Panasonic

PROGRAMMABLE CONTROLLER

FPΣ/FP2
Positioning Unit RTEX
Technical Manual

ARCT1F421E-6

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Safety Precautions

Observe the following notices to ensure personal safety or to prevent accidents.
To ensure that you use this product correctly, read this User's Manual thoroughly before use.
Make sure that you fully understand the product and information on safety.
This manual uses two safety flags to indicate different levels of danger.

WARNING

If critical situations that could lead to user's death or serious injury is assumed by mishandling of the product.

-Always take precautions to ensure the overall safety of your system, so that the whole system remains safe in the event of failure of this product or other external factor.
-Do not use this product in areas with inflammable gas. It could lead to an explosion.
-Exposing this product to excessive heat or open flames could cause damage to the lithium battery or other electronic parts.

CAUTION

If critical situations that could lead to user's injury or only property damage is assumed by mishandling of the product.

-To prevent excessive exothermic heat or smoke generation, use this product at the values less than the maximum of the characteristics and performance that are assured in these specifications.
-Do not dismantle or remodel the product. It could cause excessive exothermic heat or smoke generation.
-Do not touch the terminal while turning on electricity. It could lead to an electric shock.
-Use the external devices to function the emergency stop and interlock circuit.
-Connect the wires or connectors securely.
The loose connection could cause excessive exothermic heat or smoke generation.
-Do not allow foreign matters such as liquid, flammable materials, metals to go into the inside of the product. It could cause excessive exothermic heat or smoke generation.
-Do not undertake construction (such as connection and disconnection) while the power supply is on. It could lead to an electric shock.

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Table of Contents

Difference of Functions Between Versions

Version	Type	Added / modified functions
1.13	Additional functions	Positioning repeat function
		Synchronous operation
		J point (JOG positioning) control
		Added Home return method DOG method 2 / DOG method 3 / Limit method 1 / Limit method 2 / Stop-on-contact method 1 / Stop-on-contact method 2 / Phase Z method / Data set method
		Added "Delay mode" to Auxiliary contact
		Position deviation simple monitor function
	Specification change	Eliminated Home offset function and added Coordinate origin function and Current update function.
		Added error codes and warning code along with the addition of functions.
		Changed the operations after the occurrence of errors.
1.30	Additional functions	Supports MINAS A5N.
		AMP parameter R/W function
1.40	Additional functions	Supports MINAS A6N.

Glossary

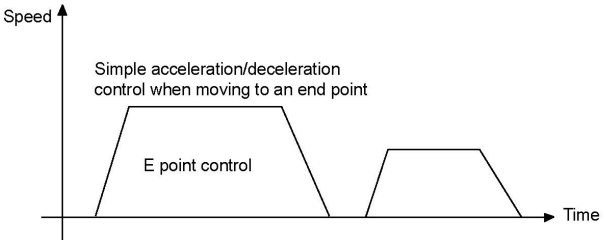
RTEX
RTEX, which stands for Realtime Express, is the network exclusive for motion connecting the Positioning Unit RTEX and AMP.
* Realtime Express is the name of the network servo system produced by Panasonic.

AMP
AMP means a servo amplifier which controls a servo motor.

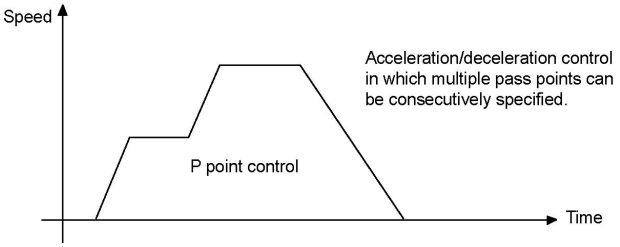
Configurator PM
Configurator PM is a setting tool for Positioning Unit RTEX. Using the Configurator PM enables the settings for positioning data and various parameters, and various monitoring. As a tool operation mode to activate a motor without using ladder programs is provided in this tool, it is convenient especially to confirm the operation at the time of an initial start-up.

PANATERM
This is a setup support tool for the servo amplifiers of MINAS series made by Panasonic. By using this tool, the parameter settings within the AMP, monitoring control statuses, the setup support or analysis of machines can be executed on PC.

E point control
This is a method of control which is initiated up to an end point, and in this manual is referred to as “E point control”. This method is used for a single - speed acceleration/deceleration. It is also called a trapezoidal control.

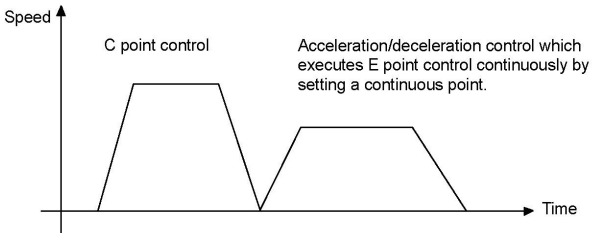


P point control
This refers to control which passes through a “Pass Point”, and is called “P point control” in this manual. This method is used when a multi-stage speed is to be specified in the same motion.



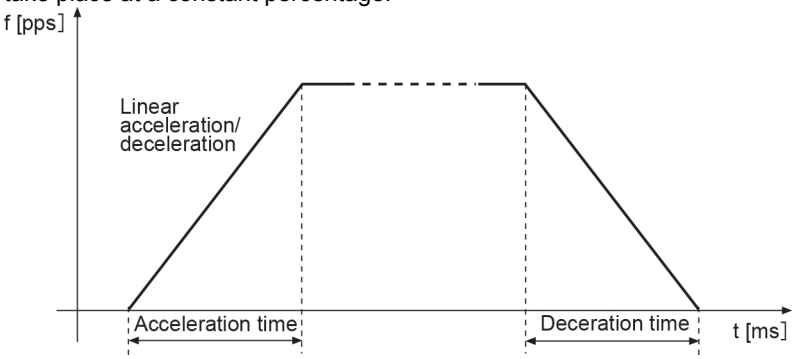
C point control

This refers to control which passes through a “Continuance Point”, and is called “C point control” in this manual. This method is used for executing continuous E point controls by one-time start.

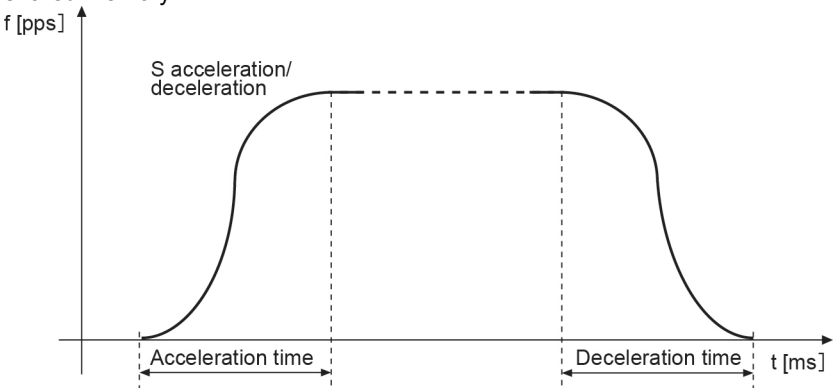


■ Linear acceleration/deceleration / S acceleration/deceleration

"Linear acceleration/deceleration" or "S acceleration/deceleration" is selectable for the acceleration/deceleration method. With linear acceleration/deceleration, acceleration and deceleration between the startup and the target speed are carried out in a straight line. Acceleration and deceleration take place at a constant percentage.



The S acceleration/deceleration performs acceleration or deceleration curvedly. Acceleration/deceleration is performed relatively slow at the beginning, and gradually increased. Acceleration/deceleration is performed slowly as approaching the end of it. The movement is relatively smooth. Acceleration/deceleration is complete in an acceleration/deceleration time specified in the shared memory.

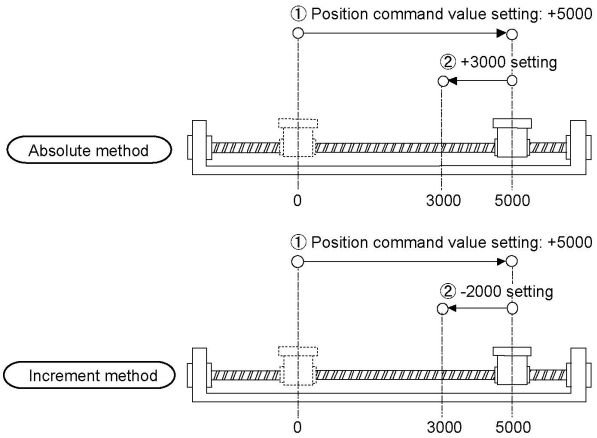


Acceleration time/deceleration time
For the E point control or C point control, the acceleration time is the time during which the speed changes from the startup speed of a motor to the target speed. The deceleration time is the time during which the speed changes from the target speed to the stop. For the P point control, the acceleration time is the time during which the speed accelerates form the current speed to the next target speed, and the deceleration time is the time during which the speed decelerates from the current speed to the next target speed.

CW, CCW
Generally, these indicate the direction in which the motor is rotating, with CW referring to clockwise rotation and CCW to counterclockwise rotation.

Absolute method (absolute value control method)
This is a control method in which the target position is specified as an absolute position from the home position. This is specified on the positioning data editing screen of the Configurator PM.

Increment method (relative value control method)
This is a control method in which the distance from the current position to the target position is specified as a relative position. This is specified on the positioning data editing screen of the Configurator PM.



Automatic operation
This is an operation to be automatically executed, and means a position control.

Manual operation
This is an operation to be executed for an initial boot or adjustments. The home return, JOG operation and pulser operation are manual operations.

Position control
This is a generic term for the E point control, P point control and C point control. For each control, the control of a single axis and the interpolation control of multiple axes are available. The interpolation control can be selected from a 2-axis linear interpolation, 2-axis circular interpolation, 3-axis linear interpolation and 3-axis spiral interpolation.

JOG operation
This refers to an operation in which the motor is rotated only while operation commands are being input. This is used to forcibly rotate the motor using input from an external switch, for instance when to make adjustments. Depending on the circumstances, this can also be applied to unlimited feeding in some cases.

Home return
The reference position for positioning is called a Home position and an operation to travel to a Home position is called Home return. The home position should be set in advance. This operation moves to the home position and its coordinate is set to be 0.
The motor rotation is reversed automatically when the limit input (+) or the limit input (-) is input and the home position or the near home position is searched to return to the home position automatically.

Pulser operation
A manual operation is available using a device (pulser) which generates pulses manually. The output similar to an encoder is obtained from the pulser, and the positioning unit RTEX is equipped with exclusive input terminals. It is also called a manual pulse generator.

Deceleration stop
This is a function that interrupts the operation in progress, slows the rotation and brings it to a stop. The deceleration time can be specified individually.

Emergency stop
This is a function that interrupts the operation in progress, slows the rotation and brings it to a stop. Generally, a time shorter than a time for a deceleration stop is set. The deceleration time can be specified individually.

Positioning table (Table)
A series of positioning data such as acceleration/deceleration time, target speed and interpolation operation that is necessary for a position control is managed as a positioning table. For example, one table is necessary for the E point control, and multiple tables are necessary for the P point control and C point control depending on the number of pass points and continuance points.

Limit input (+), limit input (-)
This is an input to set a limit the motor movement. Limit input (+) is the maximum limit and the limit input (-) is the minimum limit. They are connected to the AMP for the positioning unit RTEX.

Near home (DOG) input
In order to stop the table at the home position, a position at which deceleration begins is called the near home position. This is connected to an external input switch or sensor. It is connected to the AMP for the positioning unit RTEX.

Dwell time
In case of the E point control, a time from the completion of a position command until the operation done flag turns on can be specified as a dwell time. In case of the C point control, a time from the deceleration stop until the next table activates can be specified.

Auxiliary output code, auxiliary output contact
They are used to check the operation of a position control.
The auxiliary output code is a 16-bit code that can be specified for each positioning table, and enables to monitor which positioning table is being executed.
The execution of the position control can be confirmed by turning an exclusive auxiliary output contact on for a constant time.

Software limit
Limits in software can be set for the absolute coordinate managed within the positioning unit RTEX.
When exceeding the setting range of the software limit, an error occurs, and the system decelerates and stops. The deceleration time can be set individually.

Torque limit
The output torque of the AMP can be limited arbitrary.

Servo lock/Servo free
According the command from the positioning unit, the state that the motor is controllable is called a servo lock state, and the state that the motor is uncontrollable is called a servo free state. The servo on operation is necessary to make it to the servo lock state.

Servo ON/Servo OFF
The operation that changes the servo free state to the servo lock state is called a servo on, and the operation that changes the servo lock state to the servo free state is called a servo off.

Linear interpolation
This is the interpolation control that controls positions as the locus of the operations of the 2-axis motor with the grouped X axis and Y axis or 3-axis motor with the grouped X axis, Y axis and Z axis becomes a straight line. There are two setting methods, which are a composition speed specification and long axis speed specification.

Circular interpolation
This is the interpolation control that controls positions as the locus of the operation of the 2-axis motor with the grouped X axis and Y axis becomes a circular arc. There are two setting methods, which are a center point specification and pass point specification.

Spiral interpolation
This is the interpolation control that controls positions as the locus of the operation of the 3-axis motor with the grouped X axis, Y axis and Z axis becomes a spiral. Arbitrary 2 axes describe an arc, and the remaining one axis moves to achieve a spiral. There are two setting methods, which are a center point specification and pass point specification.

Edge type
This is one of the methods to detect the request signals allocated to this unit. It executes each requested process by detecting a trigger that is the leading edge when the request signal turns on.
Therefore, the next request cannot be accepted until the request signal turns off.

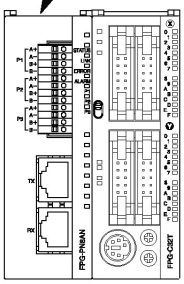
Level type
This is one of the methods to detect the request signals allocated to this unit. It executes each requested process by detecting a trigger that the request signal is on, and continues the requested process while the request signal is on.

About Illustrations in This Manual

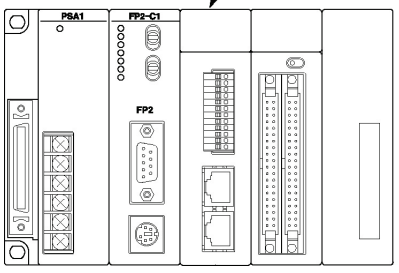
The **FPΣ Positioning Unit RTEX** and **FP2 Positioning Unit RTEX** are described in this manual.

The illustrations in this manual shows the status with the FPΣ.
If you use the FP2, please replace the illustrations of the FPΣ with the following illustration.

FP Σ Positioning Unit RTEX



FP2 Positioning Unit RTEX



Chapter 1

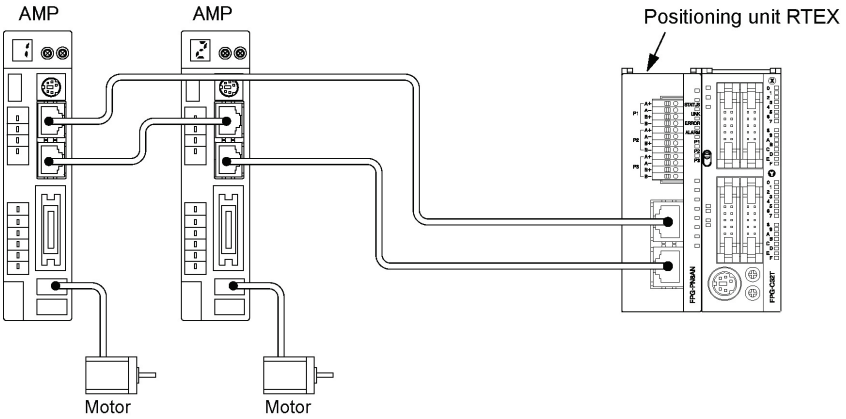
Functions of Unit and Restrictions on Combination

1.1 Functions of Positioning Unit RTEX

1.1.1 Functions of Unit

Network control

The motion-only network Realtime Express (RTEX) enables to easily construct a system of network servo motors using the cables with a category 5e shield.

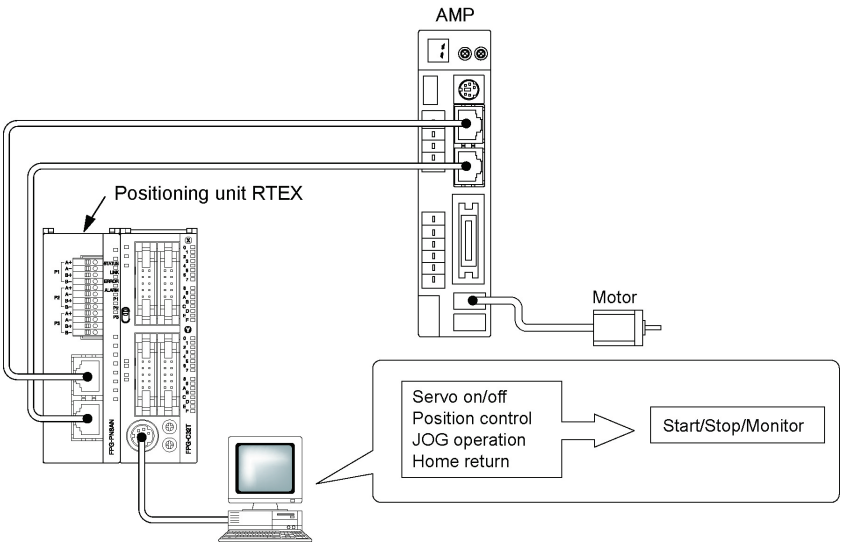


Configuration of axes according to the system

In accordance with the number of required axes, 2-axis, 4-axis and 8-axis unit are available.

Can confirm operations without ladder programs

Using the tool operation function of the Configurator PM enables a test run without a ladder program, and enables to confirm various items such as the rotating direction, various input contacts or automatic operation settings.

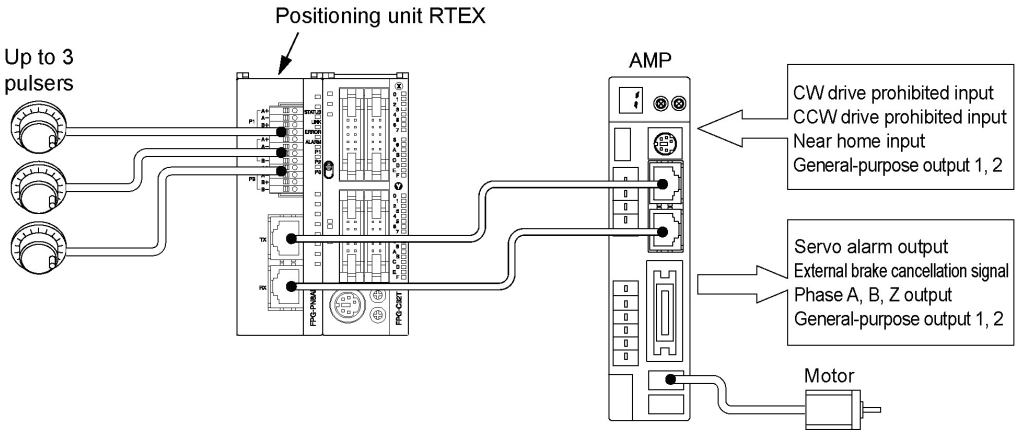


Two-axis and three-axis interpolation controls

The 2-axis linear interpolation, 2-axis circular interpolation, 3-axis linear interpolation and 3-axis spiral interpolation controls can be performed.

I/O required for the control is aggregated in the AMP

As the limit input and near home input is connected to the AMP and given to the positioning unit RTEX through the network, the wiring can be simplified.



Remote I/O of 2-input and 2-output for one AMP

The 2-point general purpose input and output (transistors) can be connected to the AMP, and they can be programmed by the X contact and Y contact of the positioning unit RTEX. The input and output neighboring the AMP can be used as the remote I/O.

Supports the manual pulser

The maximum of three manual pulsers can be connected. It is possible to change the axes corresponding to each pulser by the setting of the positioning unit RTEX.

1.1.2 Unit Types

FPΣ Positioning Unit RTEX

Type	Function	Part number	Product number
2-axis type	2-axis control	FPG-PN2AN	AFPG43610
4-axis type	4-axis control	FPG-PN4AN	AFPG43620
8-axis type	8-axis control	FPG-PN8AN	AFPG43630

FP2 Positioning Unit RTEX

Type	Function	Part number	Product number
2-axis type	2-axis control	FP2-PN2AN	AFP243610
4-axis type	4-axis control	FP2-PN4AN	AFP243620
8-axis type	8-axis control	FP2-PN8AN	AFP243630

Setting software

Name	Specifications	Product number
Control Configurator PM	English	AFPS66510

1.2 Restrictions on Units Combination

1.2.1 Restrictions on Combinations Based on Current Consumption (FP2 only)

For the FP2, when the system is designed, the other units being used should be taken into consideration, and a power supply unit with a sufficient capacity should be used. (For the FPΣ, there is no restrictions based on the current consumption.)

FP2 Positioning Unit RTEX

Type	Part number	Product number	Current consumption (from power supply)
2-axis type	FP2-PN2AN	AFP243610	300 mA
4-axis type	FP2-PN4AN	AFP243620	300 mA
8-axis type	FP2-PN8AN	AFP243630	300 mA

1.2.2 Restrictions on the Number of Units Installed

FPΣ Positioning Unit RTEX
The maximum of 2 units can be installed.

FP2 Positioning Unit RTEX
There is no restriction on the number of units installed if it is within the restrictions on the current consumption.

1.3 Restrictions on Unit and AMP

1.3.1 Restrictions on Combination of Unit and AMP

As for the combination of the positioning unit RTEX and each MINAS series, confirm the following restrictions.

Combination of Positioning Unit RTEX and AMP A: Available -: Not available

Version of Positioning Unit RTEX	Connectable AMP		
	A4N	A5N	A6N
Ver.1.0 or later	A	-	-
Ver.1.3 or later	A	A	-
Ver.1.4 or later	A	A	A

Combination of AMP series A: Available -: Not available

AMP type	Connectable AMP			Description
	A4N	A5N	A6N	
A4N	A	-	-	Only A4N can be connected to the same network.
A5N	-	A	A	A5N and A6N can be connected to the same network. A4N cannot be connected to the same network. When A4N is used, the AMP communication error occurs and the operation cannot be performed.
A6N	-	A	A	

Setting ranges of movement amount and speed
The input range of the movement amount or speed specified in the positioning unit RTEX may differ from the set upper and lower limits of AMP.

Key Point:
- A5N and A6N can be used connecting to the same network.

1.3.2 Restrictions on AMP Parameters

Some parameters of AMPs affect the operation of the positioning unit RTEX. Set parameters according to the following description.

[A4N parameters]

No.	Parameter name	Factory default setting	Settings
02	Control mode	0	Use "setting value 0 (position control)".
03	Selection of torque limit	1	The positioning unit automatically changes the setting. Do not change this parameter.
04	Over-travel inhibit input	1	Use "setting value 1 (Over-travel inhibit input is disabled)".
09	Unit of velocity	0	Use "Pulse/s".
0A	Parameter change via network	0	Use "setting value 0 (Enable)". When setting "setting value 1 (inhibit)", parameters cannot be changed from the positioning unit RTEX.
43	Direction of motion	1	The positioning unit automatically changes the setting. Do not change this parameter.
5E	Setup of 1st torque limit	500	
74	Selection of command update period	2	Use "setting value 2 (1 ms)".

[A6N/A5N parameters]

No.	Parameter name	Factory default setting	Settings
Pr0.00	Rotational direction setup	1	The positioning unit automatically changes the setting. Do not change this parameter.
Pr0.01	Control mode setup	0	Use "setting value 0 (semi-closed control)".
Pr0.08	Number of command pulses per motor revolution	0	Factory default setting When Pr.0.08=0, Pr.0.09=1, Pr.0.10=1, position command input is position command. (Note 1)
Pr0.09	Numerator of electronic gear	1	
Pr0.10	Denominator of electronic gear	1	
Pr4.00 to Pr4.07	SI1 - SI8 input selection	(Note2)	The connection method and settings vary according to the home return method used.
Pr5.04	Over-travel inhibit input setup	1	Use "setting value 1 (Over-travel inhibit input is disabled)".
Pr5.21	Selection of torque limit	1	The positioning unit automatically changes the setting. Do not change this parameter.
Pr7.20	RTEX communication cycle setup	3	Use "setting value 3 (0.5 ms)".
Pr7.21	RTEX command updating cycle ratio setting	2	Use "setting value 2 (2 times)".
Pr7.22	RTEX function extended setup 1	0	Use "setting value 0 (16-byte mode)".
Pr7.23	RTEX function extended setup 2	18	The positioning unit automatically changes the setting. Do not change this parameter.
Pr7.25	RTEX Speed unit setup	0	Change to "setting value 1 (command unit/s)".

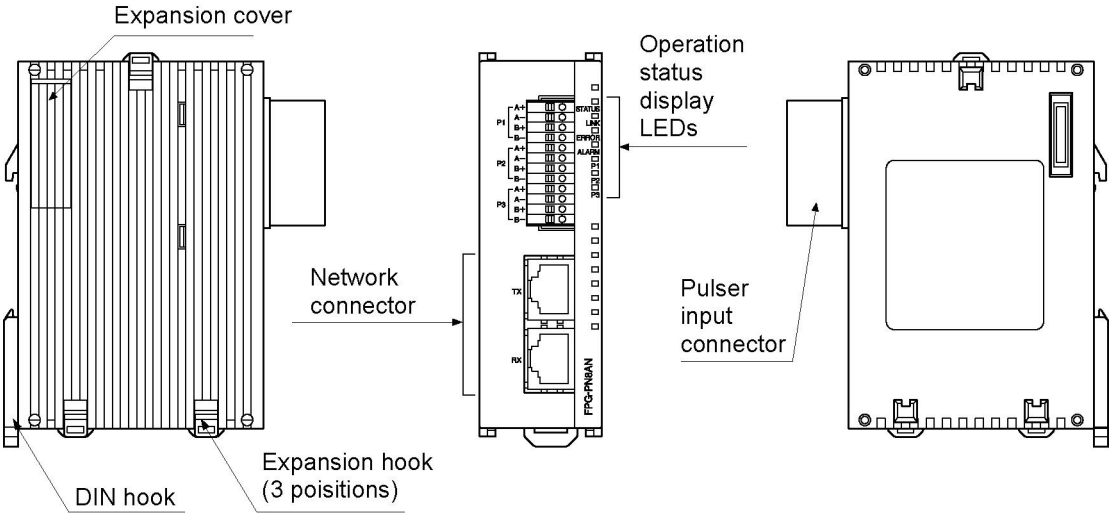
(Note 1) For details of Pr0.08 to Pr0.10, refer to "Technical Reference of AC Servo Driver A5N series" or "Technical Reference of AC Servo Driver A6N series".
(Note 2) The factory default settings of Pr4.00 to Pr4.07 vary according to parameter numbers. For details of the setting methods, refer to "10.2 AMP Settings and Usable Home Return Methods

Chapter 2

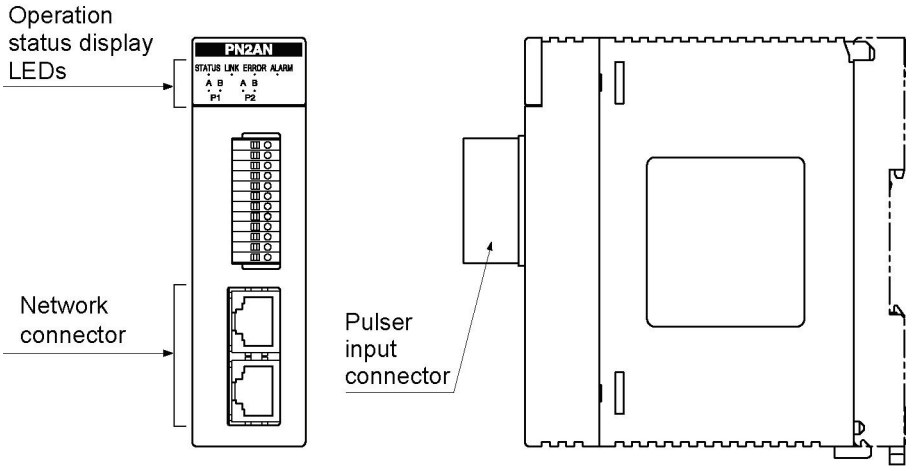
Parts and Functions

2.1 Parts and Functions

FPΣ Positioning Unit RTEX



FP2 Positioning Unit RTEX



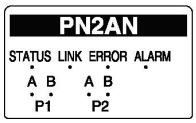
2.2 Operation Status Display LEDs

FPΣ Positioning Unit RTEX

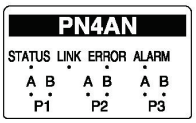
Name	Color	Status		Remarks
STATUS	Green	LED blinks: LED on:	Waiting for network establishment Network establishment	
LINK	Green	LED off: LED on:	Not connected Normal connection	The state that the TX of the sending node and the RX of the own node are electrically connected properly.
ERROR	Red	LED off: LED blinks: LED on:	Normal A warning occurred. An error occurred.	In case of warning, the operation continues. In case of error, the operation stops.
ALARM	Red	LED off: LED on:	Normal System error	If the LED turns on, the power supply should be turned off and on again.
P1 P2 P3	Green	LED off: LED on:	Both phase A and phase B are in the off state. Both phase A and phase B are in the on state	Check the input signals of the pulsers.

FP2 Positioning Unit RTEX

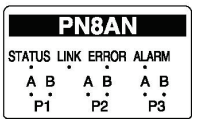
＜2-axis type＞



＜4-axis type＞



＜8-axis type＞



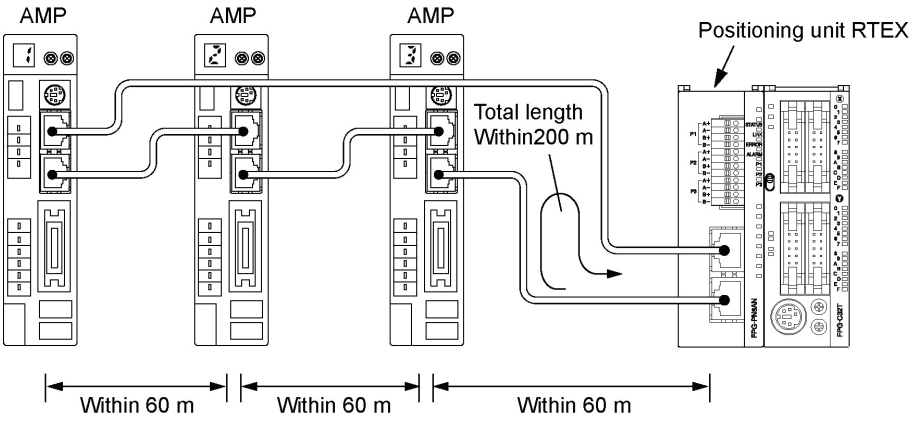
Name	Color	Status		Remarks
STATUS	Green	LED blinks: LED on:	Waiting for network establishment Network establishment	
LINK	Green	LED off: LED on:	Not connected Normal connection	The state that the TX of the sending node and the RX of the own node are electrically connected properly.
ERROR	Red	LED off: LED blinks: LED on:	Normal A warning occurred. An error occurred.	In case of warning, the operation continues. In case of error, the operation stops.
ALARM	Red	LED off: LED on:	Normal System error	If the LED turns on, the power supply should be turned off and on again.
P1A P1B P2A P2B P3A P3B	Green	LED off: LED on:	Off state On state	Check the input signals of the pulsers.

Chapter 3

Wiring

3.1 Wiring of Network

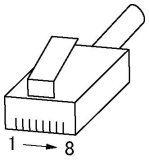
Use the LAN cable with the category 5e shielded type for the wiring of the network. To prevent the cable from coming off, securely connect the connector of the cable to the network connector (RJ45 connector) of the unit.
The length between each node should be within 60 m, and the total length of the communication loop should be within 200 m.



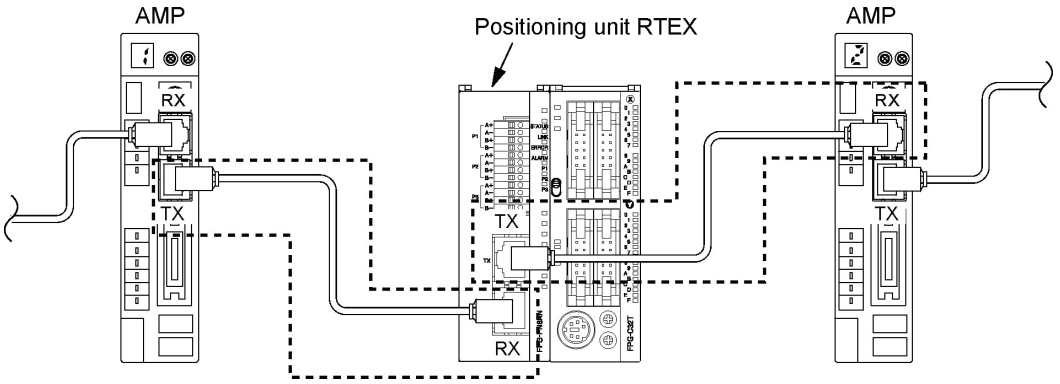
3.2 Network Connector

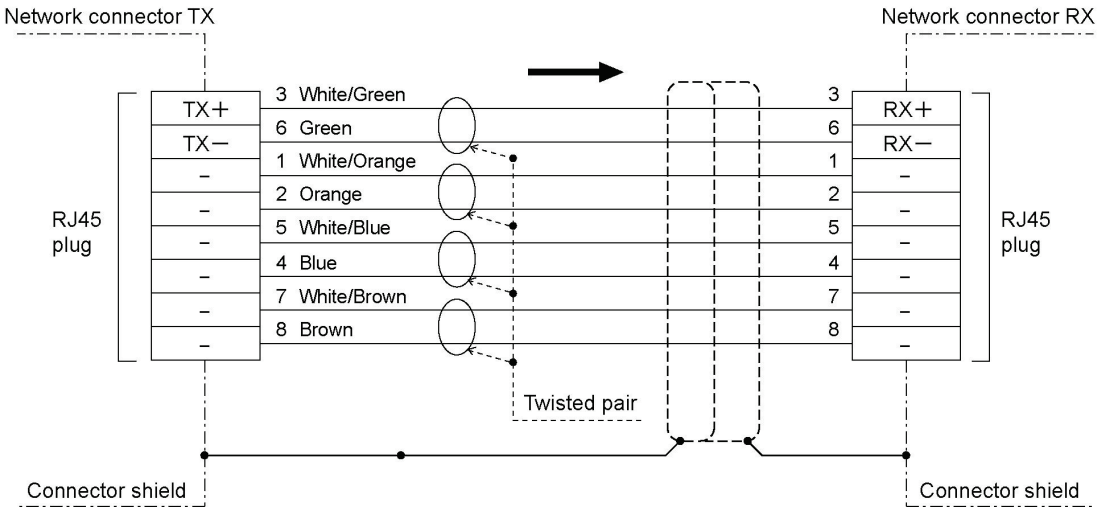
RJ45 plug is connected to the network connector.

Pins of RJ45 plug



Connecting diagram

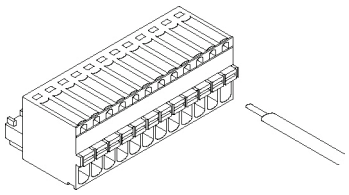




3.3 Wiring of Pulser Input Connector

Supplied connector/Suitable wire

A connector of the spring connection type is used. Use the following suitable wires for the wiring.



Supplied connector socket

The connector socket manufactured by Phoenix Contact Co. should be used.

Manufacturer	Number of pins	Part No.	Product No.
Phoenix Contact Co.	12 pins	FK-MC0, 5/12-ST-2,5	1881422

Suitable wires (strand wire)

Suitable wires	Tightening torque
AWG# 28 to 20	0.14 to 0.5 mm^2

Pole terminal with a compatible insulation sleeve

If a pole terminal is being used, the following models manufactured by Phoenix Contact Co. should be used.

Manufacturer	Cross-sectional area (mm^2)	Size	Part No.
Phoenix Contact Co.	0.25	AWG #24	A 0, 25-7
	0.34	AWG #22	A 0, 34-7
	0.50	AWG #20	A 0, 5-6

Pressure welding tool for pole terminals

Manufacturer	Part No.	Product No.
Phoenix Contact Co.	CRIMPFOX 10S	1212045

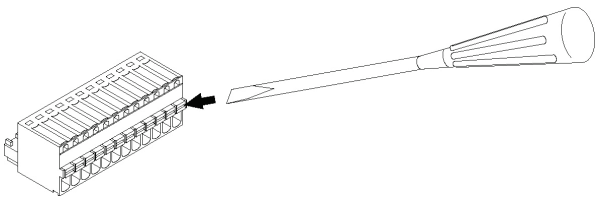
For tightening the connector

For inserting the wires, use a screwdriver (Phoenix contact Co., Product No. 1205202) with a blade size of 0.4 × 2.0 (Part No. SZS 0,4×2,0).

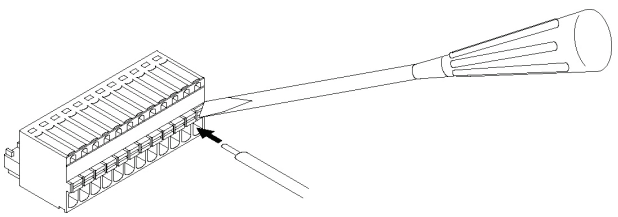
Wiring method

(1) Remove a portion of the wire's insulation.

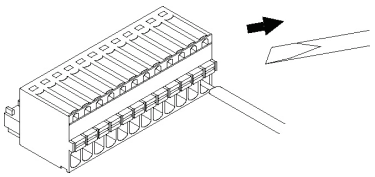
(2) Press the orange switch of the connector using a tool such as a flat-blade screwdriver.



(3) Insert the wire into the connector until it stops with pressing the orange switch.



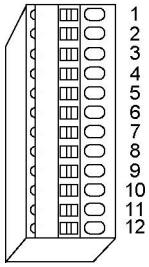
(4) Take the tool off the switch.



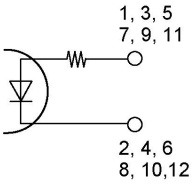
Precautions on wiring

- When removing the wire's insulation, be careful not to scratch the core wire.
- Do not twist the wires to connect them.
- Do not solder the wires to connect them. The solder may break due to vibration.
- After wiring, make sure stress is not applied to the wire.

3.3.1 Input Specifications and Pin Configuration



Input terminals of pulser input connector

Pin number	Circuit	Signal name		Item	Descriptions
1, 5, 9		Pulse input A (+)	Input specifications	Operating voltage range	3.5 to 5.25 V DC (5 VDC, line driver specifications)
2, 6, 10		Pulse input A (-)		Minimum ON voltage/current	3 V DC/4 mA
3, 7, 11		Pulse input B (+)		Maximum ON voltage/current	1 V DC/2.0 mA
4, 8, 12		Pulse input B (-)		Input impedance	Approx. 390 Ω
				Minimum input pulse width	0.5 μs or more (Max. 1 MHz for each phase)

Note) When the pulser is connected to the pulse input, the elapsed value increases if the phase A is proceeding more than the phase B.

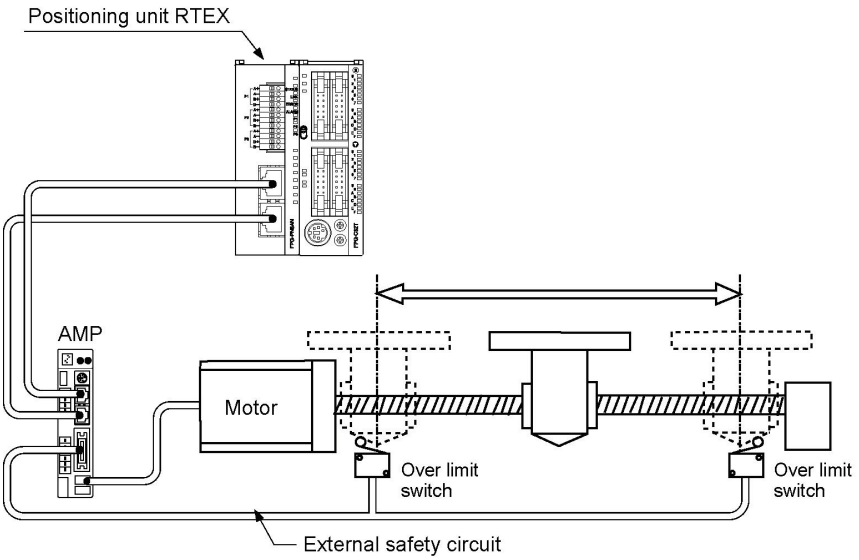
Chapter 4

Power On/Off and Items to Check

4.1 Safety Circuit Design

Example of a safety circuit

Installation of the over limit switch



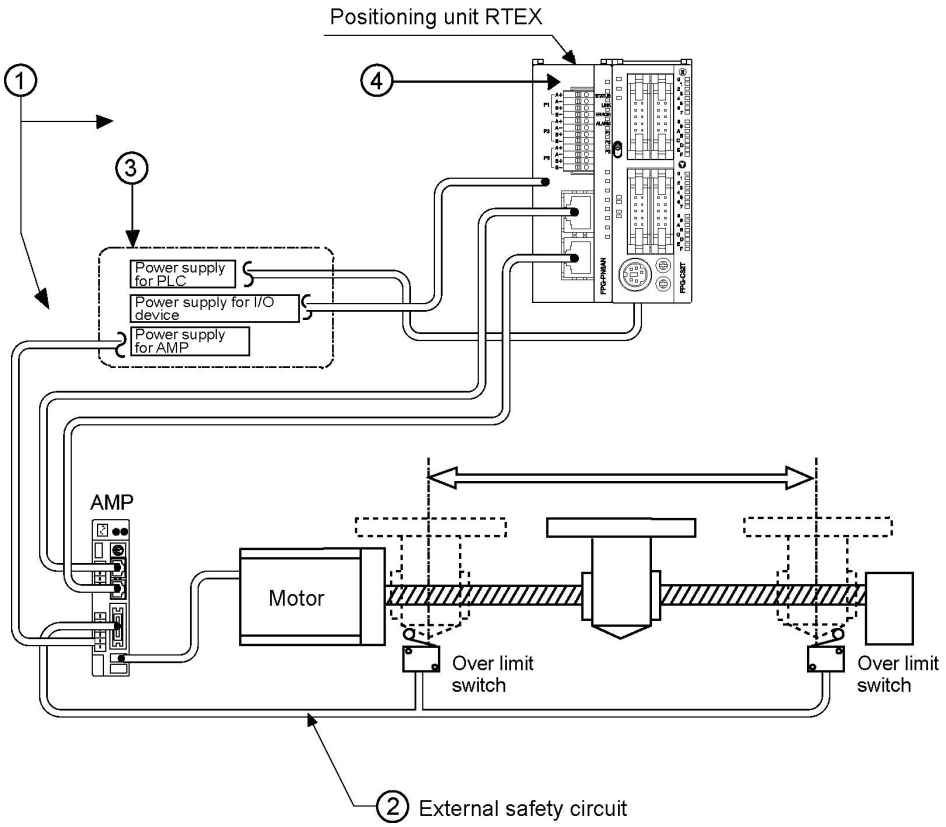
Install over limit switches as shown above.
Connect them to the CW and CCW driving inhibition input of the parallel I/O connector of AMP. For the positioning unit RTEX, connect them to the limit input (+) and limit input (-) through the network.

Install the safety circuit recommended by the manufacturer of the motor being used.

4.2 Before Turning On the Power

Items to check before turning on the power

System configuration example



① Checking connections to the various devices

Check to make sure the various devices have been connected as indicated by the design.

② Checking the installation of the external safety circuit

Check to make sure the safety circuit (wiring and installation of over limit switch) based on an external circuit has been installed securely.

③ Checking the procedure settings for turning ON the power supplies

Make sure settings have been entered so that power supplies will be turned on according to the procedure outlined in section “Procedure for Turning On the Power”.

④ Checking the CPU mode selection switch

Set the PLC in the PROG. mode. Setting it in the RUN mode can cause inadvertent operation.

Note:

When the power to the PLC is turned on, the start flags for the various operations of the positioning unit RTEX should be off. If they are on, they may activate improperly.

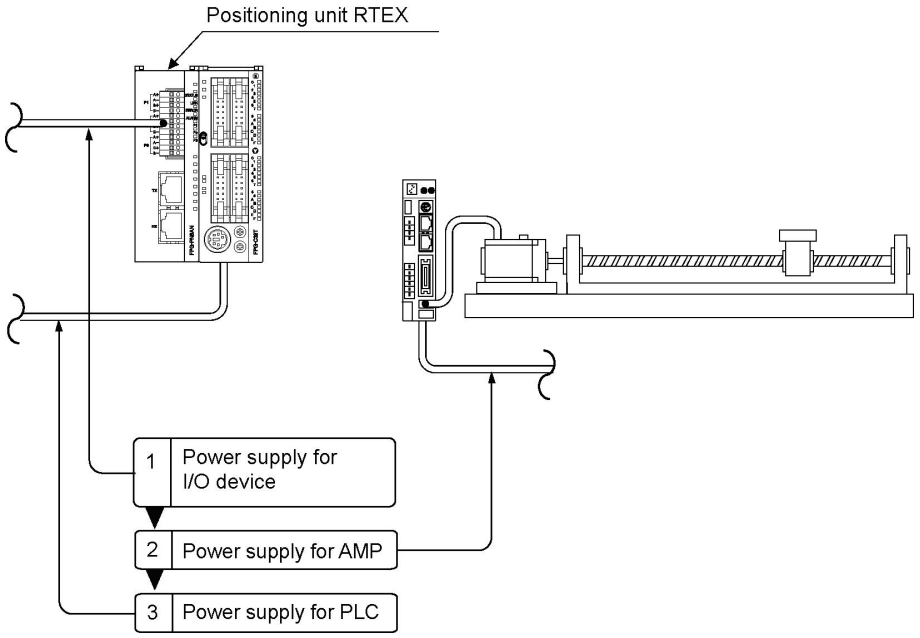
4.3 Procedure for Turning On the Power

When turning on the power to the system incorporating the positioning unit RTEX, the nature and statuses of any external devices connected to the system should be taken into consideration, and sufficient care should be taken that turning on the power does not initiate unexpected movements or operations.

4.3.1 Procedure for Turning On the Power

Procedure

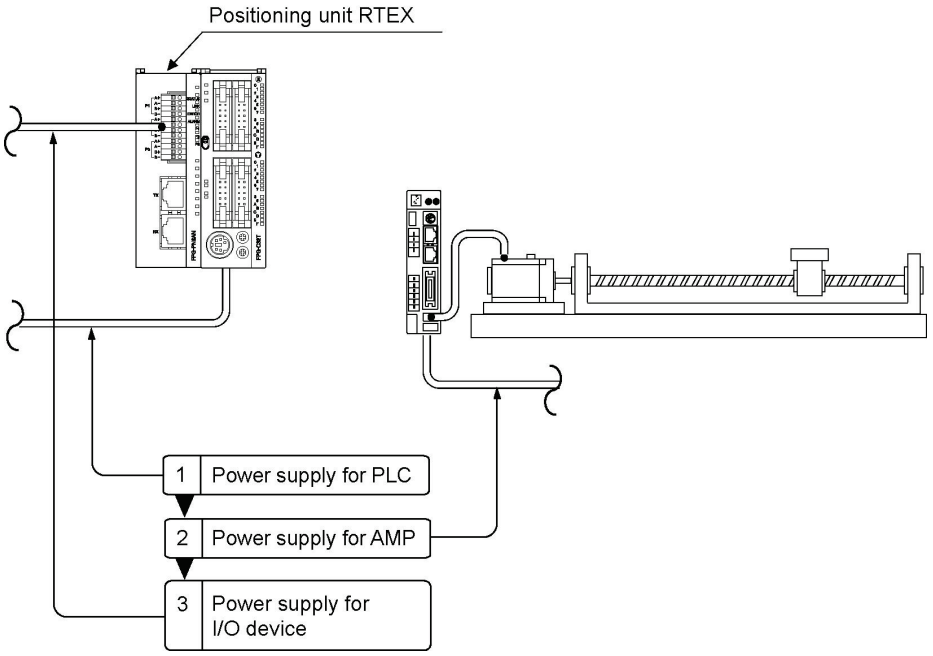
1. Turn on the power supplies for input and output devices connected to the PLC.
2. Turn on the power supply for the AMP.
3. Turn on the power supply for the PLC.



