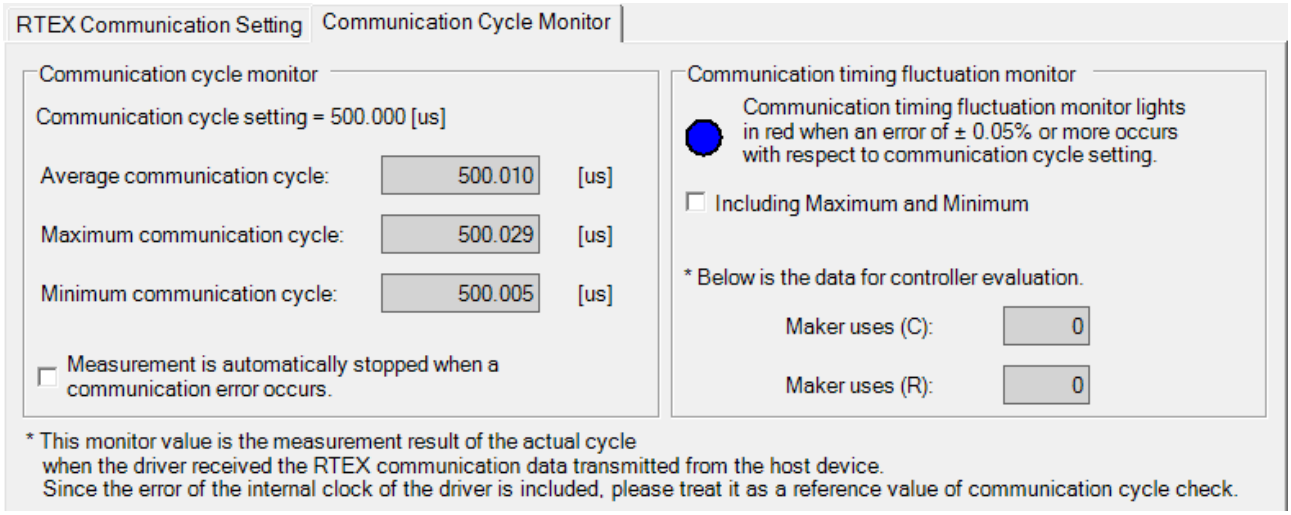
* Use the values to check the communication intervals just for reference because they include internal clock errors of the driver.

How to monitor the communication status

1 Select a tab of “Communication Cycle Monitor”.

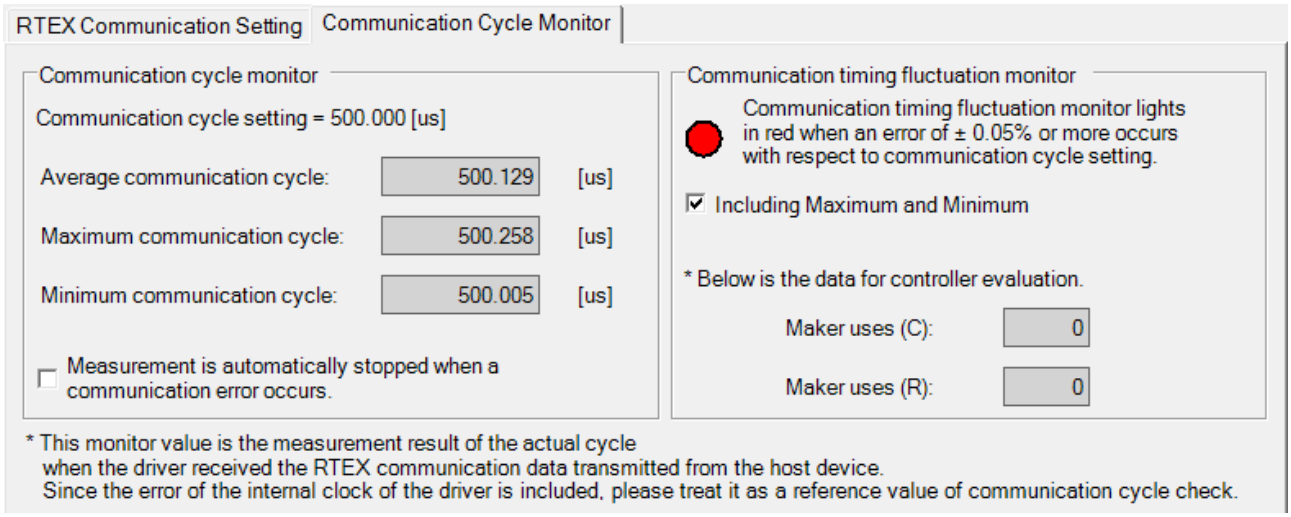


2 Click Msr (Measure) of the tool bar.
The content of the communication cycle monitoring area is updated when measurement starts.
The communication timing fluctuation monitor lights up in blue when the average communication cycle is within the valid range.
The communication timing fluctuation monitor lights up in red when it is not within the valid range.