4.3.2 Procedure for Turning Off the Power

Procedure

1. Check to make sure the rotation of the motor has stopped, and then turn off the power supply for the PLC.
2. Turn off the power supply for the AMP.
3. Turn off the power supplies for the input and output devices connected to the PLC.



Chapter 5

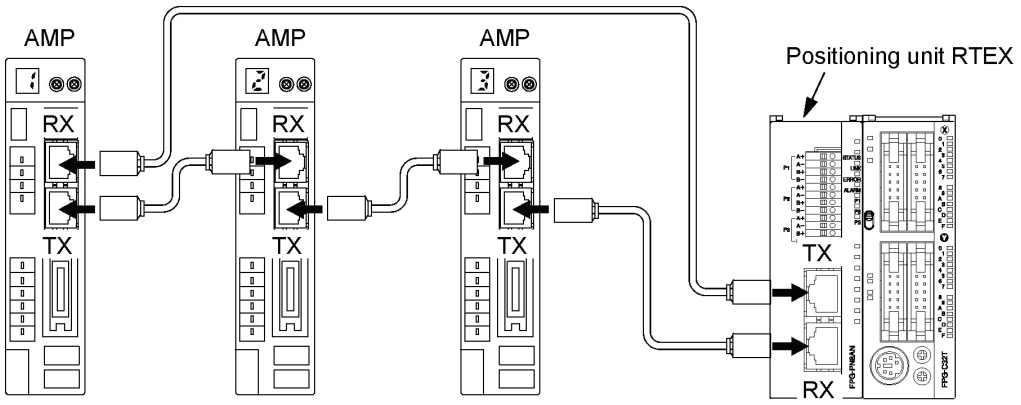
Preparation For Operation

5.1 Procedures For System Establishment

5.1.1 Procedure 1: Wiring

Use the LAN cable with the Ethernet category 5e shielded type for the wiring of the network. Connect the positioning unit RTEX with each AMP in a loop. Connect the “TX” of the positioning unit RTEX to the “RX” of an AMP, and then connect the “TX” of the AMP to the “RX” of the next AMP. At the end, connect the “TX” of the last AMP to the “RX” of the positioning unit RTEX.

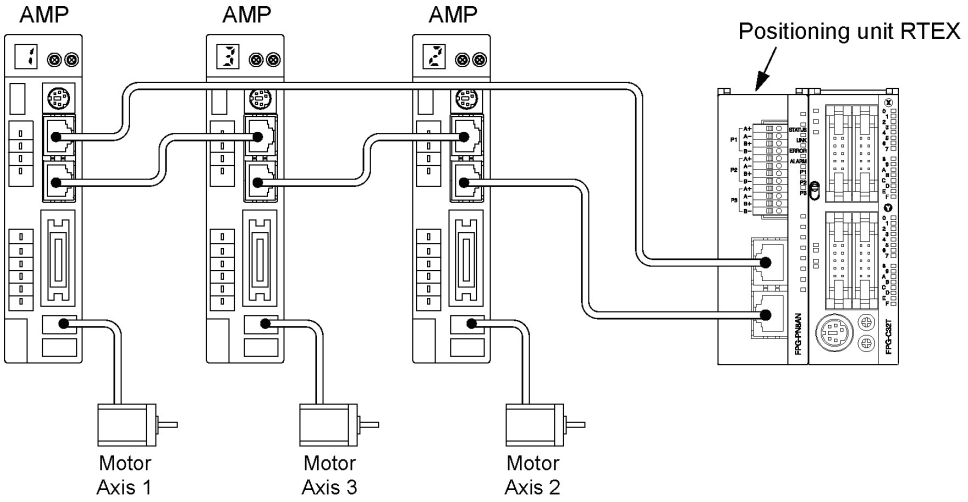
Note) Turn off the power supply of the system before wiring cables.



5.1.2 Procedure 2: Axis Numbers and Unit Numbers of AMP

The axis numbers of the positioning unit RTEX agree with the unit numbers of the rotary switch of the AMP. As the connected order on the network is not related to the axis numbers, the axis numbers can be determined after the establishment of the network.

AMP rotary switch number	Axis number
1	Axis 1
2	Axis 2
3	Axis 3
4	Axis 4
5	Axis 5
6	Axis 6
7	Axis 7
8	Axis 8



Note:

An error occurs when the settings as below were specified.

- When the same unit number is redundantly specified on the same network.
- When a unit number was set to 0.
- When a unit number larger than the maximum axis number of the unit used was specified. (For the 4-axis type, the settable unit numbers are 1 to 4.)

5.1.3 Procedure 2: Power On and Checking Network Establishment

The power-on procedure is as follows.
4. Turn on the power supplies for input and output devices connected to the PLC.
5. Turn on the power supply for the AMP.
6. Turn on the power supply for the PLC.

After the power turned on, check if the operation status display LEDs of the positioning unit RTEX is in the following state.

STATUS : Lights up
LINK : Lights up

Key Point:
- If the STATUS LED is blinking, the network is not established.
- If the LINK LED is off, the connection between the “RX” of the positioning unit RTEX (receiver) and the “TX” of the AMP (sender) is not electrically correct.

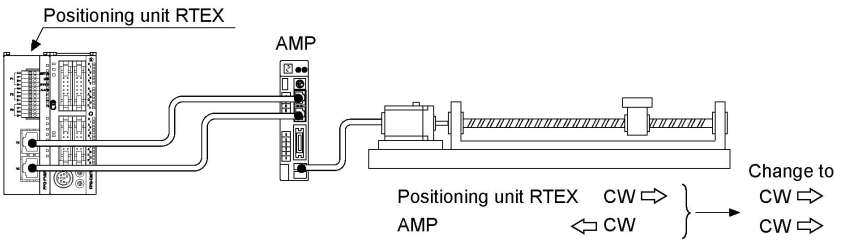
5.1.4 Procedure 3: Matching Parameters With AMP

At the factory setting, the operating directions of the positioning unit RTEX and the AMP are different as below.
- Parameters of positioning unit RTEX : CW direction is elapsed value (+) direction
- Parameters of AMP : CW direction is elapsed value (-) direction

Therefore, they must be matched according to the following procedures.

1. Boot the Configurator PM and set the corresponding axis.
2. Specify the “Select slot” from the “Online” on the menu, and select the slot number that the positioning unit RTEX is installed.
3. Specify the “Download to unit” from the “File” on the menu, and down the axis information and parameter setting data.
4. The indication for writing into the FROM (flash memory) is shown. Select “Yes” to carry out writing to the FROM.
5. After the completion of writing, turn off the power supplies of AMP and PLC, and then turn them on again.
6. After turning on the power supplies again, the system will be operated with the parameters set in the positioning unit RTEX.

Key Point:
Followings are the parameters to match the operating directions of the positioning unit RTEX and AMP according to the above procedure.
“CW/CCW direction setting”
“Limit switch connection”
As these parameters are important to establish the system, they will be reflected to the operation of a motor by turning on the power supply again after writing them into the FROM (flash memory) of the positioning unit RTEX.

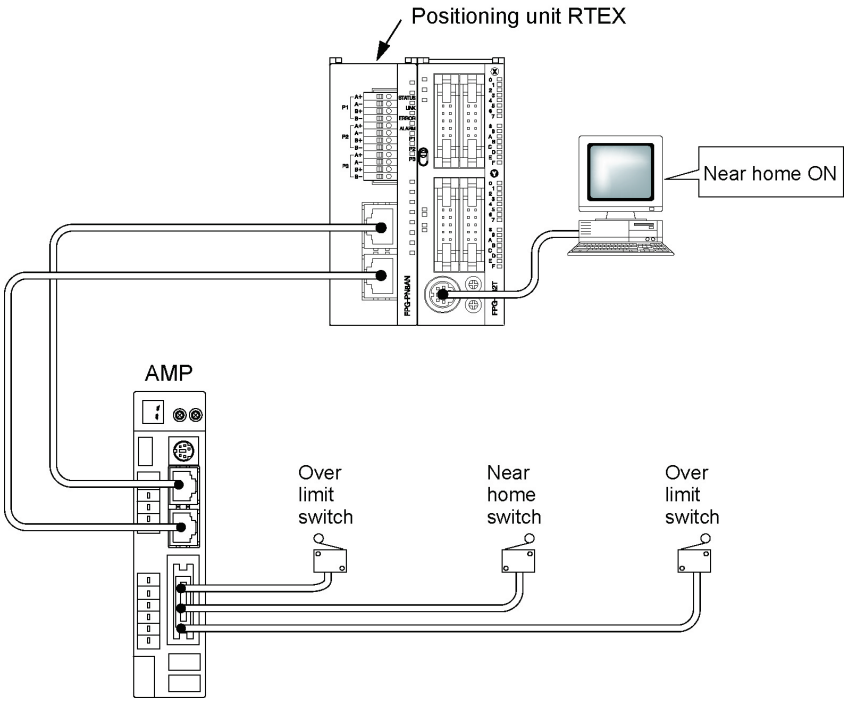


5.1.5 Procedure 4: Checking Input Signals

Check the input of the over limit switch for the protection circuit connected to the AMP and the input of the near home (DOG) switch. Confirm whether the input of the signals is properly loaded into the positioning unit RTEX or not, with operating each switch forcibly. The statuses of the input of switches can be confirmed on the status indication display of the Configurator PM.

Key Point:

If the operating direction of the motor is opposite to the position of the limits (+) and (-) after the installation of the over limit switch, the connection of the limits (+) and (-) can be set to “Reverse connection” in the parameter setting of the Configurator PM.



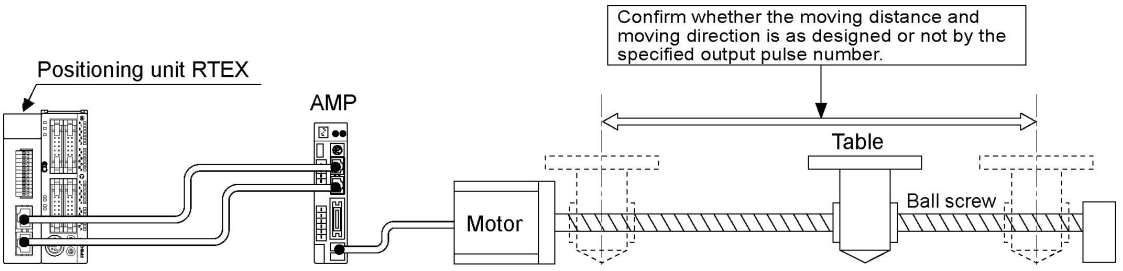
5.1.6 Procedure 5: Checking Rotating and Moving Directions and Moving Distance

Check whether the rotating and moving direction of the motor and the moving distance is correct or not. The operations can be easily confirmed using the tool operation function of the Configurator PM without ladder programs.

1. Confirm the rotating direction and moving direction of the motor by the JOG operation. Select the "Online" → "Tool operation" on the menu of the Configurator PM, and make the servo on for the corresponding axis to execute the JOG operation. When using the ladder program, turn on the forward JOG and reverse contact after turning on the servo on contact.
   The rotating direction is determined according to the installation of the ball screw or the "CW/CCW direction setting" of the parameter.

2. Confirm whether the moving distance is as designed or not by the position control. Set the table 1 of the positioning data using the Configurator PM, and select the "Online" → "Tool operation" on the menu of the Configurator PM after downloading the table to the positioning unit RTEX, and make the servo on for the corresponding axis to execute the JOG operation. When using the ladder program, set the position control starting table, and then turn on the positioning start contact after turning on the servo on contact.
   The moving distance is determined according to the pitch of the ball screw, deceleration gear rate or setting movement amount of the positioning data.

Note) Execute the servo on, and make the AMP under the condition that the servo is locked before performing the JOG operation and position control.



5.1.7 Procedure 6: Settings of Parameters and Positioning Data

The basic operation of the positioning system was checked in the procedure 5. In the procedure 6, set the parameters and positioning data in accordance with the actual operation.

The parameters and positioning data is stored in the shared memory of the positioning unit RTEX. Although there are two methods to store the data in the shared memory, it is recommended to set the parameters that are not changed so often using the Configurator PM.

- Use the Configurator PM
- Use the ladder program to write into the shared memory

When using the Configurator PM

Boot the Configurator PM, and select "Set axis" → "Parameter settings" on the menu to set the various parameters. Also, create the table for the positioning table on the positioning data editing screen. After setting the parameters and data, download them to the positioning unit RTEX.

Note) After the parameters and positioning data was downloaded, the display to select whether to write them into the FROM (flash memory) or not is shown. When they are written into the flash memory, the parameters and positioning data in the flash memory will be automatically reflected to the shared memory when the power supply of the PLC turns on. When they are not written into the flash memory, the parameters and positioning data finally stored in the flash memory will be reflected when the power supply of the PLC turns on.

When using the ladder program to write into the shared memory

Use the F151 instruction to write various parameters and positioning data into the shared memory.

 **Reference:**

- For the information on the storage addresses of various parameters and positioning data, <17.6 Details of Each Axis Setting Area in Shared Memory>
- For the information on writing positioning data using ladder programs, <14.1.3. How to Use Standard Area and Extended Area of Positioning Data>

5.2 Preparation For Operation

5.2.1 Servo On/Servo Off

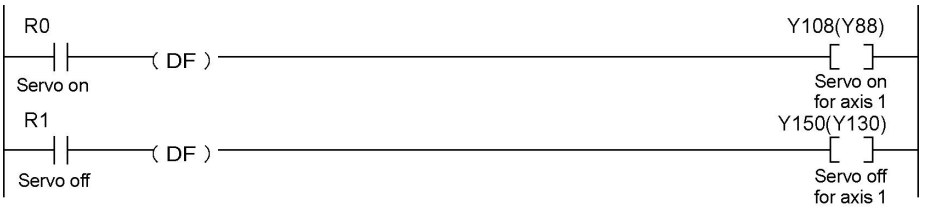
The servo motor should be in the state that the servo is locked in order to perform the JOG operation and position control. Turn on the servo on request contact to make the servo motor to be the state that the servo is locked. Turn on the servo off request contact to change the state that the servo is locked to the state that the servo is free. Set either the servo on/servo off by the tool operation of the Configurator PM without using the ladder program.

Each contact when the positioning unit RTEX is installed in the slot 0

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WX11	X110	WX1	X10	1 axis	Servo lock	Turns on when the corresponding axis is in the state of servo lock.
	X111		X11	2 axis		
	X112		X12	3 axis		
	X113		X13	4 axis		
	X114		X14	5 axis		
	X115		X15	6 axis		
	X116		X16	7 axis		
	X117		X17	8 axis		

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WY10	Y108	WY8	Y88	1 axis	Servo ON request	Requests the servo lock for the corresponding AMP. The servo lock is executed by the ON edge of this contact. The servo cannot be free automatically even in the program mode. To make the servo free, turn on the servo OFF request contact. (The operation is the edge type.)
	Y109		Y89	2 axis		
	Y10A		Y8A	3 axis		
	Y10B		Y8B	4 axis		
	Y10C		Y8C	5 axis		
	Y10D		Y8D	6 axis		
	Y10E		Y8E	7 axis		
	Y10F		Y8F	8 axis		
WY15	Y150	WY13	Y130	1 axis	Request servo off	Requests the servo free for the corresponding AMP. The servo free is executed by the ON edge of this contact. (The operation is the edge type.)
	Y151		Y131	2 axis		
	Y152		Y132	3 axis		
	Y153		Y133	4 axis		
	Y154		Y134	5 axis		
	Y155		Y135	6 axis		
	Y156		Y136	7 axis		
	Y157		Y137	8 axis		

Sample program



The numbers in parenthesis are the flag and contact numbers for the FP2.

Note) The servo lock status continues if the PLC changed to the program mode.

Chapter 6

I/O Allocation

6.1 Occupied I/O Area

The input (X)/output (Y) should be allocated to use the Positioning Unit RTEX as well as other I/O units. 256 points (128-point input/128-point output) are occupied for any axis types.

Type	Number of occupied points (allocated using a tool software)
2-axis type 4-axis type 8-axis type	Input: 128 points Output: 128 points (128SX/128SY)

With the FPΣ or FP2, the I/O numbers vary depending on the installed position of the positioning unit RTEX.


Reference: <FPΣ User's Manual ARCT1F333>
<FP2/FP2SH User's Manual ARCT1F320>

6.2 Allocation of Each Contact

Followings are occupied I/O when FPΣ/FP2 Positioning unit RTEX is installed in the slot 0.

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WX10	X100	WX0	X0	All axes	Link establishment annunciation	Indicates that the network link was established, and announce the system started running.
	X101		X1	-	-	-
	X102		X2	-	-	-
	X103		X3	All axes	Write FROM	Announces that data such as positioning parameters in the shared memory is being written in FROM.
	X104		X4	All axes	Tool operation	Contact to indicate the Tool operation from Configurator PM. The start-up from I/O is not available during the Tool operation. If it performs, a warning will occur.
	X105		X5	-	-	-
	X106		X6	-	-	-
	X107		X7	All axes	Recalculation done	If the recalculation request contact (Y_7) turns on, the positioning data of the shared memory (standard area) will be restructured. This contact will turn on after restructuring completes. If the recalculation request contact (Y_7) turns on again, this contact will be off once. Note) It is used only when the positioning data has been rewritten by ladder programs.
	X108		X8	1 axis	Each axis connection confirmation	Turns on when the corresponding axis exists.
	X109		X9	2 axis		
	X10A		XA	3 axis		
	X10B		XB	4 axis		
	X10C		XC	5 axis		
	X10D		XD	6 axis		
	X10E		XE	7 axis		
	X10F		XF	8 axis		
WX11	X110	WX1	X10	1 axis	Servo lock	Turns on when the corresponding axis is in the state of servo lock.
	X111		X11	2 axis		
	X112		X12	3 axis		
	X113		X13	4 axis		
	X114		X14	5 axis		
	X115		X15	6 axis		
	X116		X16	7 axis		
	X117		X17	8 axis		
	X118		X18	1 axis	BUSY	Turns on when the corresponding axis is operating.
	X119		X19	2 axis		
	X11A		X1A	3 axis		
	X11B		X1B	4 axis		
	X11C		X1C	5 axis		
	X11D		X1D	6 axis		
	X11E		X1E	7 axis		
	X11F		X1F	8 axis		

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WX12	X120	WX2	X20	1 axis	Operation done	Turns on when the operation command for the corresponding axis completed and the position error became in the specified completion width. For P point control and C point control of the automatic operation, turns on when the operation for all the tables completed. After this contact turned on, the on-state continues until the next control activates.
	X121		X21	2 axis		
	X122		X22	3 axis		
	X123		X23	4 axis		
	X124		X24	5 axis		
	X125		X25	6 axis		
	X126		X26	7 axis		
	X127		X27	8 axis		
	X128		X28	1 axis	Home return done	Turns on when the home return operation for the corresponding axis completed. After this contact turned on, the on-state continues until the next control activates.
	X129		X29	2 axis		
	X12A		X2A	3 axis		
	X12B		X2B	4 axis		
	X12C		X2C	5 axis		
	X12D		X2D	6 axis		
	X12E		X2E	7 axis		
	X12F		X2F	8 axis		
WX13	X130	WX3	X30	-	-	-
	X131		X31	-	-	-
	X132		X32	-	-	-
	X133		X33	-	-	-
	X134		X34	-	-	-
	X135		X35	-	-	-
	X136		X36	-	-	-
	X137		X37	-	-	-
	X138		X38	1 axis	Near home	Monitor contact for the near home input connected to the corresponding AMP.
	X139		X39	2 axis		
	X13A		X3A	3 axis		
	X13B		X3B	4 axis		
	X13C		X3C	5 axis		
	X13D		X3D	6 axis		
	X13E		X3E	7 axis		
	X13F		X3F	8 axis		
WX14	X140	WX4	X40	1 axis	Imposition	Turns on when the position error of the corresponding axis is within the imposition range specified in AMP. The setting of the imposition range can be changed by PANATERM that is a tool of AMP.
	X141		X41	2 axis		
	X142		X42	3 axis		
	X143		X43	4 axis		
	X144		X44	5 axis		
	X145		X45	6 axis		
	X146		X46	7 axis		
	X147		X47	8 axis		
	X148		X48	1 axis	Auxiliary contact	Turns on when the corresponding positioning table of the corresponding axis was executed. Use Configurator PM or directly write in the shared memory for setting to able/disable the auxiliary contact.
	X149		X49	2 axis		
	X14A		X4A	3 axis		
	X14B		X4B	4 axis		
	X14C		X4C	5 axis		
	X14D		X4D	6 axis		
	X14E		X4E	7 axis		
	X14F		X4F	8 axis		

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WX15	X150	WX5	X50	1 axis	Limit +	Monitor contact of the limit + and – connected to the corresponding AMP. During the positioning operation, JOG operation or pulsar operation, performs the deceleration stop when the limit input that is an extension of the operating direction turned on. The deceleration stop time during the limit input can be changed in the shared memory. It will be the contact for the automatic inversion when performing the home return.
	X151		X51		Limit -	
	X152		X52	2 axis	Limit +	
	X153		X53		Limit -	
	X154		X54	3 axis	Limit +	
	X155		X55		Limit -	
	X156		X56	4 axis	Limit +	
	X157		X57		Limit -	
	X158		X58	5 axis	Limit +	
	X159		X59		Limit -	
	X15A		X5A	6 axis	Limit +	
	X15B		X5B		Limit -	
	X15C		X5C	7 axis	Limit +	
	X15D		X5D		Limit -	
	X15E		X5E	8 axis	Limit +	
	X15F		X5F		Limit -	
WX16	X160	WX6	X60	1 axis	Error annunciation	Turns on when an error occurs on the corresponding axis. The contacts of all axes turn on if an error occurs on all axes. The details of the error can be confirmed in the error annunciation area of the shared memory.
	X161		X61	2 axis		
	X162		X62	3 axis		
	X163		X63	4 axis		
	X164		X64	5 axis		
	X165		X65	6 axis		
	X166		X66	7 axis		
	X167		X67	8 axis		
	X168		X68	1 axis	Warning annunciation	Turns on when a warning occurs on the corresponding axis. The contacts of all axes turn on if a warning occurs on all axes. The details of the warning can be confirmed in the warning annunciation area of the shared memory.
	X169		X69	2 axis		
	X16A		X6A	3 axis		
	X16B		X6B	4 axis		
	X16C		X6C	5 axis		
	X16D		X6D	6 axis		
	X16E		X6E	7 axis		
	X16F		X6F	8 axis		
WX17	X170	WX7	X70	1 axis	General-purpose input 1	Monitor contact for the general-purpose input connected to the corresponding AMP. The input status of this contact does not affect on the operation of the motor or positioning unit.
	X171		X71		General-purpose input 2	
	X172		X72	2 axis	General-purpose input 1	
	X173		X73		General-purpose input 2	
	X174		X74	3 axis	General-purpose input 1	
	X175		X75		General-purpose input 2	
	X176		X76	4 axis	General-purpose input 1	
	X177		X77		General-purpose input 2	
	X178		X78	5 axis	General-purpose input 1	
	X179		X79		General-purpose input 2	
	X17A		X7A	6 axis	General-purpose input 1	
	X17B		X7B		General-purpose input 2	
	X17C		X7C	7 axis	General-purpose input 1	
	X17D		X7D		General-purpose input 2	
	X17E		X7E	8 axis	General-purpose input 1	
	X17F		X7F		General-purpose input 2	

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WY10	Y100	WY8	Y80	All axes	System stop	Contact for requesting the system stop. When it turns on, all axes will stop at the deceleration time 0.
	Y101		Y81	-	-	-
	Y102		Y82	-	-	-
	Y103		Y83	-	-	-
	Y104		Y84	-	-	-
	Y105		Y85	-	-	-
	Y106		Y86	-	-	-
	Y107		Y87	All axes	Recalculation request	Turn on this signal when each positioning data (standard area) in the shared memory was changed. The positioning data after the table number starting the recalculation specified in the shared memory can be restructured and will be executable by turning on this signal. When restructuring of the positioning data completes, the recalculation done contact (X_7) will turn on. Note) It is used only when the positioning data has been rewritten by ladder programs.
	Y108		Y88	1 axis	Servo ON request	Requests the servo lock for the corresponding AMP. The servo lock is executed by the ON edge of this contact. The servo cannot be free automatically even in the program mode. To make the servo free, turn on the servo OFF request contact. (The operation is the edge type.)
	Y109		Y89	2 axis		
	Y10A		Y8A	3 axis		
	Y10B		Y8B	4 axis		
	Y10C		Y8C	5 axis		
	Y10D		Y8D	6 axis		
	Y10E		Y8E	7 axis		
	Y10F		Y8F	8 axis		
WY11	Y110	WY9	Y90	1 axis	Positioning start-up	Requests the positioning control for the corresponding AMP. The starting table is specified in the area for specifying the position control starting table number in the shared memory. (The operation is the edge type.) If this contact turns on during the Tool operation by Configurator PM, a warning will be output.
	Y111		Y91	2 axis		
	Y112		Y92	3 axis		
	Y113		Y93	4 axis		
	Y114		Y94	5 axis		
	Y115		Y95	6 axis		
	Y116		Y96	7 axis		
	Y117		Y97	8 axis		
	Y118		Y98	1 axis	Home return start-up	Requests the home return for the corresponding AMP. The settings for the direction or pattern of the home return are specified by Configurator PM or the home return operation setting area in the shared memory. (The operation is the edge type.) If this contact turns on during the Tool operation by Configurator PM, a warning will be output.
	Y119		Y99	2 axis		
	Y11A		Y9A	3 axis		
	Y11B		Y9B	4 axis		
	Y11C		Y9C	5 axis		
	Y11D		Y9D	6 axis		
	Y11E		Y9E	7 axis		
	Y11F		Y9F	8 axis		
WY12	Y120	WY10	Y100	1 axis	JOG forward	Requests the JOG operation for the corresponding AMP. The settings for acceleration time, etc are specified by Configurator PM or the JOG operation settings in the shared memory. (The operation is the level type.) If this contact turns on during the Tool operation by Configurator PM, a warning will be output.
	Y121		Y101		JOG reverse	
	Y122		Y102	2 axis	JOG forward	
	Y123		Y103		JOG reverse	
	Y124		Y104	3 axis	JOG forward	
	Y125		Y105		JOG reverse	
	Y126		Y106	4 axis	JOG forward	
	Y127		Y107		JOG reverse	
	Y128		Y108	5 axis	JOG forward	
	Y129		Y109		JOG reverse	
	Y12A		Y10A	6 axis	JOG forward	
	Y12B		Y10B		JOG reverse	
	Y12C		Y10C	7 axis	JOG forward	
	Y12D		Y10D		JOG reverse	
	Y12E		Y10E	8 axis	JOG forward	
	Y12F		Y10F		JOG reverse	

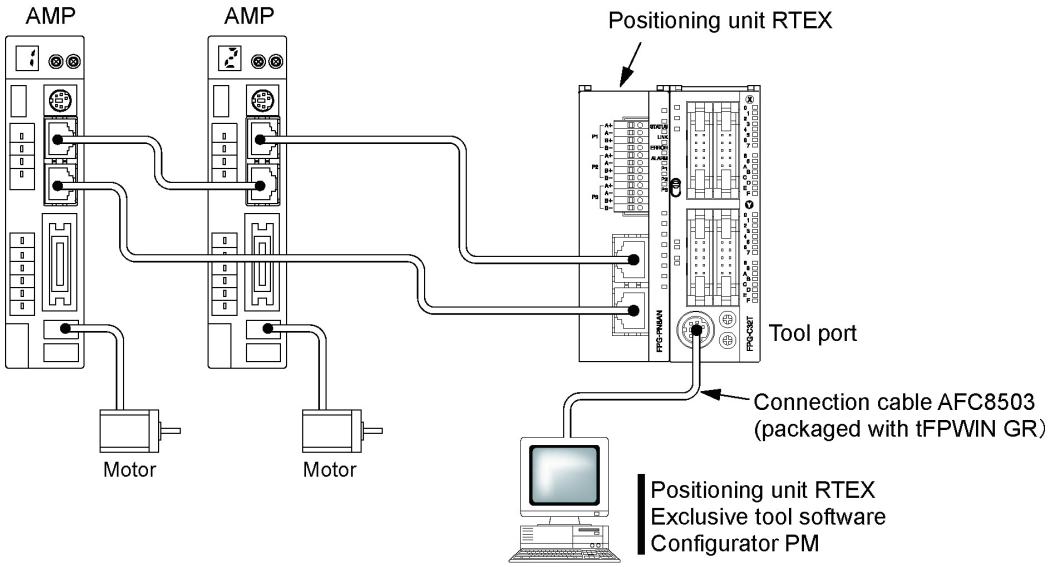
Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WY13	Y130	WY11	Y110	1 axis	Emergency stop	Requests the emergency stop for the corresponding AMP. The deceleration time for the emergency stop is specified by Configurator PM or the emergency stop setting in the shared memory. (The operation is the level type.) Note) The deviation counter cannot be cleared.
	Y131		Y111	2 axis		
	Y132		Y112	3 axis		
	Y133		Y113	4 axis		
	Y134		Y114	5 axis		
	Y135		Y115	6 axis		
	Y136		Y116	7 axis		
	Y137		Y117	8 axis		
	Y138		Y118	1 axis	Deceleration stop	Requests the deceleration stop for the corresponding AMP. The deceleration time for the deceleration stop is specified by Configurator PM or the deceleration stop setting in the shared memory. (The operation is the level type.) Note) The deviation counter cannot be cleared.
	Y139		Y119	2 axis		
	Y13A		Y11A	3 axis		
	Y13B		Y11B	4 axis		
	Y13C		Y11C	5 axis		
	Y13D		Y11D	6 axis		
	Y13E		Y11E	7 axis		
	Y13F		Y11F	8 axis		
WY14	Y140	WY12	Y120	1 axis	Pulser operation enabled	Requests the permission for the pulser operation of the corresponding AMP. The multiple setting and other settings for the pulser operation are specified by Configurator PM or the pulser operation setting area in the shared memory. (The operation is the level type.)
	Y141		Y121	2 axis		
	Y142		Y122	3 axis		
	Y143		Y123	4 axis		
	Y144		Y124	5 axis		
	Y145		Y125	6 axis		
	Y146		Y126	7 axis		
	Y147		Y127	8 axis		
	Y148		Y128	1 axis	J point speed change contact	The speed changes by turning on this signal during the J-point operation to the target speed with the specified acceleration/deceleration time and pattern. (The operation is the edge type.)
	Y149		Y129	2 axis		
	Y14A		Y12A	3 axis		
	Y14B		Y12B	4 axis		
	Y14C		Y12C	5 axis		
	Y14D		Y12D	6 axis		
	Y14E		Y12E	7 axis		
	Y14F		Y12F	8 axis		
WY15	Y150	WY13	Y130	1 axis	Request servo off	Requests the servo free for the corresponding AMP. The servo free is executed by the ON edge of this contact. (The operation is the edge type.)
	Y151		Y131	2 axis		
	Y152		Y132	3 axis		
	Y153		Y133	4 axis		
	Y154		Y134	5 axis		
	Y155		Y135	6 axis		
	Y156		Y136	7 axis		
	Y157		Y137	8 axis		
	Y158		Y138	1 axis	J point positioning start contact	Turning on this signal during the J-point operation for the appropriate axis ends the J-point operation, and moves to the process for the next table. (The operation is the edge type.)
	Y159		Y139	2 axis		
	Y15A		Y13A	3 axis		
	Y15B		Y13B	4 axis		
	Y15C		Y13C	5 axis		
	Y15D		Y13D	6 axis		
	Y15E		Y13E	7 axis		
	Y15F		Y13F	8 axis		

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WY16	Y160	WY14	Y140	1 axis	Request error clear	Requests the error clear for the corresponding AMP. The processing to recover from errors is performed and the error logs are cleared by turning on this signal. Note) Unrecoverable errors cannot be recovered even if this signal turned on.
	Y161		Y141	2 axis		
	Y162		Y142	3 axis		
	Y163		Y143	4 axis		
	Y164		Y144	5 axis		
	Y165		Y145	6 axis		
	Y166		Y146	7 axis		
	Y167		Y147	8 axis		
	Y168		Y148	1 axis	Request warning clear	Requests the warning clear for the corresponding AMP. The warning logs are cleared by turning on this signal.
	Y169		Y149	2 axis		
	Y16A		Y14A	3 axis		
	Y16B		Y14B	4 axis		
	Y16C		Y14C	5 axis		
	Y16D		Y14D	6 axis		
	Y16E		Y14E	7 axis		
	Y16F		Y14F	8 axis		
WY17	Y170	WY15	Y150	1 axis	General-purpose output 1	Contact for the general-purpose output connected to the corresponding AMP. The input status of this contact does not affect on the operation of the motor or positioning unit.
	Y171		Y151		General-purpose output 2	
	Y172		Y152	2 axis	General-purpose output 1	
	Y173		Y153		General-purpose output 2	
	Y174		Y154	3 axis	General-purpose output 1	
	Y175		Y155		General-purpose output 2	
	Y176		Y156	4 axis	General-purpose output 1	
	Y177		Y157		General-purpose output 2	
	Y178		Y158	5 axis	General-purpose output 1	
	Y179		Y159		General-purpose output 2	
	Y17A		Y15A	6 axis	General-purpose output 1	
	Y17B		Y15B		General-purpose output 2	
	Y17C		Y15C	7 axis	General-purpose output 1	
	Y17D		Y15D		General-purpose output 2	
	Y17E		Y15E	8 axis	General-purpose output 1	
	Y17F		Y15F		General-purpose output 2	

Chapter 7

Setting Tool Configurator PM

7.1 Connection With Computer



Install the Configurator PM on a computer, and connect it to the tool port of the FPΣ control unit like the above example as well as a programming tool.
For the FP2, connect to the tool port of the FP2 CPU unit.

7.2 Functions of Configurator PM

7.2.1 Overview

The Configurator PM is the Windows®-compliant setting software for our FP2/FPΣ Positioning Unit RTEX.

Copy & Paste
Copies and pastes the data you are editing into Microsoft® Excel, etc.
Also, pastes the position data calculated in Microsoft® Excel into Configurator PM.

Parameters and data transfer
Transfers the setting parameter or positioning data to the positioning unit RTEX.
Also, reads the parameters or positioning data within the positioning unit RTEX.

Batch checking of parameters and data
Checks the contents of parameters and positioning data all at once.
Jumps to the place automatically if there are parameters or data out of the range.
Also, this function is automatically executed when sending parameters or positioning data to the positioning unit RTEX.

Verify function
Verifies the parameter or positioning data you are editing with the files on the disk or the settings values in the positioning unit RTEX.
You can jump the cursor to the data with differences from the dialog of the result of verification.

Search and Replace functions
The search or replacement for data item each is possible. Twenty search strings and twenty replace strings can be memorized, so it is convenient for the repeated search or replacement.

Showing comments for all parameters and positioning data
Shows the guidance for all parameters and positioning data when making the settings.

Up to 100 one-byte characters of data comments can be input.
Up to 100 one-byte characters (50 two-byte characters) of comments can be input for the positioning data of 1 table each.
It is useful for the revision or the control of programs.
However, the comments cannot be stored within the positioning unit RTEX.

Tool operation
The tool operation enables to check the operation at the time that the system is installed or the operation of setting parameters without any ladder program.
Also, the teaching function is provided, which reflects the current position to the movement amount of data item.

7.2.2 Basic Specifications

Operating environment

Applicable OS	Windows®XP Windows® 7 (32-bit edition/64-bit edition) (Note) Windows® 8 (32-bit edition/64-bit edition) (Note) Windows® 8.1 (32-bit edition/64-bit edition) (Note)
Required HDD capacity	20MB or more
Recommended CPU	Pentium 200MHz or higher
Recommended resolution	800 * 600 or more
Recommended memory	64MB or more (Depending on OS)
Recommended display colors	256 colors or more

(Note): Available since Configurator PM Ver.1.22.

Application specifications

No. of characters of data comment	100 bytes/table
No. of histories of search/replace strings	20 each

7.3 Installing Configurator PM

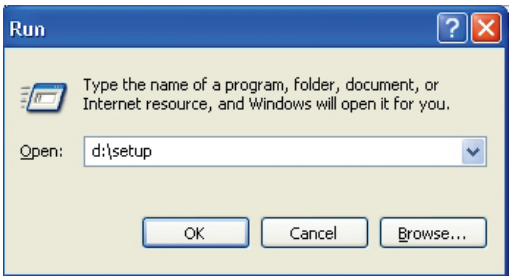
Procedure for installing Configurator PM in a personal computer
The Configurator PM is installed in a personal computer using the procedure outlined below.
For Windows® 2000, please be aware that the Configurator PM cannot be installed unless you log in at the Administrator level when booting the system

1. Exit any applications currently running.
If there are any applications currently running, exit them.

2. Insert the setup CD.
Insert the Configurator PM setup CD in the CD drive.

3. Select “Run”.
Click on the “Start” button at the lower left of the screen, or press the Ctrl + ESC keys to display the start menu of Windows® Operation System. Select “Run”.

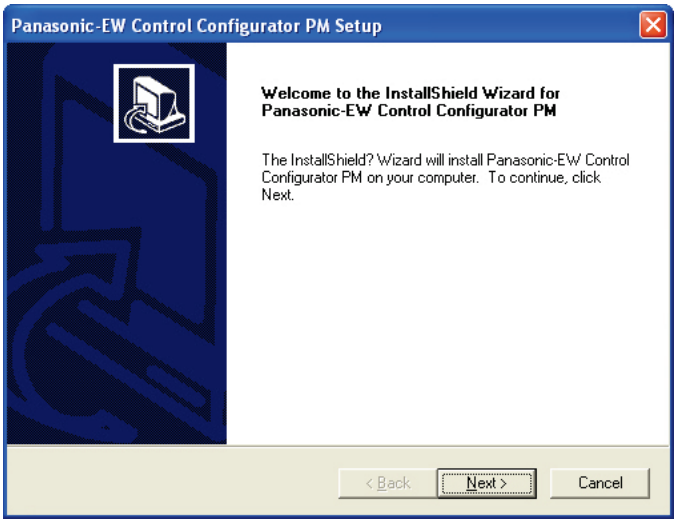
4. Enter the name of the file on which the function is to be run.
When “Run” is selected, the dialog box shown at the left is displayed. Enter **d:\setup.exe** and click on the [OK] button.



Note:
The drive name “d” varies depending on the computer configuration.

5. A confirmation message is displayed.

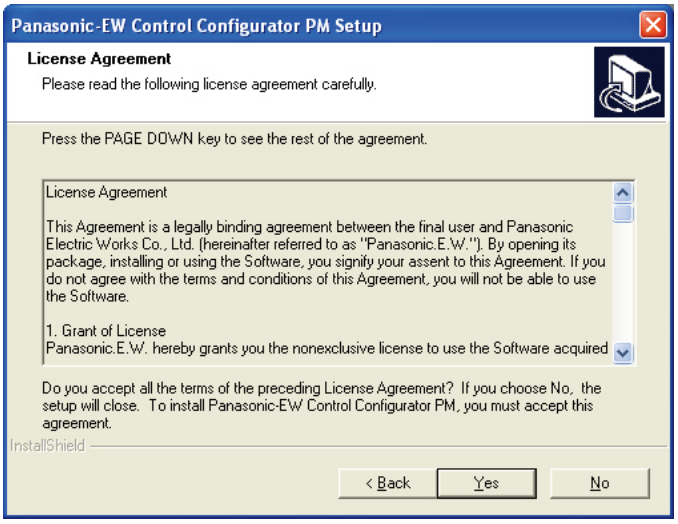
When the setup program is booted, a confirmation dialog box is displayed. Confirm the contents and click on the [Next] button. To interrupt the installation, click on [Cancel].



6. Confirm the licensing agreement.

The licensing agreement confirmation box is displayed. If you agree to all of the items in the displayed license agreement, click on [Yes].

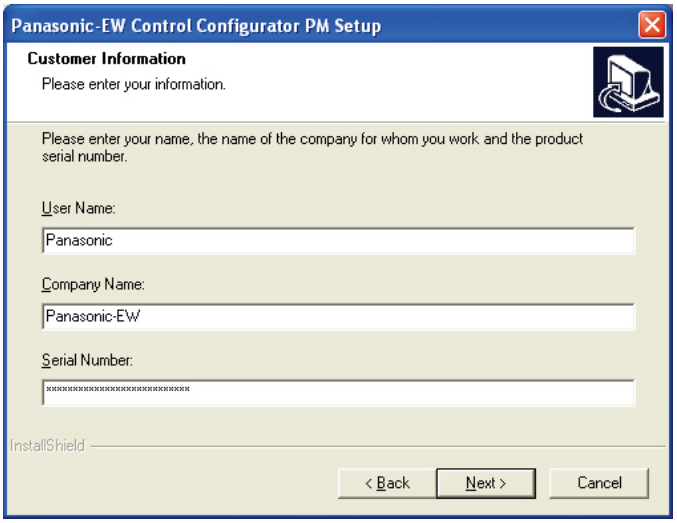
The setup process begins.



7. Register the user information.

A user information dialog box is displayed. Fill in the [User Name], [Company Name] and [Serial Number] items, and click on the [Next] button.

The serial number is noted on the user card included in the Configurator PM package. Make sure it is entered correctly.



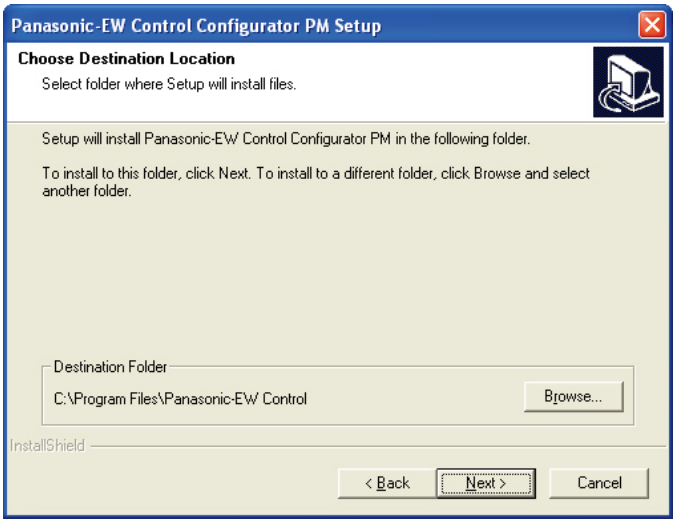
The contents entered here can be confirmed under “Version Information” on the splash screen, and in the Help function, when the Configurator PM is booted.

8. Select the installation destination.

A dialog box is displayed where the folder to which the Configurator PM is to be installed can be confirmed. To install the program in the displayed folder, click on the [Next] button.

The standard destination is "C:\Progam Files\Panasonic-ID SUNX Control".

To install the program in a different folder, click on the [Browse] button and specify a folder.

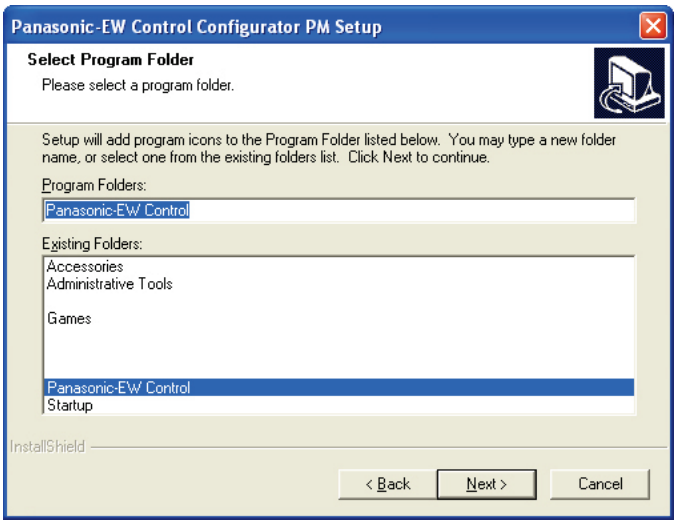


9. Select the program folder.

A dialog box is displayed where the program folder name can be confirmed. To use the displayed folder name, click on the [Next] button.

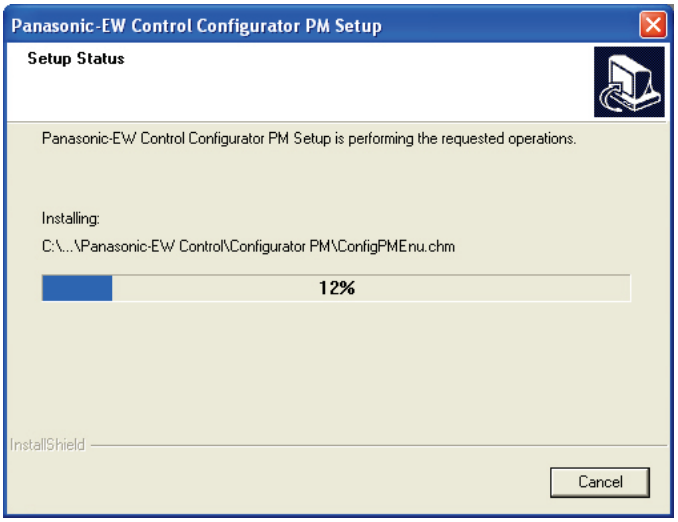
The standard folder name is “Panasonic-ID SUNX Control”.

To use a different folder name, simply enter that name.



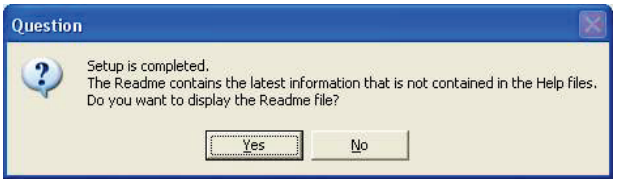
10. The installation process begins.

A message is displayed on the screen indicating that the installation is in progress, and the Configurator PM setup begins.

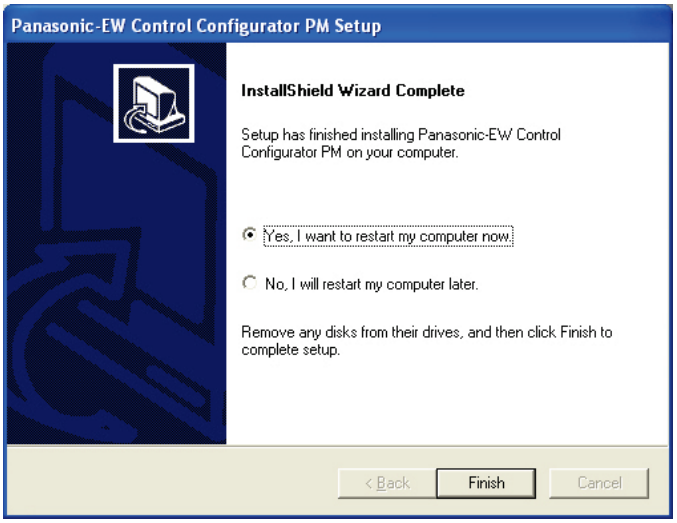


11. Display the Readme file.
When the setup process has been completed, a dialog box showing the completion is displayed.

The latest information is described in the Readme file.
Click on [Yes].



12. Reboot the computer.
When all of the process has been completed, a dialog box is displayed, confirming that the computer will be rebooted.
Select either radio button, reboot at once or reboot later, and click on [Finish].

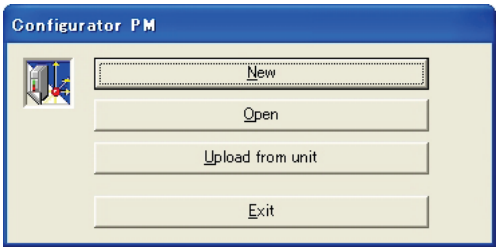


Reference:
The above group icon is displayed only when the installation completed. The procedures of the start-up, refer to the sections of “Starting Configurator PM” and “Exiting Configurator PM”.

Note:
Never eject the CD during the installation process.