* If you want the communication monitoring to be automatically stopped in case of a communication error, select “Measurement is automatically stopped when a communication error occurs.”

Selecting “Including Maximum and Minimum” includes the maximum communication cycle and the minimum communication cycle as the decision criteria of the communication timing fluctuation monitor.



Notes 1) Please refer to the manual of the driver or technical reference for details of each parameter's function and so on.
Notes 2) Even if parameters are sent to the driver, parameters are turned to the original value before modification if the power supply of the driver is turned off without writing to EEPROM of the driver. Parameter modifications list are displayed on EEPROM writing. Please check the modification carefully.
Notes 3) Do not turn off the power supply of the PC during writing to EEPROM of the driver. Data context cannot be guaranteed if the power supply is turned off during writing.
Notes 4) Some parameters become valid after modifications to the new data, writing EEPROM, and power supply reset. (On inputting, that issue is displayed. Please refer to the manual of the driver or technical reference and confirm on the objective parameters)
Notes 5) The RTEX Setup screen cannot open during opening some screens. For more information please refer to page 239 "RTEX Setup screen behavior".

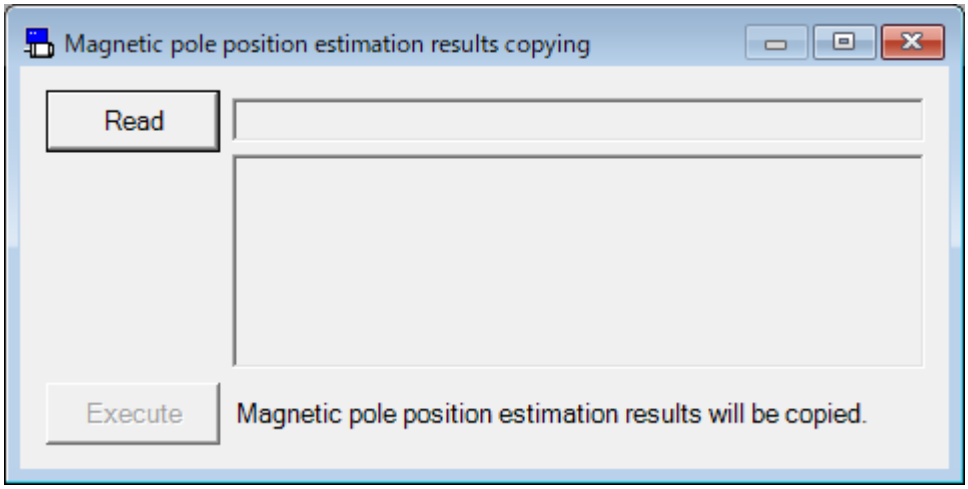
Magnetic pole position estimation results copying screen

Set the magnetic pole position estimation results based on the parameter file.

Note) Magnetic pole position estimation results copying function is assumed to exchange only driver without changing the combination of linear motor and feedback scale.
Make sure that the copy source and copy destination driver are the same device.
Otherwise the magnetic pole position will be shifted, motor cannot be controlled normally.
Magnetic pole position estimation results copying cannot be performed through RS232 communication.

Open the Magnetic pole position estimation results copying window

1 Start “PANATERM”.
(Please refer to Article 5. Start up and Close down in details)
2 Click “Other” > “Magnetic pole position estimation results copying” of the tool bar on the main screen.
3 The Magnetic pole position estimation results copying window is opened.

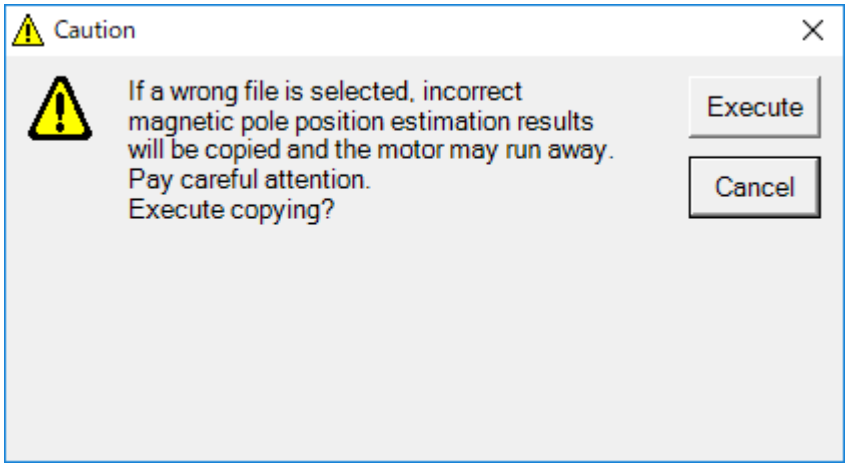


Close the Magnetic pole position estimation results copying window

Click ☒ of upright on the window

Magnetic pole position estimation results copying is executed

1 Click “Read” button.
2 Select the copy source parameter file.
3 Click “Execute” button.
4 Caution windows will appear. Confirm the window message carefully, and click “Execute”.



Notes 1) The Magnetic pole position estimation results copying screen cannot open during opening some screens. For more information please refer to page 240 “Magnetic pole position estimation results copying screen”.

7. Trouble shooting

Set up

Stop setup
→Please review the system requirements, and make sure that the computer fulfils the required condition. Please especially note the Operation system's service package.
→If there is a problem installing the Microsoft .NET Framework, then stop PANATERM's installation, install Microsoft.NET Framework directly from Microsoft homepage, and then try re - installing PANATERM.
→If the installation of Microsoft Visual C++ 2013 Redistributable(x86) fails, stop the installation of PANATERM and install Microsoft Visual C++ 2013 Redistributable(x86) in your computer directly from the Microsoft website, and then start the PANATERM installer again.
→If the installation of Microsoft Access Database Engine fails, stop the installation of PANATERM and install Microsoft Access Database Engine 2010 in your computer directly from the Microsoft website, and then start the PANATERM installer again.
→As a result of download failure, there is a possibility that the installer has broken. Please download again after clearing cash of a browser.

Communication

Drive name does not appear on the USB connection window after starting up PANATERM.
→Control electricity of the Drive may not be activated.
→Connection of USB communication cable may be loose, the cable itself may be damaged, or the correct cable may not be used.
→Confirm that the wireless LAN dongle is inserted correctly, the wireless router is running, and the wireless router recognizes the wireless LAN dongle.
→USB port of PC may not be functioning standardly. Please confirm this by the operating manual of the PC.
→Confirm that the network setting of your computer is correct and functioning normally. (Refer to the operation manual of your computer.)
→USB driver may not be installed correctly.
→Check the Wireless LAN / Driver information set-up screen to confirm that the wireless communication setting is correct.
→If DHCP is enabled on the Wireless LAN / Driver information set-up screen, there may not be enough IP addresses allocated by the DHCP server. Disable DHCP and make a static allocation, or secure an available IP address.
→A drive name is not displayed when using RS232 communication.

“Cannot detect the communication port or the drive.” is displayed and it cannot communicate.
→Control electricity of the Drive may not be activated.
→Connection of cable may be loose, the cable itself may be damaged, or the correct cable may not be used.
→Confirm that the wireless LAN dongle is inserted correctly, the wireless router is running, and the wireless router recognizes the wireless LAN dongle.
→Communication port (USB or COM port) of PC may not be functioning standardly. Please confirm this by the operating manual of the PC.
→Confirm that the network setting of your computer is correct and functioning normally. (Refer to the operation manual of your computer.)
→Driver may not be installed correctly.
→RS232 communication cannot be used at the same time as the block operation function. Make sure that the block operation function is disabled.
→RS232 communication is only available with the MINAS standard protocol.

Printing

Cannot print.
→Printer may not be connected properly, or printer driver may not be functioning properly. `This can be confirmed by printing the test page.
→Document size may not be configured correctly. PANATERM can be printed only to the size of A4 or Letter size. Please confirm the printer property of PC.
→Letter per row may be too much. If this is the case, then please separate the row into multiple rows to decrease down the letter per row down to the level where the entire row will appear when printed.

Uninstall

Unable to uninstall PANATERM
→File created not by PANATERM may be included in the same folder where PANATERM data file is included, In this case, the files will be protected, and uninstall cannot be completed.

Axis address

The number of the connected driver and the number of the driver checked by search are not in agreement.
→Please check that the axis address (ID) of the driver linked to a PC is 0. Moreover, please check whether the axis address (ID) of other driver overlaps in 1 to 31.
→Connection of cable may be loose, the cable itself may be damaged, or the correct cable may not be used.

PANATERM behavior

Response of PANATERM is slow. Operation is slow.
→Close window that are not in use. All windows that are hiding behind active windows are still active and are communicating with the Drive periodically.
→Other equipment may be connected to USB. If so, then please lighten the load for USB connection by e.g. stop the other equipment's operation.
→If there is any device that interferes the communication between the computer, wireless router, and the driver, stabilize the communication by, for example, temporarily stopping the device.
→When RS232 communication is used, please raise the transmission speed of a COM port.

Window is out of the screen, and is hard to see.
→Size of screen may not be configured properly. Please configure the screen size larger than 1,024 x 768.