7.4 Starting Configurator PM

Click the [Start] button on Windows, and click [Program], [Panasonic-ID SUNX Control] and [Setting software] in the order. And then click [Configurator PM]. The following dialog is shown.



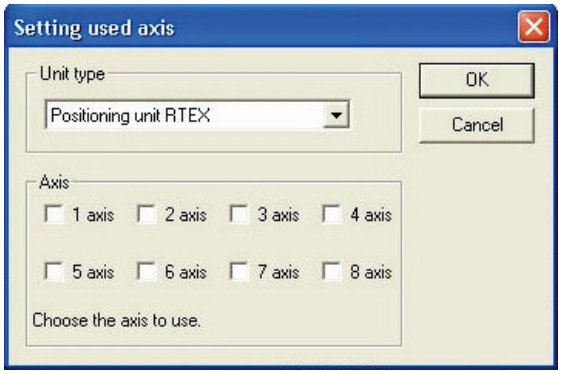
[New]	Create a new setting data for the positioning unit RTEX.
[Open]	Read the existing setting data.
[Upload from Unit]	Read the setting data of the positioning unit RTEX.
[Exit]	End this software.

7.5 Treating Files

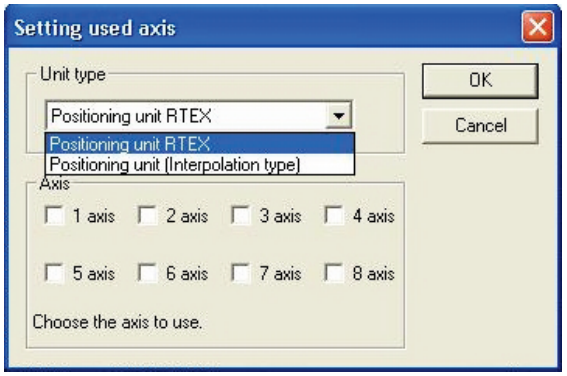
7.5.1 New

Create a new file.

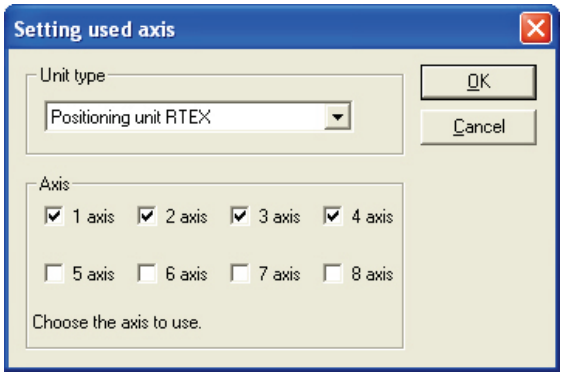
1. Select [File] → [New] in the menu bar, or click [New file] icon in the toolbar. The [Select axes] dialog is shown.



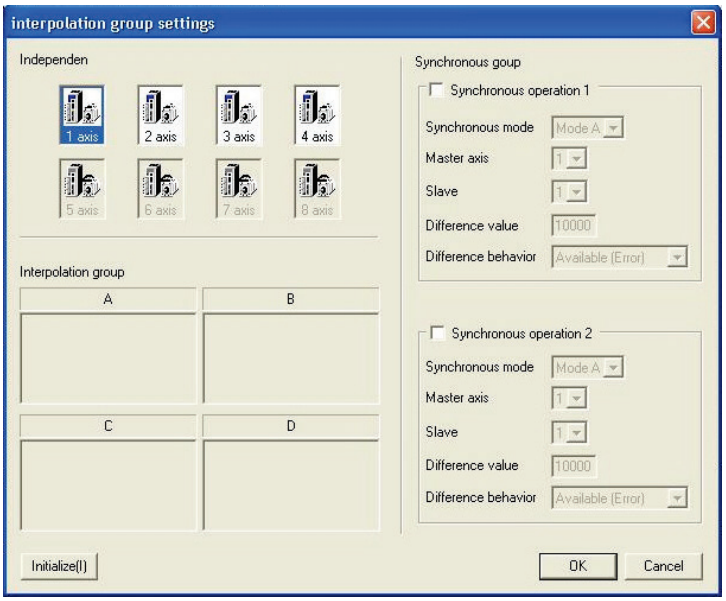
2. Select a unit type to be used.



3. Check the axes to use, and click [OK].

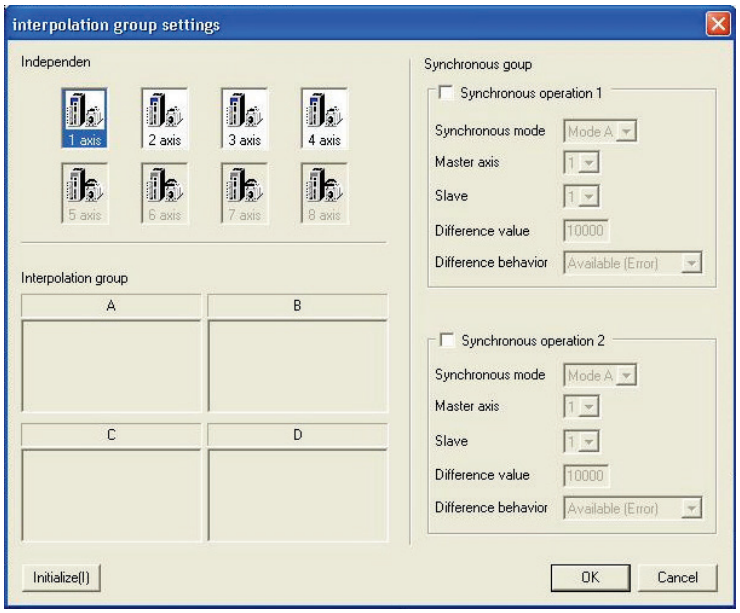


4. The [Interpolation group settings] dialog is shown. Set the grouping that the interpolation operation is executed for the selected axes in the above setting.

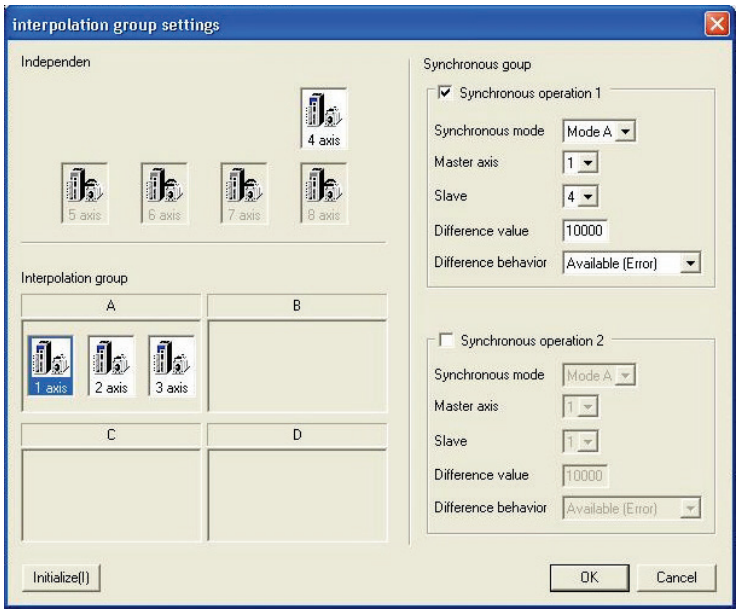


Independent	The area of the axes to be used as independent axes without performing the interpolation operation.
Interpolation group	The area of the groupings of the axes to perform the interpolation operation. Up to 4 groups can be specified.
Synchronous group	The area to be used for setting the synchronous operation.
Synchronous operation 1	It is used to set the synchronous operation group 1. Check the box to perform the synchronous operation.
Synchronous operation 2	It is used to set the synchronous operation group 2. Check the box to perform the synchronous operation.
Synchronous mode	It is used to set the synchronous operation mode. Select either Mode A or B.
Master axis	It is used to set the master axis for performing the synchronous operation.
Slave axis	It is used to set the slave axis for performing the synchronous operation. The slave axis can be specified for an independent axis only.
Difference value	It is used to set the maximum value of the difference between the master axis and the slave axis during the synchronous operation.
Difference behavior	It is used to set the operation to be performed when the difference between the master axis and slave axis exceeded the difference value.
Initialize	It is used to initialize the setting for the interpolation group and the synchronous operation.
OK	Determine the allocation of the interpolation groups.
Cancel	Back to the previous setting for the axes to use.

5. Drag the axis icon at the top of the window with the mouse and drop it in any area of the groups (A to D) at the bottom of the window to determine the axes of the interpolation groups.



6. To perform the synchronous operation, check the synchronous operation and specify each setting.



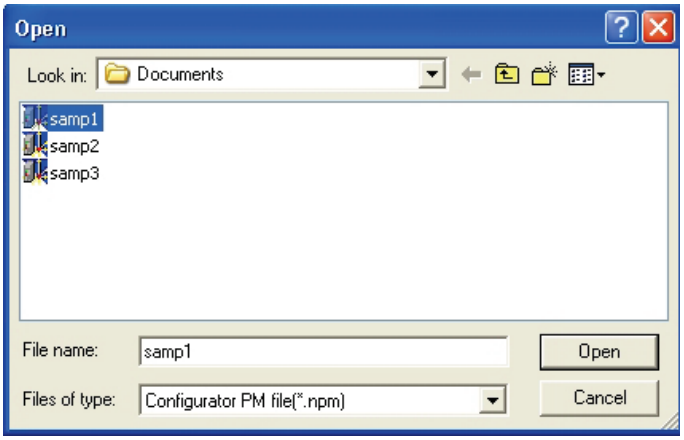
Clicking [OK] determines the interpolation group.

7. The data setting screen is shown, which enables the setting.

7.5.2 Reading from Files

Read the parameter settings or data settings from files.

1. Select [File] → [Open] in the menu bar, or click [Open] icon in the toolbar. The following dialog is shown.



2. Select the drive where the file is saved in the [Location of File] box.

3. Select the file name in the box listing the folders and files under the [Location of File] box.
If the file you want to read is not indicated, double-click the folder name where the file is saved.
Double-click the sub-folder names until the sub-folder where the file is saved is open.

4. Click the file name.
The following contents are recorded in the positioning setting file (* npm) that can be used in this software.

- Axis information
- Parameter settings
- Data settings
- Data comments

5. Click [Open].

Key Point:
Click the file name indicated at the bottom of the [File] menu to open the file that was previously active

7.5.3 Saving Files

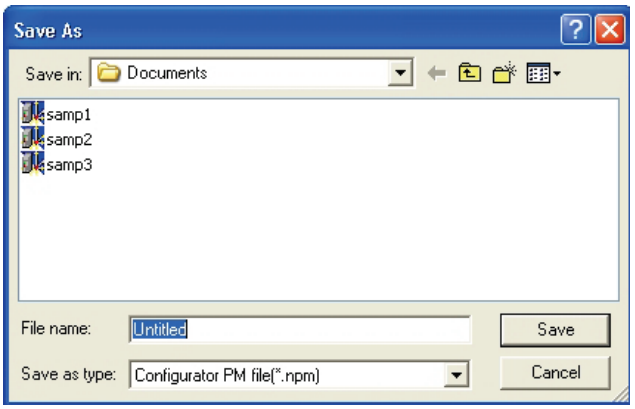
Save the parameter settings or data settings in files.
The contents saved in files are axis information, parameter settings, data settings and data comments.

1. The following methods are available to save files.
(The operation procedures and the behaviors of this software differ depending on the case of overwrite save and the one saves as a new file.)

Saving a file by overwriting an existing file.
Select [File] => [Save] in the menu bar, or click the [Save] icon in the toolbar.

Saving a file by naming a new name.
Select [File] => [Save As] in the menu bar.

When saving a file by overwriting an existing file, the operation completes when the function is selected.
When saving a file by name a new name, the following dialog is shown.



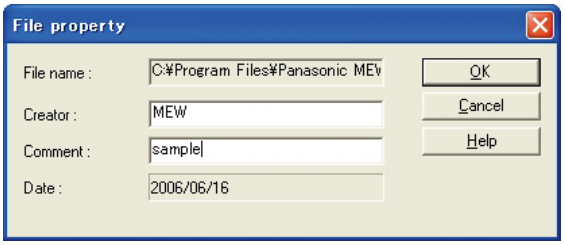
2. Input a new file name in the [File name] box.

3. Click [Save].

7.5.4 Setting File Properties

Set the property of a file (creator and comment).

1. Select [File] => [File property] in the menu bar to specify the file property.
The following dialog is shown.



2. Input the creator and comment, and click [OK].
Up to 10 one-byte characters (5 two-byte characters) for the creator and 40 one-byte characters (20 two-byte characters) for the comment can be input.

7.6 Exiting Configurator PM

Select [File] → [Exit] in the menu bar to quit the Configurator PM.

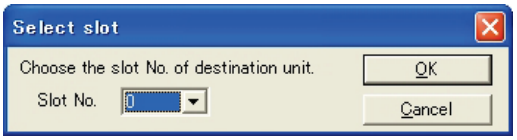
If the file is not unsaved, a message asking for the save is shown.
- Click [Yes] to save the file.
- Click [No] to end the Configurator PM without saving the file.

7.7 Connection to Positioning Unit

7.7.1 Selecting Slot Number

When accessing the positioning unit RTEX in the Configurator PM, specify the slot number that the positioning unit RTEX is installed in advance.

Select [Online] → [Select slot] in the menu bar. The following dialog is shown.



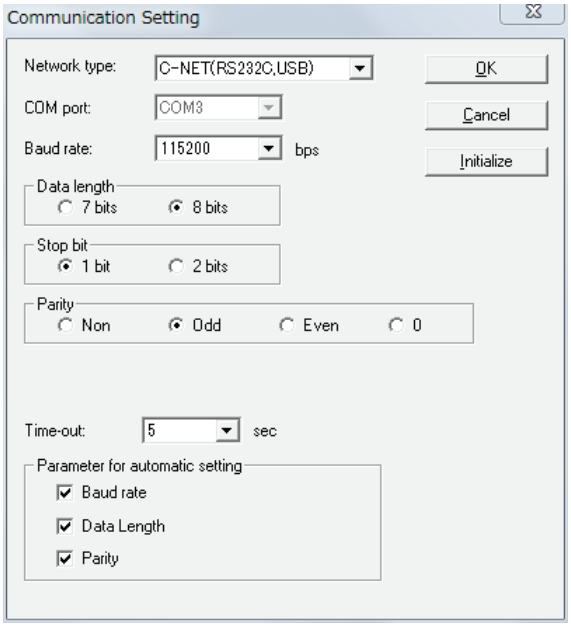
The slot numbers defined vary depending on the type of PLCs. See below.

PLC	Slot No.
FPΣ	The positioning unit RTEX is installed on the left side of the CPU unit, and defined as below. Expansion unit 1 : Slot No. 0 Expansion unit 2 : Slot No. 1 Expansion unit 3 : Slot No. 2 Expansion unit 4 : Slot No. 3
FP2	The positioning unit RTEX is installed on the CPU unit with the motherboard. The slot number for the unit installed on the right side of the CPU unit is the slot number 0, and then the slot number varies depending on the installed position of the motherboard.

7.7.2 Communication Settings

Set the condition to communicate with the PLC that the positioning unit RTEX has been installed.

Select [Option] → [Communication settings] in the menu bar. The following dialog is shown.



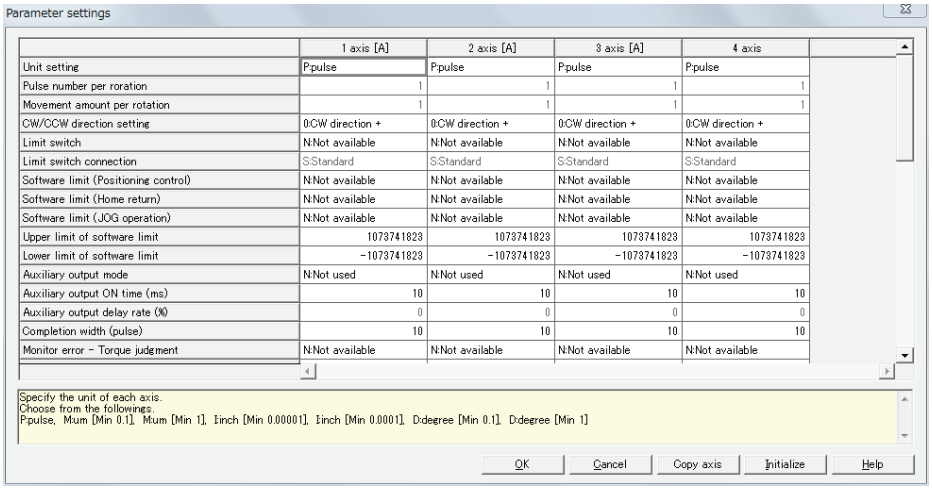
Name	Setting value	Default
Network type	Select C-NET (RS232C, USB).	-
Port number	Select a COM port to be used.	COM1
Baud rate	1200 to 115200 bps	9600
Data length	7 bits, 8 bits: Set either 7 bits or 8 bits to send 1 byte.	8 bits
Stop bit	1 bit, 2 bits	1 bit
Parity	None, Odd, Even	Odd
Timeout	Set the communication timeout time with PLC (0 to 60 seconds).	5 seconds
Automatic communication settings	When the communication condition is different from the PLC, check the items to search the matched conditions. If all items are not checked, the communication condition is not automatically searched.	All items are checked.

7.8 Parameter Settings

Set the initial operation for the positioning unit RTEX.

1. Select [Set axis] → [Parameter settings] in the menu bar, or click the [Parameter setting] icon in the toolbar.

2. The parameter setting dialog is shown. Set the parameters.

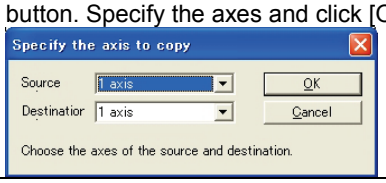


Setting items

Parameter name	Description
Unit setting	The unit to be used for setting each axis.
Pulse number per rotation	The pulse number per rotation. (It should be cancelled down with the movement amount per rotation.)
Movement amount per rotation	The movement amount per rotation. (It should be cancelled down with the pulse number per rotation.)
CW/CCW direction setting	The directions of CW and CCW. CW+: + direction is CW. CCW+: + direction is CCW.
Limit switch	Enable/disable the limit switch.
Limit switch connection	The connections of the + direction limit switch and - direction limit switch. Standard: + direction limit is CWL. - direction limit is CCWL. Reverse connection: + direction limit is CCWL. - direction limit is CWL.
Software limit (Positioning control)	Enable/disable the software limit in the positioning control.
Software limit (Home return)	Enable/disable the software limit in the home return.
Software limit (JOG operation)	Enable/disable the software limit in the JOG operation.
Upper limit of software limit	The upper limit value of the software limit.
Lower limit of software limit	The lower limit value of the software limit.
Auxiliary output mode	Enable/disable the auxiliary output contact and auxiliary output code.
Auxiliary output ON time (ms)	The time that the auxiliary output contact is ON.

Parameter name	Description
Auxiliary output delay ratio (%)	When setting the auxiliary output to Delay mode, output is performed at the ratio (%) specified in this area.
Completion width(pulse)	The width of the completion of command operation.
Monitor error – Torque judgment	The judgment operation of the torque command for the motors controlled by the AMP of each axis. Not available: Not perform the torque judgment. Available (Warning): If the torque of the AMP exceeded the judgment value, a warning occurs.
Monitor error – Torque judgment value (%)	The torque command value of the motors controlled by the AMP of each axis.
Monitor error - Judge the actual speed	The judgment operation for the actual speed of the motors controlled by the AMP of each axis. Not available: Not perform the actual speed judgment. Available (Error): If the actual speed of the AMP exceeded the judgment value, an error occurs. Available (Warning): If the actual speed of the AMP exceeded the judgment value, a warning occurs.
Monitor error – Actual speed judgment value	The actual speed of the motors controlled by the AMP of each axis.
Home return – Setting code	The pattern of the home return.
Home return - Torque value (%)	When using the stop-on-contact method, it is regarded as a criterion for judging the home return once the torque value of the AMP exceeded the setting value in this area by the stop-on-contact.
Home return - Judgment time (ms)	When using the stop-on-contact method, it is regarded as a criterion for judging the home return once this set time has passed after the torque value of the AMP exceeded the stop-on-contact torque value.
Home return – Direction	The operating direction of the home return.
Home return – Acceleration time	The acceleration time in the home return.
Home return – Deceleration time	The deceleration time in the home return.
Home return – Target speed	The target speed in the home return.
Home return – Creep speed	The speed to search the home position after the proximity input.
Home return - Coordinate origin (pulse)	Current value after the completion of home return.
JOG operation - Acceleration/Deceleration pattern	The acceleration/deceleration type in the JOG operation.
JOG operation - Acceleration time (ms)	The acceleration time in the JOG operation.
JOG operation - Deceleration time (ms)	The deceleration time in the JOG operation.
JOG operation - Target speed	The target rate in the JOG operation.
Emergency stop deceleration time (ms)	The deceleration time when the emergency stop is requested by the input contact.
Limit stop deceleration time (ms)	The deceleration time for the deceleration operation when the limit is input.
Error stop deceleration time (ms)	The deceleration time for the deceleration operation when an error occurs

Parameter name	Description
J point control - Acceleration/Deceleration pattern	Acceleration pattern in the J point (speed point) operation.
J point control - Acceleration time (ms)	Acceleration time in the J point (acceleration point) operation.
J point control - Deceleration time (ms)	Deceleration time in the J point (acceleration point) operation.
J point control - Target speed	Target speed in the J point (acceleration point) operation.
Pulser operation setting code	The pulser input (1 to 3) in the pulser operation.
Pulser input method	Input method in the pulser operation
Pulser operation ratio numerator	No. of movement pulse is calculated by multiplying the No. of input pulse from the pulser by the ratio below. (Numerator of ratio of pulser operation)/(Denominator of ratio of pulser operation)
Pulser operation ratio denominator	
Pulser operation target speed	Maximum operation speed of pulser operation

OK	Update the parameter settings with the specified contents.
Cancel	Close this dialog without updating the parameter settings.
Copy axis	Specify the axes of the source and destination to copy the parameter setting between the axes. The following dialog is shown by clicking the [Copy axis] button. Specify the axes and click [OK]. 
Initialize	Initialize the parameter settings.
Help	Indicate the help for this function.

3. Click [OK] to determine the settings.

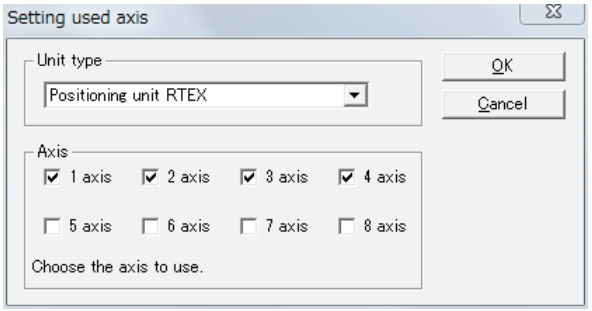
Click [OK] to determine the edited settings.

Click [Cancel] to cancel the edited settings.

7.9 Changing Axis Information

Change the used axes or the groups for the setting data being edited.

Select [Set axis] → [Change axis] in the menu bar. The following dialog is shown.



The editing dialog for the interpolation axis group is shown by clicking [OK] after selecting the used axes.

7.10 Setting Positioning Data

Set the various data to perform the positioning operation. They are set on the data setting screen.

This is an example for the interpolation group of 1 axis and 2 axis.

Positioning data editing screen

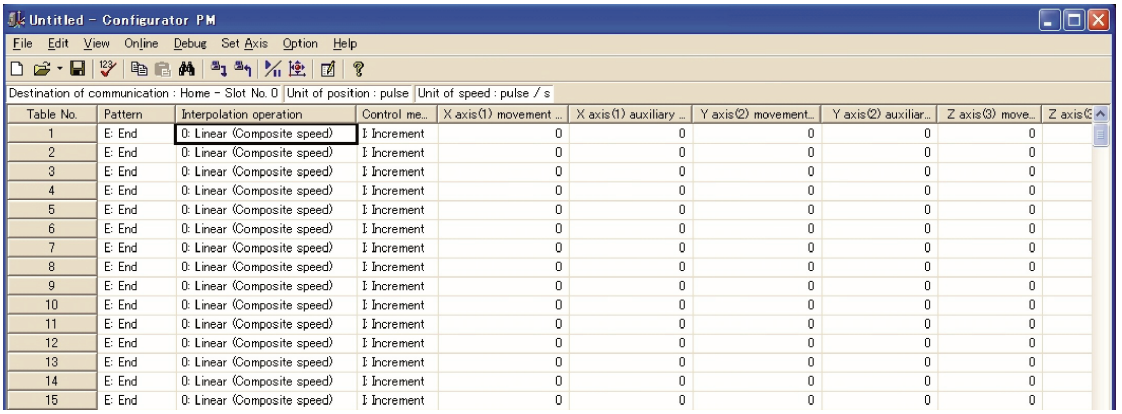


Table No.	Pattern	Interpolation operation	Control me...	X axis(1) movement ...	X axis(1) auxiliary ...	Y axis(2) movement...	Y axis(2) auxiliar...	Z axis(3) move...	Z axis(3
1	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
2	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
3	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
4	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
5	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
6	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
7	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
8	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
9	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
10	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
11	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
12	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
13	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
14	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	
15	E: End	0: Linear (Composite speed)	I: Increment	0	0	0	0	0	

Setting items

Parameter Name	Description
Operation pattern	Select one from the following operation patterns. ・End point control: Execute the trapezoidal control of only one table. ・Continuance point control : Execute the trapezoidal control continuously. Specify the end point at the end of the continuance point control. ・Pass point control: Execute the continuous speed change control. Specify the end point at the end of the pass point control. ・J point: Execute the speed control. Specify the end point (E point) at the end of the speed control (J point).
Interpolation operation	Select the operation of interpolation.
X-axis control method	Select either increment or absolute coordinate.
X-axis movement amount	Input the movement amount of X axis. The movement amount depends on the unit system specified in the parameter settings.
X-axis auxiliary point	It is used when the circular interpolation is selected, and ignored when the linear interpolation is selected. The details of the auxiliary points differ depending on the type of circular interpolation. ・Circular interpolation (Center point): The auxiliary point is used as the X axis of the center point. ・Circular interpolation (Pass point): The auxiliary point is used as the X axis of the pass point.

+

Parameter Name	Description
Y-axis movement amount	Input the movement amount of Y axis. The movement amount depends on the unit system specified in the parameter settings.
Y-axis auxiliary point	It is used when the circular (spiral) interpolation is selected, and ignored when the linear interpolation is selected. The details of the auxiliary points differ depending on the type of circular interpolation. ・Circular interpolation (Center point): The auxiliary point is used as the Y axis of the center point. ・Circular interpolation (Pass point): The auxiliary point is used as the Y axis of the pass point.
Acceleration/decelera-tion pattern	Select the pattern to accelerate/decelerate.
Acceleration time (ms)	Set the acceleration time. It is set in the ms unit.
Deceleration time (ms)	Set the deceleration time. It is set in the ms unit.
Interpolation speed	Set the interpolation speed.
Dwell time (ms)	Set the time from when the positioning command in the end point control completes till when the completion flag (Y contact) turns on. For the continuance point control, it is the wait time between each table. For the pass point control, the dwell time is ignored.
Auxiliary output	Set the auxiliary output code. When the auxiliary output is set to enable in the parameter settings, the auxiliary output code specified here is output.
Comment	Input the comments of tables. The comments are saved in the positioning setting file (*.npm) of the PC only. They are not saved in the positioning unit RTEX.

Note) The details for the settings in each parameter are indicated in the guidance bar.

7.11 How to Edit Positioning Data

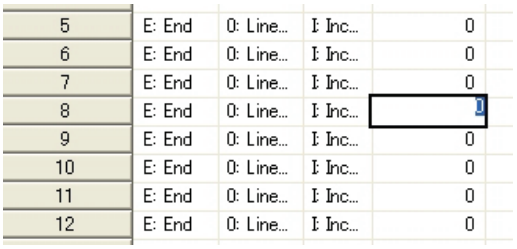
7.11.1 Inputting Positioning Data

The cursor on the positioning data editing screen can be moved by clicking, double-clicking with the mouse and with the arrow, Enter and Tab keys.

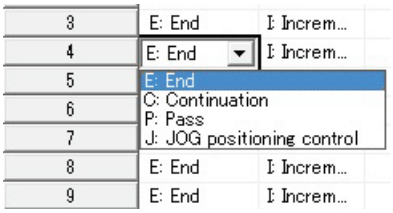
Move the cursor to the data item.
Using the arrow key enables to move the cursor to the adjacent cell in the direction of the arrow.

Using the mouse enables to move the cursor only by clicking the cell. If the cell you want to specify is not in the data editing screen, scroll the screen using the scroll bar until you can see the cell.

Input the data item.
Pressing any character input key or double-clicking the mouse on the cell you want to input data enables to input the data as below.

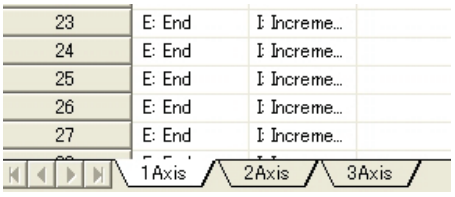


However, in the column with the combo box as below, the data item can be set only by inputting the initial character on the keyboard. For example, input [C] directly in the column of the pattern. Then the data item will be [C: Continuance point]. Also, it is possible to select with the arrow keys after the input is enable.



Press [Enter] key to determine. Press [ESC] key to cancel.

Click the tab of a sheet to change to the sheet.
When using the keyboard, press [Ctrl]+[Page Up] or [Ctrl]+[Page Down].

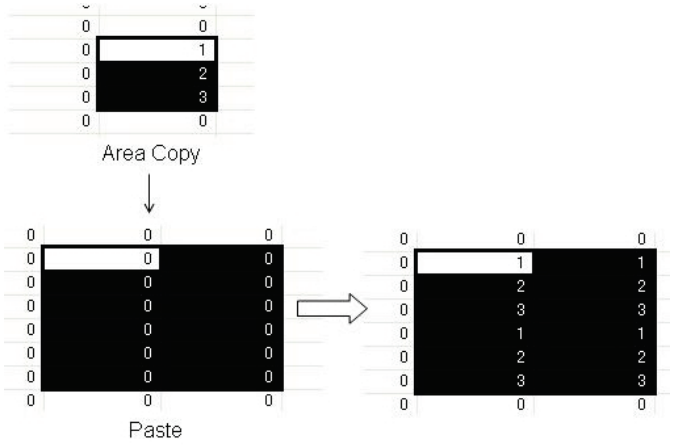


7.11.2 Copying Positioining Data

The data contents can be stored in the clipboard by setting the preference field of the cells on the positioning data editing screen. The data stored in the clipboard are pasted in Microsoft® Excel as well as the data editing screen of this software.

Note:
Pasting is not possible if the content in the clipboard is different from the attributes of the pasted area.
If values are contained in the contents of the clipboard, the values can be pasted up to the maximum digit number of the data item.

Key Point:
If the pasted area is different from the data in the clipboard, paste as shown below.



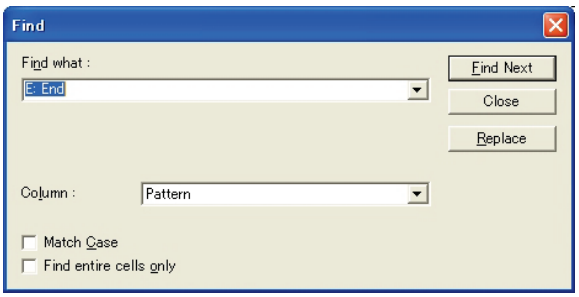
7.11.3 Selecting All Cells

All cells can be selected before the operations such as copy or paste are done.
It is convenient to copy all the settings of the specified axis to another axis.

Press [Ctrl] + [A] on the keyboard, or click the [Table No.] header on the upper-left corner of the data editing screen with the mouse to select all cells.

7.11.4 Searching Character Strings

1. Select [Edit data] → [Find] in the menu bar, or click the [Find] icon in the toolbar. The following dialog is shown.

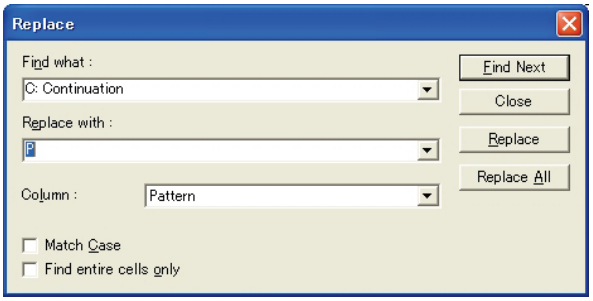


2. Input the character string to search in the [Character string to find] box, and select the target line (setting item).
3. Click [Next].

Key Point:
Press [Esc] to end the search.
Press [Replace] to change the replacement screen.

7.11.5 Replacing Character Strings

1. Select [Replace] → [Find] in the menu bar. The following dialog is shown.



2. Input the character string to search in the [Character string to find] box.
3. Input the character string after the replacement in the [Character string after replacement].
4. Select the target line (setting item).
5. Click [Next] and [Replace], or [Replace all].

7.11.6 Selecting Lines

The cells in a line or multiple lines can be selected before the operations such as copy or paste are done.

Click the [Table No.] header on the upper-left corner of the positioning data editing screen with the mouse to select the all the cells in one line. Drag the mouse up and down (holding down the left click) to select multiple lines.

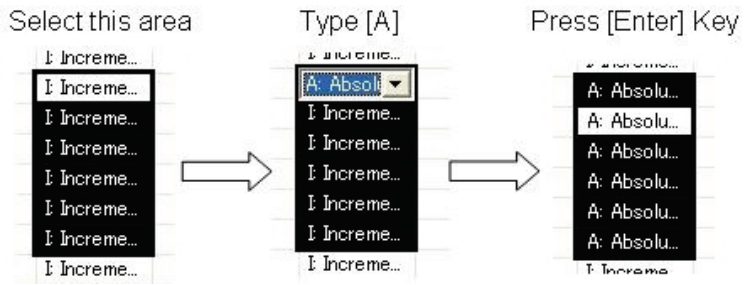
7.11.7 Selecting Colums

It is convenient for editing data collectively before the operations such as copy and paste, or for data item each.

Click the header on the upper corner of the data editing screen to select all the cells in one column. Drag the header holding down the left click on the mouse to select multiple columns.

7.11.8 Editing Data Items Collectively

Select a series of the data item in the same column and change them all at once.



1. Select the part to change with the mouse or the up and down arrows on the keyboard.
2. Input the data item. For example, press [A] on the keyboard to change the X-axis pattern from "I: Increment" to "A: Absolute".
3. Press the [Enter] key to determine the content of the data item.

The data item can be edited collectively in the above procedure.

Key Point:
When inputting the data item using the edit box (e.g. movement amount, acceleration time, etc.), input the data item directly using the numbered keyboard.

7.12 Customizing Software

Changing Column Width

Widen the column width to enable all the characters to be shown during data editing, or narrow it when the resolution of the PC you use is small. As the column width is saved when this software quits, the same width will be recreated at the next time of the start-up.

1. **The mouse cursor changes to a mark like "+" by moving the mouse cursor to the right end of the column you want to widen the width in the header on the upper corner of the data editing screen.**
2. **Move the cursor left and right with clicking down the left button of the mouse.**
3. **Release the left button of the mouse to finish the change in the column width.**

Key Point:

The column width returns to the one on start-up by double-clicking the mouse in the state of the above procedure 1.

- Showing/Hiding Toolbar

Set to show or hide the toolbar.

Select [View] → [Toolbar], and check or uncheck in the menu.

The toolbar is indicated with the check, and it is not indicated without the check.

- Showing/Hiding Status Bar

Set to show or hide the status bar.

Select [View] → [Status Bar], and check or uncheck in the menu.

The status bar is indicated with the check, and it is not indicated without the check.

- Showing/Hiding Parameter-Status Bar

Set to show or hide the parameter-status bar.

Select [View] → [Parameter-Status Bar], and check or uncheck in the menu.

The parameter-status bar is indicated with the check, and it is not indicated without the check.

- Showing/Hiding Guidance Bar

Set to show or hide the guidance bar on the main screen that provides guidance on various settings.

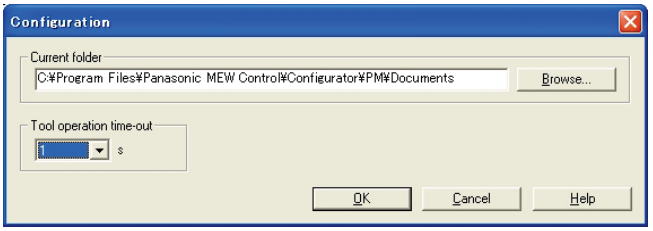
Select [View] → [Guidance Bar], and check or uncheck in the menu.

The guidance bar is indicated with the check, and it is not indicated without the check.

- Configuration setting

Select [Option] → [Configuration] in the menu bar. The following dialog is shown.

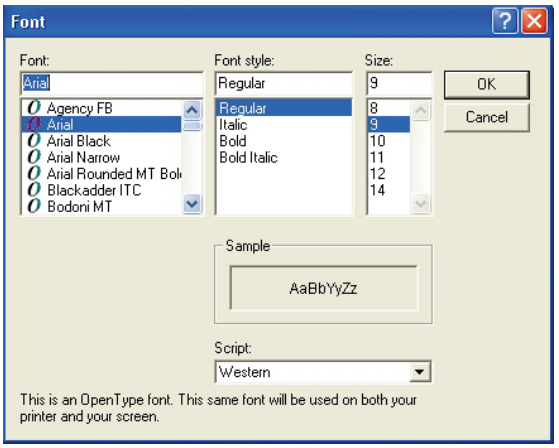
The current folder in the setting data file can be changed.



Current folder	Specify a current folder to be used for this software.
Tool operation monitoring time	Set the communication error detection time in the Tool operation.

- Setting Font

Select [Option] → [Font] in the menu bar. The following dialog is shown.



7.13 Checking Settings

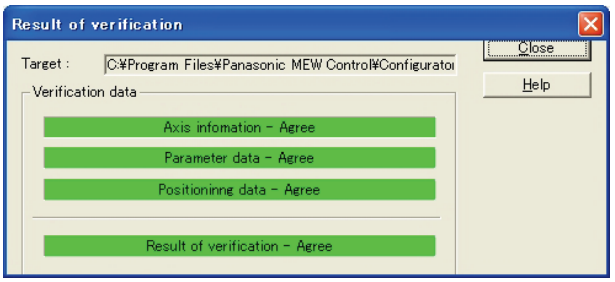
7.13.1 Checking Parameters and Data Values

Collectively check the parameter setting first and then the positioning data if the values are within the range. If an error is found in the parameter setting, the parameter setting dialog is automatically indicated and the position where the error exists is focused. Also, if an error is found in the positioning data, the cursor moves to the position where the error exists.

Select [Debug] → [Check Parameters and Data] in the menu bar, or click the [Check Parameter and Data] icon in the toolbar.

Verifying File Contents
Verify the file currently being edited, and the files on the disk or the information in the unit. The following procedure is for the verification with the files on the disk.
Verify the axis information, parameters and positioning data collectively.

Select [Debug] → [Verify] → [File] in the menu bar.
The dialog to select the file to verify is shown as below. Select the file to verify.
The contents of the file currently being edited are verified with the selected file and the result is indicated in the dialog below.



Click [Close] to close the dialog.

7.14 Transferring Setting Data

7.14.1 Uploading Setting Data from Positioning Unit RTEX

Read the parameters and positioning data of the positioning unit RTEX.

1. Make the connection between a PC and PLC, and configure the settings. Then, select [File] → [Upload from Unit] in the menu bar, or click the [Upload from Unit] icon in the toolbar.

2. Execute reading the unit.

 **Note:**
The process of reading may take for a few minutes. Click [Cancel] to stop the read.

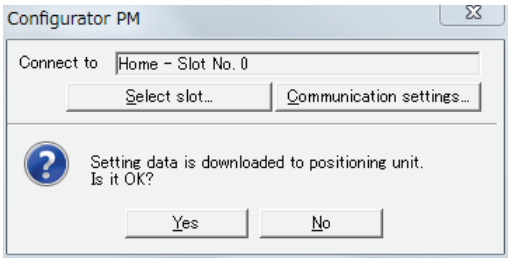
3. When the read completes successfully, a message asking if the data comment will be held is indicated.
- **Click [Yes] to leave all the comments set in the data.**
- **Click [No] to clear all the comments.**

 **Note:**
To execute the upload, previously determine the target positioning unit RTEX by the communication settings and selecting the slot number.
The data comments are not stored in the positioning unit RTEX. They are managed in the setting files of the PC.

7.14.2 Downloading Setting Data to Positioning Unit RTEX

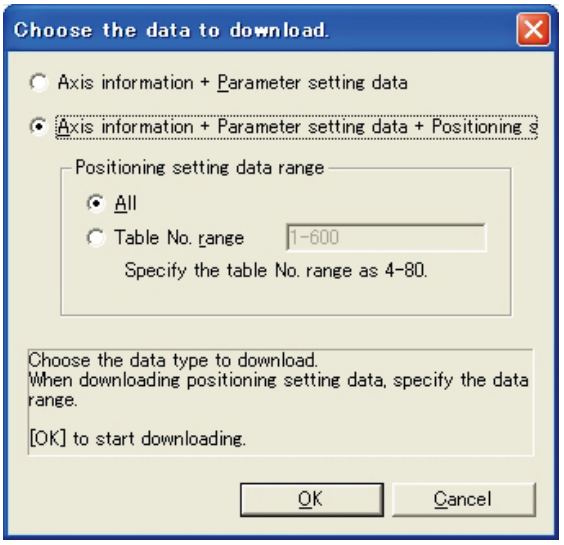
Transfer the setting parameters and positioning data to the positioning unit RTEX.

1. Make the connection between a PC and PLC, and configure the settings. Then, select [File] → [Download to Unit] in the menu bar, or click the [Download to Unit] icon in the toolbar. The dialog is shown as below.



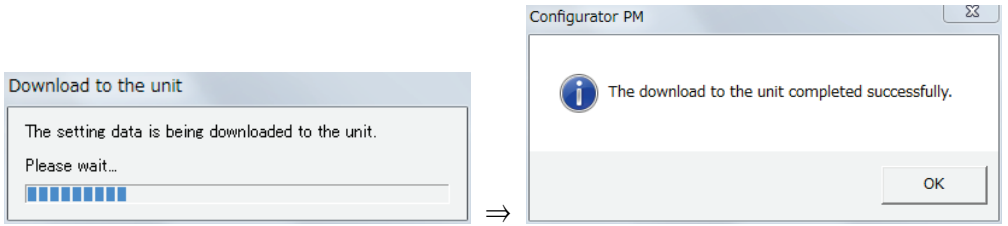
Connect to	Displays the slot number of a positioning unit RTEX to be transferred.
Select slot	The slot number of a positioning unit RTEX to be transferred can be changed.
Communication settings	Changes the communication setting.

2. Clicking [Yes] displays the following dialog.



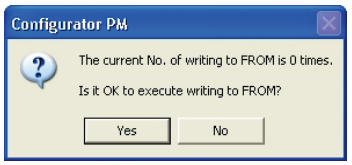
Axis information + Parameter setting data	Select this to download axis information and parameter only.
Axis information + Parameter setting data + Positioning setting data	Select this to download all setting data. The range of the positioning data to download can be specified.
Positioning setting data range	
All	Download all setting data.
Table number range	Download the positioning data in the specified range.
OK	Start downloading with the selected settings.
Cancel	Stop downloading.

3. Click [OK] to start the download to the positioning unit. The time required for the download depends on the range of the positioning setting data.



Note:
To execute the download, previously determine the target positioning unit RTEX by the communication settings and selecting the slot number.

4. Once the download completes, the following dialog is shown.



Clicking [Yes] indicates the following dialog and save the setting data in the FROM (Flash Memory) within the positioning unit RTEX. The saved setting data is automatically read when the power supply of the PLC turns on.

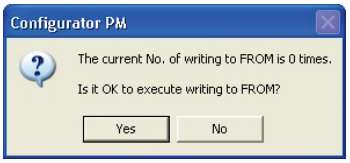
Click [No] not to write the setting data to the FROM. The downloaded data is erased when the power supply of the PLC turns off.

Note:
Writing to FROM is restricted up to 10000 times. The current number of write can be monitored with the data monitor.

7.14.3 Writing Settings to FROM

Save the setting data written in the positioning unit RTEX in the FROM (Flash Memory) within the positioning unit RTEX. The saved setting data is automatically read when the power supply of the unit turns on.

Make the connection between a PC and PLC, and configure the settings. Then, select [Tool] → [Write to FROM] in the menu bar. The following dialog is shown.



Clicking [Yes] indicates the following dialog and save the setting data in the FROM (Flash Memory) in the unit. The saved setting data is automatically read when the power supply of the PLC turns on.

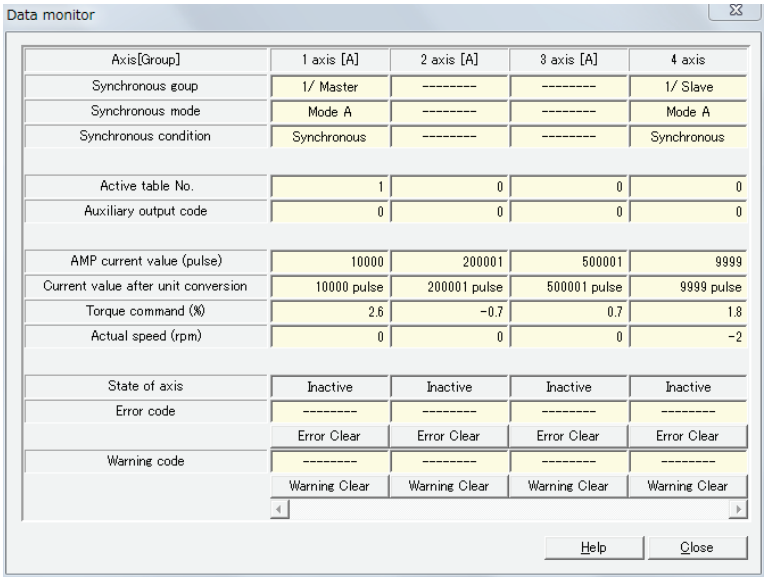
Click [No] not to write the setting data to the FROM. The downloaded data is erased when the power supply of the PLC turns off.

Note:
Writing to FROM is restricted up to 10000 times. The current number of write can be monitored with the data monitor.

7.15 Data Monitor

The internal data of the positioning unit RTEX can be monitored.

Make the connection between a PC and PLC, and configure the settings. Then, select [Online] → [Data Monitor] in the menu bar. The following dialog is shown.



Axis [Group]	The axis No. and group names to be monitored.
Synchronous group	Displays the current synchronous group.
Synchronous mode	Displays the current synchronous mode.
Synchronous condition	Displays the current synchronous state (synchronous or asynchronous).
Active table number	The table number that the positioning data is being executed or has completed.
Auxiliary output code	Auxiliary output code
AMP current value(pulse)	Monitor the value of feedback pulses.
Current value after unit conversion	Monitor the feedback value of the AMP after the unit conversion.
Torque command (%)	Monitor the torque command value of the AMP
Actual speed (rpm)	Monitor the actual speed (rpm) of the AMP.
State of axis	The operating states of axes or error and warning occurrences.
Error code	The latest error code when an error occurred.
Error clear	Clear the error by clicking this button, when an error occurred.
Warning code	Indicate the latest warning code when a warning occurs.
Warning clear	Clear the warning by clicking this button, when a warning occurred.
Help	Indicate the help regarding this function.
Close	Close this dialog.