Cannot open window. Display of the icon is strange.
→Memory may be lacking. Please close down PANATERM, other applications that are not in use, and/or reboot the PC, and then start up the PANATERM again.

PANATERM is not reacting anymore
→Close down PANATERM by pressing [CTRL]+[ALT]+[DEL] keys
→The error dialog may be displayed on the back of the PANATERM screen. Press the [ALT]+[TAB] keys and select the error dialog.

PANATERM had closed down suddenly
→Start up the PANATERM again.

Cannot start PANATERM
→It has failed to install .NET Framework. Install .NET Framework 3.5 SP1 directly from Microsoft homepage, and then try re - installing PANATERM.
→When installing to the Program Files folder, it has failed series definition setting. Please re - install PANATERM after remove of the following folder. [System Drive]:Users\[User Name]\AppData\Local\VirtualStore\Program Files\Panasonic Corporation\MINAS\PANATERM\ini\def
→If Windows update for November 2017 has not been executed, it may become impossible to start up the system. Refer to Microsoft website and execute Windows Update, then restart PANATERM.

Parameter screen behavior

Cannot open the parameter screen
→The parameter screen cannot be opened simultaneously with the gain tuning screen, the pin assign setting screen, the setup wizard, the fit gain screen (Standard), the fit gain screen (2 degrees of freedom control), the object editor screen, the block operation editor screen, the deterioration diagnosis screen, the RTEX setup screen, and the magnetic pole position estimation results copying screen. Please close these screens first.

Parameter value returns back to the original
→Procedure to change parameter may not have been completed. This may happen if you select other parameter or switch windows without pressing [ENTER] key or “Change of set value” button. Please make sure of your operations.
→If the parameter value is read from the file, changed parameters are not sent to the driver. If you want to send then please click the “Trans” button.

Changed parameter after EEPROM over write does not match to the change
→Parameter may be changed by other windows that will change parameter. Please click “Rcv” button to update the parameter value.

The explanation of parameter is unkind. Cannot you display it in detail?
→Please double-click the item with underline on the left sub-themes tree. Related to the page of the operation manual of driver is displayed.
→Please check on “Display - Set value description” on the lower right of the screen. Information according to each value is displayed. Or else value with decimal point is displayed.

Monitor screen behavior

Cannot open the monitor screen
→The monitor screen cannot be opened simultaneously with the pin assign setting screen, the setup wizard and the RTEX setup screen. Please close these screens first.

Monitor screen does not change
→Stop button may be clicked. If condition indicated on upper left corner states “Monitor stopped” then click the “Start” button on toolbar.
→Communication with the drive may be severed and may be off line. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.

Log cannot be saved
→Log cannot be saved if the drive is in Input / Output confirm mode. Please retry after turning the drive back to standard condition e.g. reset drive, reboot drive.

In a digital input / output signal monitor, although a count does not change, a waveform changes
→When the processing speed of PC is slow, High data may be drawn with Low data. Please lengthen the communication interval of driver and PC.

Cannot display a digital input / output signal monitor
→When you use RS232 communication with the communication speed of less than 4800 bps, please do not make a monitor cycle into 1 second.
→A background may become white, without drawing meeting the deadline when the processing speed of PC is slow. Please lengthen the communication interval of driver and PC.

Cannot do Forced Output and Drive reset.
→In the case of network type (MINAS-A5N, MINAS-A5NL, etc.), if a network is established, it cannot do Forced Output and Drive reset. Please retry after making the network unestablished.

Alarm screen behavior

Cannot open the alarm screen
→The alarm screen cannot be opened simultaneously with the pin assign setting screen, the setup wizard and the RTEX setup screen. Please close these screens first.

Error log does not appear
→When error has never occurred or if the log has been cleared once, the error log will not appear.
→Additional information that appears on lower left portion only contains error that occurred 1 time to 3 times before. If additional information for older error is needed, then please select error log number at the upper left portion of window.
→Errors that were not presumed will not leave log even the error occurred. In this case, the log will not be kept, and therefore will not appear.

Gain tuning screen behavior

Cannot open the gain tuning screen
→The gain tuning screen cannot be opened simultaneously with the parameter screen, the pin assign setting screen, the setup wizard, the fit gain screen (Standard), the fit gain screen (2 degrees of freedom control), the object editor screen, the block operation editor screen, the deterioration diagnosis screen the RTEX setup screen and the magnetic pole position estimation results copying screen. Please close these screens first.
→The gain tuning screen cannot be displayed communication with the driver is severed. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.

Automatic resonance suppression function does not activate effectively
→When mode 1 to 4 is selected for Real time auto tuning; automatic resonance suppression function will be active. Please configure the resonance detection level with reviewing the peak value of vibration by the monitor measurement, and put check on the checkbox.