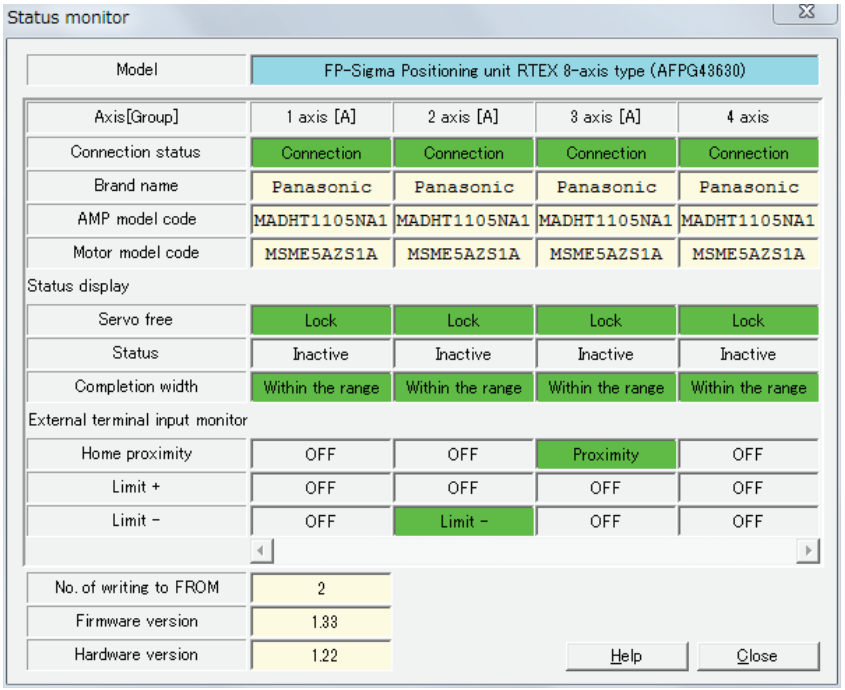
Note:

If an recoverable error occurred in the positioning unit RTEX, click [Error Clear] to clear the error.
If a warning occurred in the positioning unit RTEX, click [Warning Clear] to clear the warning.

7.16 Status Display

The states of the motors of each axis can be monitored.

Make the connection between a PC and PLC. Then, select [Online] → [Status Display] in the menu bar. The following dialog is shown.

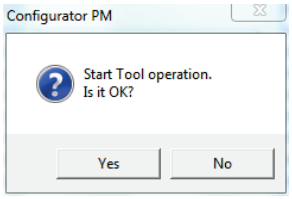


Model		The model name of positioning unit RTEX
Axis [Group]		The axis number and group names to be monitored.
Connection status		Monitor the connection statuses of each axis
Brand name		The individual brand names for each axis.
AMP model code		Obtain and display the model code of AMP.
Motor model code		Obtain and display the model code of a motor.
servo free		The state of the servo of the AMP whether it is locked or free.
Status		The operating states of axes
Completion width		The state of the deviation counter whether it is in the range of the imposition or out of the range of the imposition.
Home proximity		The state of the AMP input contact whether the home return is input or not.
Limit +		The limit + input state of the AMP input setting.
Limit -		The limit- input state of the AMP input setting.
Number of writing to FROM		The number of writing the setting data to FROM in the positioning unit RTEX.
Version	**Firmware**	The version of the positioning unit RTEX
	Hardware	
Help		Indicate the help regarding this function.
Close		Close this dialog.

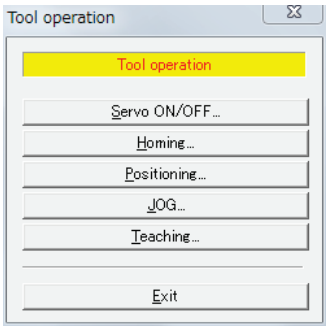
7.17 Tool Operation

As the positioning unit RTEX can activate without a ladder program in the tool operation, the operation can be checked quickly.

Select [Online] → [Tool operation] in the menu bar, and click the [Tool operation] icon in the toolbar. The following dialog is shown.



Clicking [Yes] displays the following tool operation dialog.



The followings are the operations that are selectable in the tool operation.

Servo On/off
Control the on/off state of the servo.

Home return
Move to the home position in the machine coordinate.

Positioning
Operate from the starting table number according to the settings of the data stored in the positioning unit RTEX.

JOG operation
The specified axis can be moved to the specified direction with the specified speed, while the operation command is on.

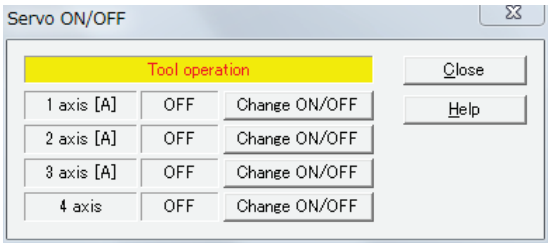
Teaching
Control the axis manually using the same operation as the JOG operation, and reflect the resulting positioning address on the data editing screen.

Note:
It is not possible to change the mode to the tool operation mode during the ladder operation of PLC.
If any communication error occurs during the tool operation, the positioning unit RTEX detects the error and stops automatically.
If the previous tool operation did not finish properly due to a communication error, etc., the tool operation mode will be cancelled forcibly when the next tool operation starts.

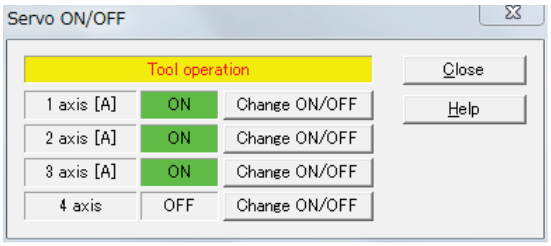
7.17.1 Tool Operation – Servo On/Off

Turn the servo on to make the motor be in the state that the servo is locked first in the operation of the servo motor.
Therefore, in the tool operation, set the servo to ON using this setting.

1. Click [Servo ON/OFF] in Tool operation dialog. The following dialog is shown.



2. Set the servo to on/off by clicking the [Change ON/OFF] for the equivalent axes.
If the servo is on for the 1 axis to 3 axis, the setting is as below.



3. Click [Close] to close this dialog after completing the servo ON for the axes operated in the tool operation. The tool operation dialog is automatically shown once the dialog is closed.

Note:
If the servo ON/OFF has been controlled using the ladder program before starting the tool operation, the state of the servo lock/servo free is also kept in the tool operation.

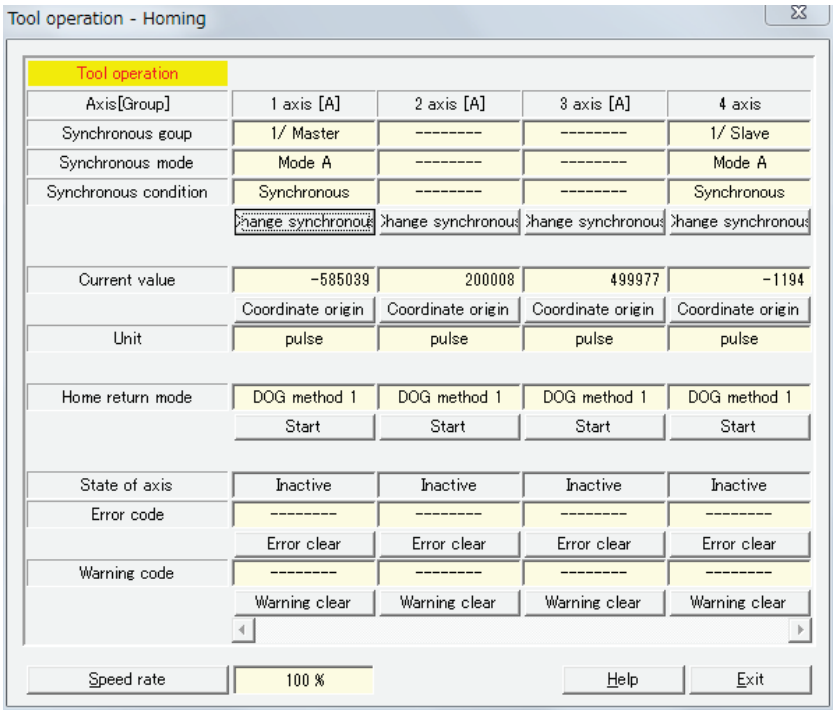
7.17.2 Tool Operation – Home Return

After the power supply of the positioning unit RTEX turned on, the zero (home) of the machine position (coordinate) does not always agree with the zero of the coordinate value in the positioning unit RTEX. Therefore, coordinate the home of the machine position with the home of the positioning unit RTEX. This setting is called Home return.

Note:

To perform the home return, the equivalent axes should be in the state that the servo is locked (servo ON).

1. Click [Home Return] in the tool operation dialog. The following dialog is shown.

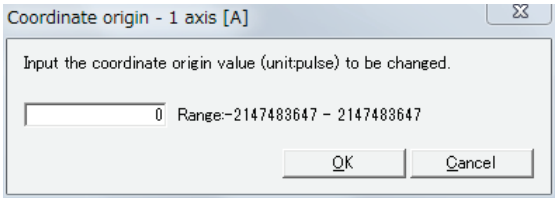


Axis [Group]	The axis numbers and group names to be monitored.
Synchronous group	Displays the current synchronous group.
Synchronous mode	Displays the current synchronous mode.
Synchronous condition	Displays the current synchronous state (synchronous or asynchronous). Click [Change synchronous] to display the dialog for changing the synchronous setting.
Current value	Monitor the feedback values after the unit system conversion for each axis.
Coordinate origin	Click [Coordinate origin] to display the dialog for inputting value to change the coordinate origin.
Unit	The unit of position for each axis specified in the parameter settings.
Home return mode	Indicate the contents of the home return setting code specified in parameters.

Start/Stop	Execute the operation to start/stop the home return. ・Click [Start] to execute the home return operation. The button name changes to [Stop]. ・Click [Stop] to execute the deceleration stop operation. The button name changes to [Start].
State of axis	The operating states of axes or error and warning occurrences.
Error code	The latest error code when an error occurred.
Error clear	Clear the error by clicking this button, when an error occurred.
Warning code	Indicate the latest warning code when a warning occurs.
Warning clear	Clear the warning by clicking this button, when a warning occurred.
Speed rate	The target speed of the home return specified in the parameter settings for each axis is regarded as 100%, and the operation is executed in the specified speed rate. Clicking [Speed rate] shows the dialog for inputting the value. The speed rate changed here is effective only in the tool operation, and it changes to the original speed rate automatically once the tool operation quits.

Note:
If an recoverable error occurred in the positioning unit RTEX, click [Error Clear] to clear the error.
If a warning occurred in the positioning unit RTEX, click [Warning Clear] to clear the warning.

2.Click [Coordinate Origin] to change the coordinate value after the home return operation.
The following dialog box is displayed. Enter the coordinate origin value to be changed.
The value can also be changed during the home return operation.



3. Execute the home return. Click [Start] for the axis to execute the home return.

4. Click [Close] to close the dialog.

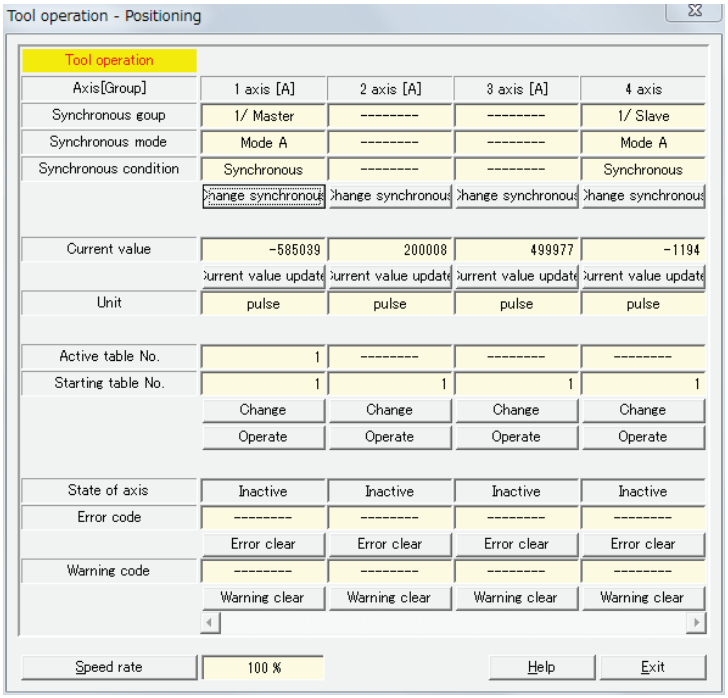
Note:
This dialog cannot be closed during the home return operation.

7.17.3 Tool Operation - Positioning

The test run is possible like actual positioning operations.
Specifying the starting table number enables to check if the positioning/interpolation from the starting table operates properly.

Note:
For the positioning operation, the setting data should be downloaded to the positioning unit in advance.
For the positioning operation, the equivalent axes should be in the state that the servo is locked (Servo ON).
The operations after the starting table number vary depending on the Operation patterns.

1. Click [Positioning] in the Tool operation dialog. The following dialog is shown.



Axis [Group]	The axis numbers and group names to be monitored.
Synchronous group	Displays the current synchronous group.
Synchronous mode	Displays the current synchronous mode.
Synchronous condition	Displays the current synchronous state (synchronous or asynchronous). Click [Change synchronous] to display the dialog for changing the synchronous setting.
Current value	Monitor the feedback values after the unit system conversion for each axis.
Current value update	Click [Current value update] to display the dialog for inputting value to change the preset value.
Unit	The unit of position for each axis specified in the parameter settings.
Active table number	Monitor the table number during the operation or when it completes.
Starting table number	The starting table number for the positioning control. Click [Change] to change the starting table number.

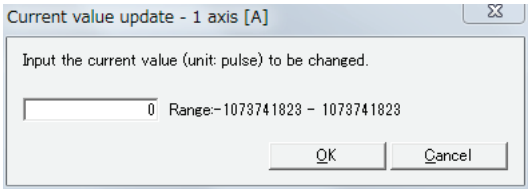
Operate/Stop	Execute the operation to start/stop the home return. ・Click [Operate] to execute the positioning operation. The button name changes to [Stop]. ・Click [Stop] to execute the deceleration stop operation. The button name changes to [Operate].
State of axis	The operating states of axes or error and warning occurrences.
Error code	The latest error code when an error occurred.
Error clear	Clear the error by clicking this button, when an error occurred.
Warning code	Indicate the latest warning code when a warning occurs.
Warning clear	Clear the warning by clicking this button, when a warning occurred.
Speed rate	The target speed of the home return specified in the parameter settings for each axis is regarded as 100%, and the operation is executed in the specified speed rate. Clicking [Speed rate] shows the dialog for inputting the value. The speed rate changed here is effective only in the tool operation, and it changes to the original speed rate automatically once the tool operation quits.

Note:
If an recoverable error occurred in the positioning unit RTEX, click [Error Clear] to clear the error.
If a warning occurred in the positioning unit RTEX, click [Warning Clear] to clear the warning.

2. Click [Change] in the starting table number field to specify the starting table number.
Specify the starting table number and click [Operate] to start the positioning operation.

Note:
- In the positioning unit RTEX, the positioning operation for the interpolation group is performed to request the start and stop for the smallest number of axes in the group.
- In the tool operation, the positioning operation for the interpolation group is performed by clicking [Operate] for any axes. However, due to the above specifications, a warning message is shown when any [Operate] button other than the one for the smallest axis number is clicked.

3. Click [Current value update] to change the current value.
The following dialog box is displayed. Enter the current value to be changed.
The value can also be changed during the positioning operation.



4. Click [Close] to close the dialog.

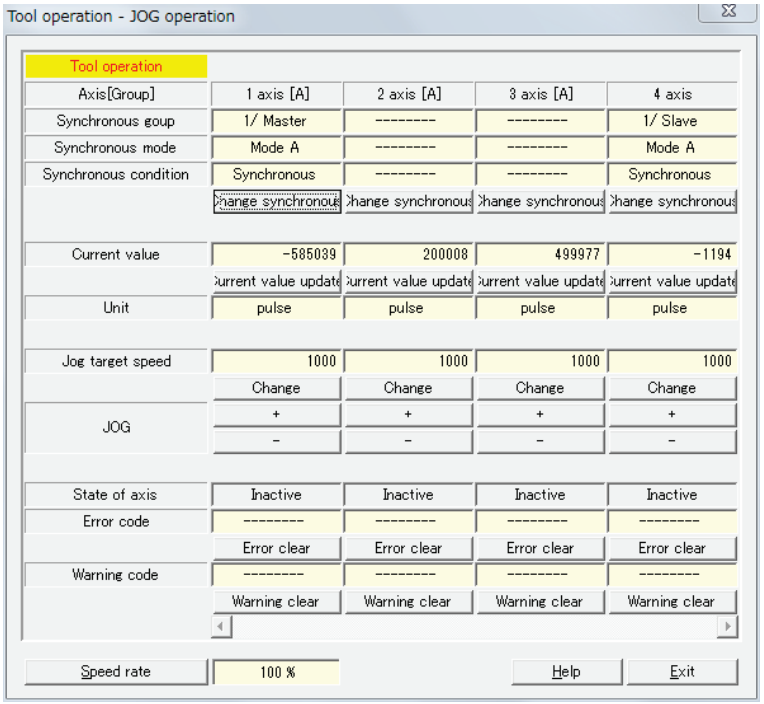
Note:
This dialog cannot be closed during the positioning operation.

7.17.4 Tool Operation – JOG Operation

Each axis can be operated manually using the tool operation.

Note:
To perform the JOG operation, the equivalent axes should be in the state that the servo is locked (servo ON).

1. Click [JOG operation] in the tool operation dialog. The following dialog is shown.



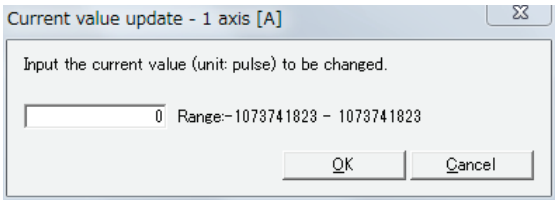
Axis [Group]	The axis numbers and group names to be monitored.
Synchronous group	Displays the current synchronous group.
Synchronous mode	Displays the current synchronous mode.
Synchronous condition	Displays the current synchronous state (synchronous or asynchronous). Click [Change synchronous] to display the dialog for changing the synchronous setting.
Current value	Monitor the feedback values after the unit system conversion for each axis.
Current value update	Click [Current value update] to display the dialog for inputting value to change the preset value.
Unit	The unit of position for each axis specified in the parameter settings.
JOG target speed	Monitor and display the target speed in the JOG operation. Click [Change] to change the target speed for the JOG operation.
JOG [+]	Click [+] to perform the forward rotation.
JOG [-]	Click [-] to perform the reverse rotation.
State of axis]	The operating states of axes or error and warning occurrences.
Error code	The latest error code when an error occurred.
Error clear	Clear the error by clicking this button, when an error occurred.

Warning code	Indicate the latest warning code when a warning occurs.
Warning clear	Clear the warning by clicking this button, when a warning occurred.
Speed rate	The target speed of the home return specified in the parameter settings for each axis is regarded as 100%, and the operation is executed in the specified speed rate. Clicking [Speed rate] shows the dialog for inputting the value. The speed rate changed here is effective only in the tool operation, and it changes to the original speed rate automatically once the tool operation quits.

Note:
If an recoverable error occurred in the positioning unit RTEX, click [Error Clear] to clear the error.
If a warning occurred in the positioning unit RTEX, click [Warning Clear] to clear the warning.

2. Click the JOG[+] for the JOG operation in the forward rotation. Click the JOG[-] for the JOG operation in the reverse rotation.

3. Click [Current value update] to change the current value.
The following dialog box is displayed. Enter the current value to be changed.
The value can be changed during the JOG operation as well.



4. Click [Close] to close the dialog.

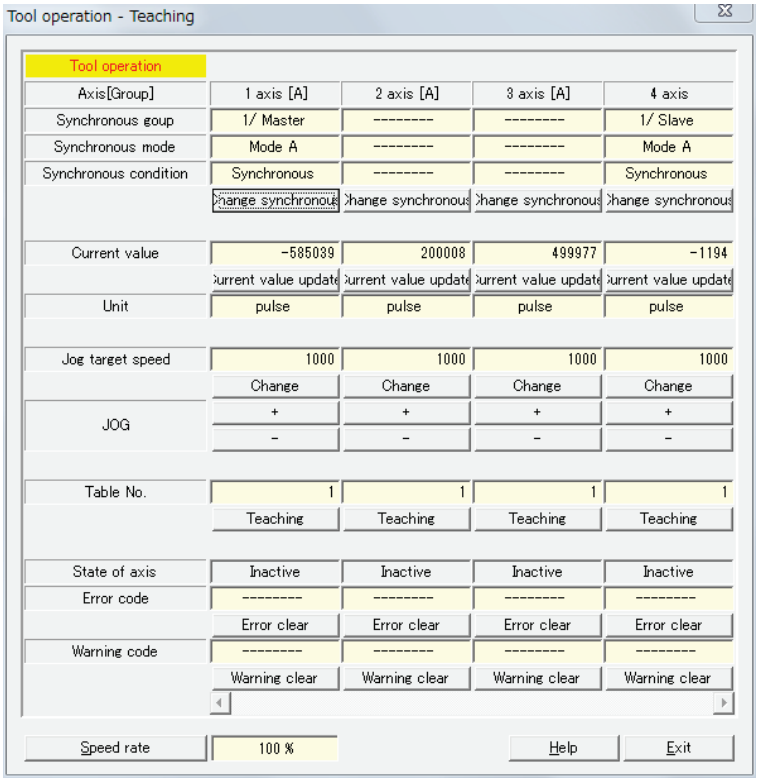
Note:
This dialog cannot be closed during the JOG operation.

7.17.5 Tool Operation - Teaching

Activate each axis manually by the tool operation, and register the positioning addresses where the axes stopped as the point data.

Note:
To perform the teaching operation, the equivalent axes should be in the state that the servo is locked (servo ON).

1. Click [Teaching] in the tool operation dialog. The following dialog is shown.



Axis [Group]	The axis numbers and group names to be monitored.
Synchronous group	Displays the current synchronous group.
Synchronous mode	Displays the current synchronous mode.
Synchronous condition	Displays the current synchronous state (synchronous or asynchronous). Click [Change synchronous] to display the dialog for changing the synchronous setting.
Current value	Monitor the feedback values after the unit system conversion for each axis.
Current value update	Click [Current value update] to display the dialog for inputting value to change the preset value.
Unit	The unit of position for each axis specified in the parameter settings.
JOG target speed	Monitor and display the target speed in the JOG operation. Click [Change] to change the target speed for the JOG operation.
JOG [+]	Click [+] to perform the forward rotation.
JOG [-]	Click [-] to perform the reverse rotation.

Table number	Indicate the table number to perform the teaching. Click [Teaching] to change the table number for the teaching and register the current value.
State of axis]	The operating states of axes or error and warning occurrences.
Error code	The latest error code when an error occurred.
Error clear	Clear the error by clicking this button, when an error occurred.
Warning code	Indicate the latest warning code when a warning occurs.
Warning clear	Clear the warning by clicking this button, when a warning occurred.
Speed rate	The target speed of the home return specified in the parameter settings for each axis is regarded as 100%, and the operation is executed in the specified speed rate. Clicking [Speed rate] shows the dialog for inputting the value. The speed rate changed here is effective only in the tool operation, and it changes to the original speed rate automatically once the tool operation quits.

 **Note:**

If an recoverable error occurred in the positioning unit RTEX, click [Error Clear] to clear the error.
If a warning occurred in the positioning unit RTEX, click [Warning Clear] to clear the warning.

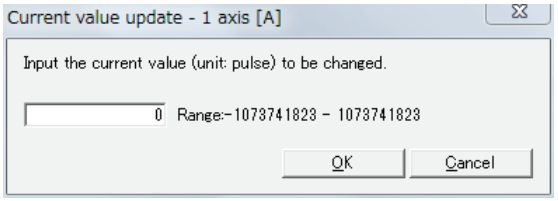
2. Click [Teaching] after stopping the axis at the desired position by the JOG operation, and input the table number to execute the teaching operation.

3. Click [OK] after inputting the table number. The current value is registered for the movement amount of the specified table number. Also, if the axis that the teaching operation is performed is the interpolation axis, the current value is registered for the movement amount of the equivalent coordinate in the interpolation group.

 **Note:**

- The control method for the table number that the teaching operation was performed is automatically changed to “Absolute”.
- The result of the teaching becomes effective once the tool operation quits and the setting data is downloaded to the positioning unit RTEX.

4. Click [Current value update] to change the current value.
The following dialog box is displayed. Enter the current value to be changed.



5. Click [Close] to close the dialog.

Note:
This dialog cannot be closed during the JOG operation.

Chapter 8

Automatic Operation (Position Control)

8.1 Basic Operation

Type of operations

The automatic operation is an operation mode to be perform a position control. For the position control, there are a single axis control and an interpolation control that starts and stops multiple axes simultaneously.

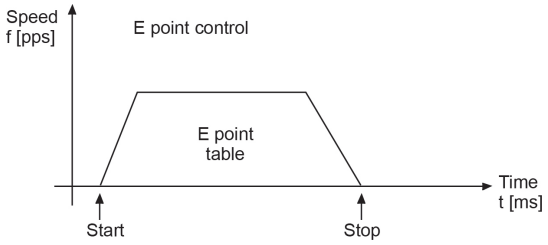
For the operations of the position control, there are the E point control that uses the positioning data of 1 table, the P point control and C point control that use multiple tables for the single axis control or interpolation control. Each operation is as mentioned below, and the acceleration time and deceleration time can be set individually. For the P point control and C point control, the E point should be set as the last table. Also, in the P point control and C point control, the operation done flag turns on after the last table was executed.

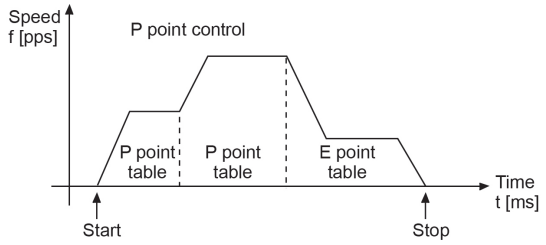
JOG positioning (J-point) control (i.e., speed control) is available in addition to P-point control, C-point control, and E-point control.

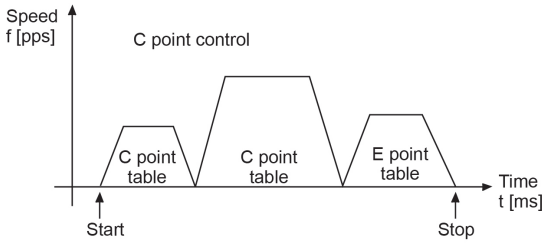
J-point control operates until the start contact of J-point positioning turns ON after the operation of the positioning unit starts, and the next positioning control will start when the start contact of J-point positioning turns ON.

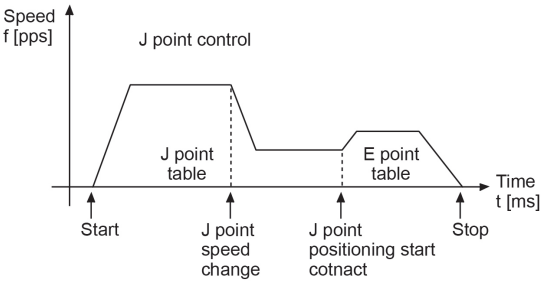
In J-point control, the operation done flag turns ON after the last table is executed.

J-point control can be used for a single axis only.

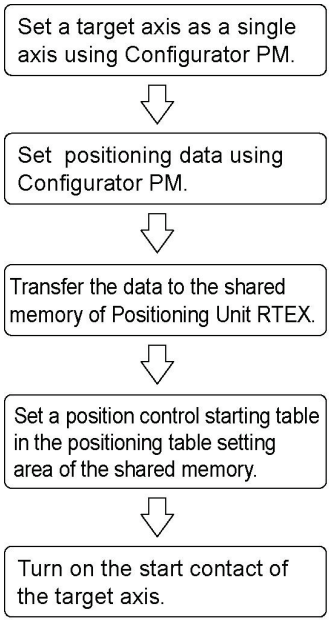




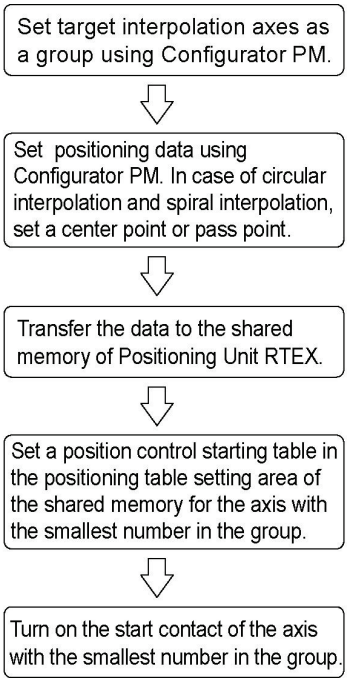




Operation flow of single axis control



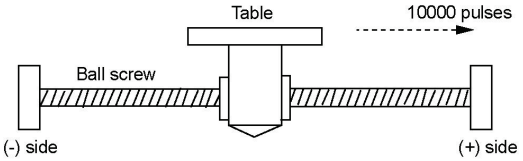
Operation flow of interpolation control



The procedures to set the positioning data and to start the position control are the same for the E point control, P point control and C point control. The operation of each control is determined according to the contents of the positioning data to be set.

8.1.1 Setting and Operation of E Point Control

The example below is the case of a single axis control when using the FPΣ with the positioning unit RTEX installed in the slot 0. The movement amount setting is the increment method, and the unit is set to pulse. When using the FP2, change the contact and flag numbers appropriately.

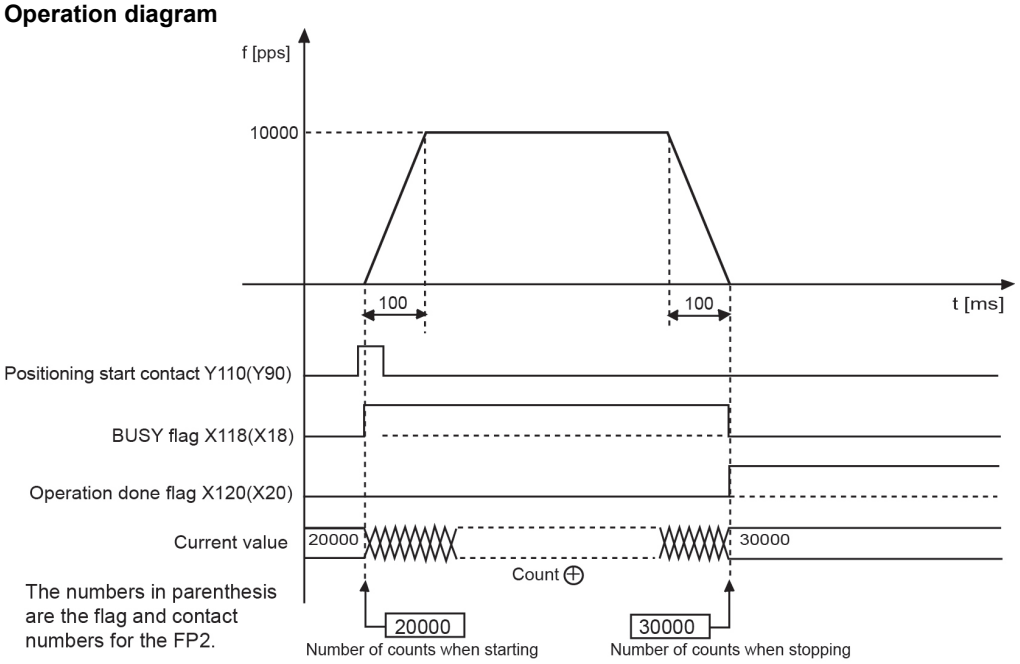


Setting

The parameters necessary for the setting of the positioning data and parameters are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example	Allowable range
Operation pattern	E: End point	C: Continuance point E: End point P: Pass point J: Speed point
Control method	I: Increment	I: Increment A: Absolute
X-axis movement amount	10000 pulse	Pulse: -1,073,741,823 to 1,073,741,823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): -1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 1-7,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree
Acceleration/deceleration pattern	L: Linear	L: Linear S: S-shaped
Acceleration time (ms)	100 ms	0 to 10000 ms
Deceleration time (ms)	100 ms	0 to 10000 ms
Target speed	10000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s

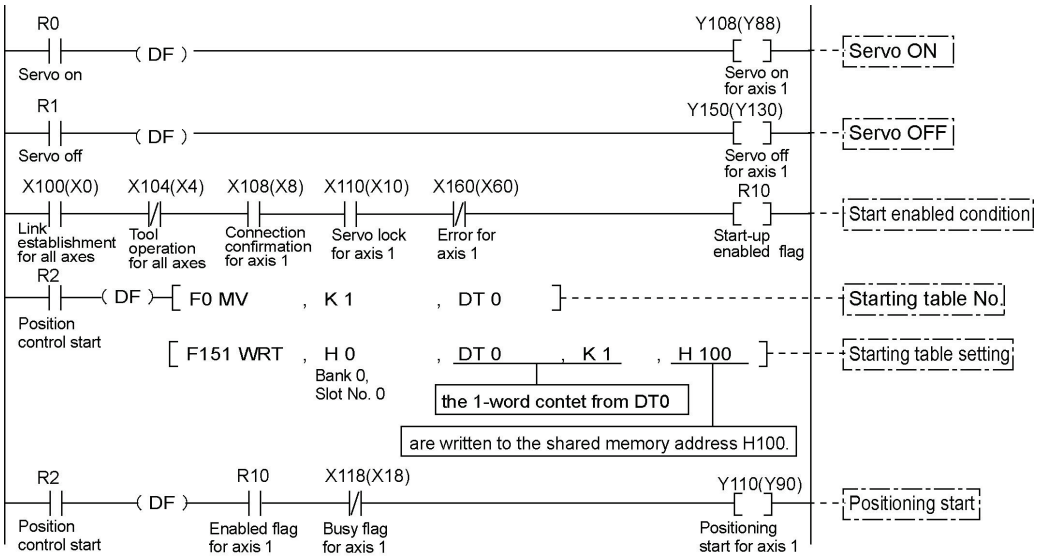
Operation diagram



Operations of each contact

- The BUSY flag (FPΣ: X118, FP2: X18) indicating the state that a motor is running turns on when the position control started, and it turns off when the operation completed.
- The operation done flag (FPΣ: X120, FP2: X20) indicating the state that an operation completed turns on when the position control completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts. The timing of that the flag turns on is at the time that the current value of the AMP became within the completion width specified in the parameter setting of the Configurator PM after sending the command to move to the target position.

Sample program



The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

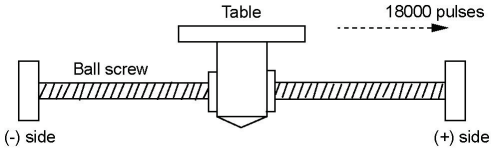
- If any value such as a movement amount, acceleration time, deceleration time or target speed is out of the specified range, a setting value error will occur when the position control starts.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

Operation at limit input

Condition	Direction	Limit status	Operation
When E point control is executed	Forward	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
	Reverse	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
During E point control	Forward	Limit input(+):ON	Deceleration stop, Error occurs.
	Reverse	Limit input (-):ON	Deceleration stop, Error occurs.

8.1.2 Setting and Operation of P Point Control

The example below is the case of a single axis control when using the FPΣ with the positioning unit RTEX installed in the slot 0. The movement amount setting is the increment method, and the unit is set to pulse. When using the FP2, change the contact and flag numbers appropriately.

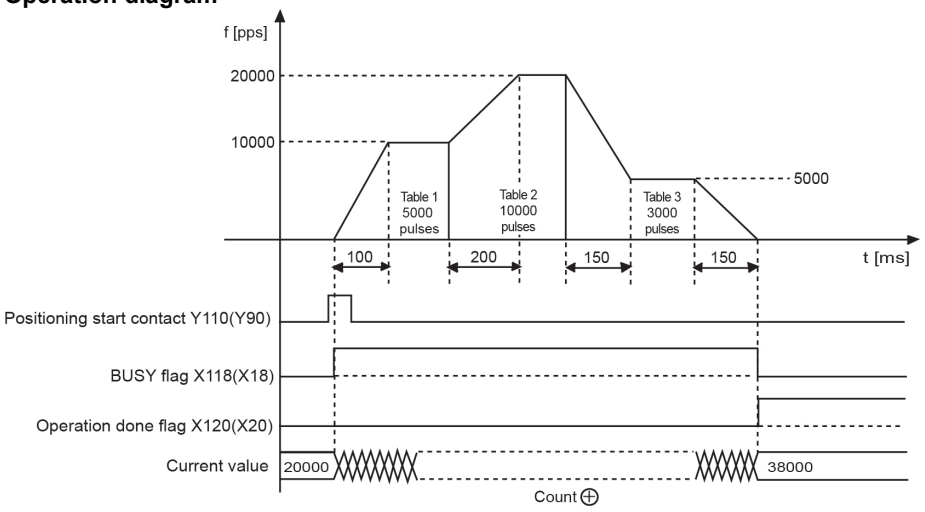


Setting

The parameters necessary for the setting of the positioning data and parameters are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example			Allowable range
	Table 1	Table 2	Table 3	
Operation pattern	P: Pass point	P: Pass point	E: End point	C: Continuance point E: End point P: Pass point J: Speed point
Control method	I: Increment	I: Increment	I: Increment	I: Increment A: Absolute
X-axis movement amount	5000 pulses	10000 pulses	3000 pulses	Pulse: -1,073,741,823 to 1,073,741,823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): -1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 1-7,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree
Acceleration/ deceleration pattern	L: Linear	L: Linear	L: Linear	L: Linear S: S-shaped
Acceleration time (ms)	100 ms	200 ms	30 ms	0 to 10000 ms
Deceleration time (ms)	10 ms	20 ms	150 ms	0 to 10000 ms
Target speed	10000 pps	20000 pps	5000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s

Operation diagram

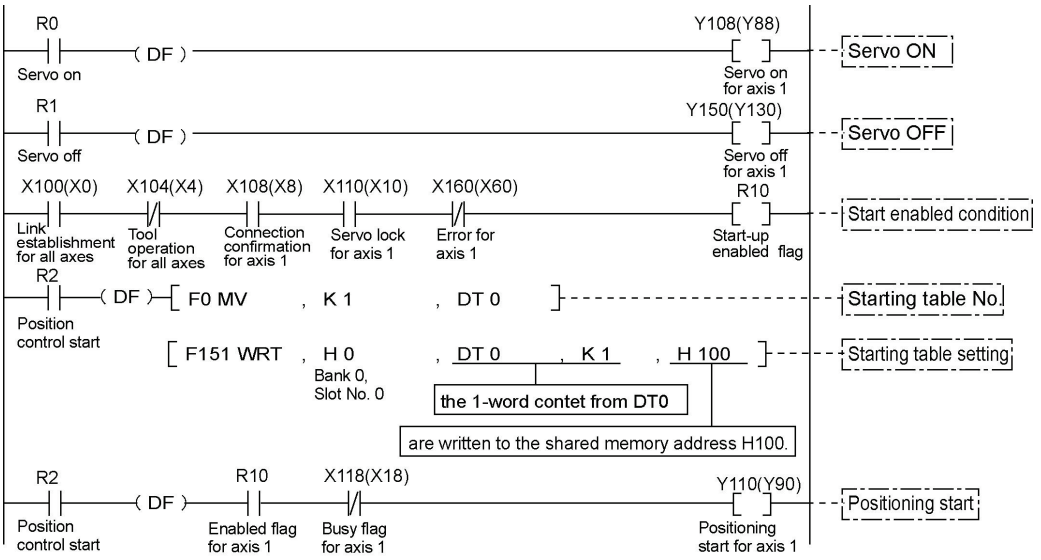


The numbers in parenthesis are the flag and contact numbers for the FP2.

Operations of each contact

- The BUSY flag (FPΣ: X118, FP2: X18) indicating the state that a motor is running turns on when the position control started, and it turns off when the operation completed.
- The operation done flag (FPΣ: X120, FP2: X20) indicating the state that an operation completed turns on when the position control completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts. The timing of that the flag turns on is at the time that the current value of the AMP became within the completion width specified in the parameter setting of the Configurator PM after sending the command to move to the target position.

Sample program



The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

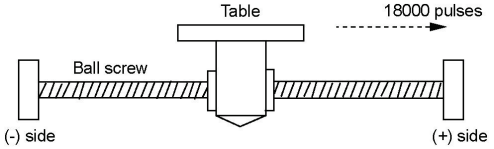
- Once starting the table 1, the operation continues up to the table 3 automatically. The last table should be set to E: End point.
- If any value such as a movement amount, acceleration time, deceleration time or target speed is out of the specified range, a setting value error will occur when the position control starts.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

Operation at limit input

Condition	Direction	Limit status	Operation
When P point control is executed	Forward	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
	Reverse	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
During P point control	Forward	Limit input(+):ON	Deceleration stop, Error occurs.
	Reverse	Limit input (-):ON	Deceleration stop, Error occurs.

8.1.3 Setting and Operation of C Point Control

The example below is the case of a single axis control when using the FPΣ with the positioning unit RTEX installed in the slot 0. The movement amount setting is the increment method, and the unit is set to pulse. When using the FP2, change the contact and flag numbers appropriately.

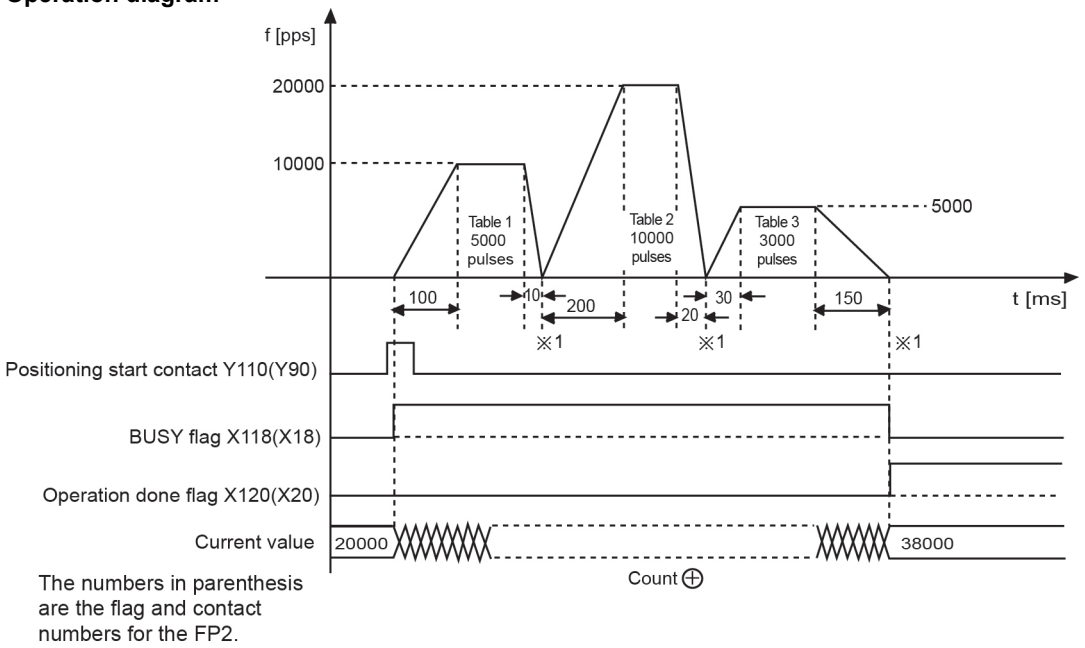


Setting

The parameters necessary for the setting of the positioning data and parameters are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example			Allowable range
	Table 1	Table 2	Table 3	
Operation pattern	C: Continu-ance point	C: Continuance point	E: End point	C: Continuance point E: End point P: Pass point J: Speed point
Control method	I: Increment	I: Increment	I: Increment	I: Increment A: Absolute
X-axis movement amount	5000 pulses	10000 pulses	3000 pulses	Pulse: -1,073,741,823 to 1,073,741,823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): -1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 1-7,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree
Acceleration/ deceleration pattern	L: Linear	L: Linear	L: Linear	L: Linear S: S-shaped
Acceleration time (ms)	100 ms	200 ms	30 ms	0 to 10000 ms
Deceleration time (ms)	10 ms	20 ms	150 ms	0 to 10000 ms
Target speed	10000 pps	20000 pps	5000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s

Operation diagram

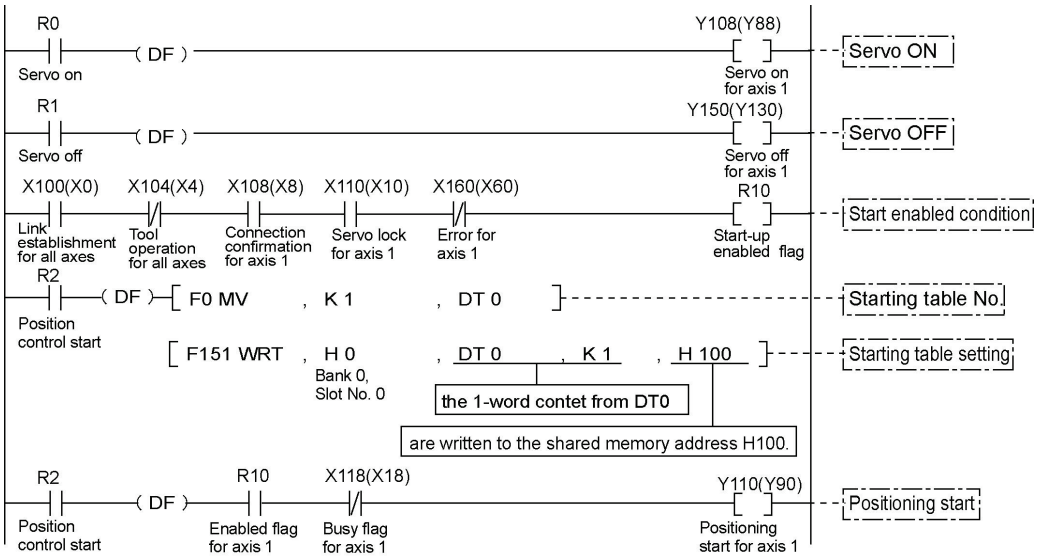


*1 The operation shifts to the next action after the elapse of dwell time.
For details of dwell time, refer to "13.1 Dwell Time".

Operations of each contact

- The BUSY flag (FPΣ: X118, FP2: X18) indicating the state that a motor is running turns on when the position control started, and it turns off when the operation completed.
- The operation done flag (FPΣ: X120, FP2: X20) indicating the state that an operation completed turns on when the position control completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts. The timing of that the flag turns on is at the time that the current value of the AMP became within the completion width specified in the parameter setting of the Configurator PM after sending the command to move to the target position.

Sample program



The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

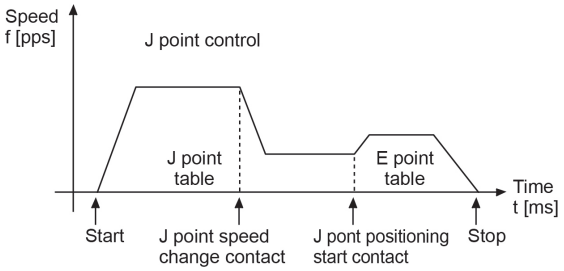
- Once starting the table 1, the operation continues up to the table 3 automatically. The last table should be set to E: End point.
- If any value such as a movement amount, acceleration time, deceleration time or target speed is out of the specified range, a setting value error will occur when the position control starts.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

Operation at limit input

Condition	Direction	Limit status	Operation
When C point control is executed	Forward	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
	Reverse	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
During C point control	Forward	Limit input(+):ON	Deceleration stop, Error occurs.
	Reverse	Limit input (-):ON	Deceleration stop, Error occurs.

8.1.4 Setting and Operation of J Point Control

J-point control operates until the start contact of J-point positioning turns ON after the operation of the positioning unit starts, and the next positioning control will start when the start contact of J-point positioning turns ON.
J-point control can be used for single-axis control only. Note that it cannot be used for interpolation control.

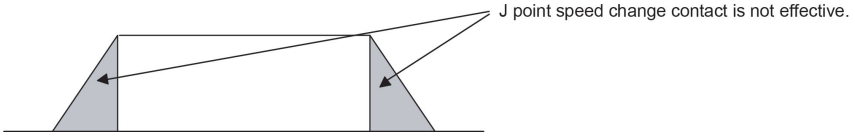


Also, the speed can be changed during the J point control. For changing the speed, turn the J point speed change contact ON after changing the following parameters in the parameter setting area.