Assumes value of load characteristics does not change
→Mode of real time auto tuning is “0”, or least - squares estimation of customize setting is invalid. Please select mode between 1 and 5, or valid the least - squares estimation at customize setting.
→If characteristics variation is set as “0: No Change” then the load characteristics estimation is stopped. Please set a value from 1 to 3.

Resonance frequency appears as default value 5,000Hz
→When resonance level is small, or does not continue for long time, and then the resonance frequency may not change from 5,000Hz. Please use the graphic wave function to read resonance frequency directly from motor speed or torque command wave, and set notch filter.

Resonance frequency appears as default value 0.0Hz
→When resonance level is small or does not continue for long time, resonance frequency may not appear changed. Please use wave graphic function to set resonance suppression control setting by measuring position deviation to read resonance frequency directly.

Cannot use clear button of resonance suppression setting
→Please click “edit” button of the applicable window. When setting/clear button is clocked, the changed setting value will be transmitted to the drive automatically.

Simplified monitor does not update
→When drive Servo is OFF, measurement will stop also. Please turn ON the Servo and click “Start measurement” button again.
→Simplified monitor will stop when test run No. reaches the measurement number. When you need to continue the measurement, then please click on the “Start measurement” button again.

Parameter cannot be set manually
→Please click on the “edit” button to enable editing. Also, please click on the “Send” button to write the parameter to drive value when after the parameter was changed.

Wave form graphic screen behavior

Cannot open the wave form graphic screen
→The wave form graphic screen cannot be opened simultaneously with the pin assign setting screen, the setup wizard and the RTEX setup screen. Please close these screens first.

Wave data does not appear
→Trigger condition may not be satisfied. Please confirm trigger condition, or click on measure button with no trigger condition. However, if measurement is done without trigger condition is done, and then portion of measurement condition will be cleared. Also, please be noted that trigger will not be active if both sub condition is not satisfied when trigger condition is “A and B”.

Reference wave does not appear
→Referential wave will not appear even when the “Copy” button is clicked. Please put a check in the checkbox to the referential wave you would like to see on screen at the “Format” tab on lower portion.
→When copied referential wave data exceeds 10 data, then the newly copied wave data will be over written to the referenced previous 20 data. Please delete the unnecessary reference wave data to make the data number within 10 data.

Wave graphic data cannot be selected
→Please select one of the measurement items inside the measurement item tab’s measurement condition, and open the measurement item selection window.

Digital data cannot be triggered
→When digital data is selected at applicable trigger, then use at either trigger slope being “Matched” or “Unmatched”.

The P-N voltage is not triggered. Or an unintended trigger is triggered.
→In the case of the M-frame driver, the trigger may not be activated as expected because the PN voltage is handled as a decimal number inside the driver. In that case, do not use the trigger slope match or mismatch, and adjust the trigger level by 1V.

Wave data does not appear even “W-get” button is clicked
→Trigger condition of drive may not be satisfied or configured. Please reconfirm trigger condition by clicking the “T-Get” button, with confirming that the actual operation is satisfying the trigger condition.

A trigger position shifts
→In the case of network type (MINAS-A5N, MINAS-A5NL, etc.), if a network is established in the state of trigger standby, the detected trigger position may shift.

The waveform graphic cannot be loaded.
→Data for expanded sampling cycles (extension: wgd6, wgc6, and wgp6) cannot be loaded if the connected device or the selected series does not support the expanded function. Try loading it again after connecting a device or selecting a series that supports the expanded function.

Trial run screen behavior

Cannot open the trial run screen
→The trial run screen cannot be opened simultaneously with the pin assign setting screen, the Z phase search screen, the setup wizard, the fit gain screen (2 degrees of freedom control) the RTEX setup screen, and the magnetic pole position estimation results copying screen. Please close these screens first.
→Drive is not in ready status (Alarm or Main power source is cut off), front panel is used except for monitor mode, network is established, or Servo ON is input from outside. Please re - execute after these status is eliminated, and the trial run screen is closed.
→The trial run screen cannot be displayed communication with the driver is severed. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.

Error happens frequently
→At the operation area setting window, the drive will automatically set the safety function to default setting; Over speed level 600r/min, Over load level 50%, Software limit setting 1 revolution. Please try with tuning the gain, changing operation command, and/or changing protection function on operation area setting window.
→The setting of the speed exceeds the maximum speed of the motor. Please set the speed below maximum speed of the motor.

Operation will stop shortly
→The JOG or STEP button at operation area setting window, or JOG button (un - continuous) at Test operation window will operate the motor when only during the button is clicked.
→If motion at step operation is smaller than expected and then please understand that this setting is set by command times, and therefore the motor rotation operation will vary by electrical gear ratio. Please change the setting.
→If limitation of operation area at test operation window is the issue, then please moves to test operation window by skip button if operation limit is not needed, or return to the operation area setting window to reconfigure the operation area.
→A working range cannot be set up more than the range of -1,073,741,823 to 1,073,741,823.

Operation doesn't reach at the speed
→The acceleration is limited 10,000 to 327,670,000. Please set it within the range, referring to the following equations. [Position Control] Acceleration [command unit/s2] = Speed [r/min] / 60 x encoder resolution / Electronic gear ratio / Acceleration time [s] [Full close control] Acceleration [command unit/s2] = Speed [r/min] / 60 x encoder resolution / External scale frequency division ratio / Electronic gear ratio / Acceleration time [s] [Linear motor] Acceleration [command unit/s2] = (Speed [mm/s] x scale resolution) x 10^6 / Electronic gear ratio / Acceleration time [s]

Frequency characteristics screen behavior

Cannot open the frequency characteristics screen
→The frequency characteristics screen cannot be opened simultaneously with the pin assign setting screen, the setup wizard, the fit gain screen (Standard), the fit gain screen (2 degrees of freedom control) and the RTEX setup screen. Please close these screens first.

Cannot measure frequency response. The result of measurement is wrong.
→The servo on input is necessary. Please confirm the motor is in the state of servo on.
→No condition that the motor works standard it, it is not likely to be able to measure it well. Please confirm a torque limitation and driving prohibition the functions etc.
→The frequency response measurement result changes greatly depending on the measurement condition. Please measure it when you measure the speed closed-loop characteristic on the condition that the motor doesn't stop as amplitude = offset absolute value though range of motion is noted. Moreover, please measure the amplitude setting from a small value as much as possible for the first time within the range where the torque saturation is not generated, and affects the equipment negatively by a big setting.
→When a nonlinear characteristic like the backlash and the dead-band, etc. exists in the equipment, it is likely not to become a value that changes the resonance frequency, and is correct by the amplitude setting and the offset setting.
→In the case of network type (MINAS-A5N, MINAS-A5NL, etc.), if a network is established, it cannot measure frequency response. Please retry after making the network unestablished.

Frequency response cannot analyze.
→Analysis can be used when driver and a communication state are being continued after measurement by "Torque speed" mode.
→This cannot analyze, when using RS232 communication.
→Analysis after frequency characteristic measurement cannot be used with the MINAS-A6 series.

Pin assign setting screen behavior

Cannot open the pin assign setting screen
→The pin assign setting screen cannot be opened simultaneously with all other screens. Please close all other screens first.

The setting change of the pin assign screen is not reflected in the driver operation.
→It is necessary to reset the driver. Please turn it on again after turning off the control source of the driver once.
→In the case of network type (MINAS-A5N, MINAS-A5NL, etc.), if a network is established, the change of the pin assign setting is not reflected. Please retry after making the network unestablished.

Trouble shooting screen behavior

Cannot open the trouble shooting screen
→The trouble shooting screen cannot be opened simultaneously with the pin assign setting screen, the setup wizard and the RTEX setup screen. Please close these screens first.

The factor that doesn't rotate doesn't occasionally disappear.
→Please execute it in order with young number when you do measures because another factor might be generated by a certain factor.

The content of the longevity diagnosis might return to the origin.
→Longevity information is recorded only every 30 minutes. Please confirm time that the control source of the driver is energized.

The Communication error tab is not displayed.
→The Communication error tab is displayed only when the connected driver is of a network type that supports the monitoring of the RTEX communication error counter (MINAS-A6NF, etc.).

Analogue input adjustment screen behavior

Cannot open the analogue input adjustment screen
→The analogue input adjustment screen cannot be opened simultaneously with the pin assign setting screen, the setup wizard the RTEX setup screen and the magnetic pole position estimation results copying screen. Please close these screens first.
→The analogue input adjustment screen cannot be displayed communication with the driver is severed. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.

The offset self-adjustment function is not effective.
→There is a possibility for the input voltage to have exceeded the range of the offset adjustment. Please confirm the analog input voltage display of a monitor screen and a driver front panel. Whether the input voltage is in about 0V or actually measures it.

After the function the offset self-adjustment, the parameter is written in EEPROM
→After the offset self-adjustment function is executed thoroughly to a front panel of the driver, the offset parameter is automatically written in EEPROM.

Z phase search screen behavior

Cannot open the Z phase search screen
→The Z phase search screen cannot be opened simultaneously with the trial run screen, the pin assign setting screen, the setup wizard, the fit gain screen (2 degrees of freedom control) the RTEX setup screen and the magnetic pole position estimation results copying screen. Please close these screens first.
→Drive is not in ready status (Alarm or Main power source is cut off), front panel is used except for monitor mode, network is established, or Servo ON is input from outside. Please re - execute after these status is eliminated, and the Z phase search screen is closed.
→The Z phase search screen cannot be displayed communication with the driver is severed. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.