- J point control code
- J point acceleration time
- J point deceleration time
- J point target speed

Note:
The control code, acceleration (deceleration) time and target speed at the start of the J point control are activated by each setting of a specified table.
The J point control code, J point acceleration (deceleration) time and J point target speed are enabled when changing the speed of the J point control.

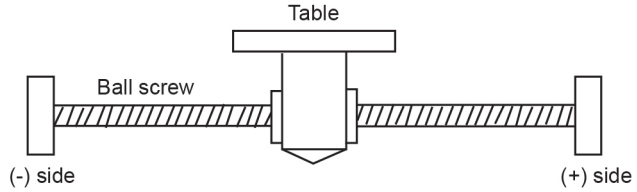
Precautions when performing J point control
A speed change is possible during J-point control, but impossible during acceleration or deceleration. The speed change while accelerating (decelerating) is ignored, and the speed change is performed after the unit becomes a constant speed state.



Set the positioning unit to increment mode to implement P-point control, C-point control, or E-point control with positions specified after J-point control is implemented.

Speed control is performed while the positioning unit is in J-point control, in which case, be sure to input the amount of movement for positioning with a value that can secure a target constant-speed area.

The example below is a case of single-axis control with the positioning unit installed in the slot 0. The movement amount setting uses an increment method in pulses.

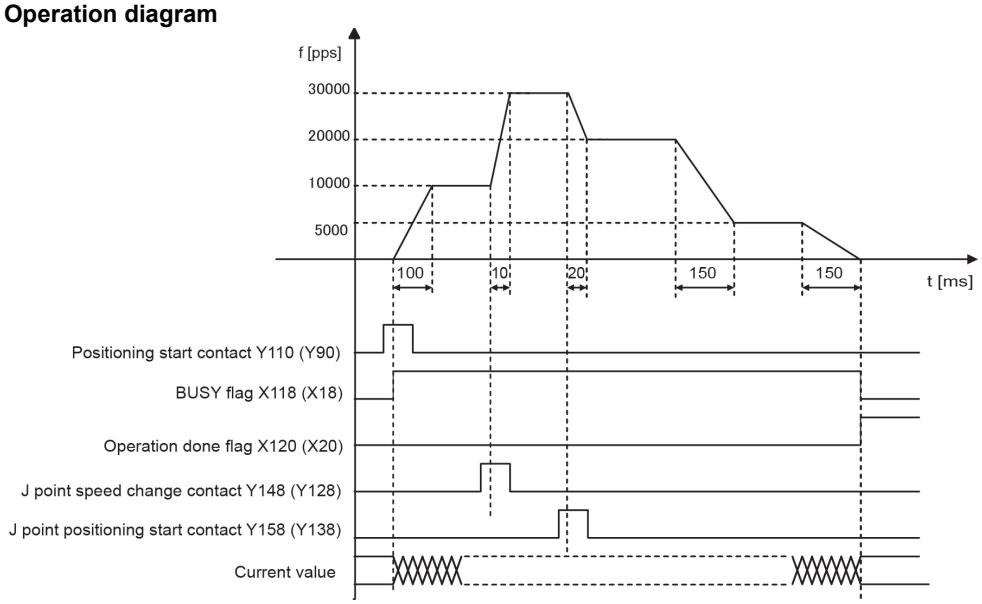


Settings

The parameters necessary for the setting of the positioning data and parameters are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example			Allowable range
	Table 1	Table 2	Table 3	
Operation pattern	J: Speed point	P: Pass point	E: End point	C: Continuance point E: End point P: Pass point J: Speed point
Control method	I: Increment	I: Increment	I: Increment	I: Increment A: Absolute
X-axis movement amount	5000 pulses	10000 pulses	3000 pulses	Pulse: -1,073,741,823 to 1,073,741,823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): -1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 1-7,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree
Acceleration/ deceleration pattern	L: Linear	L: Linear	L: Linear	L: Linear S: S-shaped
Acceleration time (ms)	100 ms	200 ms	30 ms	0 to 10000 ms
Deceleration time (ms)	10 ms	20 ms	150 ms	0 to 10000 ms
Target speed	10000 pps	20000 pps	5000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s
J point control code	Linear accel./ decel.			0: Linear acceleration/deceleration, 1: S acceleration/deceleration
J point acceleration time	10 ms			0 to 10000 ms
J point deceleration time	10 ms			0 to 10000 ms
J point target speed	30000 pps			pulse: 1 to 32,767,000 pps μm: 1 to 32,767,000 μm/s Inch: 0.001 to 32,767,000 inch/s degree: 0.001 to 32,767.000 rev/s

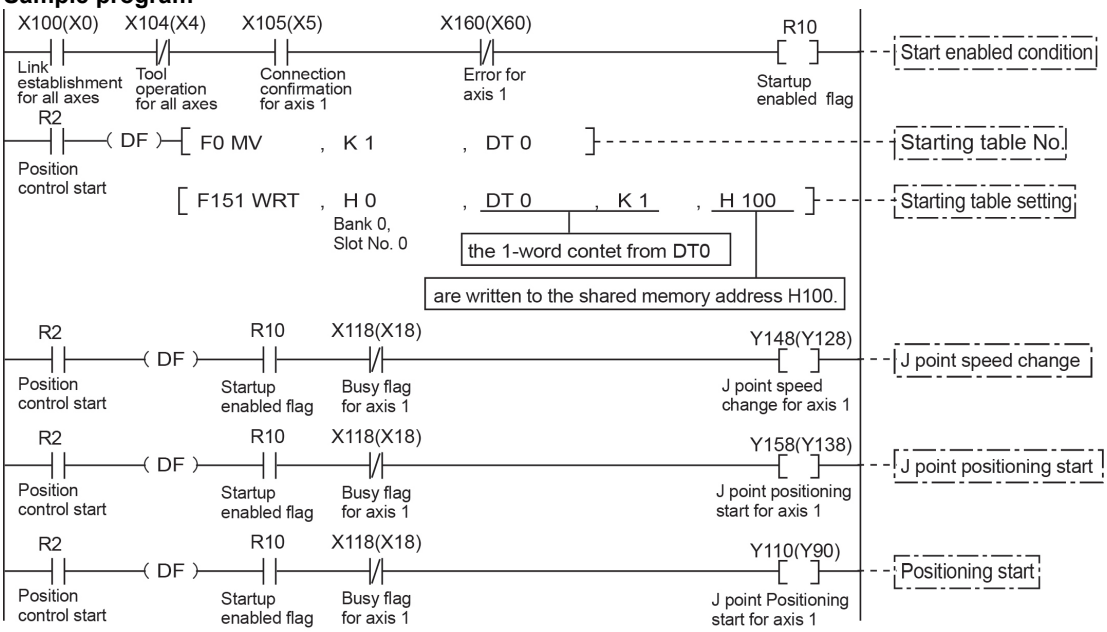
Operation diagram



Operations of each contact

- The BUSY flag (X18), which indicates that the motor is running, will turn ON when the positioning control starts, and it will turn OFF when the operation completes.
- The operation done flag (X20), which indicates the completion of operation, will turn ON when the current operation is completed, and it will be held until the next positioning control, JOG operation, home return, or pulser operation starts.
- The target speed during the J point operation changes to the target speed specified for the J point target speed when the J point speed change contact turns ON.
- The next position table (table) operation starts when the J point positioning start contact turns ON.

Sample program



The flags and contact numbers in parentheses are for FP2.

Precautions on programming

- Once starting the table 1, the operation continues up to the table 3 automatically. The last table should be set to E: End point.
- If any value such as a movement amount, acceleration time, deceleration time or target speed is out of the specified range, a setting value error will occur when the position control starts.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

Operation at limit input

Condition	Direction	Limit status	Operation
When J point control is executed	Forward	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
	Reverse	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
During J point control	Forward	Limit input(+):ON	Deceleration stop, Error occurs.
	Reverse	Limit input (-):ON	Deceleration stop, Error occurs.

8.2 Interpolation Control

Type of operations

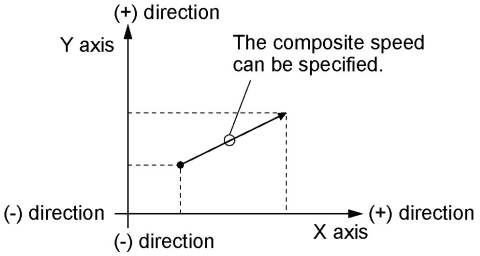
For the interpolation control, there are 2-axis linear interpolation control, 2-axis circular interpolation control, 3-axis linear interpolation control, and 3-axis spiral interpolation control. The following methods are available to specify the operation of each interpolation control. Select any of them as usage. The axes in the relation of an interpolation are called X axis and Y axis for the 2-axis interpolation, and are called X axis, Y axis and Z axis for the 3-axis interpolation.

In each interpolation control, the E point control that uses one table, P point control and C point control that uses multiple tables can be combined arbitrarily as positioning data.

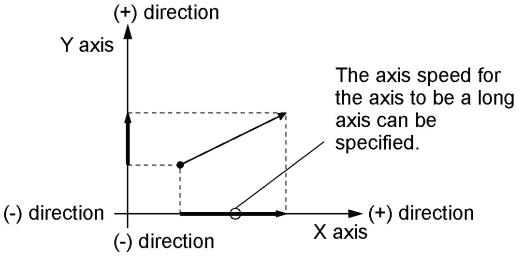
For example, using the P point control enables the continuous interpolation control from the 2-axis linear control to the 2-axis circular interpolation control. The acceleration time and deceleration time can be specified individually. For the P point control and C point control, the E point should be set as the last table.

Type	Operation specification method	Necessary data
2-axis linear interpolation control	Composite speed	Composite speed of X axis and Y axis
	Long axis speed	Speed of long axis (Axis of which moving distance is long)
2-axis circular interpolation control	Center point/CW direction	X-axis and Y-axis coordinate of center point
	Center point/CCW direction	X-axis and Y-axis coordinate of center point
	Pass point	X-axis and Y-axis coordinate of pass point on arc
3-axis linear interpolation control	Composite speed	Composite speed of X axis and Y axis
	Long axis speed	Speed of long axis (Axis of which moving distance is long)
3-axis spiral interpolation control	Center point/CW direction/ X-axis movement	Y-axis and Z-axis coordinate of center point
	Center point/CCW direction/ X-axis movement	Y-axis and Z-axis coordinate of center point
	Center point/CW direction/ Y-axis movement	X-axis and Z-axis coordinate of center point
	Center point/CCW direction/ Y-axis movement	X-axis and Z-axis coordinate of center point
	Center point/CW direction/ Z-axis movement	X-axis and Y-axis coordinate of center point
	Center point/CCW direction/ Z-axis movement	X-axis and Y-axis coordinate of center point
	Pass point/X-axis movement	Y-axis and Z-axis coordinate of pass point on arc
	Pass point/Y-axis movement	X-axis and Z-axis coordinate of pass point on arc
	Pass point/Z-axis movement	Y-axis and Z-axis coordinate of pass point on arc

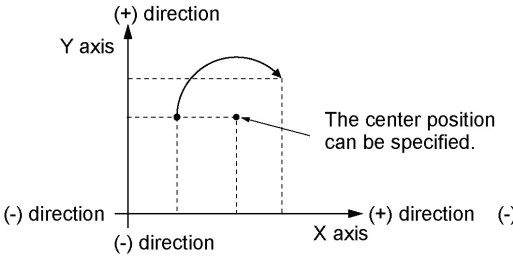
2-axis linear interpolation
(Composite speed specification)



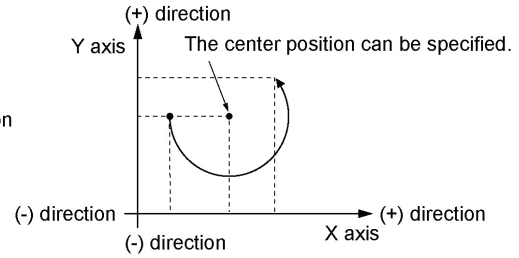
2-axis linear interpolation
(Long axis speed specification)



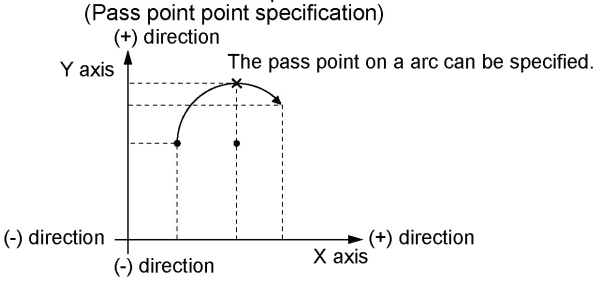
2-axis circular interpolation
(Center point specification/CW direction)



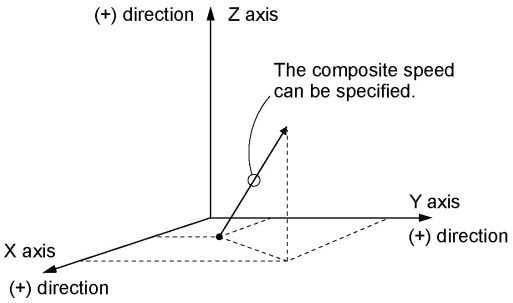
2-axis circular interpolation
(Center point specification/CCW direction)



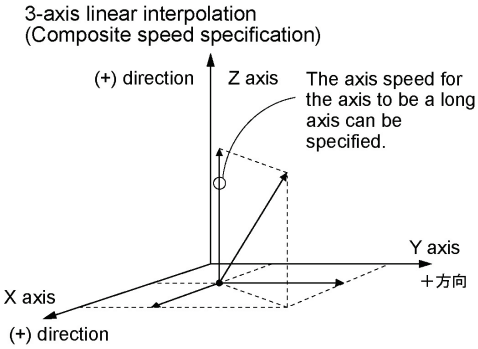
2-axis circular interpolation
(Pass point point specification)



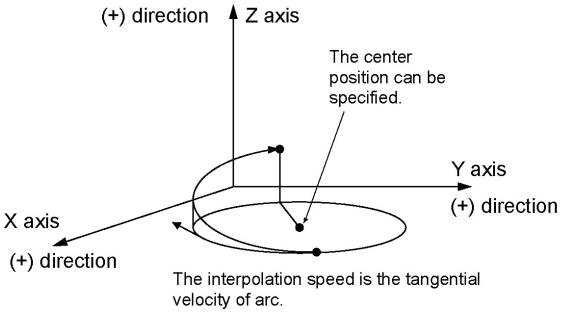
3-axis linear interpolation
(Composite speed specification)



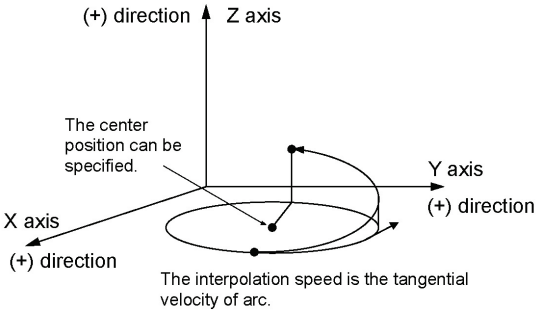
3-axis linear interpolation
(Composite speed specification)



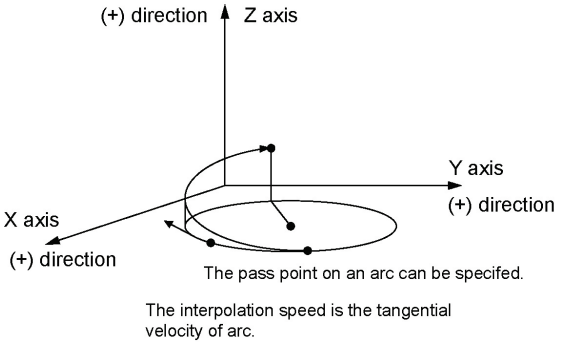
3-axis spiral interpolation (Center point specification/
CW direction/Z-axis movement)



3-axis spiral interpolation (Center point specification/
CCW direction/Z-axis movement)



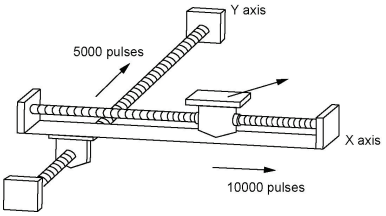
3-axis spiral interpolation (Pass point specification/
Z-axis movement)



When the X axis and Y axis is the moving axes, each axis in the above diagram is replaced.

8.2.1 Setting and Operation of Two-Axis Linear Interpolation

The example below is the case of a single axis control when using the FPΣ with the positioning unit RTEX installed in the slot 0. The X axis is set to the 1st axis and the Y axis is set to the 2nd axis. The movement amount setting is the increment method, and the unit is set to pulse. When using the FP2, change the contact and flag numbers appropriately.

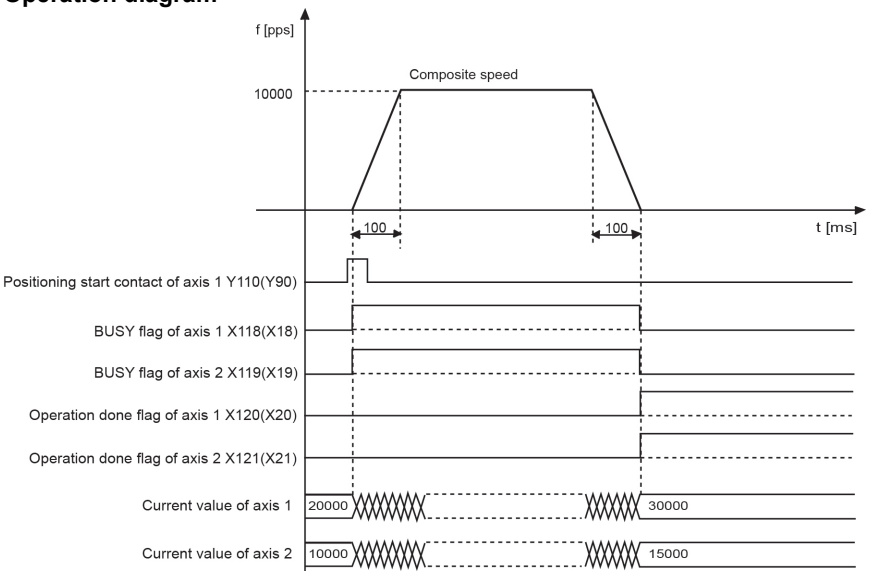


Setting

The parameters necessary for the setting of the positioning data and parameters are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example	Allowable range
Operation pattern	E: End point	C: Continuance point E: End point P: Pass point
Interpolation operation	0: Linear (Composite speed)	0: Linear (Composite speed) 1: Linear (Long axis speed) S: Circular (Pass point/CW direction) T: Circular (Pass point/CCW direction U: Circular (Pass point)
Control method	I: Increment	I: Increment A: Absolute
X-axis movement amount	10000 pulses	Pulse: -1,073,741,823 to 1,073,741,823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): -1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 1-7,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree
X-axis auxiliary point	0	
Y-axis movement amount	5000 pulses	
Y-axis auxiliary point	0	
Acceleration/ deceleration pattern	L: Linear	L: Linear S: S-shaped
Acceleration time (ms)	100 ms	0 to 10000 ms
Deceleration time (ms)	100 ms	0 to 10000 ms
Interpolation speed	10000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s

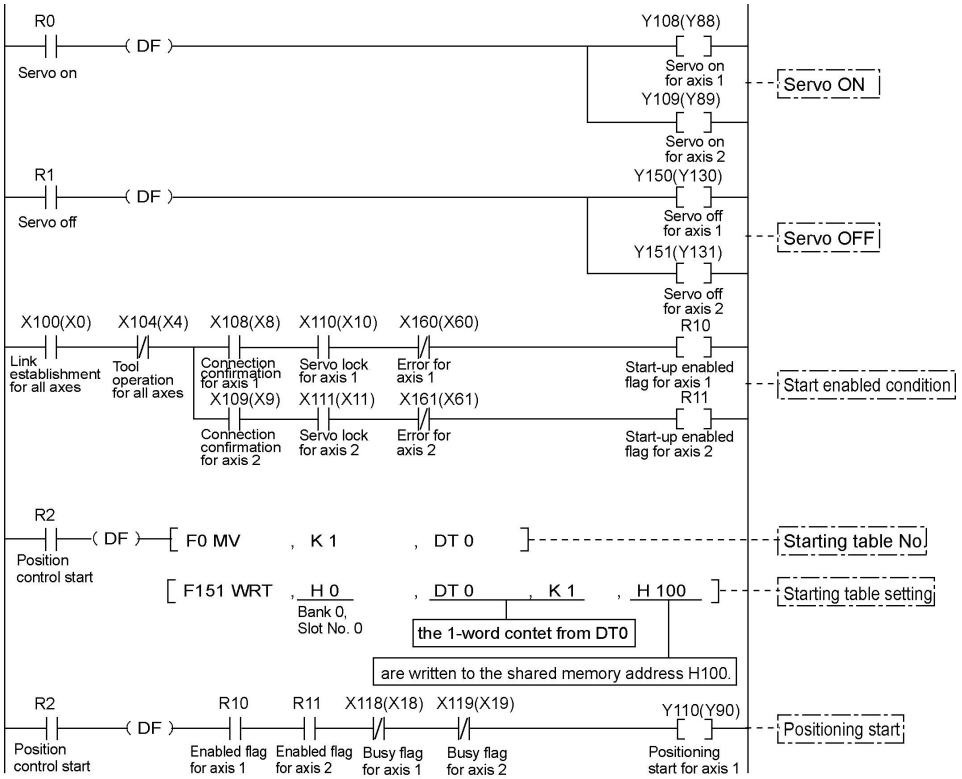
Operation diagram



Operations of each contact

- The BUSY flag for the axis 1 and 2 (FPΣ: X118, X119, FP2: X18, X19) indicating the state that a motor is running turns on when the position control started, and it turns off when the operation completed.
- The operation done flag for the axis 1 and 2 (FPΣ: X120, X121, FP2: X20, X21) indicating the state that an operation completed turns on when the position control completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts. The timing of that the flag turns on is at the time that the current value of the AMP became within the completion width specified in the parameter setting of the Configurator PM after sending the command to move to the target position.

Sample program



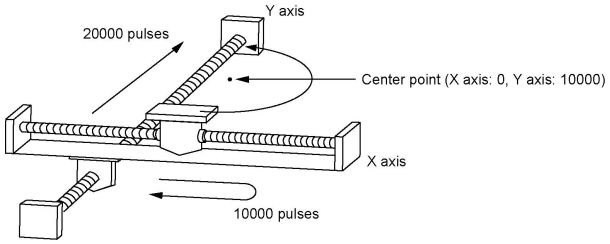
The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

- To start the interpolation control, turn on the positioning start contact of the axis with the smallest number in the same group.
- The values of the X-axis auxiliary point and Y-axis auxiliary point are invalid for the linear interpolation.
- When setting the long axis speed, the composite speed is faster than the long axis speed.
- If any value such as a movement amount, acceleration time, deceleration time or target speed is out of the specified range, a setting value error will occur when the position control starts.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

8.2.2 Setting and Operation of Two-Axis Circular Interpolation

The example below is the case of a single axis control when using the FPΣ with the positioning unit RTEX installed in the slot 0. The X axis is set to the 1st axis and the Y axis is set to the 2nd axis. The movement amount setting is the increment method, and the unit is set to pulse. When using the FP2, change the contact and flag numbers appropriately.

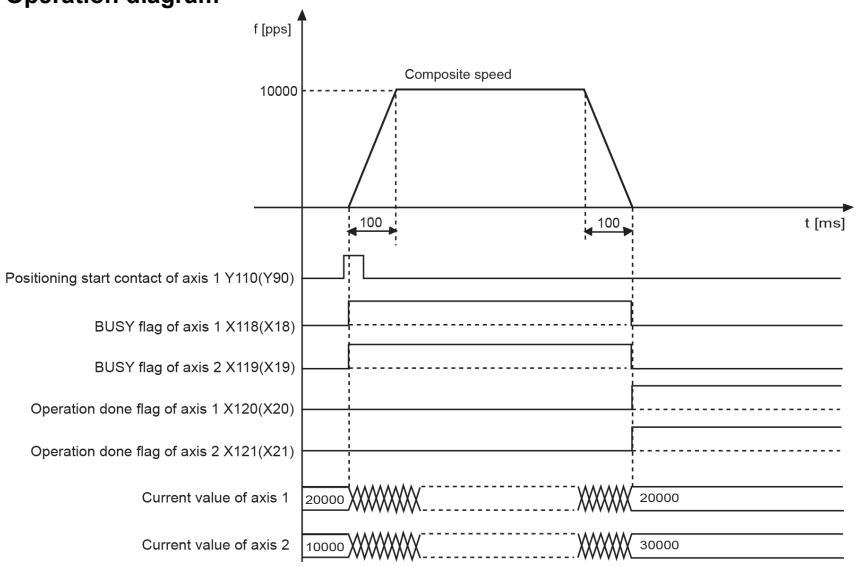


Setting

The parameters necessary for the setting of the positioning data and parameters are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example	Allowable range
Operation pattern	E: End point	C: Continuance point E: End point P: Pass point
Interpolation operation	S: Circular (Pass point/CW direction)	0: Linear (Composite speed) 1: Linear (Long axis speed) S: Circular (Pass point/CW direction) T: Circular (Pass point/CCW direction U: Circular (Pass point)
Control method	I: Increment	I: Increment A: Absolute
X-axis movement amount	0 pulse	Pulse: -1,073,741,823 to 1,073,741,823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): -1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 1-7,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree
X-axis auxiliary point	0 pulse	
Y-axis movement amount	20000 pulses	
Y-axis auxiliary point	10000 pulses	
Acceleration/ deceleration pattern	L: Linear	L: Linear S: S-shaped
Acceleration time (ms)	100 ms	0 to 10000 ms
Deceleration time (ms)	100 ms	0 to 10000 ms
Interpolation speed	10000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s

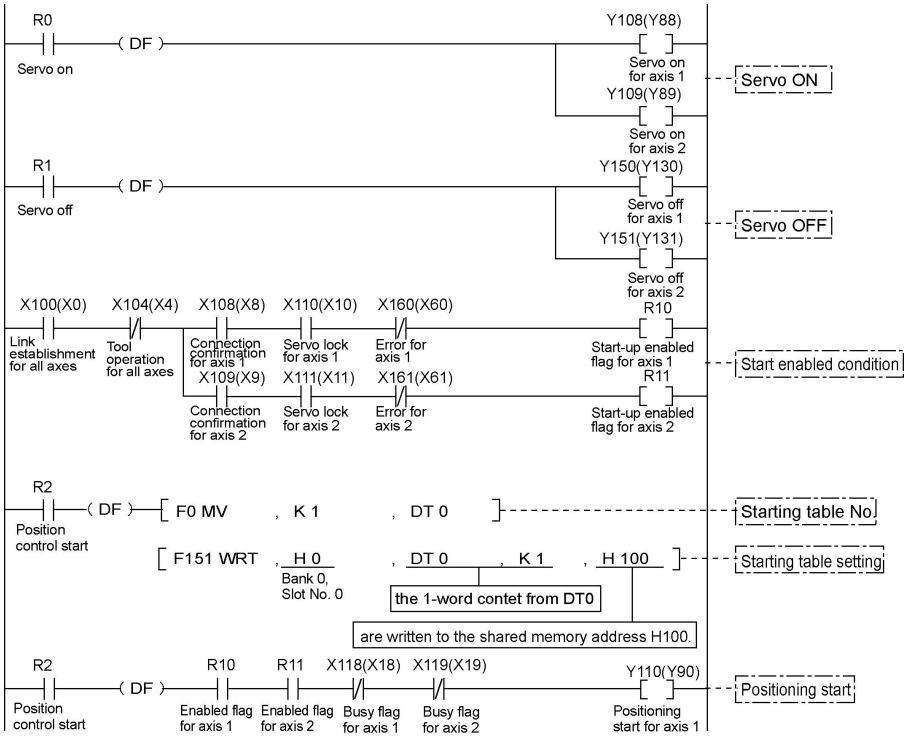
Operation diagram



Operations of each contact

- The BUSY flag for the axis 1 and 2 (FPΣ: X118, X119, FP2: X18, X19) indicating the state that a motor is running turns on when the position control started, and it turns off when the operation completed.
- The operation done flag for the axis 1 and 2 (FPΣ: X120, X121, FP2: X20, X21) indicating the state that an operation completed turns on when the position control completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts. The timing of that the flag turns on is at the time that the current value of the AMP became within the completion width specified in the parameter setting of the Configurator PM after sending the command to move to the target position.

Sample program



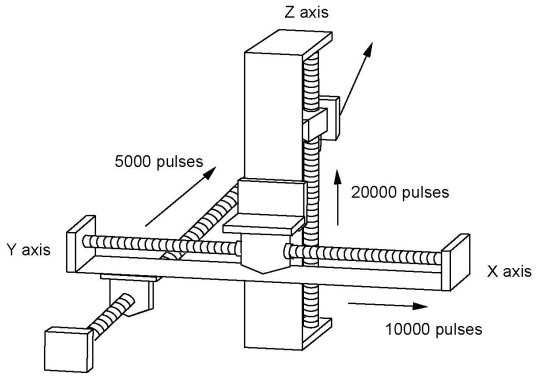
The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

- To start the interpolation control, turn on the positioning start contact of the axis with the smallest number in the same group.
- In case of the center point specification, the X-axis auxiliary point is the center point of X axis, and the Y-axis auxiliary point is the center point of Y axis. In case of the pass point, each pass point is set as the pass point of X axis and Y axis.
- When the control method is increment, both the center point and pass point are the increment coordinate from the start point.
- When the start point and the operation done point is the same, it performs one circular operation when using the center point method. However, when using the pass point method, an error occurs.
- In case of the pass point method, when the start point, pass point and operation done point exist in the same straight line, an arc is not comprised, and an error occurs.
- When setting the long axis speed, the composite speed is faster than the long axis speed.
- If any value such as a movement amount, acceleration time, deceleration time or target speed is out of the specified range, a setting value error will occur when the position control starts.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

8.2.3 Setting and Operation of Three-Axis Linear Interpolation

The example below is the case of a single axis control when using the FPΣ with the positioning unit RTEX installed in the slot 0. The X axis is set to the 1st axis and the Y axis is set to the 2nd axis. The movement amount setting is the increment method, and the unit is set to pulse. When using the FP2, change the contact and flag numbers appropriately.

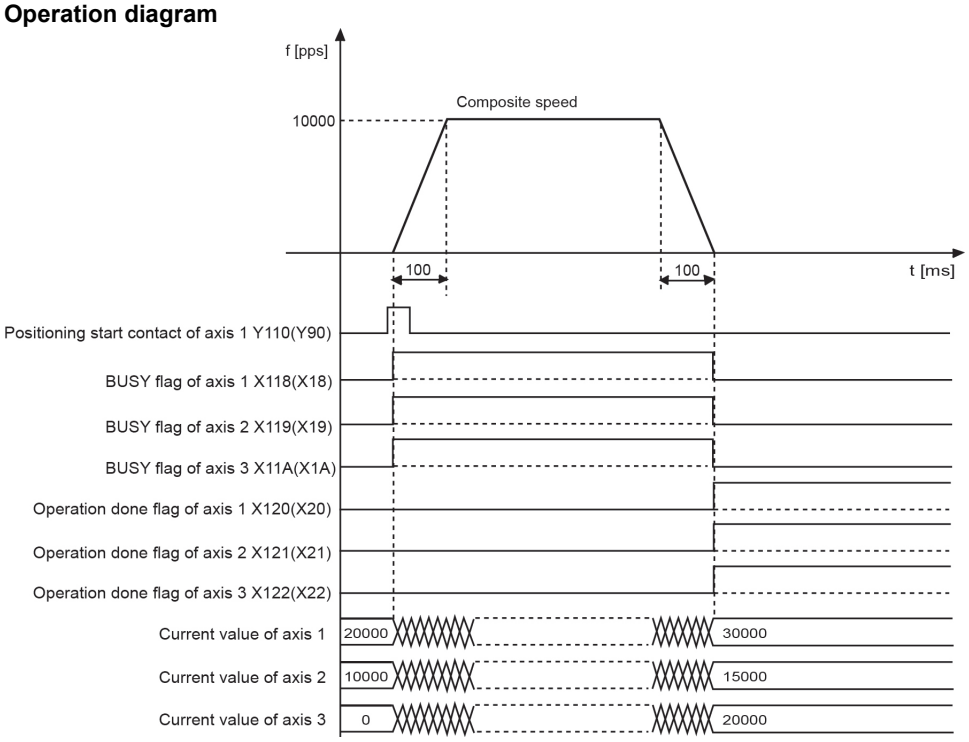


Setting

The parameters necessary for the setting of the positioning data and parameters are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example	Allowable range
Operation pattern	E: End point	C: Continuance point E: End point P: Pass point
Interpolation operation	0: Linear (Composite speed)	0: Linear (Composite speed) 1: Linear (Long axis speed) A: Spiral (Center point/CW direction/X-axis movement) B: Spiral (Center point/CCW direction/X-axis movement) C: Spiral (Center point/CW direction/Y-axis movement) D: Spiral (Center point/CCW direction/Y-axis movement) E: Spiral (Center point/CW direction/Z-axis movement) F: Spiral (Center point/CCW direction/Z-axis movement) L: Spiral (Pass point/X-axis movement) M: Spiral (Pass point/Y-axis movement) N: Spiral (Pass point/Z-axis movement)
Control method	I: Increment	I: Increment A: Absolute
X-axis movement amount	10000 pulses	Pulse: -1,073,741,823 to 1,073,741,823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): -1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 1-7,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree
X-axis auxiliary point	0	
Y-axis movement amount	5000 pulses	
Y-axis auxiliary point	0	
Z-axis movement amount	20000 pulses	
Z-axis auxiliary point	0	
Acceleration/ deceleration pattern	L: Linear	L: Linear S: S-shaped
Acceleration time (ms)	100 ms	0 to 10000 ms
Deceleration time (ms)	100 ms	0 to 10000 ms
Interpolation speed	10000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s

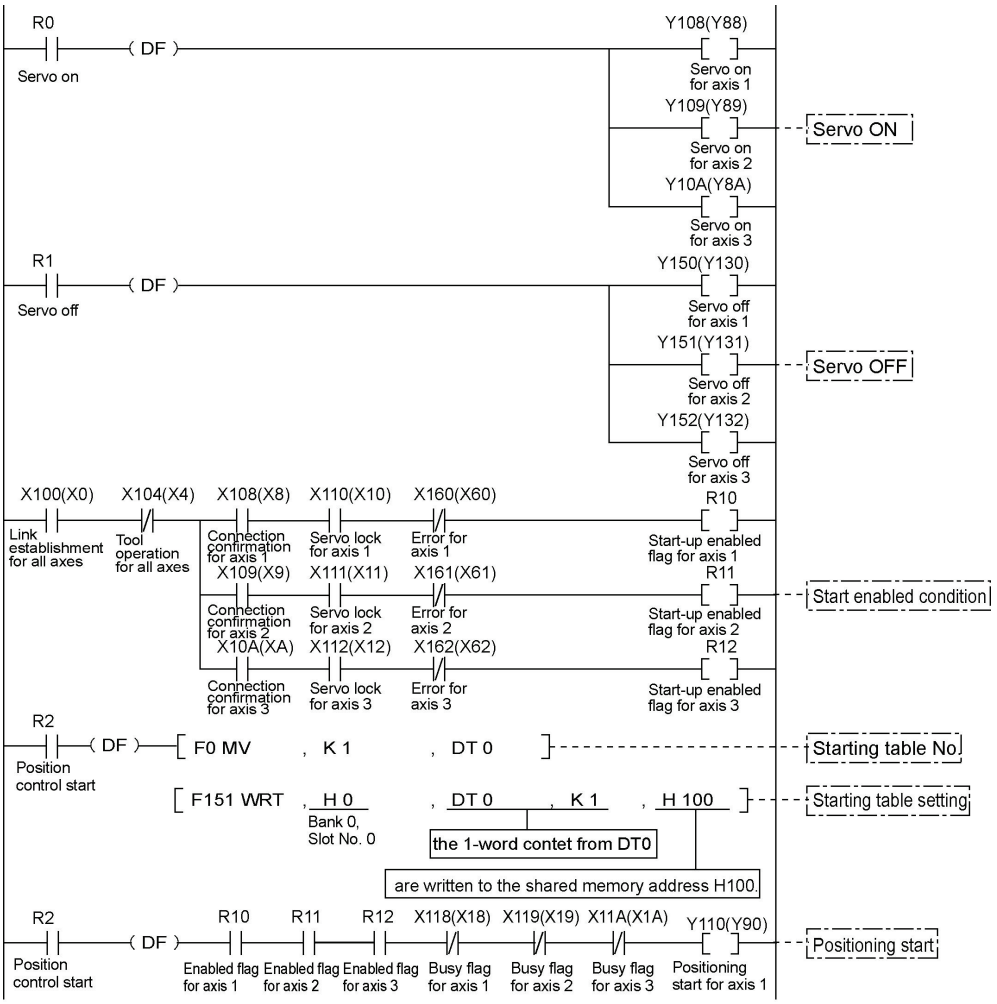
Operation diagram



Operations of each contact

- The BUSY flag for the axes 1, 2 and 3 (FPΣ: X118, X119, X11A, FP2: X18, X19, X1A) indicating the state that a motor is running turns on when the position control started, and it turns off when the operation completed.
- The operation done flag for the axes 1, 2 and 3 (FPΣ: X120, X121, X122, FP2: X20, X21, X22) indicating the state that an operation completed turns on when the position control completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts. The timing of that the flag turns on is at the time that the current value of the AMP became within the completion width specified in the parameter setting of the Configurator PM after sending the command to move to the target position.

Sample program



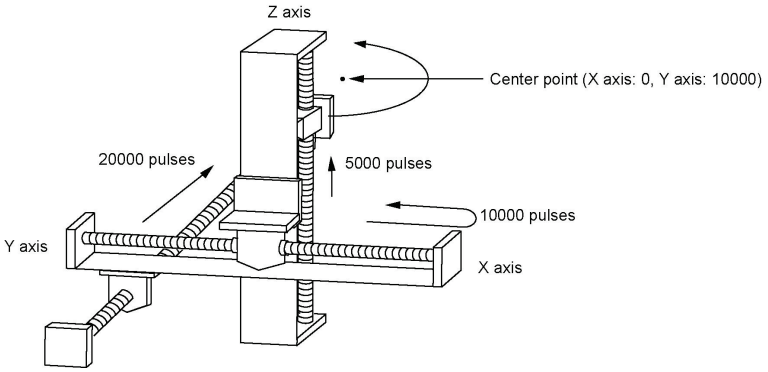
The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

- To start the interpolation control, turn on the positioning start contact of the axis with the smallest number in the same group.
- The values of the X-axis auxiliary point and Y-axis auxiliary point are invalid for the linear interpolation.
- When setting the long axis speed, the composite speed is faster than the long axis speed.
- If any value such as a movement amount, acceleration time, deceleration time or target speed is out of the specified range, a setting value error will occur when the position control starts.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

8.2.4 Setting and Operation of Three-Axis Linear Interpolation

The example below is the case of a single axis control when using the FPΣ with the positioning unit RTEX installed in the slot 0. The X axis is set to the 1st axis, the Y axis is set to the 2nd axis and the Z axis is set to the 3rd axis. The movement amount setting is the increment method, and the unit is set to pulse. When using the FP2, change the contact and flag numbers appropriately.

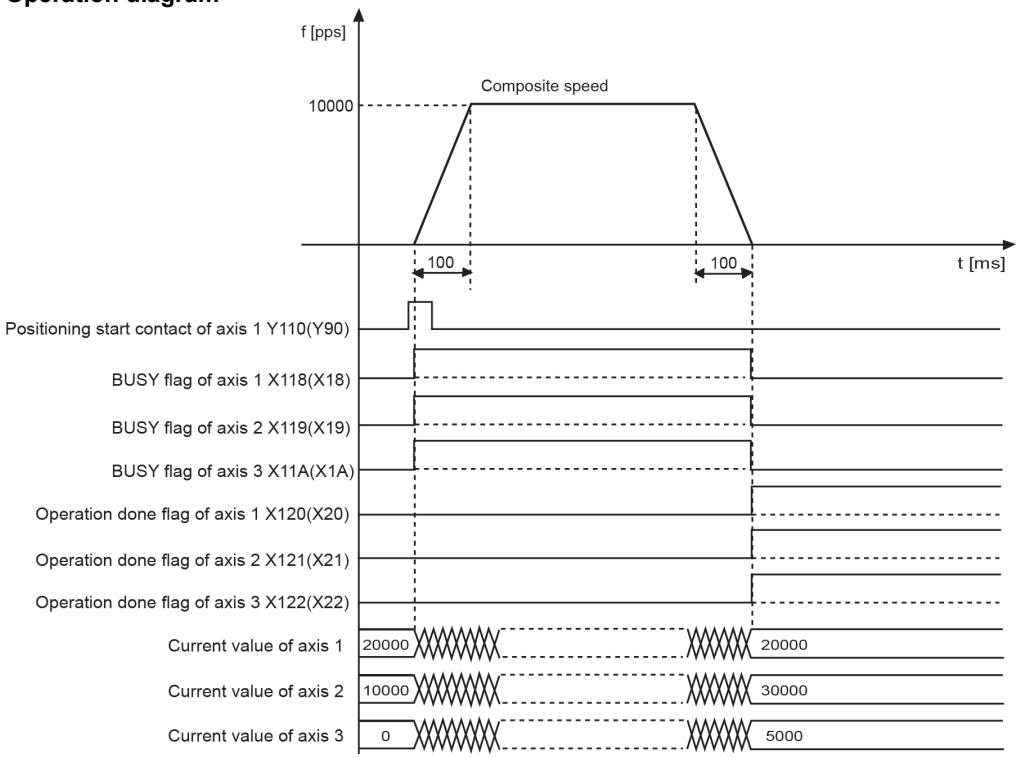


Setting

The parameters necessary for the setting of the positioning data and parameters are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example	Allowable range
Operation pattern	E: End point	C: Continuance point E: End point P: Pass point
Interpolation operation	E: Spiral (Center point/CW direction/Z-axis movement)	0: Linear (Composite speed) 1: Linear (Long axis speed) A: Spiral (Center point/CW direction/X-axis movement) B: Spiral (Center point/CCW direction/X-axis movement) C: Spiral (Center point/CW direction/Y-axis movement) D: Spiral (Center point/CCW direction/Y-axis movement) E: Spiral (Center point/CW direction/Z-axis movement) F: Spiral (Center point/CCW direction/Z-axis movement) L: Spiral (Pass point/X-axis movement) M: Spiral (Pass point/Y-axis movement) N: Spiral (Pass point/Z-axis movement)
Control method	I: Increment	I: Increment A: Absolute
X-axis movement amount	0 pulse	Pulse: -1,073,741,823 to 1,073,741,823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): -1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 1-7,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree
X-axis auxiliary point	0 pulse	
Y-axis movement amount	20000 pulses	
Y-axis auxiliary point	10000 pulses	
Z-axis movement amount	5000 pulses	
Z-axis auxiliary point	0	
Acceleration/ deceleration pattern	L: Linear	L: Linear S: S-shaped
Acceleration time (ms)	100 ms	0 to 10000 ms
Deceleration time (ms)	100 ms	0 to 10000 ms
Interpolation speed	10000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s

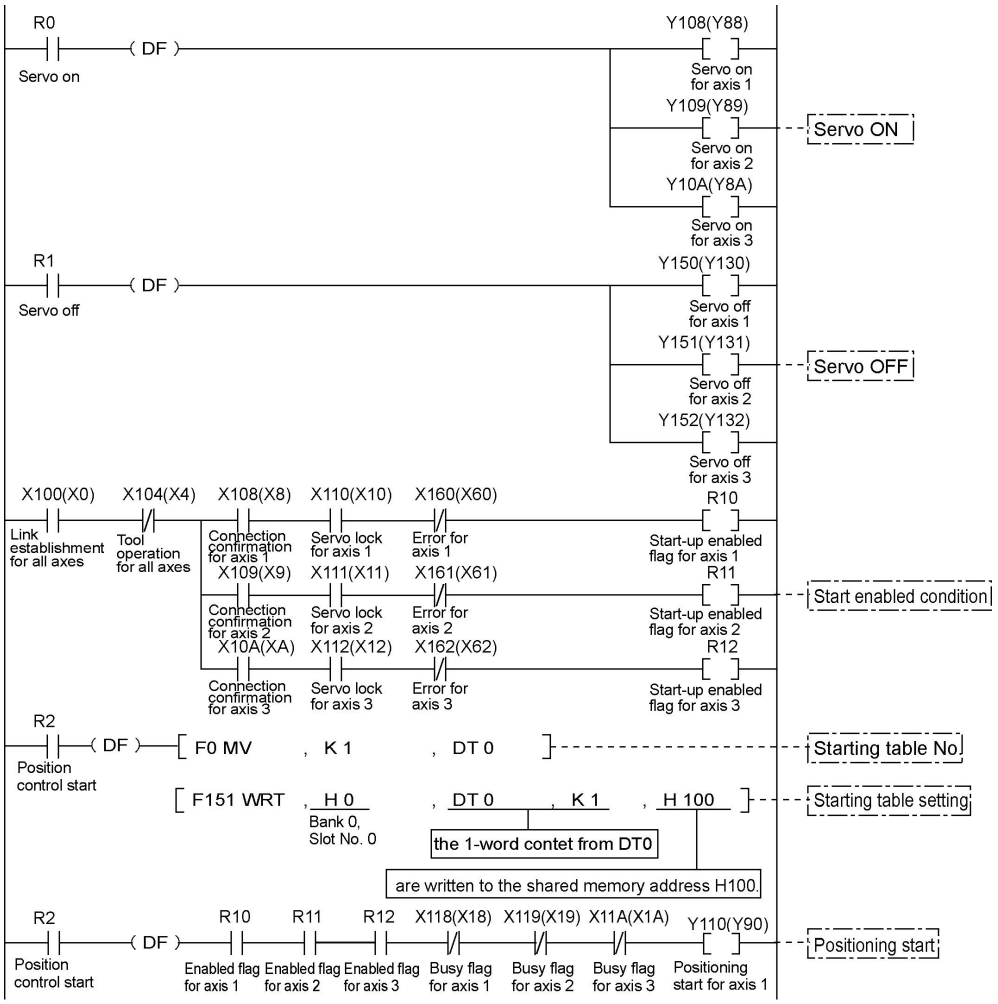
Operation diagram



Operations of each contact

- The BUSY flag for the axes 1, 2 and 3 (FPΣ: X118, X119, X11A, FP2: X18, X19, X1A) indicating the state that a motor is running turns on when the position control started, and it turns off when the operation completed.
- The operation done flag for the axes 1, 2 and 3 (FPΣ: X120, X121, X122, FP2: X20, X21, X22) indicating the state that an operation completed turns on when the position control completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts. The timing of that the flag turns on is at the time that the current value of the AMP became within the completion width specified in the parameter setting of the Configurator PM after sending the command to move to the target position.

Sample program



The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

- For X-Y plane, in case of the center point specification, the X-axis auxiliary point is the center point of X axis, and the Y-axis auxiliary point is the center point of Y axis. In case of the pass point, each pass point is set as the pass point of X axis and Y axis. These settings are the same for Y-Z plane and X-Z plane.
- When the control method is increment, both the center point and pass point are the increment coordinate from the start point.
- When the start point and the operation done point is the same, it performs one circular operation when using the center point method. However, when using the pass point method, an error occurs.
- In case of the pass point method, when the start point, pass point and operation done point exist in the same straight line, an arc is not comprised, and an error occurs.
- When setting the long axis speed, the composite speed is faster than the long axis speed.
- If any value such as a movement amount, acceleration time, deceleration time or target speed is out of the specified range, a setting value error will occur when the position control starts.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

8.3 Synchronous Operation

8.3.1 Overview of Synchronous Operation

The synchronous operation is a function to set an axis to be the standard (master axis) and an axis to be synchronized (slave axis), and make the operations the master and slave axes identical (synchronous).

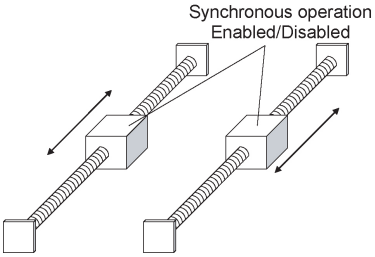
The features of the synchronous operation are as below.

- A maximum of 2 groups can be set for the synchronous operation.
- The master and slave axis can be set for one axis each.)

Two types of synchronous operation can be selected.

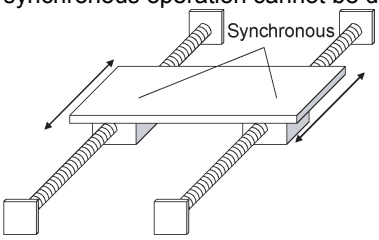
1. Synchronous mode A

Using this mode enables to switch the setting of the synchronous operation between “enabled” and “disabled”, and perform the synchronous operation as necessary.



2. Synchronous mode B

This mode is used to drive a large-sized table such as a carrier machine with two motors. The synchronous operation cannot be disabled in the mode B..



Differences in the operations of synchronous modes

	Synchronous mode A	Synchronous mode B
Synchronous setting	A maximum of 2 groups can be set for the synchronous group. An individual operation mode can be set for each synchronous group.	
Enabled/disabled of synchronous operation	It can be selected either Enabled or Disabled.	Only Enabled
Positioning operation JOG operation Operation stop Pulser operation	【Synchronous: When enabled】 Operates with the setting of the master axis. The positioning starts for the master axis.	Operates with the setting of the master axis. The positioning starts for the master axis.
	【Synchronous: When disabled】 The master and slave axes are operated according to the respective settings for each axis. The positioning starts for each axis.	
Home return	It is performed for each axis. It is necessary to set the synchronous operation to be “Disabled” when performing the home return.	Some home return methods cannot be used. The connection of the switch of the positioning unit may be changed according to the home return methods.

8.3.2 Home Return in Synchronous Operation

The usable home return methods vary according to the synchronous mode to be used in the synchronous operation.

A: Available N/A: Not available

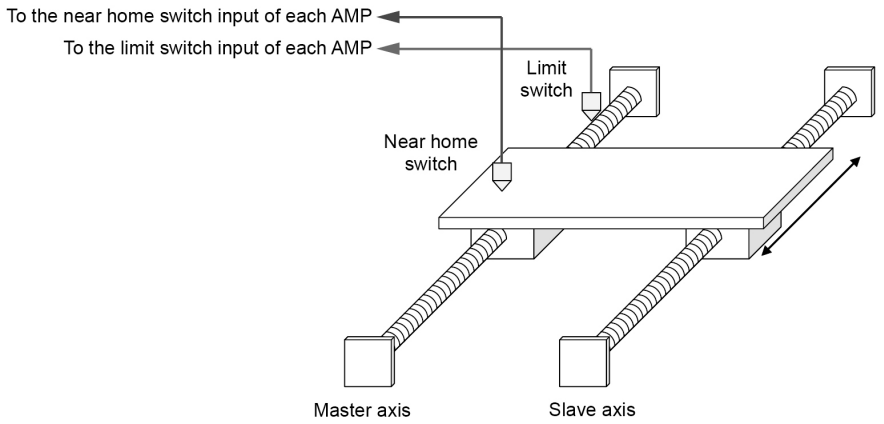
Home return method	Synchronous mode A	Synchronous mode B
DOG method 1	A	N/A
DOG method 2	A	A
DOG method 3	A	N/A
Limit method 1	A	N/A
Limit method 2	A	A
Phase Z method	A	N/A
Stop-on-contact method 1	A	A
Stop-on-contact method 2	A	N/A
Data set method	A	A
Remarks	Set the synchronous operation to be “Disabled” when performing the home return.	The connections for each switch are different when using the home return.

Home return when using synchronous mode A
In the synchronous mode A, the home return is performed for each axis individually.

[Procedure]
1. Disable the synchronous operation.
2. Execute the home return for the master axis and slave axis individually.
3. Enable the synchronous operation after confirming the completion of the home return for the master and slave axes.

Home return when using synchronous mode B
In the synchronous mode B, the home return is performed simultaneously for the master and slave axes by executing the home return for the master axis.

Connect the near home switch and limit switch as below to perform the home return using the “DOG method 2” and “Limit method 2”.



DOG method: Connect the near home switch input of the master axis to the salve axis, too.
Limit method: Connect the limit switch input of the master axis to the salve axis, too.

Reference: <Chapter 10 Manual Operation (Home Return)>

8.3.3 Synchronous Operation Difference Behavior Check Function

The difference behavior check function is used to check if the master and slave axes perform the synchronous operation properly, and detect the feedback pulse value between the master and slave axes exceeds the threshold by comparing the feedback pulse value.

The operations when the difference between the moving amounts of master and slave axes exceeds the specified difference value can be selected from the followings.

Difference check	Operation
Error	An error occurs, and the operations of master and slave axes stop. The operations cannot start until the error is cleared.
Warning	A warning occurs. The operations continue.
None	The difference behavior check is not performed.

8.3.4 Controlling and Monitoring Synchronous Operation

The following area is used to set the synchronous operation to be enabled/disabled, and check the synchronous status.

[Synchronous operation control/monitor area]

<table>
<tr><th>Bank</th><th>Offset address</th><th>Name</th><th>Description</th></tr>
<tr><td rowspan="3">00H</td><td>2B0H</td><td>Synchronous group 1 Operation enabled/disabled</td><td>Switches the setting for the synchronous operation between “Enabled” and “Disabled”.
When using the synchronous mode B, this setting is ignored, and an operation always being synchronized is performed.</td></tr>
<tr><td>2B1H</td><td>Synchronous group 2 Operation enabled/disabled</td><td>
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Group attribute of axis 1</td><td>0</td><td rowspan="8">0: Executes synchronous operation.
1:Cancel synchronous operation.</td></tr>
<tr><td>1</td><td>Group attribute of axis 2</td><td>0</td></tr>
<tr><td>2</td><td>Group attribute of axis 3</td><td>0</td></tr>
<tr><td>3</td><td>Group attribute of axis 4</td><td>0</td></tr>
<tr><td>4</td><td>Group attribute of axis 5</td><td>0</td></tr>
<tr><td>5</td><td>Group attribute of axis 6</td><td>0</td></tr>
<tr><td>6</td><td>Group attribute of axis 7</td><td>0</td></tr>
<tr><td>7</td><td>Group attribute of axis 8</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>2B4H</td><td>Synchronous operation monitor</td><td>In this area, the bits of the axes where the synchronous operation is performed are turned on regardless of synchronous groups, master or slave axes.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Axis 1 synchronous state</td><td>0</td><td rowspan="8">0: Asynchronous state
1: Synchronous operation target axis</td></tr>
<tr><td>1</td><td>Axis 2 synchronous state</td><td>0</td></tr>
<tr><td>2</td><td>Axis 3 synchronous state</td><td>0</td></tr>
<tr><td>3</td><td>Axis 4 synchronous state</td><td>0</td></tr>
<tr><td>4</td><td>Axis 5 synchronous state</td><td>0</td></tr>
<tr><td>5</td><td>Axis 6 synchronous state</td><td>0</td></tr>
<tr><td>6</td><td>Axis 7 synchronous state</td><td>0</td></tr>
<tr><td>7</td><td>Axis 8 synchronous state</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
</table>

Note:

Setting to enable/disable the synchronous mode is available in the synchronous mode A only.

8.3.5 Operation of Master and Slave Axes

Operation of master and slave axes

Various positioning parameters should be set to perform operations on the positioning unit. The parameters to be applied vary in the synchronous operation as follows.

Parameter name	Operation during synchronous operation
Unit setting	Operates by the setting of each axis. Specify the same settings for the axes to be synchronized when performing the synchronous operation.
Pulse number per rotation	
Moving amount per rotation	
Pulse I/O setting	
Limit switch	Follows the operation of the master axis during the synchronous operation.
Limit switch connection	
Software limit (Positioning control)	
Software limit (Home return)	
Software limit (JOG operation)	
Upper limit of software limit	
Lower limit of software limit	
Auxiliary output mode	
Auxiliary output ON time (ms)	
Auxiliary output Delay rate	
Home return – Setting code	Varies depending on the operation mode of the synchronous operation. Synchronous mode A: Operates by the setting of each axis. Synchronous mode B: Follows the operation of a master axis.
Home return – Direction	
Home return – Acceleration time	
Home return – Deceleration time	
Home return – Target speed	
Home return – Creep speed	
JOG operation – Acceleration/Deceleration type	Follows the operation of the master axis during the synchronous operation.
JOG operation – Acceleration time	
JOG operation – Deceleration time	
JOG operation – Target speed	
JOG positioning operation setting code	
JOG positioning operation acceleration time	
JOG positioning operation deceleration time	
JOG positioning operation target speed	
Emergency stop deceleration time (ms)	The operation varies according to the type of stop operations. For the details, see the following “Stop function in synchronous operation”.
Limit stop deceleration time (ms)	
Error stop deceleration time (ms)	
Pulser operation setting code	Operates by the setting of each axis. Specify the same settings for the axes to be synchronized when performing the synchronous operation.
Pulser operation ratio numerator	
Pulser operation ratio denominator	

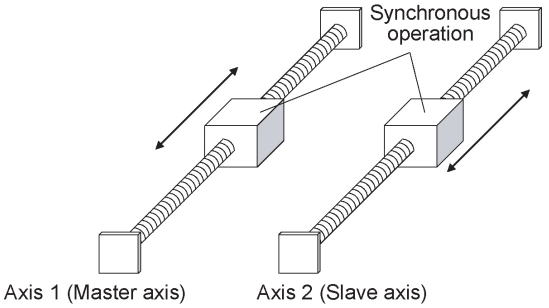
Stop function in synchronous operation

If the stop operation is executed for the master and slave axes during the synchronous operation, the operation is as follows.

		Axis requested to stop	
Stop operation	**Operational overview**	**Master axis**	**Slave axis**
System stop	All axes stop without deceleration time.	All axes stop.	
Emergency stop Deceleration stop	A specified axis stops with a deceleration time.	Stops with the deceleration time for the master axis.	
Limit stop	Stops with a deceleration time when a limit occurred.	Stops with the deceleration time for the master axis. After stop, the error code occurred on the master axis is set for the master/slave axes.	
Error stop	Stop the operation with a deceleration time when an error occurs.		

8.3.6 Setting and Operation of Synchronous Operation

The example below is the case of the synchronous operation for 2 axes with the positioning unit installed in the slot 0. The movement amount setting is the increment method, and the unit is set to pulse.

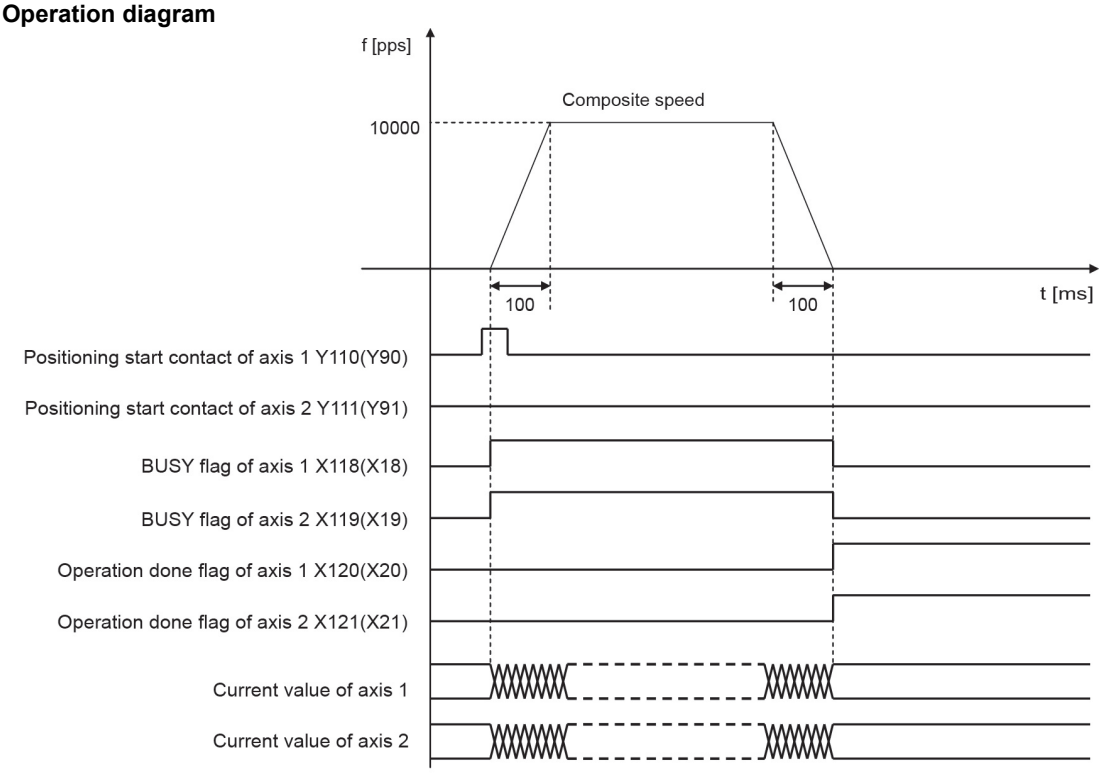


Setting

The parameters necessary for the setting of the positioning data and parameters are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example	Allowable range
Operation pattern	E: End point	C: Continuance point E: End point P: Pass point
Control method	I: Increment	I: Increment A: Absolute
X-axis movement amount	10000 pulses	Pulse: -1,073,741,823 to 1,073,741,823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): -1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 1-7,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree
Acceleration/ deceleration pattern	L: Linear	L: Linear S: S-shaped
Acceleration time (ms)	100 ms	0 to 10000 ms
Deceleration time (ms)	100 ms	0 to 10000 ms
Target speed	10000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s
Synchronous group	Synchronous group 1	Synchronous group 1/Synchronous group 2
Master axis	Axis 1	Axis 1 to Axis 8
Slave axis	Axis 2	Axis 1 to Axis 8
Synchronous mode	Synchronous mode A	Synchronous mode A/Synchronous mode B

Operation diagram

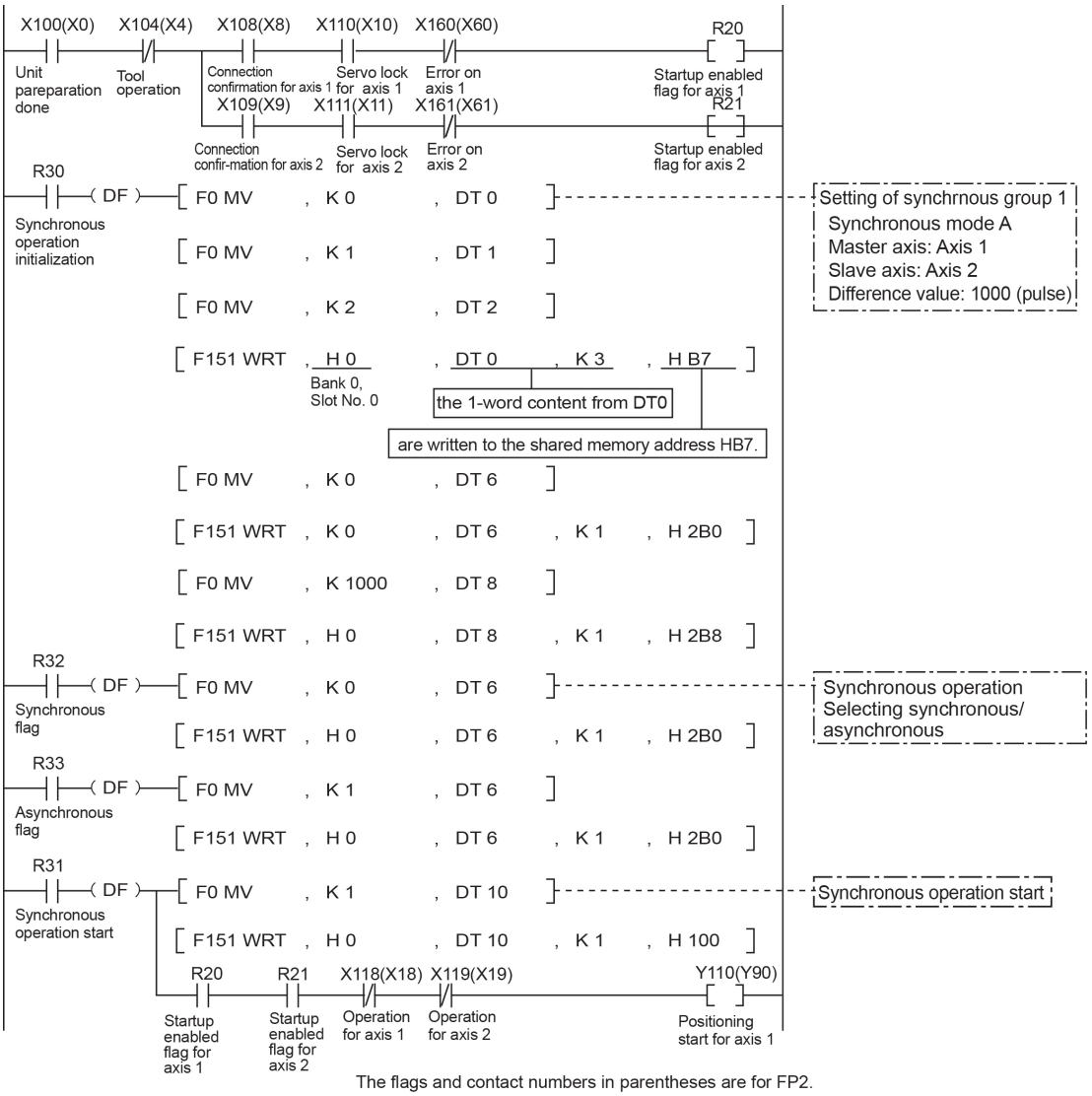


The flags and contact numbers in parentheses are for FP2.

Operations of each contact

- The BUSY flag (FP Σ: X118 and X119, FP2: X18 and X19) indicating the state that a motor is running turns on when the position control started, and it turns off when the operation completed.
- The operation done flag (FPsigma: X120 and X121, FP2: X20 and X21) indicating the state that an operation completed turns on when the position control completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts.
- In the synchronous operation, the request for the operation of the slave axis is ignored.

Sample program



The flags and contact numbers in parentheses are for FP2.

Precautions on programming

- If any value such as a movement amount, acceleration time, deceleration time or target speed is out of the specified range, a setting value error will occur when the position control starts.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

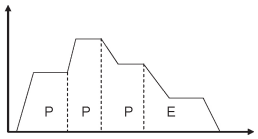
Operation at limit input

Condition	Direction	Limit status	Operation
When E point control is executed	Forward	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
	Reverse	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
During E point control	Forward	Limit input(+):ON	Deceleration stop, Error occurs.
	Reverse	Limit input (-):ON	Deceleration stop, Error occurs.

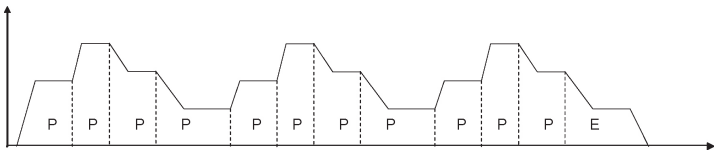
8.4 Setting and Operation of Positioning Repeat Function

The positioning repeat function is a function to execute the positioning control repeatedly for the specified times.
The repeat count is specified in the positioning repeat count area for each axis. It can be specified in the range of 2 to 254 times. Setting the positioning repeat count area to 255 specifies the unlimited repeat count.

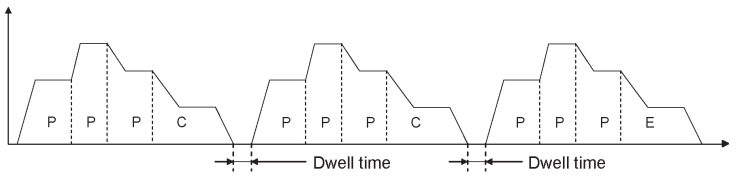
Overview of positioning repeat function
The operation when the following positioning control is repeated for 3 times is as below.



When setting the dwell time to 0 for the E point control that is the last of the positioning control, the positioning unit processes the E point control as the P point control, and completes the operation after repeating the positioning control for 3 times without stopping the operation.

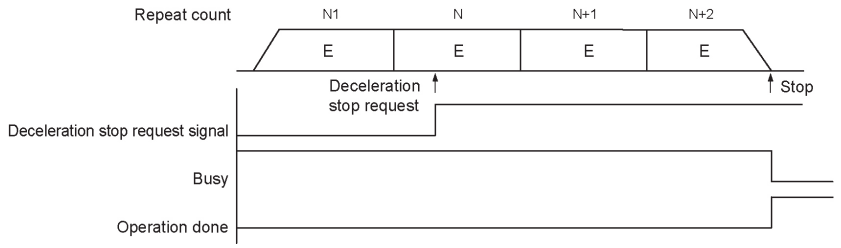


When setting the dwell time to a number other than 0 for the E point control that is the last of the positioning control, the positioning unit processes the E point control as the C point control, and execute the positioning control again after stopping the operation for the dwell time (ms). The positioning unit completes after repeating the positioning control for 3 times.



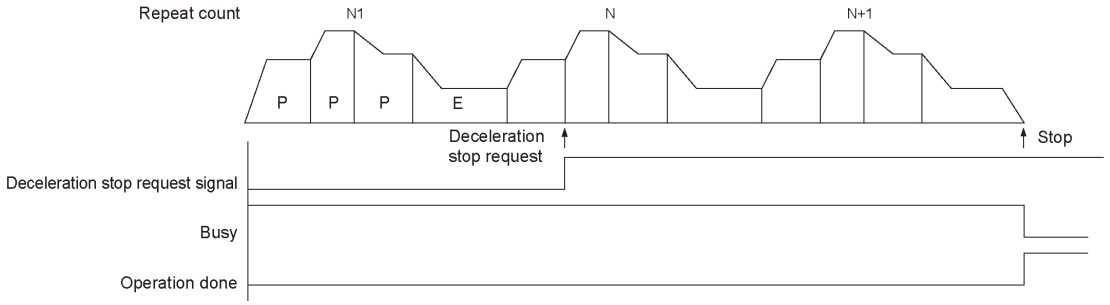
Stop processing in positioning repeat operation
The following operation is carried out only if performing the deceleration stop while repeating the positioning.

- When repeating the E point control (dwell time: 0 ms)
Once the positioning unit detects the deceleration stop, it will stop the positioning control after repeating for N+2 times.

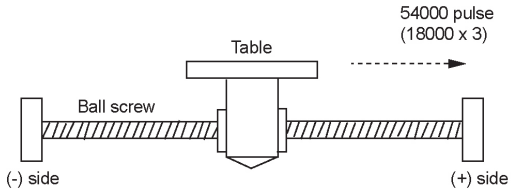


- When executing multiple positioning table consecutively

Once the positioning unit detects the deceleration stop, it will stop the positioning control after repeating for N+1 times.



The example below is the case of a single axis control with the positioning unit installed in the slot 0. The movement amount setting is the increment method, and the unit is set to pulse.

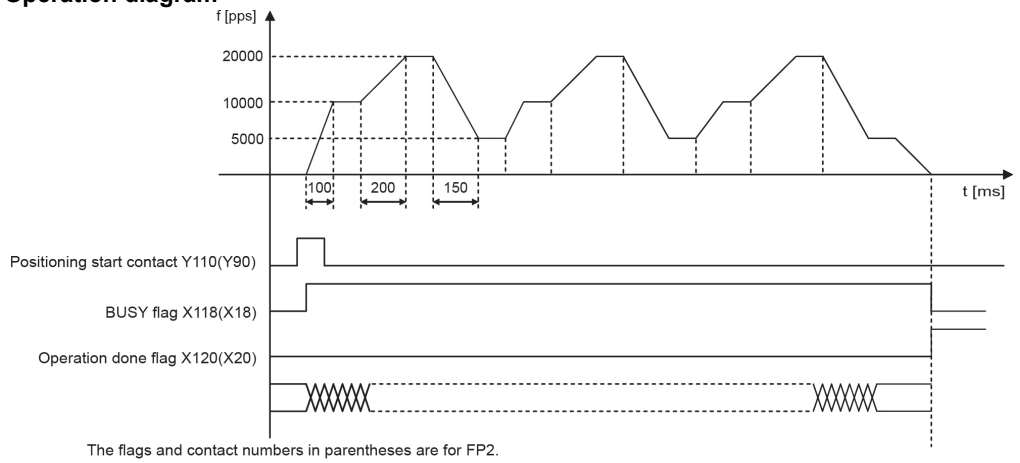


Setting

The parameters necessary for the setting of the positioning data and parameters are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example			Allowable range
	Table 1	Table 2	Table 3	
Operation pattern	P: Pass point	P: Pass point	E: End point	C: Continuance point E: End point P: Pass point J: Speed point
Control method	I: Increment	I: Increment	I: Increment	I: Increment A: Absolute
X-axis movement amount	5000 pulses	10000 pulses	3000 pulses	Pulse: -1,073,741,823 to 1,073,741,823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): -1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 1-7,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree
Acceleration/ deceleration pattern	L: Linear	L: Linear	L: Linear	L: Linear S: S-shaped
Acceleration time (ms)	100 ms	200 ms	30 ms	0 to 10000 ms
Deceleration time (ms)	10 ms	20 ms	150 ms	0 to 10000 ms
Target speed	10000 pps	20000 pps	5000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s
Positioning repeat count	3			0, 1: Execute only once 2 to 254: Repeat count 255: Unlimited repeat

Operation diagram

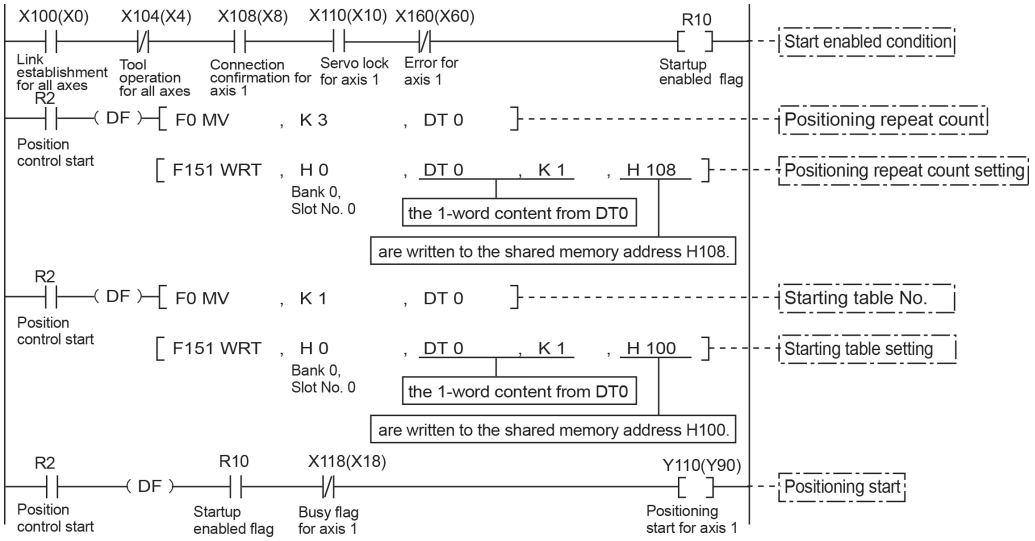


The flags and contact numbers in parentheses are for FP2.

Operations of each contact

- The BUSY flag (FPΣ: X118, FP2: X18) indicating the state that a motor is running turns on when the position control started, and it turns off when the operation completed.
- The operation done flag (FPΣ: X20, FP2: X20) indicating the state that an operation completed turns on when the position control completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts.

Sample program



The flags and contact numbers in parentheses are for FP2.

Precautions on programming

- Once starting the table 1, the operation continues up to the table 3 automatically. The last table should be set to E: End point.
- If any value such as a movement amount, acceleration time, deceleration time or target speed is out of the specified range, a setting value error will occur when the position control starts.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

Operation at limit input

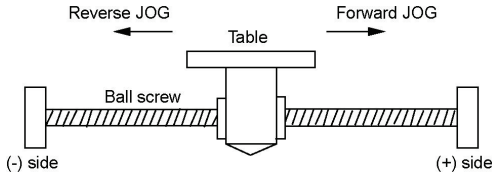
Condition	Direction	Limit status	Operation
When Position control is executed	Forward	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
	Reverse	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Not executable, Error occurs.
During position control	Forward	Limit input(+):ON	Deceleration stop, Error occurs.
	Reverse	Limit input (-):ON	Deceleration stop, Error occurs.

Chapter 9

Manual Operation (JOG Operation)

9.1 Setting and Operation of Home Return

The example below is a case when using the FPΣ with the positioning unit RTEX installed in the slot 0. The unit is set to pulse. When using the FP2, change the contact and flag numbers appropriately.

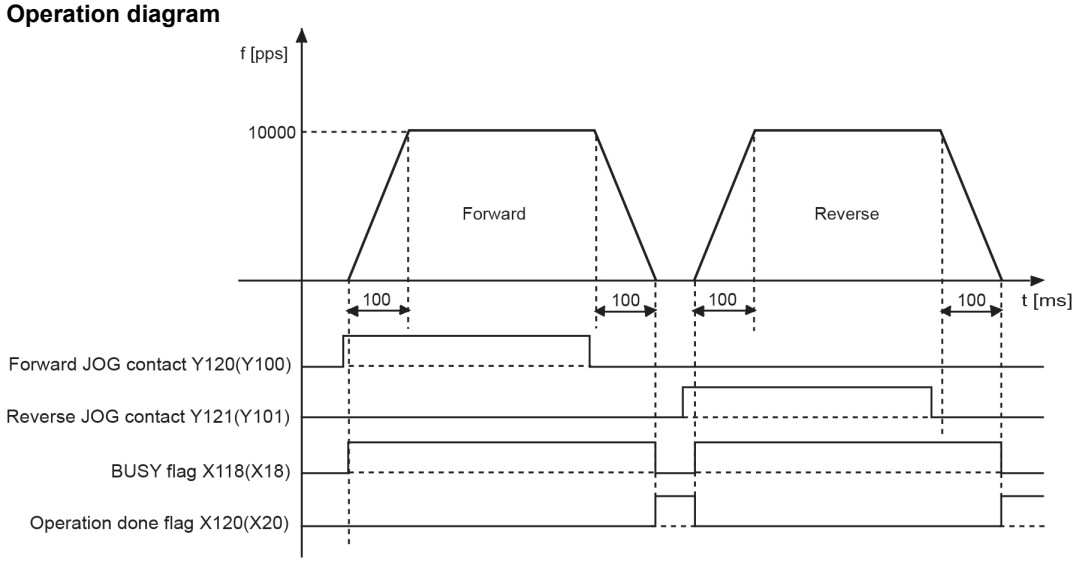


Setting

The parameters necessary for the setting of the JOG operation are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example	Allowable range
Acceleration/deceleration pattern	0: Linear acceleration/deceleration	0: Linear acceleration/deceleration 1: S-shaped acceleration/deceleration
Acceleration time (ms)	100 ms	0 to 10000 ms
Deceleration time (ms)	100 ms	0 to 10000 ms
Target speed	10000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s

Operation diagram

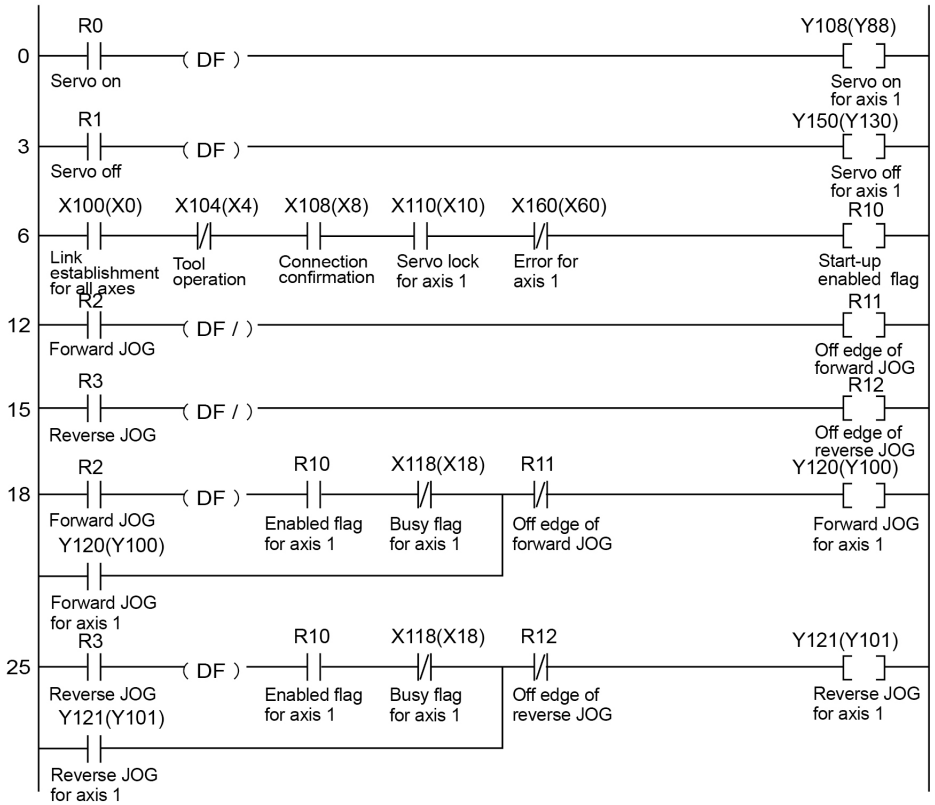


The numbers in parenthesis are the flag and contact numbers for the FP2.

Operations of each contact

- The BUSY flag (FPΣ: X118, FP2: X18) indicating the state that a motor is running turns on when the JOG operation started, and it turns off when the operation completed.
- The operation done flag (FPΣ: X120, FP2: X20) indicating the state that an operation completed turns on when the JOG operation completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts. The timing of that the flag turns on is at the time that the current value of the AMP became within the completion width specified in the parameter setting of the Configurator PM after sending the command to move to the stop position of the JOG operation.

Sample program



The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

Operation at limit input

Condition	Direction	Limit status	Operation
When JOG operation is executed	Forward	Limit input(+):ON	Not executable, Error occurs.
		Limit input (-):ON	Executable
	Reverse	Limit input(+):ON	Executable
		Limit input (-):ON	Not executable, Error occurs.
During JOG operation	Forward	Limit input(+):ON	Deceleration stop, Error occurs.
	Reverse	Limit input (-):ON	Deceleration stop, Error occurs.

9.2 Changing the Speed During JOG Operation

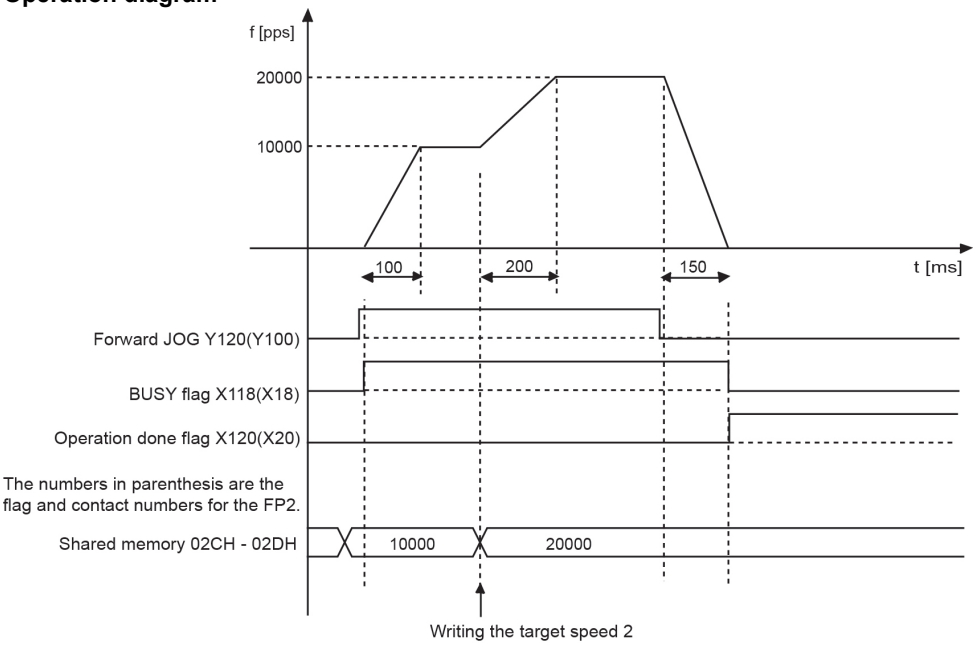
The target speed can be changed during the JOG operation.

Setting

The basic parameters necessary for the setting of the JOG operation are specified by the Configurator PM. However, the speed change during operation is set in pulse.

Item	Setting example	Allowable range
Acceleration/deceleration pattern	0: Linear acceleration/deceleration	0: Linear acceleration/deceleration 1: S-shaped acceleration/deceleration
Acceleration time 1 (ms)	100 ms	0 to 10000 ms
Deceleration time 1 (ms)	50 ms	0 to 10000 ms
Target speed 1	10000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s
Acceleration time 2 (ms)	200 ms	0 to 10000 ms
Deceleration time 2 (ms)	150 ms	0 to 10000 ms
Target speed 2	20000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s

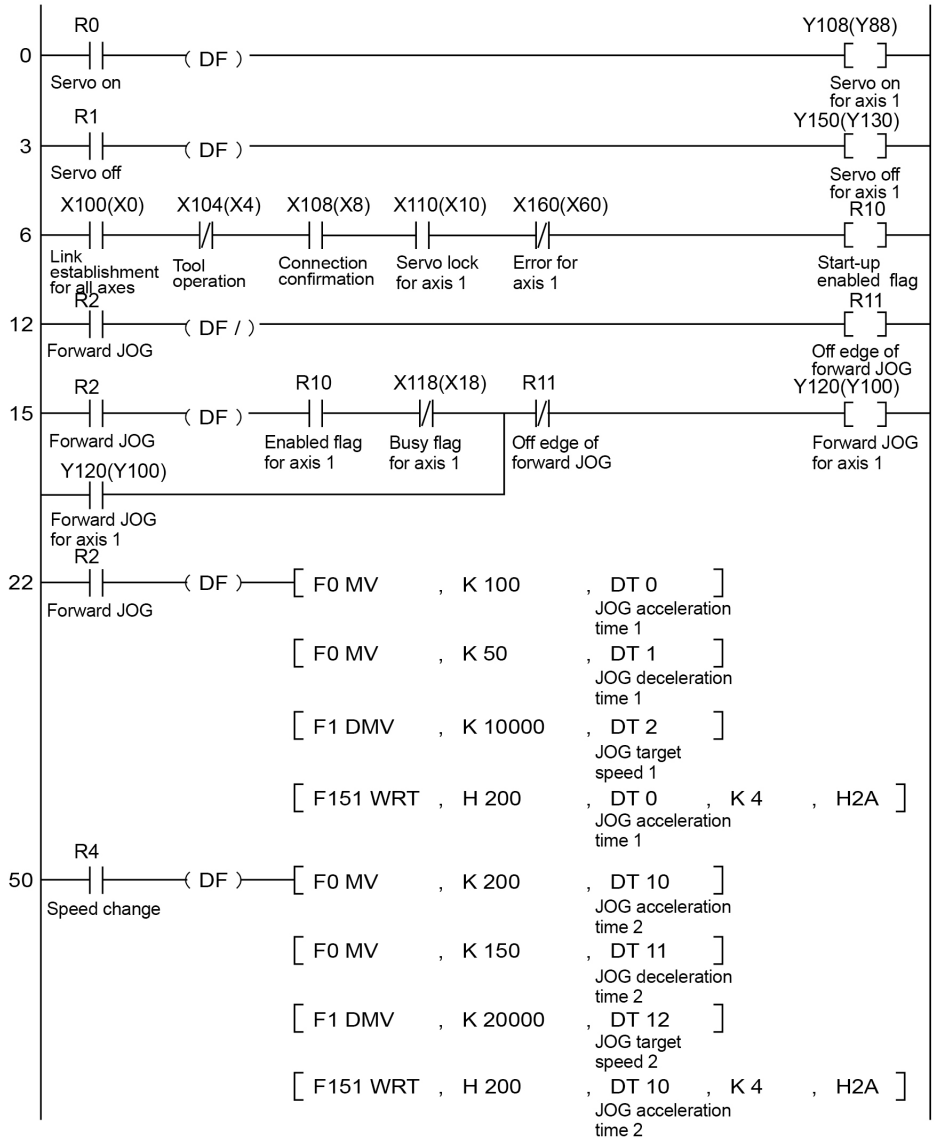
Operation diagram



Operations of each contact

- The BUSY flag (FPΣ: X118, FP2: X18) indicating the state that a motor is running turns on when the JOG operation started, and it turns off when the operation completed.
- The operation done flag (FPΣ: X120, FP2: X20) indicating the state that an operation completed turns on when the JOG operation completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts. The timing of that the flag turns on is at the time that the current value of the AMP became within the completion width specified in the parameter setting of the Configurator PM after sending the command to move to the stop position of the JOG operation.

Sample program



The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

- As the acceleration time and deceleration time will be retrieved when the speed is changed during the JOG operation, the acceleration/deceleration speed can be changed.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

Chapter 10

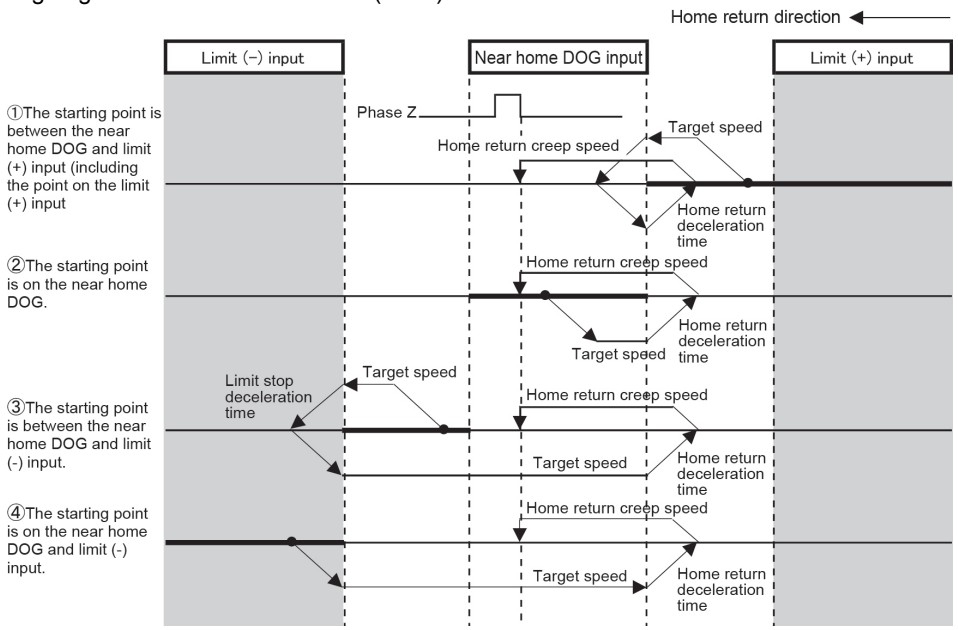
Manual Operation (Home Return)

10.1 Type of Home Return Method

The home return is a function to move a position to the origin of a reference position and set the coordinate to zero. The following home return methods are available for the positioning unit.

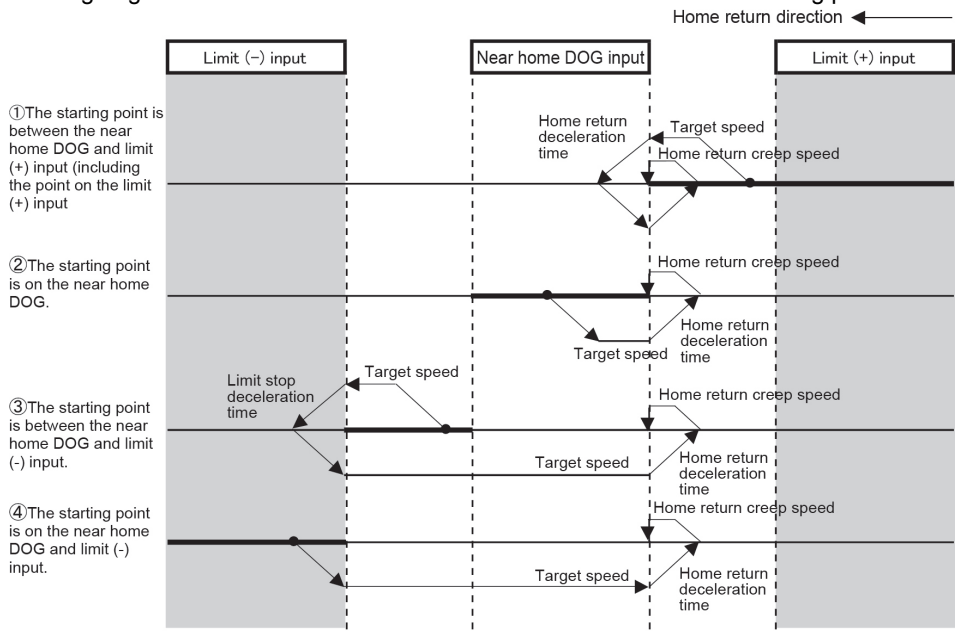
■DOG method 1 (Edge detection of near home switch + Home, based on front end)

The rising edge of the first home position (phase Z) is set as the starting point after the detection of the rising edge of the near home switch (DOG).



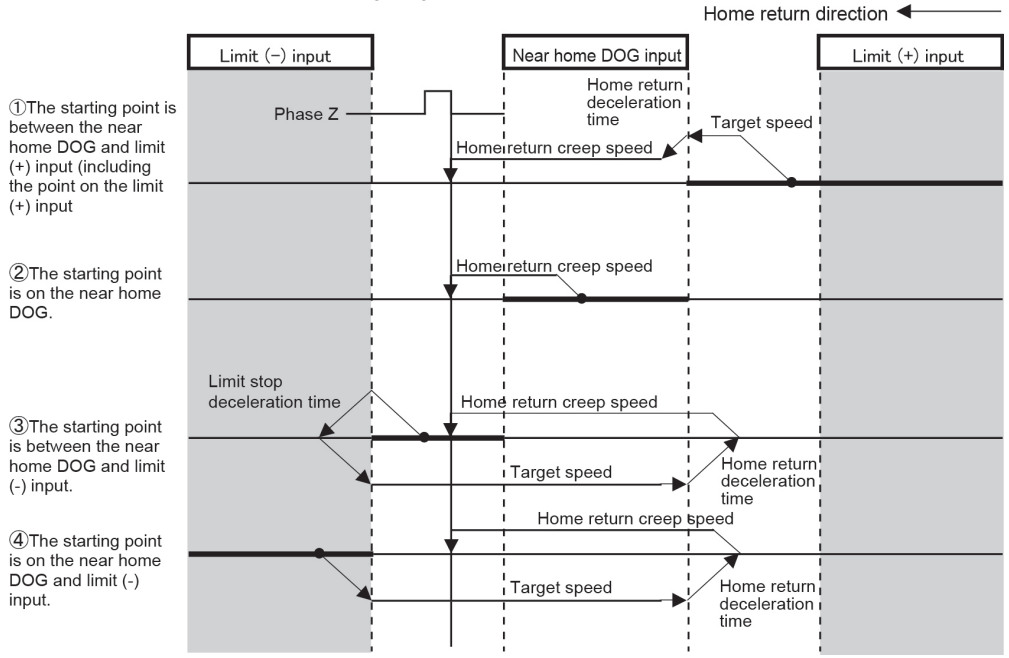
■**DOG method 2 (Edge detection of near home switch)**

The rising edge of the near home switch is detected and it is set as the starting point.