When the power supply of the driver is turned on, the numerical value at the center is not changed as -1.
→Because single-turn data is not decided until the first Z phase is detected when the motor equipped with the encoder of an incremental type is used, the display becomes -1. The numerical value at the center comes to take a value nonnegative from 0 to single-turn data maximum value by executing Z phase search.

Setup wizard behavior

Cannot open the setup wizard
→The Setup Wizard window cannot be used when Servo is turned ON by input from outside. Please confirm the motor is in the state of servo off.
→The setup wizard cannot be opened simultaneously with all other screens. Please close all other screens first.

The setting change of the setup wizard is not reflected in the driver operation.
→It is necessary to reset the driver. Writing to EEPROM after, please turn it on again after turning off the control source of the driver once.

Fit gain screen (Standard) behavior

Cannot open the fit gain screen
→The fit gain screen (Standard) cannot be opened simultaneously with the parameter screen, the gain tuning screen, the frequency characteristics screen, the pin assign setting screen, the setup wizard, the object editor screen, the block operation editor screen, the deterioration diagnosis screen, the RTEX setup screen and the magnetic pole position estimation results copying screen. Please close these screens first.
→The fit gain screen (Standard) cannot be used velocity control mode and torque control mode.
→The fit gain screen (Standard) cannot be displayed except the case of communication with the driver. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.

Proceed to Step 3
→Please change the driving pattern according to the instructions.
→Please check behavior of real-time auto-tuning on the gain tuning screen.
→Please check behavior of easy monitor on the gain tuning screen.
→Try increasing Initial rigidity on the Other setting of Step 1. Or else try decreasing it.
→Try increasing Permissible vibration level on the Other setting of Step 1. Or else try decreasing it.

Ranking is not displayed in Step 4
→There is no data that satisfies the restrictions determined by the “Recommendation”. Please review the “Recommendation” and Recommendation setting.
→There is no data below the Target value of stabilization time. Please increase the Target value of stabilization time.
→It may exist in the Recommendation data below Initial rigidity. After returning to Step 1, please decrease Initial rigidity on the Other setting to measure again.

Fit gain screen (2 degrees of freedom control) behavior

Cannot open the fit gain screen (2 degrees of freedom control)
→The fit gain screen (2 degree of freedom control compatible) cannot be opened simultaneously with the parameter screen, the gain tuning screen, the trial run screen, the frequency characteristics screen, the pin assign setting screen, the Z phase search screen, the setup wizard, the object editor screen, the block operation editor screen, the deterioration diagnosis screen the RTEX setup screen and the magnetic pole position estimation results copying screen. Please close these screens first.
→The fit gain screen (2 degrees of freedom control) cannot be used velocity control mode, torque control mode and full close control mode.
→The fit gain screen (2 degrees of freedom control) can be displayed only when the combination of driver and selected series is correct.
→The fit gain screen (2 degrees of freedom control) is supported only linear type (LINEAR) when the driver is Linear and DD Control Drive (MINAS-A6BL etc.). Rotary type (DD) is not supported.

Cannot open the log on of fit gain screen
→The log on of fit gain screen cannot be displayed except the case of communication with the driver. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.
→The log on of fit gain screen can be displayed only when driver have 2 degrees of freedom control (MINAS-A5II, MINAS-A6 etc.).

Proceed to Step 3
→Please check the load condition.
→If the driver is Linear and DD Control Drive, please review the parameter settings of motor inertia (Mass of motor's movable section), Rated motor torque (Rated motor thrust).
→Try increasing Initial rigidity on the Machine setting of Step 1. Or else try decreasing it.
→Please change the Mode setting of Step 1 to Balanced or Stability preferentially. Or else try decreasing it.

Object editor screen behavior

Cannot open the object editor screen
→The object editor screen cannot be opened simultaneously with the parameter screen, the gain tuning screen, the pin assign setting screen, the setup wizard, the fit gain screen (Standard) and the fit gain screen (2 degrees of freedom control), the block operation monitor screen, the block operation editor screen, the deterioration diagnosis screen the RTEX setup screen and the magnetic pole position estimation results copying screen. Please close these screens first.
→Object editor screen can be displayed only if the series with uses the EtherCAT Communication is selected. (Example)MINAS-A5B

Cannot transmit and edit object value
→Please check that “ESM Condition” is “INIT” and is displayed at the next to the “Change of set value” button.
→Please check object attribute is RW at column of “Attrib”.