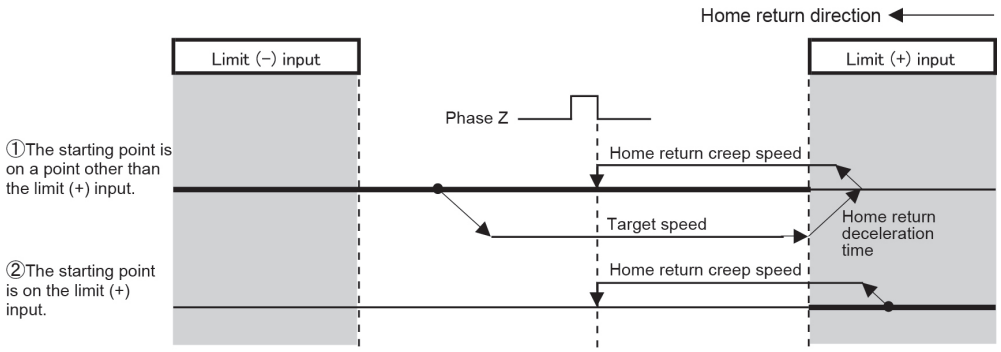
■**DOG method 3 (Edge detection of near home switch + Home, based on back end)**

The rising edge of the first home position (phase Z) in the home return direction is set as the starting point after the detection of the trailing edge (back end) of the near home switch (DOG).



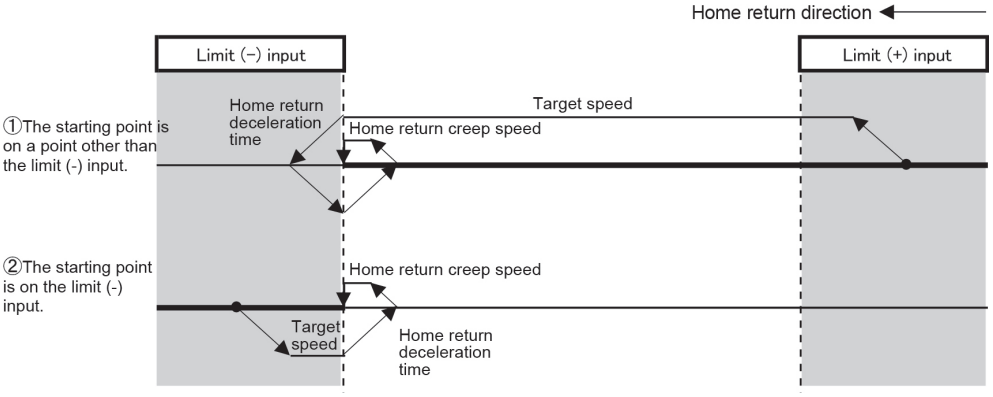
■Limit method 1 (Edge detection of limit switch + Home, based on front end)

Reverses after detecting the rising edge of the limit switch on the opposite side of the home return direction.



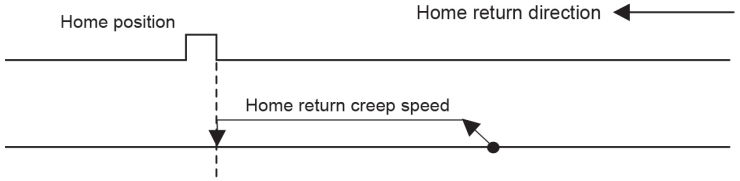
■Limit method 2 (Edge detection of limit switch)

Detects the rising edge of the limit switch in the home return direction and stops. That point becomes the starting point.



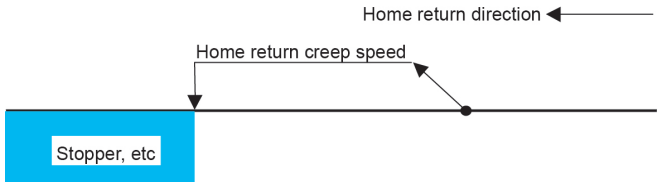
■Home (phase Z) method (Edge detection of home position)

Moves the current position to the home return direction, and stops at the position where the rising edge of the home position (phase Z) is detected. This coordinate is set as the starting point.



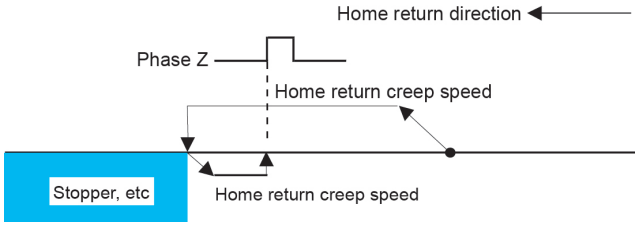
■Stop-on-contact method 1 (Stop-on-contact)

The position reached after a constant time has passed at the torque value higher than a specified value using an automatic stop mechanism such as a stopper is regarded as origin.



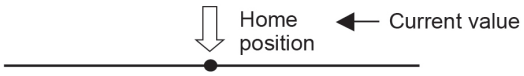
■Stop-on-contact method 2 (Stop-on-contact + Home, based on front end)

Although the operation is similar to the stop-on-contact method, it performs the reverse operation after the stop by a stopper and stops at the position where the first home position (phase Z) is detected. This coordinate is set as the starting point.



Data Set Method

The current value is considered as the origin.



Sample Program

Refer to “Home return ladder program for demo.fp”.

10.2 AMP Settings and Usable Home Return Methods

When using A6N or A5N as AMP, some home return methods cannot be used depending on the connections of limit signal and near home signal, and the parameter settings of AMP.
Note that the home return which cannot be executed is treated as an error and the positioning unit does not operate.

[A6N/A5N - Setting A (Factory default setting)]

Parameter No.	X4 connector Terminal name	X4 connector Terminal No.	Parameter value (HEX)	Set signal	Set logic
Pr 4.00	SI1	5	00323232H	SI-MON5	A contact
Pr 4.01	SI2	7	00818181H	POT	B contact
Pr 4.02	SI3	8	00828282H	NOT	B contact
Pr 4.03	SI4	9	002E2E2EH	SI-MON1	A contact
Pr 4.04	SI5	10	00222222H	HOME	A contact
Pr 4.05	SI6	11	00212121H	EXT2	A contact
Pr 4.06	SI7	12	002B2B2BH	EXT3	A contact
Pr 4.07	SI8	13	00313131H	SI-MON4	A contact

[A6N/A5N - Setting B (Setting value change)]

Parameter No.	X4 connector Terminal name	X4 connector Terminal No.	Parameter value (HEX)	Set signal	Set logic
Pr 4.00	SI1	5	00323232H	SI-MON5	A contact
Pr 4.01	SI2	7	00000000H		
Pr 4.02	SI3	8	00000000H		
Pr 4.03	SI4	9	002E2E2EH	SI-MON1	A contact
Pr 4.04	SI5	10	00222222H	HOME	A contact
Pr 4.05	SI6	11	00010101H	POT	A contact
Pr 4.06	SI7	12	00020202H	NOT	A contact
Pr 4.07	SI8	13	00313131H	SI-MON4	A contact

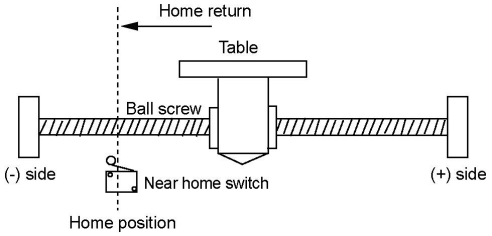
Available home return methods for each AMP setting of A6N/A5N are as follows.

Home return method	Reference home position	A6N/A5N Setting A	A6N/A5N Setting B
DOG method 1	Home (Phase Z)	Available	Available
DOG method 2	Near home (DOG)	Not available	Available
DOG method 3	Home (Phase Z)	Available	Available
Limit method 1	Home (Phase Z)	Available	Available
Limit method 2	Limit - (NOT) / Limit + (POT)	Not available	Available
Phase Z method	Home (Phase Z)	Available	Available
Stop-on-contact method 1	Mechanical stop mechanism such as a stopper	Available	Available
Stop-on-contact method 2	Home (Phase Z)	Available	Available
Data set method	-	Available	Available

Key Point:
For using HOME/POT/NOT as a home position reference trigger, select the AMP input as follows;
SI5 for HOME, SI6 for POT, SI7 for NOT
When a different input is allocated, a latch input allocation error occurs.

10.3 Setting and Operation of Home Return

The example below is a case when using the FPΣ with the positioning unit RTEX installed in the slot 0. The unit is set to pulse. When using the FP2, change the contact and flag numbers appropriately.

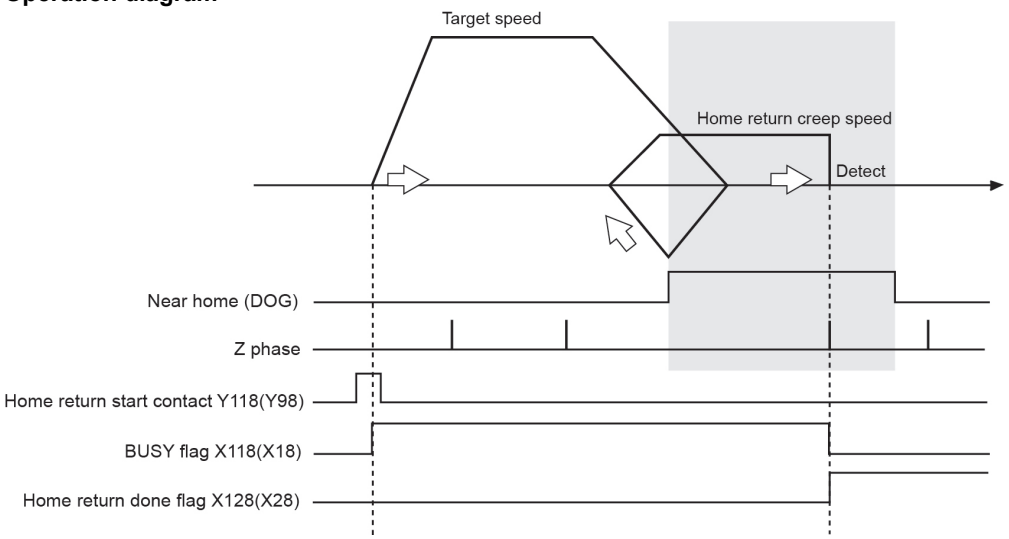


Setting

The parameters necessary for the setting of the home return are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example	Allowable range
Return setting code	0: DOG method 1	0: DOG method, 1: DOG method 2, 2: DOG method 3, 3: Limit method 1, 4: Limit method 2, 5: Phase Z method, 6: Stop-on-contact method 1, 7: Stop-on-contact method 2, 8: Data set
Return direction	0: Limit (-) direction	0: Limit (-) direction 1: Limit (+) direction
Acceleration time (ms)	100 ms	0 to 10000 ms
Deceleration time (ms)	100 ms	0 to 10000 ms
Target speed	10000 pps	Pulse: 1 to 32,767,000 pps μm: 1 to 32,767, 000 μm/s Inch: 0.001 to 32,767.000 inch/s degree:0.001 to 32,767.000 rev/s
Return creep speed	1000 pps	

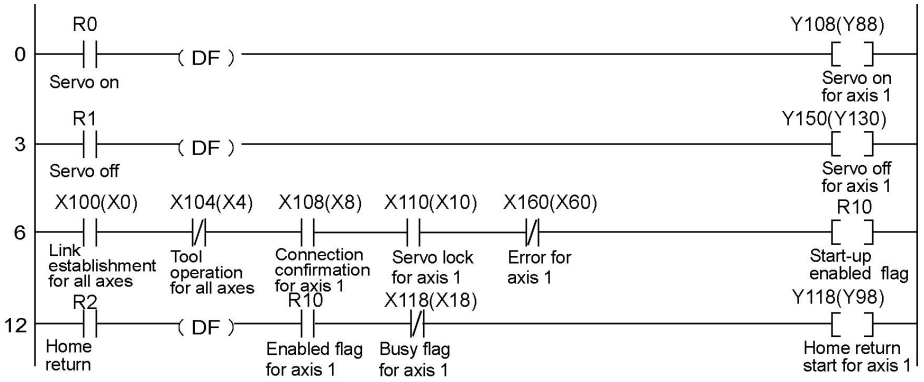
Operation diagram



Operations of each contact

- The BUSY flag (FPΣ: X118, FP2: X18) indicating the state that a motor is running turns on when the home return started, and it turns off when the operation completed.
- The home return done flag (FPΣ: X128, FP2: X28) indicating the state that an operation completed turns on when the home return operation completed, and it will be held until any operation among the position control, JOG operation, home return and pulser operation starts. The timing of that the flag turns on is at the time that the home return operation completed.

Sample program



The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

Operation at limit input

Condition	Direction	Limit status	Operation
When Home return operation is executed	Forward	Limit input(+):ON	Executable
		Limit input (-):ON	Executable
	Reverse	Limit input(+):ON	Executable
		Limit input (-):ON	Executable
During Home return operation	Forward	Limit input(+):ON	Automatic reverse operation
	Reverse	Limit input (-):ON	Automatic reverse operation

Chapter 11

Manual Operation (Pulser Operation)

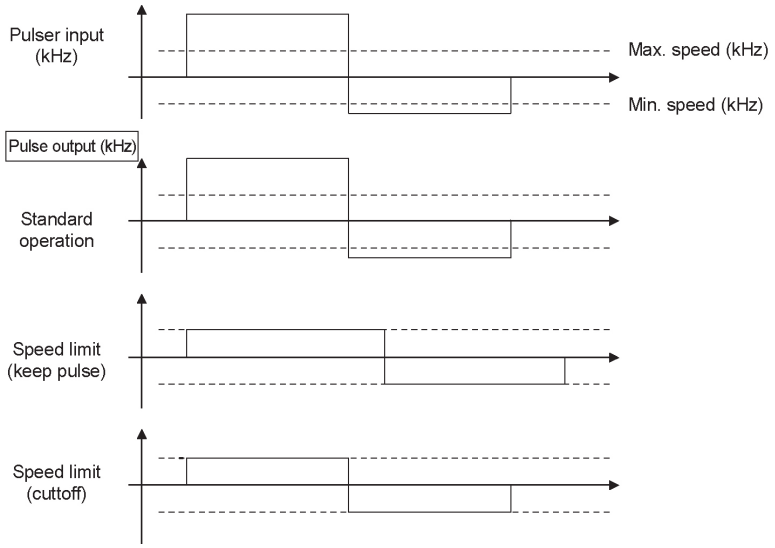
11.1 Setting and Operation of Pulser Operation

Types of pulse operation

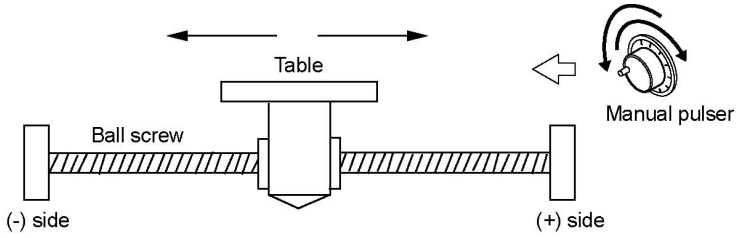
The pulser operation is a function to output pulses in the manual operation using the pulser connected to the positioning unit.

The following operation methods can be used.

Operation method	Operation
Standard operation	Obtains the number of pulses of the pulser in increment of 1 ms, and operates. The content of the input from the pulser are reflected in the actual operation as it is.
Speed limit (keep pulse)	Operates keeping the maximum speed, once the speed of the pulser input exceeds the specified maximum speed. The number of pulses that has been input with the pulser is kept. As the pulse that could not be output is kept, the pulse may be output even without input from the pulser. Speed unit is "Set unit X1000/s".
Speed limit (cutoff)	Operates keeping the maximum speed, once the speed of the pulser input exceeds the specified maximum speed The pulse that could not be output is cut off, and the pulse output is processed simultaneously with the operation of the pulser. Speed unit is "Set unit x1000/s".



The example below is a case when using the FPΣ with the positioning unit RTEX installed in the slot 0. The unit is set to pulse. When using the FP2, change the contact and flag numbers appropriately.

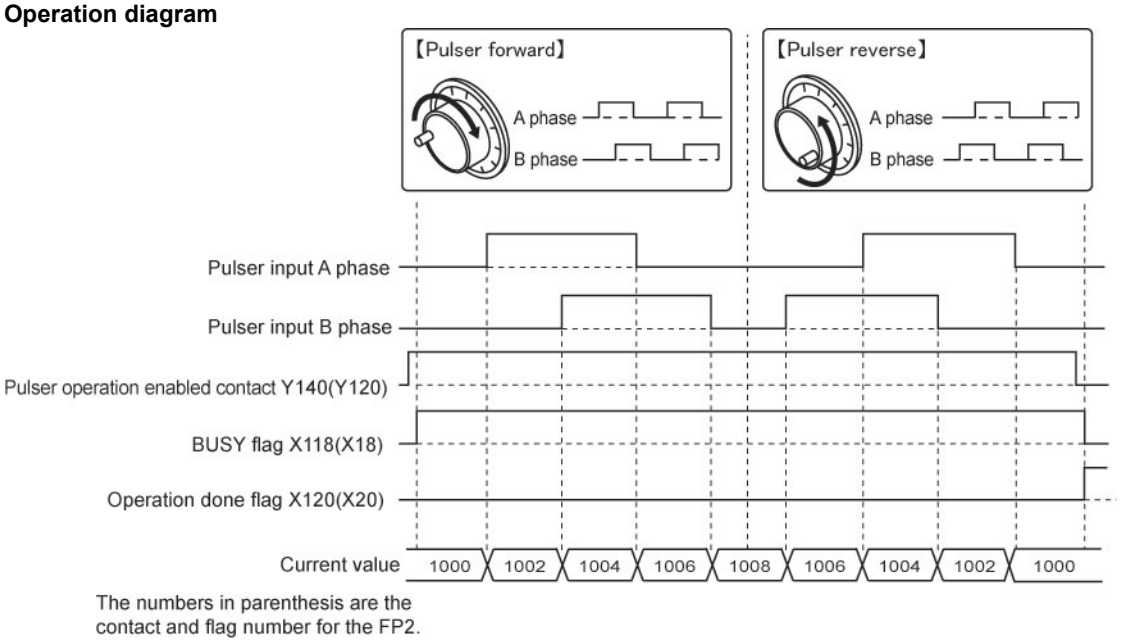


Setting

The parameters necessary for the setting of the pulser operation are specified by the Configurator PM. The unit is set to pulse.

Item	Setting example	Allowable range
Operation setting code	0: Pulser 1	0: Pulser 1, 1: Pulser 2, 2: Pulser 3
Pulser operation ratio numerator	2	1 to 32,767
Pulser operation ratio denominator	1	1 to 32,767
Pulser operation method	2: Speed limit (Round down)	0:Standard operation , 1: Speed limit (Pulse retention), 2: Speed limit (Round down)
Pulser operation maximum speed	500	Pulse: 1 to 32,767,000 pps

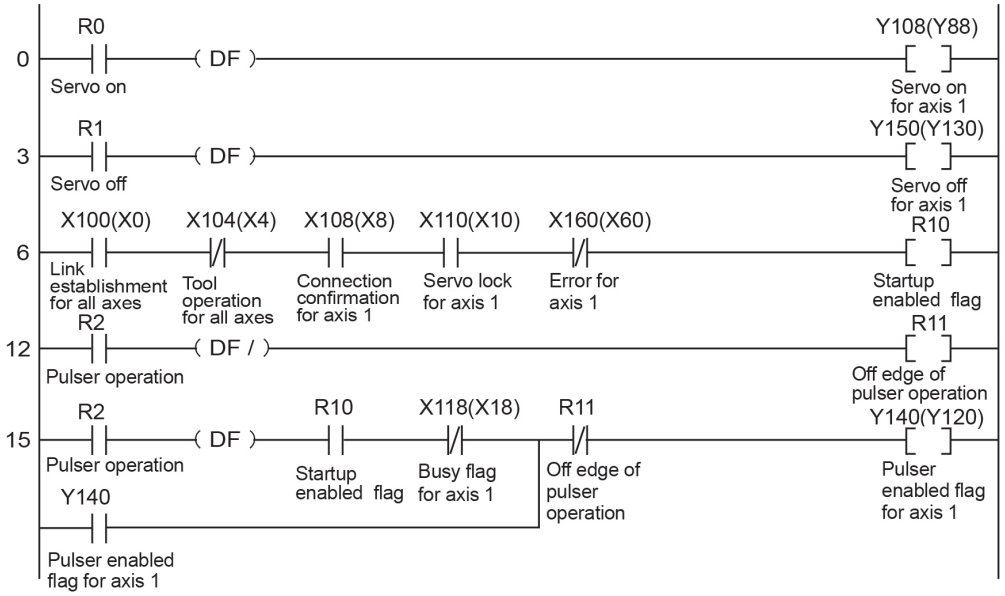
Operation diagram



Operations of each contact

- The BUSY flag (FPΣ: X118, FP2: X18) indicating the state that a motor is running turns on when a pulser operation enabled contact turned on, and it turns off when the pulser operation enabled contact turned off.
- The operation done flag (FPΣ: X120, FP2: X20) indicating the state that an operation completed turns on when an pulser operation enabled contact turned off, and it will be held until any operation among the position control, JOG operation, Home return and pulser operation starts.

Sample program



The numbers in parenthesis are the flag and contact numbers for the FP2.

Precautions on programming

- The movement amount per an 1-pulse signal from the pulser can be changed by setting the ratio numerator and ratio denominator for the input signal of the pulser.
- The number of the startup contact and flag varies depending on the number of axes and the installation position.
- The specified slot number varies depending on the installation position of the unit.

Operation at limit input

Condition	Direction	Limit status	Operation
When Pulser operation is executed	Forward	Limit input(+):ON	Not executable, Limit error occurs.
		Limit input (-):ON	Executable
	Reverse	Limit input(+):ON	Executable
		Limit input (-):ON	Not executable, Limit error occurs.
During Pulser operation	Forward	Limit input(+):ON	Deceleration stop, Limit error occurs.
	Reverse	Limit input (-):ON	Deceleration stop, Limit error occurs.

Chapter 12

Stop Functions

12.1 Settings and Operations of Stop Functions

Following stop functions are available during operations. Each deceleration time can be set individually. Set the deceleration time according to each occurrence condition of the stop operation.

Name	Occurrence condition	Axis stopped	Operation
Deceleration stop	when the deceleration stop contact turns on	Each axis	Stops in deceleration time of the control being operated.
Pause	when the deceleration stop contact turns on	Each axis	Stops in deceleration time of the control being operated, and restarts the stopped control once the deceleration stop is reset.
Emergency stop	when the emergency stop contact turns on	Each axis	Stops in the emergency stop deceleration time.
Limit stop	when the input of limit switch turns on	Each axis	Stops in the limit stop deceleration time.
Software limit stop	when exceeding the range of the software limit	Each axis	
Error stop	when an error occurred	Each axis	Stops in the error stop deceleration time.
System stop	when the system stop contact turns on	All axes	Stops without deceleration time

The deceleration stop (pause), emergency stop and system stop is performed by turning on each request contact in the I/O area. The stopped state is held while each contact is on until each request signal turns off. Any operation cannot be performed in the stopped state.

Refer to the following table for the stop by turning contacts on. It indicates the allocated I/O when the FPΣ/FP2 positioning unit RTEX is installed in the slot 0.

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
	Y100		Y80	All axes	System stop	Contact for requesting the system stop. When it turns on, all axes will stop with 0-deceleration time.
WY13	Y130	WY11	Y110	1 axis	Emergency stop	Requests the emergency stop for the corresponding AMP. The deceleration time for the emergency stop is specified by Configurator PM or the emergency stop setting in the shared memory. (The operation is the level type.) Note) The deviation counter cannot be cleared.
	Y131		Y111	2 axis		
	Y132		Y112	3 axis		
	Y133		Y113	4 axis		
	Y134		Y114	5 axis		
	Y135		Y115	6 axis		
	Y136		Y116	7 axis		
	Y137		Y117	8 axis		
	Y138		Y118	1 axis	Deceleration stop	Requests the deceleration stop for the corresponding AMP. The deceleration time for the deceleration stop is specified by Configurator PM or the deceleration stop setting in the shared memory. (The operation is the level type.) Note) The deviation counter cannot be cleared.
	Y139		Y119	2 axis		
	Y13A		Y11A	3 axis		
	Y13B		Y11B	4 axis		
	Y13C		Y11C	5 axis		
	Y13D		Y11D	6 axis		
	Y13E		Y11E	7 axis		
	Y13F		Y11F	8 axis		

12.2 Setting and Operation of Pause Function

The pause function is a function to temporarily stop the control in operation. The pause function is used switching between the deceleration stop function.
Using the pause function enables to perform the deceleration stop in the deceleration time of the control being operated by turning on the deceleration stop request contact.
After that, the stopped state is kept while the deceleration stop request contact is on, and the control stopped is restarted by turning off the deceleration stop request contact.

Switching between the pause function and deceleration stop function is carried out in the system operation setting area of the shared memory.

System operation setting area

Bank	Offset address	Name	Description
00H	389H	Deceleration stop operation	Specify the operation when turning on the deceleration stop request contact. 0: Deceleration stop 1: Pause - Performs the deceleration stop, and restarts the positioning operation when resetting “Deceleration stop request signal” (from ON to OFF). - Performs the same operation as the deceleration stop except during the positioning operation. - In the repeat operation, operates until getting to the E point targeted for repeating and stops. Restarts the repeat operation when resetting “Deceleration stop request signal” (from ON to OFF). - When executing the system stop or emergency stop in paused state, the pause will be reset and the operation will not be restarted even if the “Deceleration stop request signal” is reset (from ON to OFF). [Default] 0: Deceleration stop

 **Reference:** <17.4.13 System Operation Setting Area>

 **Note:**
The deceleration stop cannot be executed when using the pause function. Use the emergency stop function to execute the stop operation when using the pause function.
The pause function is available only when performing the automatic operation (positioning control). In the manual operation, it is the same operation as the deceleration stop.
The pause function keeps the stopped state as well as other stop functions when the deceleration stop (pause) request signal is on. If executing the emergency stop or system stop in paused state, the pause will be cancelled and the state will change to the one of the emergency stop or system stop.
The pause function cannot be specified by the Configurator PM. Change the operation with the program to use the pause function.

Chapter 13

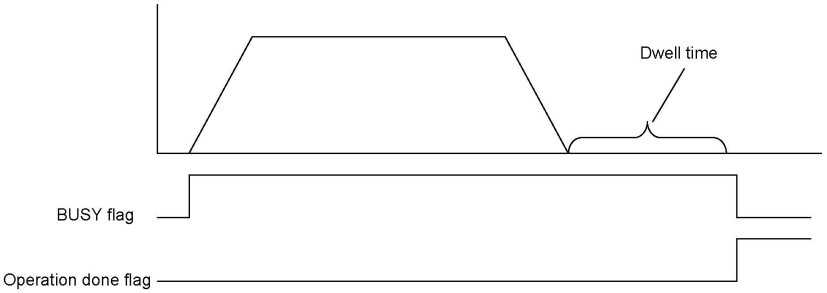
Supplementary Functions

13.1 Dwell Time

The time taken until the next operation after the completion of an executed positioning table in the automatic operation is called dwell time.
The operations of the dwell time vary according to control methods slightly. Followings are the operations in each control method.

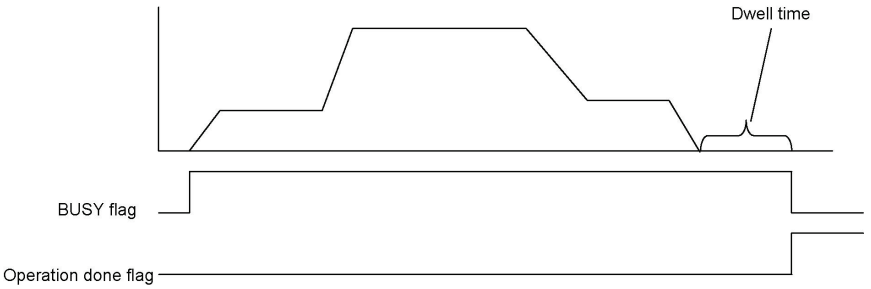
For E point control

The dwell time is the time taken from the completion of the position command until the operation done flag turns on.



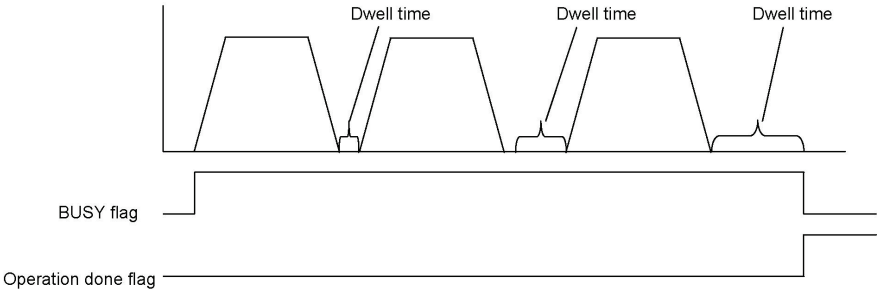
For P point control

In the P point control, the positioning table operates consecutively, therefore, the dwell time is ignored. For the last table (E point), as well as the E point control, the dwell time is the time taken from the completion of the position command until the operation done flag turns on.



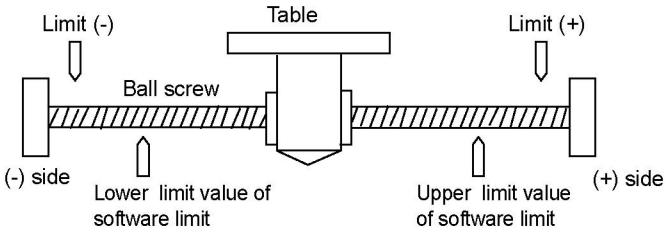
For C point control

The dwell time is the waiting time for executing the next table from the completion of the positioning table (deceleration stop).
For the last table (E point), as well as the E point control, the dwell time is the time taken from the completion of the position command until the operation done flag turns on.

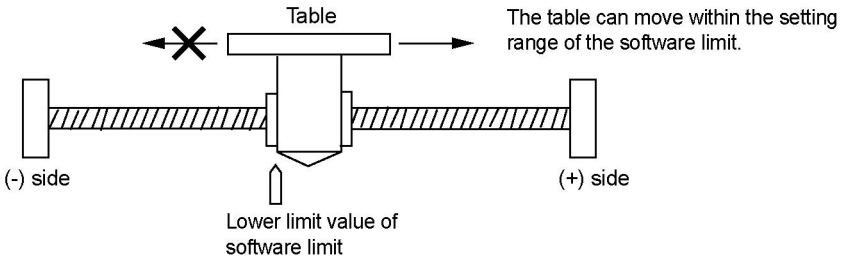


13.2 Software Limit

The system is designed to mechanically set the limit (+) and limit (-) to restrict the moving range of a motor.
Separately from the mechanical limits (+) and (-), the software limit is a function to add the limits in software for the absolute coordinate managed within the positioning unit RTEX. As the software limit is a function for the protection of the motor and AMP, it is recommended to set them to the values within the range of the mechanical limits (+) and (-) as below.



When exceeding the setting range of the software limit (upper and lower limit values), an error occurs, and the deceleration stop is executed. It is necessary to clear the error and move the motor into the range of the software limit using an operation such as JOG operation after the stop.



Whether the software limit is set to be available or not can be specified individually for the positioning control, JOG operation and home return each. For example, it is possible to set the limit software to be invalid only in the home return operation.

Reference: <17.6.2 Parameter Setting Area>

13.3 Torque Limit

The positioning unit RTEX supports a function (torque limit) to change the maximum torque for the AMP in real time. The torque limit can be arbitrarily changed during the torque limit operation, however, note that the torque cannot be changed in the home return operation.

The specified torque limit value is used as the maximum torque during the torque limit operation. Also, the torque limit cannot be specified by the setting tool, Configurator PM. Data must be written into the shared memory from the PLC in order to carry out the torque limit. Followings are the details of the shared memory to carry out the torque limit.

Torque limit setting area (Shared memory, Bank 0)

Add-ress	Name	Descriptions	Default value	Setting range	Unit
0D8H	Torque limit enabled flag	Sets whether to enable or disable the execution of the torque limit for each axis.	0H		
0D9H to 0DFH	Not used				
0E0H	Torque limit value of axis 1	Stores the torque limit value of axis 1.	3000	1 to 5000	0.1 %
0E1H	Torque limit value of axis 2	Stores the torque limit value of axis 2.	3000	1 to 5000	0.1 %
0E2H	Torque limit value of axis 3	Stores the torque limit value of axis 3.	3000	1 to 5000	0.1 %
0E3H	Torque limit value of axis 4	Stores the torque limit value of axis 4.	3000	1 to 5000	0.1 %
0E4H	Torque limit value of axis 5	Stores the torque limit value of axis 5.	3000	1 to 5000	0.1 %
0E5H	Torque limit value of axis 6	Stores the torque limit value of axis 6.	3000	1 to 5000	0.1 %
0E6H	Torque limit value of axis 7	Stores the torque limit value of axis 7.	3000	1 to 5000	0.1 %
0E7H	Torque limit value of axis 8	Stores the torque limit value of axis 8.	3000	1 to 5000	0.1 %

Torque limit enabled flag

bit	Name	Default value	Descriptions
0	Torque limit of axis 1	0	0: Torque limit disabled (Default) 1: Torque limit enabled
1	Torque limit of axis 2	0	
2	Torque limit of axis 3	0	
3	Torque limit of axis 4	0	
4	Torque limit of axis 5	0	
5	Torque limit of axis 6	0	
6	Torque limit of axis 7	0	
7	Torque limit of axis 8	0	
15 to 8	-	-	-

Torque limit values of axes 1 to 8

bit	Name	Default value	Descriptions
15 to 0	Torque limit value	3000	Sets the torque limit value. The unit is (0.1%). If 2000 is written in this area, it operates with “2000 x 0.1 = 200 (%)” as the maximum torque.

 **Reference:** <17.4.7 Torque Limit Area>

13.3.1 Restrictions on Real-time Torque Limit

The realtime torque limit function cannot be used for the home return operation.
As a parameter of AMP “Primary torque limit value” is used, do not change the used torque e limit by PANATERM, etc when using the torque limit.

13.4 Auxiliary Output Code and Auxiliary Output Contact

The auxiliary output contact is a function to inform about which table's operation is performing when the automatic operation (E point control, C point control, P point control, J point control) is executed.
The auxiliary output contact and the auxiliary output code can be used by setting the parameter "auxiliary output mode" of each axis to the With or Delay mode.

Auxiliary output contact

The With mode and Delay mode are available for the operation of the auxiliary output contact.

Auxiliary output mode	Operation
With mode	At the same time the automatic operation starts, the auxiliary contact flag of the corresponding axis allocated in the I/O area turns on.
Delay mode	The auxiliary contact flag of the corresponding axis allocated in the I/O area turns on according to the rate (%) of positioning moving amount in the automatic operation. The rate to turn on the flag in the Delay mode is specified in the auxiliary output delay rate area of the shared memory. However, if the J point control has been specified for the automatic operation, the operation is the same as the one in the With mode.

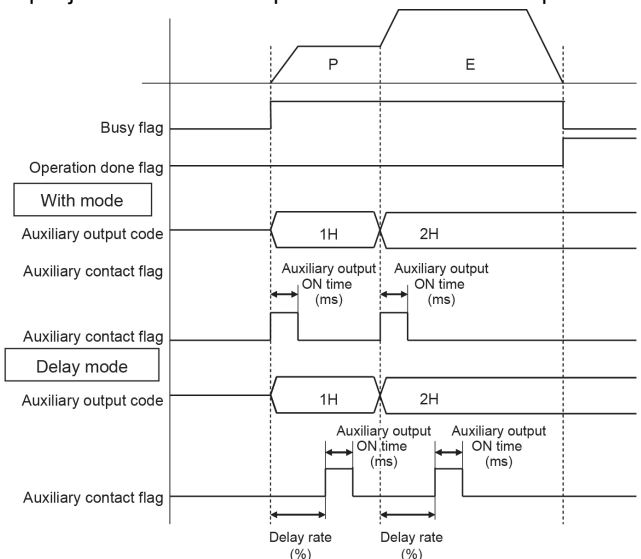
Also, the ON time of the auxiliary contact flag can be specified in the ms unit

Reference: <17.6.2 Parameter Setting Area>

Note: When performing the J point control, the operation in the Delay mode is the same as the one in the With mode.
When the auxiliary output mode is set to With mode or Delay mode, and the position control is "0", the auxiliary output contact is not output.

Auxiliary output code

The auxiliary output code (1 word) can be set for each table of the positioning data. The content of the process currently carried out can be confirmed by setting the auxiliary output. The values in the auxiliary output code are held until the next positioning table is executed. Also, the auxiliary output data that was output just before the completion of the automatic operation is held.

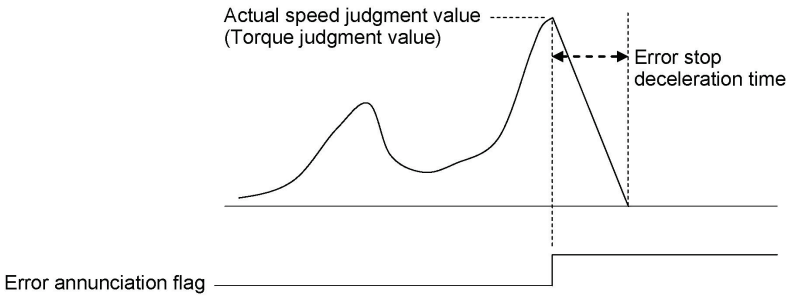


Note: The auxiliary output code is stored when the positioning starts regardless of the type of auxiliary output modes (With mode or Delay mode).
When the auxiliary output mode is set to With mode or Delay mode, and the position control is "0", the auxiliary output code is output.

13.5 Actual Speed/Torque Value Judgment

These are the functions that monitor the actual speed/torque of the AMP in real time and to give an error or warning when the monitored values exceed the judgment values.
The judgment values for the actual speed and torque can be specified for axis each, and it is possible to select either to give an error or warning.

When an error occurs, the operation stops with the error stop deceleration time, and the next operation cannot be executed until performing the error clear.
When giving a warning, the warning is just informed, and the operation continues.



Reference: <17.6.2 Parameter Setting Area>

13.6 Imposition Flag and Completion Width

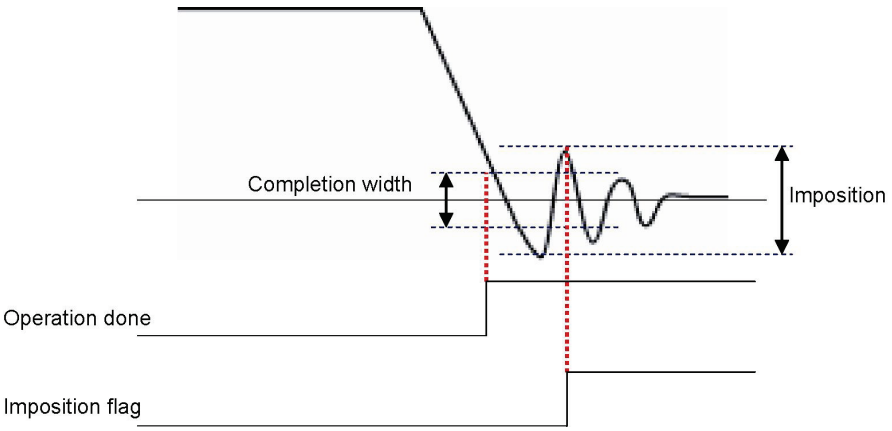
Imposition

The imposition flag is a flag to inform the imposition status of the AMP allocated to the I/O, and it turns on when the position error of the corresponding axis is within the setting range specified in the AMP. It does not relate to the control of the positioning RTEX. It is the imposition monitor of the AMP.
The imposition range must be directly specified in the AMP. Use the PANATERM that is a setting tool for the AMP.

Reference: <17.2 Table of I/O Area>

Completion width

It is used to set the timing to turn on the operation done flag allocated to the I/O of the positioning unit RTEX.
The operation done flag turns when the current position is in the range of the +/- completion width (pulse) of the target command position after the completion of the pulse output. The completion width is monitored by the positioning unit RTEX unlike the position error of the AMP. Therefore, note that the timing of which the imposition flag turns on may differ from the timing of which the operation done flag turns on.



Reference: <17.6.2 Parameter Setting Area>

13.7 Current Value Update

The current value update is a function to change the current value managed in the positioning unit to an arbitrary value.
Data must be written into the shared memory from the PLC in order to carry out the current value update.
Followings are the details of the shared memory to carry out the current value update.

Home change area (Shared memory, Bank 0)

<table>
<tr><th>address</th><th>Name</th><th>Descriptions</th></tr>
<tr><td>0C0H</td><td>Current value update request flag</td><td>Only when the corresponding bits for each axis changed to 1 from 0, the current value coordinate managed in the positioning unit is changed to the following current value update coordinate.
After the change, the positioning unit clears the corresponding bits to 0 automatically.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Current value update request axis 1</td><td>0</td><td rowspan="8">0: No change
1: Change the coordinate origin.
(After the change, the positioning unit sets to 0 automatically.)</td></tr>
<tr><td>1</td><td>Current value update request axis 2</td><td>0</td></tr>
<tr><td>2</td><td>Current value update request axis 3</td><td>0</td></tr>
<tr><td>3</td><td>Current value update request axis 4</td><td>0</td></tr>
<tr><td>4</td><td>Current value update request axis 5</td><td>0</td></tr>
<tr><td>5</td><td>Current value update request axis 6</td><td>0</td></tr>
<tr><td>6</td><td>Current value update request axis 7</td><td>0</td></tr>
<tr><td>7</td><td>Current value update request axis 8</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>0C8H
0C9H</td><td>Current value update coordinate of axis 1</td><td>Stores the coordinate to change the current value of axis 1.</td></tr>
<tr><td>0CAH
0CBH</td><td>Current value update coordinate of axis 2</td><td>Stores the coordinate to change the current value of axis 2.</td></tr>
<tr><td>0CCH
0CDH</td><td>Current value update coordinate of axis 3</td><td>Stores the coordinate to change the current value of axis 3.</td></tr>
<tr><td>0CEH
0CFH</td><td>Current value update coordinate of axis 4</td><td>Stores the coordinate to change the current value of axis 4.</td></tr>
<tr><td>0D0H
0D1H</td><td>Current value update coordinate of axis 5</td><td>Stores the coordinate to change the current value of axis 5.</td></tr>
<tr><td>0D2H
0D3H</td><td>Current value update coordinate of axis 6</td><td>Stores the coordinate to change the current value of axis 6.</td></tr>
<tr><td>0D4H
0D5H</td><td>Current value update coordinate of axis 7</td><td>Stores the coordinate to change the current value of axis 7.</td></tr>
<tr><td>0D6H
0D7H</td><td>Current value update coordinate of axis 8</td><td>Stores the coordinate to change the o current value of axis 8.</td></tr>
</table>

Procedures of current value update

1. Write an coordinate to be the current value in the current value update coordinate area of the target axis.
2. Write the value at the time that the bit of the target axis set to 1 in the current value request flag area. As the current value update process is performed for the axis that is 1 in the current value request flag area, do not set any bit to 1 other than the target axis.
3. The feedback value after unit conversion in each axis information and monitor area is changed to the specified current value.

Reference: <17.4.6 Current Value Update Data Area>

Note: The value to be changed by updating the current value is the feedback value after unit conversion.

13.7.1 Restrictions on Operation

The current value update can be executed only when the target axes stop. Although the current value update function can be executed during the operation of a target axis, the current value update request during the axis operation (Busy) is ignored, and the current value is automatically updated after the axis operation stops.

13.8 Coordinate Origin

The positioning unit sets the coordinate managed to 0 by the home return process.
Coordinate origin is a function to set the coordinate after the home return process to an arbitrary value.

Procedure of coordinate origin process

1. Write the coordinate to be the origin in the coordinate origin value area for the axis of which coordinate will be changed after the home return.
2. Execute the home return for the target axis. After the home return, the coordinated specified in the above 1 becomes the origin.

Offset address	Name	Description
04AH	Coordinate origin	Stores the value of coordinate origin after the home return.
04BH		

 **Reference:** <17.6.2 Parameter Setting Area>

 **Note:** The coordinate origin value should be specified in the specified unit. The value to be changed by the coordinate origin value is the feedback value after unit conversion.

13.9 Position Deviation Simple Monitor

Overview

The position deviation is the difference between the current value controlled by the positioning unit RTEX and the AMP current position fed back from the AMP.

This function is the same as the deviation counter provided in the AMP. The difference between the command value of the positioning unit in the positioning process and the current value of the AMP can be confirmed by indicating this deviation in the monitor area on the positioning unit.

13.9.1 Monitoring Method

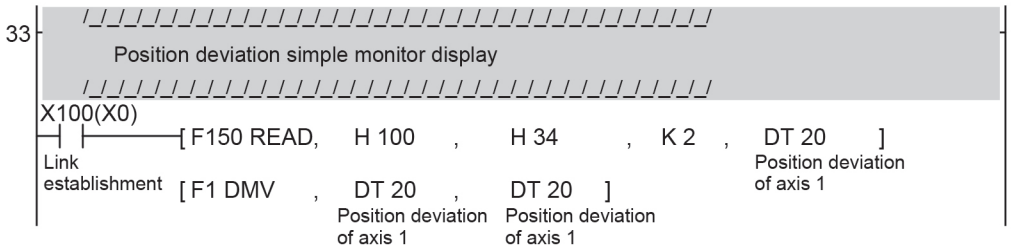
"Position deviation" is added in the each axis information & monitor area.

 **Reference:** <17.5.2 Each Axis Information & Monitor Area>

Added to 17.5.2: Axis information of axis 1 (Ver.1.13 or later)

Bank	Offset address	Name	Description
01H	034H	Position deviation of axis 1	The position deviation calculated on the unit of axis 1 is stored.
	035H		
	074H	Position deviation of axis 2	The position deviation calculated on the unit of axis 2 is stored.
	075H		
	0B4H	Position deviation of axis 3	The position deviation calculated on the unit of axis 3 is stored.
	0B5H		
	0F4H	Position deviation of axis 4	The position deviation calculated on the unit of axis 4 is stored.
	0F5H		
	134H	Position deviation of axis 5	The position deviation calculated on the unit of axis 5 is stored.
	135H		
	174H	Position deviation of axis 6	The position deviation calculated on the unit of axis 6 is stored.
	175H		
	1B4H	Position deviation of axis 7	The position deviation calculated on the unit of axis 7 is stored.
	1B5H		
	1F4H	Position deviation of axis 8	The position deviation calculated on the unit of axis 8 is stored.
	1F5H		

13.9.2 Sample program



（The flags and contact numbers in parentheses are for FP2.

13.9.3 Restrictions on Operation

- As the deviation to be displayed with the position deviation simple monitor is calculated within the positioning unit, a difference may occur with the deviation counter value of the AMP.
- The display of the position deviation monitor is updated by 10 ms.

13.10 AMP Parameter R/W Function

The positioning unit RTEX can execute the following operations for AMP via network (Realtime Express).

- Reading AMP parameters
- Writing AMP parameters
- Saving AMP parameters (EEPROM write)
- Resetting AMP (Restart)

For performing the AMP control with the positioning unit RTEX, use the AMP parameter control area (Shared memory: Bank 52H, Address from 000H) after changing the AMP control mode (System operation setting area: Shared memory: Bank 00H, Address 384H) to 1H (AMP control enable).

Each operation of AMP control can be executed only when the target axis stops.
If the operation is executed when the axis is activated, it will end because the request cannot be executed.
Reading parameters, however, can be executed during operations other than home return.

The procedure of each operation for AMP is described below.