Object value returns back to original
→Procedure to change object may not have been completed. This may happen if you select other object or switch windows without pressing [ENTER] key or “Change of set value” button. Please make sure of your operations.
→If the object value is read from the file, changed objects are not sent to the driver. If you want to send then please click the “Trans” button.

Changed object after EEPROM over write does not match to the change
→The object may be changed by other windows that will change parameter. Please click “Rcv” button to update the object value.
→The some of the objects may not displayed in the Writing to EEPROM screen if you change.
→The some of the objects may be changed in conjunction. These objects will be applied last changes.

Battery refresh screen behavior

Cannot open the battery refresh screen
→The battery refresh screen cannot be opened simultaneously with the pin assign setting screen, the setup wizard screen and the RTEX setup screen. Please close these screens first.
→The battery refresh screen cannot be displayed communication with the driver is severed. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.

Cannot execute the battery refresh.
→Battery refresh can be executed in the case of a combination of control mode and the encoder that support.
→When the block operation function is enabled then, battery refresh cannot execute.

Block operation editor screen behavior

Cannot open the block operation editor screen
→The block operation editor screen cannot be opened simultaneously with the parameter screen, the gain tuning screen, the pin assign setting screen, the setup wizard, the fit gain screen (Standard), the fit gain screen (2 degrees of freedom control), the object editor screen, the deterioration diagnosis screen the RTEX setup screen and the magnetic pole position estimation results copying screen. Please close these screens first.
→When the block operation function is disabled then, the block operation editor screen cannot be opened. Please check of your parameter setting.

Parameter value returns back to the original
→Procedure to change parameter may not have been completed. This may happen if you select other parameter or switch windows without pressing [ENTER] key. Please make sure of your operations.
→If the parameter value is read from the file, changed parameters are not sent to the driver. If you want to send then please click the “Trans” button.

Changed parameter after EEPROM over write does not match to the change
→Parameter may be changed by other windows that will change parameter. Please click “Rcv” button to update the parameter value.

Block operation monitor screen behavior

Cannot open the block operation monitor screen
→The block operation monitor screen cannot be opened simultaneously with the pin assign setting screen, the setup wizard screen, the object editor screen and the RTEX setup screen. Please close these screens first.
→The block operation monitor screen cannot be displayed communication with the driver is severed. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.

Deterioration diagnosis screen behavior

Cannot open the deterioration diagnosis screen
→The deterioration diagnosis screen cannot be opened simultaneously with the parameter screen, the gain tuning screen, the pin assign setting screen, the setup wizard screen, the fit gain screen (Standard), the fit gain screen (2 degrees of freedom control), the object editor screen, the block operation editor screen, the RTEX setup screen and the magnetic pole position estimation results copying screen. Please close these screens first.
→The deterioration diagnosis screen cannot be displayed communication with the driver is severed. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.

RTEX Setup screen behavior

Cannot open the RTEX setup screen
→The RTEX setup screen cannot be opened simultaneously with all other screens. Please close all other screens first.

Magnetic pole position estimation results copying screen behavior

Cannot open the Magnetic pole position estimation results copying screen.
→The magnetic pole position estimation results copying screen cannot be opened simultaneously with the parameter screen, the gain tuning screen, the trial run screen, the pin assign setting screen, the analogue input adjustment screen, the Z phase search screen, the setup wizard, the fit gain screen (Standard), the fit gain screen (2 degrees of freedom control), the object editor screen, the block operation editor screen, the deterioration diagnosis screen and the RTEX setup screen. Please close these screens first.
→The magnetic pole position estimation results copying screen cannot be displayed communication with the driver is severed. Please confirm if the unconnected mark is on the left side of status bar at the lowest portion of PANATERM screen.

Post-sale service

Queries

- **Contact point for customer technical assistance**
  <For questions on how to select and use motors and drivers>
  Toll free: 0120-70-3799
  (The toll free number cannot be called from a smartphone, mobile phone, and some IP phones.)
  Tel: 072-870-3057
  Fax: 072-870-3120
  Open: Monday to Friday, 9:00–12:00
  13:00–17:00
  (Public holidays and company holidays excluded)

- **Contact point for repairs**
  <For requests for the repair service and questions on how to obtain spare parts>
  Tel: 072-870-3123
  Fax: 072-870-3152
  Open: Monday to Friday, 9:00–12:00
  13:00–17:00
  (Public holidays and company holidays excluded)

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Tokyo: Toranomon 35 Mori Building, Toranomon 3-4-10, Minato-ku, Tokyo 105-0001
Tel: 03-5404-5172
Fax: 03-5404-2924
Osaka: Morofuku 7-1-1, Daito City, Osaka 574-0044
Tel: 072-870-3065
Fax: 072-870-3151

Motor technology information on the web

You can download operation manuals and CAD data.
https://www3.panasonic.biz/ac/e/motor/fa-motor/ac-servo/