13.10.1 Reading AMP Parameters

[With A4N]

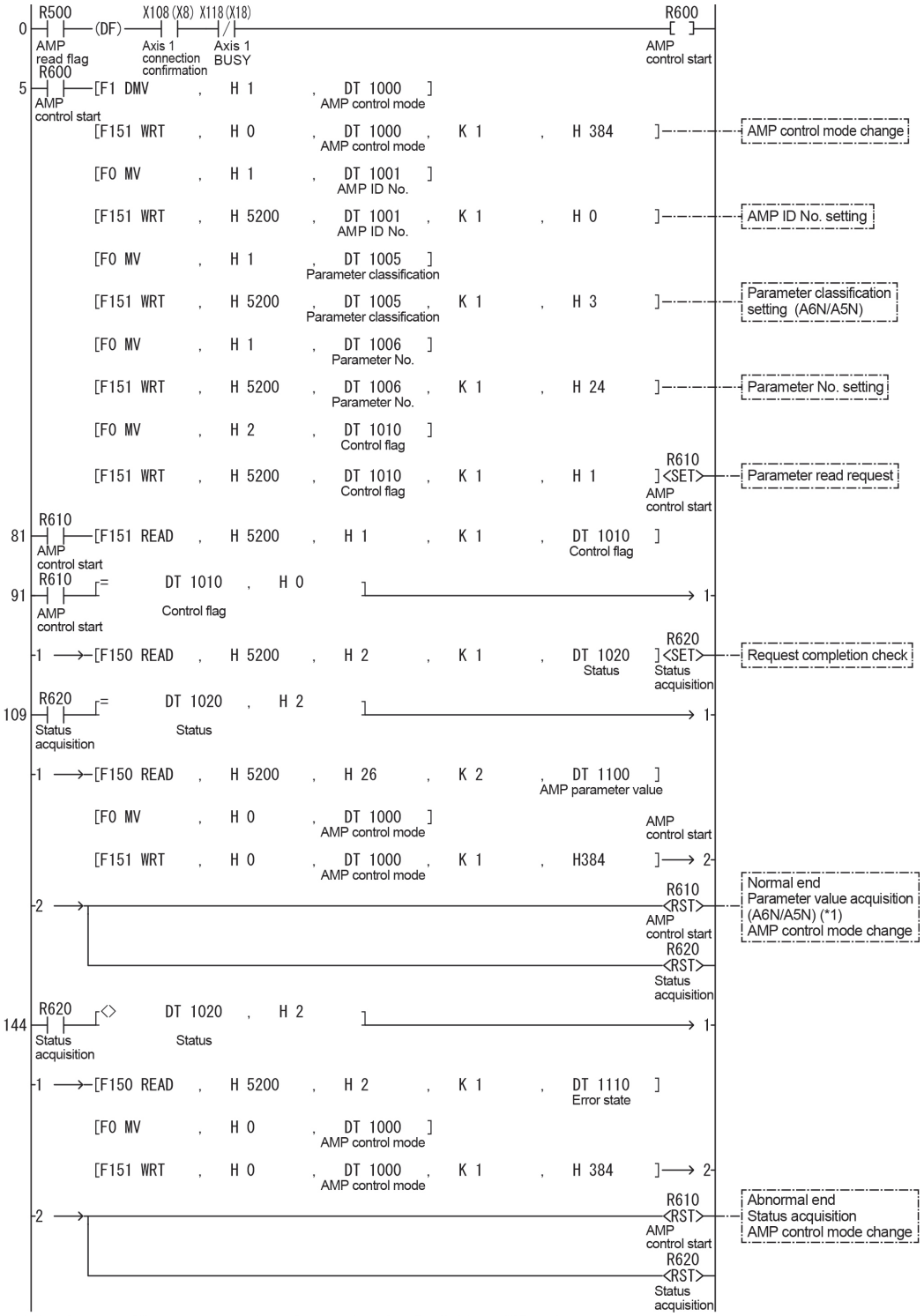
1. Change the AMP control mode to "1 (AMP control enable)".
2. AMP parameter control area
   Set the axis number (AMP ID No.) to be read to the AMP ID number.
   Set the parameter number to be read to the individual parameter number.
   Set the control flag to "2H (Read request)".
3. The positioning unit RTEX reads parameters of the AMP and stores the parameter values in the A4N parameter data of the AMP parameter control area.
4. Confirm the AMP parameter control area status is 2H (Normal end).
5. Change the AMP control mode to "0 (AMP control disable)" after reading parameter data.

[With A6N / A5N]

1. Change the AMP control mode to "1 (AMP control enable)".
2. AMP parameter control area
   Set the axis number (AMP ID No.) to be read to AMP ID number.
   Set the parameter classification to be read to the A6N/A5N parameter classification.
   Set the parameter number to be read to the individual parameter number.
   Set the control flag to "2H (Read request)".
3. The positioning unit RTEX reads parameters of the AMP and stores the parameter values in the A6N/A5N parameter data of the AMP parameter control area.
   Note that the A6N/A5N parameter is double word data.
4. Confirm the AMP parameter control area status is 2H (Normal end).
5. Change the AMP control mode to "0 (AMP control disable)" after reading parameter data.

Sample program

(When reading AMP parameter No.1.1 of axis 1 with A6N or A5N)



*1: The storage address of parameter value and the size for A4N are different.

*2: The flags and contact numbers in parentheses are for FP2.

13.10.2 Writing AMP Parameters

[With A4N】

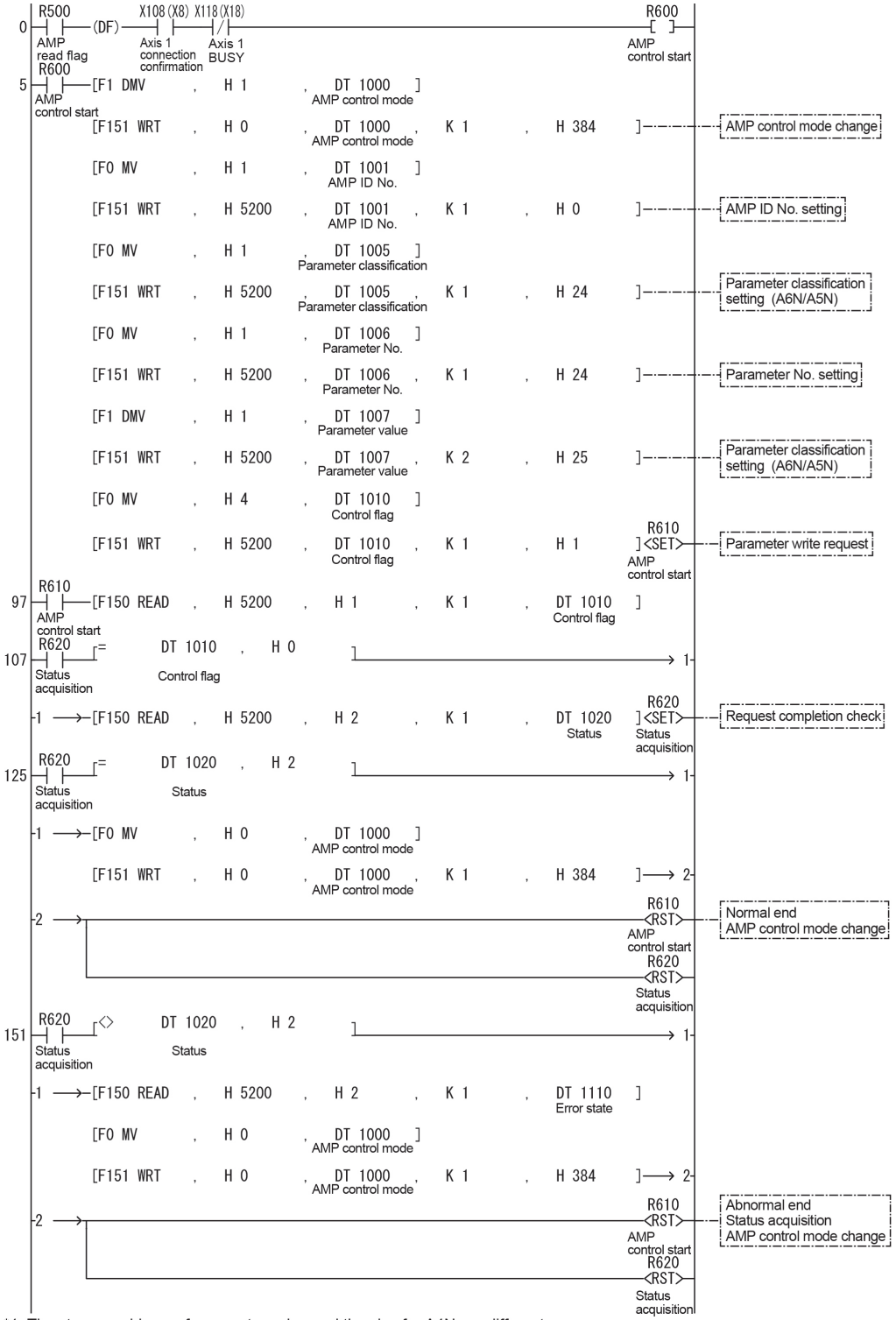
1. Change the AMP control mode to "1 (AMP control enable)".
2. AMP parameter control area
   Set the axis number (AMP ID No.) to be read to AMP ID number.
   Set the parameter number to be read to the individual parameter number.
   Store the parameter value to be written in the A4N parameter data.
   Set the control flag to "4H (Write request)".
3. The positioning unit RTEX writes the parameter to the AMP.
4. Confirm the AMP parameter control area status is 2H (Normal end).
5. Change the AMP control mode to "0 (AMP control disable)" after reading parameter data.

[With A6N/A5N]

1. Change the AMP control mode to "1 (AMP control enable)".
2. AMP parameter control area
   Set the axis number (AMP ID No.) to be read to AMP ID number.
   Set the parameter classification to be read to the A6N/A5N parameter classification.
   Set the parameter number to be read to the individual parameter number.
   Store the parameter value to be written in the A6N/A5N parameter data. (Double word data)
   Set the control flag to "4H (Write request)".
3. The positioning unit RTEX writes the parameter to the AMP.
4. Confirm the AMP parameter control area status is 2H (Normal end).
5. Change the AMP control mode to "0 (AMP control disable)" after reading parameter data.

Sample program

(When writing AMP parameter No.1.1 of axis 1 with A6N or A5N)



*1: The storage address of parameter value and the size for A4N are different.

*2: The flags and contact numbers in parentheses are for FP2.

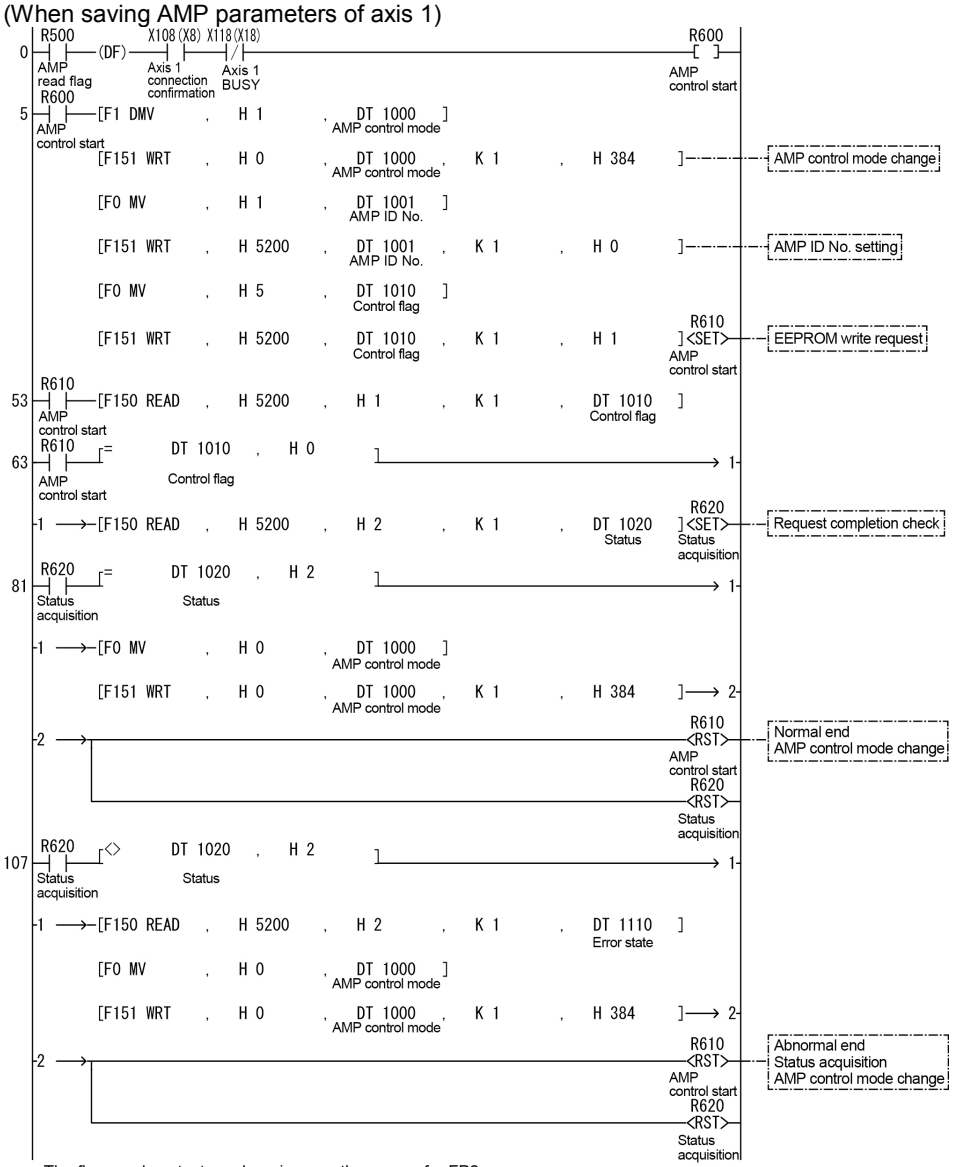
13.10.3 Saving AMP Parameters (EEPROM Write)

[With A4N / A5N / A6N]

1. Change the AMP control mode to "1 (AMP control enable)".
2. AMP parameter control area
   Set the axis number (AMP ID No.) to be read to AMP ID number.
   Set the control flag to "5H (EEPROM write request)".
3. The positioning unit RTEX performs EEPROM write of the AMP.
4. Confirm the AMP parameter control area status is 2H (Normal end).
5. Change the AMP control mode to "0 (AMP control disable)" after reading parameter data.

Sample program

(When saving AMP parameters of axis 1)



The flags and contact numbers in parentheses are for FP2.

13.10.4 Resetting AMP (Restart)

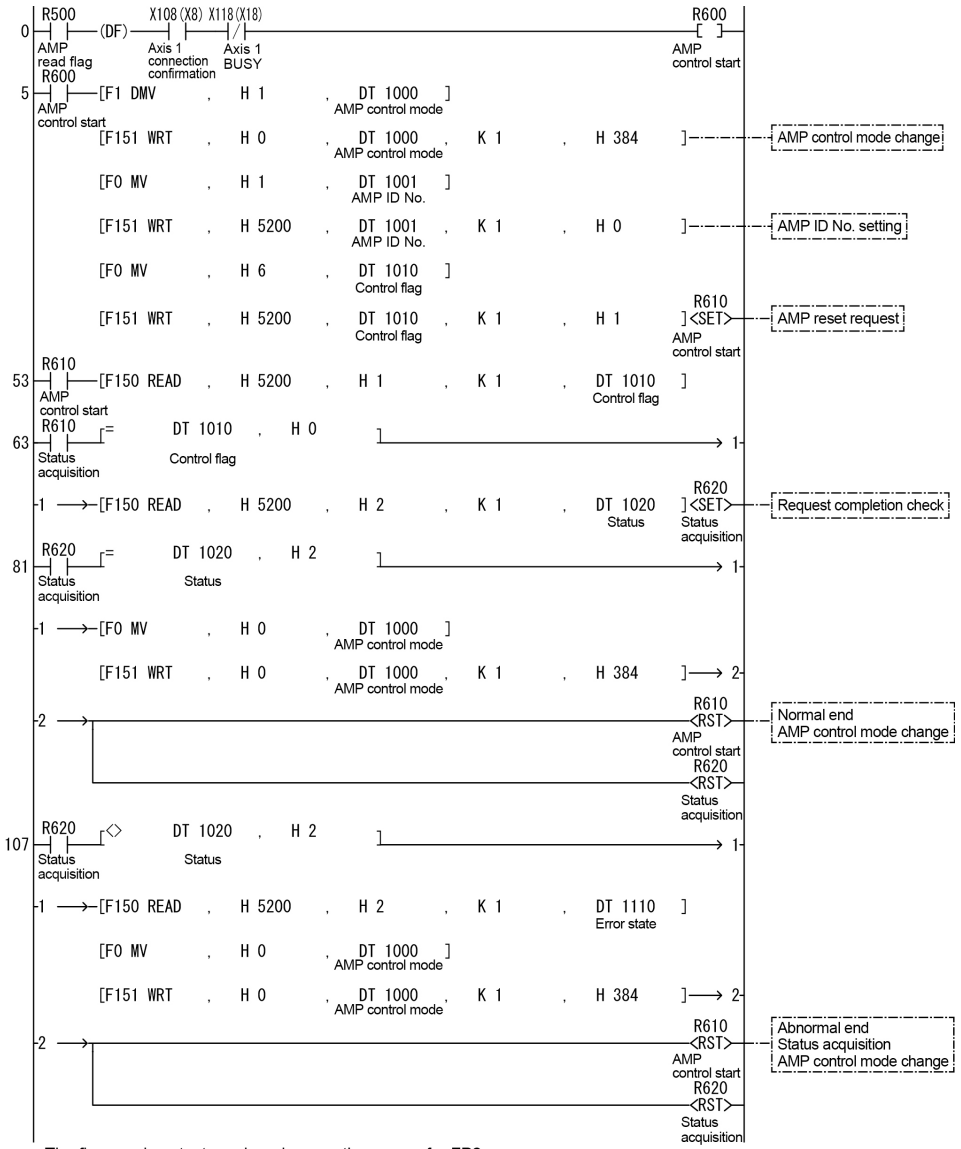
[With A4N / A5N / A6N]

1. Change the AMP control mode to "1 (AMP control enable)".
2. AMP parameter control area
   Set the axis number (AMP ID No.) to be read to AMP ID number.
   Set the control flag to "6H (AMP reset request)".
3. The positioning unit RTEX resets the AMP.
4. Confirm the AMP parameter control area status is 2H (Normal end).
5. Change the AMP control mode to "0 (AMP control disable)" after reading parameter data.

Note: When the AMP is reset, all the connected axes will result in error and be in the servo off state because the network is disconnected.

Sample program

(When resetting AMP of axis 1)



The flags and contact numbers in parentheses are for FP2.

13.11 Position Deviation Simple Monitor

Functional Overview

The position deviation is the difference between the current value controlled by the positioning unit RTEX and the AMP current position fed back from the AMP.
This function is the same as the deviation counter provided in the AMP. The difference between the command value of the positioning unit in the positioning process and the current value of the AMP can be confirmed by indicating this deviation in the monitor area on the positioning unit.

13.11.1 Monitoring Method

“Positioning deviation” is added in the each axis information & monitor area.


Reference: 17.5.2 Each Axis Information & Monitor Area
Addition of 17.5.2: Axis information of axis 1 to 8 (Ver.1.13 or later)

Bank	Offset address	Name	Description
01H	034H	Position deviation of axis 1	The position deviation calculated on the unit of axis 1 is stored.
	035H		
	074H	Position deviation of axis 2	The position deviation calculated on the unit of axis 2 is stored.
	075H		
	0B4H	Position deviation of axis 3	The position deviation calculated on the unit of axis 3 is stored.
	0B5H		
	0F4H	Position deviation of axis 4	The position deviation calculated on the unit of axis 4 is stored.
	0F5H		
	134H	Position deviation of axis 5	The position deviation calculated on the unit of axis 5 is stored.
	135H		
	174H	Position deviation of axis 6	The position deviation calculated on the unit of axis 6 is stored.
	175H		
	1B4H	Position deviation of axis 7	The position deviation calculated on the unit of axis 7 is stored.
	1B5H		
	1F4H	Position deviation of axis 8	The position deviation calculated on the unit of axis 8 is stored.
	1F5H		

13.11.2 Sample Program

Refer to “Position deviation ladder program for demo.fp”.

13.11.3 Restrictions on Operation

-As the deviation to be displayed with the position deviation simple monitor is calculated within the positioning unit, a difference may occur with the deviation counter value of the AMP.

-The display of the position deviation monitor is updated in 10-ms units.

Chapter 14

Precautions During Programming

14.1 Precautions During Programming

14.1.1 Turning Off Power Supply Clears Contents in Shared Memory

The data in the shared memory of the positioning unit RTEX is cleared when the power supply of the PLC turns off. So, if you want to perform the positioning control with the current settings of the shared memory the next time the power supply turns on, the positioning data should be written in the FROM (flash memory) within the positioning unit RTEX.
When parameters and positioning data has been set using the Configurator PM, it is selectable whether to store them in the FROM (flash memory) or not at the time of downloading to the positioning unit.

14.1.2 Once starting an Operation,

Once any start-up contact of the automatic operation (position control), manual operations (JOG operation, home return, pulser operation) turns on and the operation starts, it will not change to another operation even if the contact of the other contact turns on.
However, the stop operation (deceleration stop, emergency stop, system stop) can be executed during other operations.

14.1.3 How to Use Standard Area and Extended Area of Positioning Data

When executing the automatic operation (position control) with the positioning unit RTEX, specify the number of the positioning table that has been specified in advance, and start the position control. After the start-up, the motor is automatically controlled according to the settings of the table. There are the method that creates the positioning table using Configurator PM that is an exclusive setting tool, and the other method that writes the positioning table in a prescribed address by ladder programs.
There are the standard area of 600 points that is specified by No. 1 to 600, and the extended area of 25 points that is specified by No. 10001 to 10025.

The standard area is used when the setting values of the positioning table are predetermined. It can be set using Configurator PM, and can be rewritten from the ladder programs, too. However, if the positioning table is changed by the ladder program, the calculation is necessary to restructure the positioning data before executing the automatic operation. This function enables to read the positioning data of 600 points in advance and to prepare for the start-up within the positioning unit, and enables to shorten the start-up time for the positioning. When using Configurator PM to download the positioning data, the data is restructured automatically, so the calculation is not necessary. However, the calculation is necessary after rewriting the positioning data from the ladder program. The procedures for the calculation are as follows.

1. Change the positioning table in the shared memory.
2. Turn on the output contact Y_7 (recalculation request contact).
3. Confirm the input contact X_7 (recalculation done contact) is on (Confirm the completion of the recalculation.)

If the data is not recalculated after rewriting the positioning table by the ladder program, note that the operation will be executed with the positioning table before the rewriting.

The extended area is used when the setting values of the positioning table cannot be determined until just before executing the positioning operation. For example, in the application of alignment using an image processing, the moving distance is determined by the image processing. Therefore, the positioning table cannot be determined until just before starting the positioning operation. In that case, the positioning table is set just before the start-up of the positioning. In the extended area, the positioning table can be rewritten as needed, and the recalculation is not necessary. However, it is up to 25 tables, and Configurator PM cannot be used. The ladder programs should be used to write the positioning table in the prescribed address in the shared memory. The start-up time is longer than the standard area, and when performing the P point control or C point control in the extended area, note that the start-up time varies depending on the number of tables to be executed consecutively.
How to use each area and the precautions are as below.

	How to use	Number of points	Table number	Setting using Configurator PM	Setting using ladder program
Standard area	Area to be used when the setting value of the positioning table is predetermined.	600 points	1 to 600	Available	Available (Calculation for restructuring is necessary.)
Extended area	Area to be used when the setting value of the positioning table cannot be determined until just before executing the positioning operation.	25 points	10001 to 10025	Not available	Available (Calculation for restructuring is not necessary.)

14.1.4 Operation When the Mode of PLC Changed to PROG. from RUN

Any start-up contact of the automatic operation (position control), manual operations (JOG operation, home return, pulser operation) turns on, and the operation will continue even if the PLC changes to the PROG. mode from the RUN mode after starting the operation.
When any start-up contact of the automatic operation (position control) and manual operations (JOG operation, home return, pulser operation) turns on and the PLC is changed to the PROG. mode from the RUN mode after starting the operation, 1031H error (host CPU operation mode error) will occur and the operation will stop.

14.1.5 Upper Limit of Speed

The speed specified in the positioning unit RTEX is internally calculated using the following items to calculate the speed to instruct the servo AMP.
- Unit setting
- Pulse number per rotation
- Movement amount per rotation

Therefore, the calculation may be failed depending on the above parameter setting as a result of the internal calculation even if the specified speed is within the input range, and an error (Error codes 3025H to 3027H) may occur.

Refer to the values in the following table, and specify a speed not to cause an error.

Specified speed x [Conversion factor] < 2147418112

Use the table below as a guide for conversion factor.

Unit setting	Conversion factor
Pulse	0.002
1μm	0.002
0.1μm	0.02
0.0001 inch	0.02
0.00001 inch	0.2
1 degree	0.00072
0.1 degree	0.0072

Chapter 15

Errors and Warnings

15.1 Errors and Warnings

15.1.1 About Errors and Warnings

When any operational unconformity occurs in the positioning unit RTEX, errors or warnings will occur. When errors or warnings occur, the following operations will be performed.

Errors	Occurs in any abnormal conditions. When a motor is operating, the operation stops. The motor stopped due to the occurrence of error will not activate until the error clear is executed.
Warnings	Occurs when any operational unconformity not abnormal conditions exist. The operation can continue even after the occurrence of warnings, and the motor continues running if the motor is operating.

The errors and warnings can be confirmed on the data monitor and status monitor screens of the Configurator PM.

The errors and warnings occur in the positioning unit RTEX and AMP.
The area that errors/warnings occurred and the details can be identified by the error/warning codes.

15.1.2 Error and Warning Logs

There are log areas to store the error/warning logs within the positioning unit RTEX.

Error log	Max. 7 error codes can be stored for each axis (axes 1 to 8).
Warnings log	Max. 7 warning codes can be stored for each axis (axes 1 to 8).

Once an error/warning occurs, the error/warning code will be stored in the log area of the axis that the error occurred.
When an error/warning that is not related to the axes occurs, such as an failure in the unit, the error/warning code will be stored in the log areas of all axes.
The latest error/warning codes for each axis can be checked with the Configurator PM.
When referring the error and warning logs for each axis, read the following shared memory from the PLC.

Error log area (Shared memory Bank 0)

Address	Name
128H	Error log area of axis 1
138H	Error log area of axis 2
148H	Error log area of axis 3
158H	Error log area of axis 4
168H	Error log area of axis 5
178H	Error log area of axis 6
188H	Error log area of axis 7
198H	Error log area of axis 8

Offset	Name
00H	–
01H	No. of occurrences of errors
02H	Error code annunciation buffer 1
03H	
04H	Error code annunciation buffer 2
05H	
06H	Error code annunciation buffer 3
07H	
08H	Error code annunciation buffer 4
09H	
0AH	Error code annunciation buffer 5
0BH	
0CH	Error code annunciation buffer 6
0DH	
0EH	Error code annunciation buffer 7
0FH	

Warning log area (Shared memory Bank 0)

Address	Name
1C0H	Warning log area of axis 1
1D0H	Warning log area of axis 2
1E0H	Warning log area of axis 3
1F0H	Warning log area of axis 4
200H	Warning log area of axis 5
210H	Warning log area of axis 6
220H	Warning log area of axis 7
230H	Warning log area of axis 8

Offset	Name
00H	–
01H	No. of occurrences of warnings
02H	Warning code annunciation buffer 1
03H	
04H	Warning code annunciation buffer 2
05H	
06H	Warning code annunciation buffer 3
07H	
08H	Warning code annunciation buffer 4
09H	
0AH	Warning code annunciation buffer 5
0BH	
0CH	Warning code annunciation buffer 6
0DH	
0EH	Warning code annunciation buffer 7
0FH	

Number of occurrences of errors/warnings	Stores the number of occurrences of errors and warnings.
Error/warning annunciation buffers (1 to 8)	Stores error and warning codes. The buffer 1 is always the latest code.

15.1.3 Error and Warning Clear

When an error/warning occurred, it can be cleared at the each axis that the error occurred.
Note that all the contents of the error log will be initialized, once the error/warning clear is executed.

The following three error/warning clear methods are available.

- Error clear request flag and warning clear request flag allocated to the I/O
- Error clear individual axis setting and warning clear individual axis setting allocated to the share memory
- Errors or warnings can be cleared by the error clear request flag or warning clear request flag of the I/O allocated to the data monitor screen of Configurator PM or operation screen of each tool.

Note) When an error occurred, the axis that the error occurred will not be operated until the execution of the error clear.


Reference: <17.4.10 Error Annunciation & Clear Area>
<17.4.11 Warning Annunciation & Clear Area>

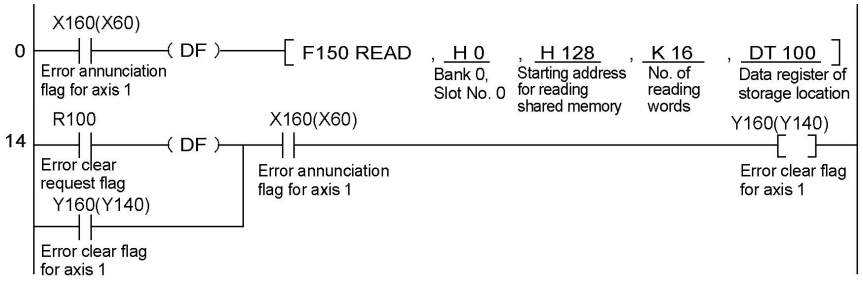
15.1.4 Error and Warning Code Format

The error and warning codes are 32-bit data and in the format as follows.

32 bits (double word)	
16 bits (word)	**16 bits (word)**
Not used	Error/warning code

15.1.5 Sample Program

The program below is a sample program to detect the occurrence of error, and to clear the error after reading the error log.



The numbers in parenthesis are the I/O numbers for the FP2.

Error logs will be stored in the following registers.

DT101	Number of occurrences
DT103	Error log buffer 1
DT105	Error log buffer 2
DT107	Error log buffer 3
DT109	Error log buffer 4
DT111	Error log buffer 5
DT113	Error log buffer 6
DT115	Error log buffer 7

15.2 List of Error Codes

The areas that errors occurred can be identified according to the range of error codes. When the error code is in the range of 0001H to 0FFFH, it indicates that the error occurred in the AMP. When the error code is one from 1000H, it indicates that the error occurred in the positioning unit.

The recovery method for each error code varies according to the state when each error occurred.
In the list of error codes, the recoverable state is indicated with "A", and the unrecoverable state is indicated with "N/A".
Although this unit outputs an alarm to be output from the AMP as an error code, note that the notation method is different from that of the error codes for the AMP.

15.2.1 AMP Errors (From 0001H)

Alarms/errors occurred on the AMP side are output from the positioning unit RTEX as error codes. Error codes output from this unit are hexadecimal, however, error codes output from the AMP are decimal Also, the AMP errors differ depending on the types of AMP. For details of the processing for AMP errors, refer to the manuals of servo amplifiers. When an AMP error occurs, the servomotor automatically becomes free. Execute the servo on request again after clearing the error.

How to read AMP error codes [For A6N/A5N]
An AMP error is divided into a main code and sub code.
As for a four-digit error code of this unit, the main code is the lower two digits and the sub code is the higher two digits.
For error codes on the AMP, hexadecimal codes of this unit are converted to decimal codes.

Example) When the encoder communication error protection occurred;
Error code of this unit: 01 15 H
↓
Main code: 15 H, Sub code: 01 H
↓
Converts hexadecimal codes to decimal codes

Error code of the AMP
Main code: 21, Sub code: 1

How to read AMP error codes [For A4N]
For AMP errors, hexadecimal error codes of this unit are converted to decimal codes.

Example) When an overload protection occurred;

Error code of this unit: 0010 H
↓
Converts hexadecimal codes to decimal codes.

Error code of the AMP: 16

AMP error code table [For A6N]

Error code of FPΣ/FP2 Positioning Unit RTEX	A6N error no.		Description
	Main	Sub	
000BH	11	0	Control power supply undervoltage protection
000CH	12	0	Over-voltage protection
000DH	13	0	Main power supply undervoltage protection (between P to N)
010DH	13	1	Main power supply undervoltage protection (AC interception detection)
000EH	14	0	Over-current protection
010EH	14	1	IPM error protection
000FH	15	0	Over-heat protection
010FH	15	1	Encoder overheat error protection
0010H	16	0	Over-load protection
0110H	16	1	Torque saturation error protection
0012H	18	0	Over-regeneration load protection
0112H	18	1	Over-regeneration Tr error protection
0015H	21	0	Encoder communication disconnect error protection
0115H	21	1	Encoder communication error protection
0017H	23	0	Encoder communication data error protection
0018H	24	0	Position deviation excess protection
0118H	24	1	Speed deviation excess protection
0019H	25	0	Hybrid deviation excess error protection
001AH	26	0	Over-speed protection
011AH	26	1	2nd over-speed protection
011BH	27	1	Absolute clear protection
041BH	27	4	Command error protection 1
051BH	27	5	Command generation error protection
061BH	27	6	Operation command contention protection
071BH	27	7	Position information initialization error protection
001CH	28	0	Limit of pulse replay error protection
011DH	29	1	Deviation counter overflow protection 1
021DH	29	2	Deviation counter overflow protection 2
001FH	31	0	Safety function error protection 1
021FH	31	2	Safety function error protection 2
0021H	33	0	I/F input duplicated allocation error 1 protection
0121H	33	1	I/F input duplicated allocation error 2 protection
0221H	33	2	I/F input function number error 1 protection
0321H	33	3	I/F input function number error 2 protection

AMP error code table [For A6N]

Error code of FPΣ/FP2 Positioning Unit RTEX	A6N error no.		Description
	Main	Sub	
0421H	33	4	I/F output function number error 1 protection
0521H	33	5	I/F output function number error 2 protection
0821H	33	8	Latch input allocation error protection
0022H	34	0	Software limit protection
0024H	36	0	EEPROM parameter error protection
0124H	36	1	EEPROM parameter error protection
0025H	37	0	EEPROM check code error protection
0125H	37	1	EEPROM check code error protection
0225H	37	2	EEPROM check code error protection
0026H	38	0	Over-travel inhibit input protection 1
0126H	38	1	Over-travel inhibit input protection 2
0226H	38	2	Over-travel inhibit input protection 3
0028H	40	0	Absolute system down error protection
0029H	41	0	Absolute counter over error protection
002BH	43	0	Encoder initialization error protection
002CH	44	0	Single turn counter error protection
002DH	45	0	Multi-turn counter error protection
0030H	48	0	Encoder Z-phase error protection
0031H	49	0	Encoder CS signal error protection
0032H	50	0	External scale connection error protection
0132H	50	1	External scale communication error protection
0033H	51	0	External scale status 0 error protection
0133H	51	1	External scale status 1 error protection
0233H	51	2	External scale status 2 error protection
0333H	51	3	External scale status 3 error protection
0433H	51	4	External scale status 4 error protection
0533H	51	5	External scale status 5 error protection
0037H	55	0	A-phase connection error protection
0137H	55	1	B-phase connection error protection
0237H	55	2	Z-phase connection error protection
0052H	82	0	RTEX node addressing error protection
0053H	83	0	RTEX communication error protection 1
0153H	83	1	RTEX communication error protection 2
0054H	84	0	RTEX time out error protection
0354H	84	3	RTEX sync and initialization error protection

AMP error code table [For A6N]

Error code of FPΣ/FP2 Positioning Unit RTEX	A6N error no.		Description
	Main	Sub	
0554H	84	5	RTEX communication cycle error protection
0056H	86	0	RTEX cyclic data error protection 1
0156H	86	1	RTEX cyclic data error protection 2
0256H	86	2	RTEX update counter error protection
0057H	87	0	Compulsory alarm input protection
025AH	90	2	Multi-axis synchronization establishment error protection
015BH	91	1	RTEX command error protection
005CH	92	0	Encoder data recovery error protection
015CH	92	1	External scale data recovery error protection
035CH	92	3	Multi-turn data upper-limit value disagreement error protection
005DH	93	0	Parameter setting error protection 1
025DH	93	2	Parameter setting error protection 2
035DH	93	3	External scale connection error protection
055DH	93	5	Parameter setting error protection 4
085DH	93	8	Parameter setting error protection 6
025EH	94	2	Home position return error protection
035EH	94	3	Home position return error protection 2
005FH	95	0	Motor automatic recognition error protection
015FH	95	1	Motor automatic recognition error protection
025FH	95	2	Motor automatic recognition error protection
035FH	95	3	Motor automatic recognition error protection
045FH	95	4	Motor automatic recognition error protection
0260H	96	2	Control unit error protection 1
0360H	96	3	Control unit error protection 2
0460H	96	4	Control unit error protection 3
0560H	96	5	Control unit error protection 4
0660H	96	6	Control unit error protection 5
0760H	96	7	Control unit error protection 6
0162H	98	1	RTEX hardware error protection 1
0262H	98	2	RTEX hardware error protection 2
0362H	98	3	RTEX hardware error protection 3
-	Other numbers		Other error protections

AMP error code table [For A5N]

Error code of FPΣ/FP2 Positioning Unit RTEX	A5N error no.		Description
	Main	Sub	
000BH	11	0	Control power supply undervoltage protection
000CH	12	0	Over-voltage protection
000DH	13	0	Main power supply undervoltage protection (between P to N)
010DH	13	1	Main power supply undervoltage protection (AC interception detection)
000EH	14	0	Over-current protection
010EH	14	1	IPM error protection
000FH	15	0	Over-heat protection
0010H	16	0	Over-load protection
0110H	16	1	Torque saturation error protection
0012H	18	0	Over-regeneration load protection
0112H	18	1	Over-regeneration Tr error protection
0015H	21	0	Encoder Communication disconnect error protection
0115H	21	1	Encoder Communication error protection
0017H	23	0	Encoder communication data error protection
0018H	24	0	Position deviation excess protection
0118H	24	1	Speed deviation excess protection
0019H	25	0	Hybrid deviation excess error protection
001AH	26	0	Over-speed protection
011AH	26	1	2nd over-speed protection
011BH	27	1	Absolute clear protection
041BH	27	4	Command error protection 1

AMP error code table [For A5N]

Error code of FPΣ/FP2 Positioning Unit RTEX	A5N error no.		Description
	Main	Sub	
051BH	27	5	Command generation error protection
061BH	27	6	Operation command contention protection
071BH	27	7	Position information initialization error protection
001CH	28	0	Limit of pulse replay error protection
011DH	29	1	Deviation counter overflow protection 1
021DH	29	2	Deviation counter overflow protection 2
001EH	30	0	Safety detection [Only special product supports this feature.]
0021H	33	0	I/F input duplicated allocation error 1 protection
0121H	33	1	I/F input duplicated allocation error 2 protection
0221H	33	2	I/F input function number error 1 protection
0321H	33	3	I/F input function number error 2 protection
0421H	33	4	I/F output function number error 1 protection
0521H	33	5	I/F output function number error 2 protection
0821H	33	8	Latch input allocation error protection
0022H	34	0	Software limit protection
0024H	36	0	EEPROM parameter error protection
0124H	36	1	EEPROM parameter error protection
0224H	36	2	EEPROM parameter error protection
0025H	37	0	EEPROM check code error protection
0125H	37	1	EEPROM check code error protection
0225H	37	2	EEPROM check code error protection
0026H	38	0	Over-travel inhibit input protection 1
0126H	38	1	Over-travel inhibit input protection 2
0226H	38	2	Over-travel inhibit input protection 3
0028H	40	0	Absolute system down error protection
0029H	41	0	Absolute counter over error protection
002AH	42	0	Absolute over-speed error protection
002BH	43	0	Incremental encoder initialization error protection
002CH	44	0	・For Absolute Absolute single turn counter error protection ・For Incremental Incremental single turn counter error protection

AMP error code table [For A5N]

Error code of FPΣ/FP2 Positioning Unit RTEX	A5N error no.		Description
	Main	Sub	
002DH	45	0	・For Absolute Absolute multi-turn counter error protection ・For Incremental Incremental multi-turn counter error protection
002FH	47	0	Absolute status error protection
0030H	48	0	Incremental encoder Z-phase error protection
0031H	49	0	Incremental encoder CS signal error protection
0032H	50	0	External scale connection error protection
0132H	50	1	External scale communication error protection
0033H	51	0	External scale status 0 error protection
0133H	51	1	External scale status 1 error protection
0233H	51	2	External scale status 2 error protection
0333H	51	3	External scale status 3 error protection
0433H	51	4	External scale status 4 error protection
0533H	51	5	External scale status 5 error protection
0037H	55	0	A-phase connection error protection
0137H	55	1	B-phase connection error protection
0237H	55	2	Z-phase connection error protection
0052H	82	0	RTEX node addressing error protection
0053H	83	0	RTEX communication error protection 1
0153H	83	1	RTEX communication error protection 2
0054H	84	0	RTEX time out error protection
0354H	84	3	RTEX sync and initialization error protection
0554H	84	5	RTEX communication cycle error protection
0056H	86	0	RTEX cyclic data error protection 1
0156H	86	1	RTEX cyclic data error protection 2
0256H	86	2	RTEX update counter error protection
0057H	87	0	Compulsory alarm input protection
025AH	90	2	Multi-axis synchronization establishment error protection
015BH	91	1	RTEX command error protection
005CH	92	0	Encoder data recovery error protection
015CH	92	1	External scale data recovery error protection
005DH	93	0	Parameter setting error protection 1
025DH	93	2	Parameter setting error protection 2

AMP error code table [For A5N]

Error code of FPΣ/FP2 Positioning Unit RTEX	A5N error no.		Description
	Main	Sub	
035DH	93	3	External scale connection error protection
055DH	93	5	Parameter setting error protection 4
025EH	94	2	Home position return error protection
005FH	95	0	Motor automatic recognition error protection
015FH	95	1	Motor automatic recognition error protection
025FH	95	2	Motor automatic recognition error protection
035FH	95	3	Motor automatic recognition error protection
045FH	95	4	Motor automatic recognition error protection
0162H	98	1	RTEX hardware error protection 1
0262H	98	2	RTEX hardware error protection 2
0362H	98	3	RTEX hardware error protection 3
-	Other numbers		Other error protections

AMP error code table [For A4N]

Error code of FPΣ/FP2 Positioning Unit RTEX	Alarm code	Description
000BH	11	Control power supply under-voltage protection
000CH	12	Over-voltage protection
000DH	13	Main power supply under-voltage protection
000EH	14	Over-current protection
000FH	15	Over-heat protection
0010H	16	Over-load protection
0012H	18	Over-regeneration load protection
0015H	21	Encoder communication error protection
0017H	23	Encoder communication data error protection
0018H	24	Position deviation excess protection
0019H	25	Hybrid deviation excess error protection
001AH	26	Over-speed protection
001BH	27	Command error protection
001CH	28	External scale communication data error protection
001DH	29	Deviation counter overflow protection
0022H	34	Software limit protection
0023H	35	External scale communication error protection
0024H	36	EEPROM parameter error protection
0025H	37	EEPROM check code error protection
0026H	38	Over-travel inhibit input protection
0028H	40	Absolute system down error protection
0029H	41	Absolute counter over error protection
002AH	42	Absolute over-speed error protection
002CH	44	Absolute single turn counter error protection
002DH	45	Absolute multi-turn counter error protection
002FH	47	Absolute status error protection
0030H	48	Encoder Z-phase error protection
0031H	49	Encoder CS signal error protection
0032H	50	External scale status 0 error protection
0033H	51	External scale status 1 error protection
0034H	52	External scale status 2 error protection
0035H	53	External scale status 3 error protection
0036H	54	External scale status 4 error protection
0037H	55	External scale status 5 error protection

AMP error code table [For A4N]

Error code of FPΣ/FP2 Positioning Unit RTEX	Alarm code	Description
003AH	58	External scale other error protection
0052H	82	Node addressing error protection
0053H	83	Communication error protection
0054H	84	Time out error protection
0056H	86	Cyclic data error protection
0057H	87	Compulsory alarm input protection
005FH	95	Motor automatic recognition error protection
-	Other	Other error

15.2.2 System Errors (From 1000H)

These are the errors that occur due to any failure within the positioning unit. The system errors are defined as the fatal errors for the system. Except for some items, the power supply must be turned off and on again to recover from the errors.

A: Available N/A: Not available

Error code	Error name	Description	Object	Clear	Countermeasures
1000H	System runaway	System runaway (If the error occurred, the ALARM LED on the positioning unit is lighted.	All axes	N/A	Turn off the power supply and turn it on again. If the error occurred repeatedly, please contact us.
1001H	Hardware error	An error occurred in the hardware test when the power supply turned on.	All axes	N/A	
1002H	Unit error	Any error occurred in the internal processing.	All axes	N/A	
1003H	System processing error	An error occurred in the system processing due to any reason.	All axes	A	Check the settings. If the setting values are correct and the error occurred repeatedly, please contact us.
1010H	FROM writing error	An error occurred when the positioning settings were written in the positioning unit.	All axes	A	Rewrite into the FROM again. If the error occurred repeatedly, please contact us.
1020H	Tool operation abnormal end	An error occurred in the communication with a PC in the tool operation by the Configurator PM.	All axes	A	Check the connection of the RS232C cable connecting the PC and PLC. Reboot the PC.
1030H	Host CPU error	ALARM occurred in the host CPU (control unit or CPU).	All axes	N/A	- Check the status of the host CPU. - Turn off the power supply and turn it on again.
1031H	Host CPU operation mode error	The operation stopped as the operation mode of the host CPU (control unit or CPU) was changed to PROG. mode.	Each axis	A	- Check the status of the host CPU. - Change the operation mode of the host CPU to RUN mode.

15.2.3 AMP Communication Errors (From 2000H)

These are the errors occurred in the communication between the positioning unit and AMP.
They occur when the communication data was judged as abnormal.

A: Available N/A: Not available

Error code	Error name	Description	Object	Clear	Countermeasures
2000H	AMP Communication error	A communication error occurred after the network communication has been established.	All axes	N/A	Check the power supply of the AMP is on. Check the communication pathway. Carefully check the connector failure and breaking of the communication cable. Also, check if any excessive noise is caused in the usage environment. If the error occurred repeatedly, please contact us.
2001H	AMP Data acquisition error	Failed in the data acquisition of each AMP.	Each axis	A	Check the status of the AMP that the error occurred.
2002H	AMP Parameter error	The communication parameters of each AMP are incorrect.	Each axis	A	Check the communication pathway. Carefully check the connector failure and breaking of the communication cable. Also, check if any excessive noise is caused in the usage environment. If the error occurred repeatedly, please contact us.
2003H	Network communication timeout	Time-out occurred in communication between the positioning unit RTEX and AMP, and communication was cut off.	Each axis	A	Check the status of the AMP. (As information on the AMP cannot be obtained when communication is cut off, an error on the AMP may not be obtained.) Check the communication cable.
2004H	AMP parameter control error	A communication error occurred during an AMP parameter operation (read, write, save or reset).	Each axis	A	- Check the status of the AMP. - Check that the control mode of the AMP is correctly set. (The speed control mode and torque control mode cannot be used.)
2010H	AMP Excess No. of connections	The number of the AMPs connected to the network exceeded the limit (maximum No. of axes) of the positioning unit.	All axes	N/A	After checking the connection and settings of the AMP, turn off the power supply and turn it on again. If the error occurred repeatedly, please contact us.
2020H	AMP Node duplication	The AMPs with the same node number exist in the network.	All axes	N/A	
2030H	AMP Node No. setting error	The AMP with a node number other than the numbers below exists. 2-axis type: 1 to 2 4-axis type: 1 to 4 8-axis type: 1 to 8	All axes	N/A	
2040H	AMP reset failure	An error occurred in the AMP reset operation and the system stopped.	All axes	N/A	Turn off the power supply to the system and turn it on again.
2050H	AMP connection error	A4N and A6N/A5N are both used for the connected AMP.	All axes	N/A	Check the configuration of connected AMPs so that A4N and A5N/A6N are not mixed.

15.2.4 Axis Operation Errors (From 3000H)

These are the errors occurred while various operations are being executed.

A: Available N/A: Not available

Error code	Error name	Description	Object	Clear	Countermeasures
3000H	Not servo ready	The axis that servo is not locked was started.	Each axis	A	Confirm the servo is locked while each axis is operating.
3001H	Servo off detection in operation	The servo became off during the operation being processed.	Each axis	A	Turn off the servo on input when the Busy signal for the target axis is not on. Check the status of the AMP.
3005H	Main power supply OFF error	The servo on was requested when the main power supply of the AMP was off.	Each axis	A	- Turn the servo on after the main power supply has been turned on. - Check the voltage of the main power supply.
3010H	Limit + signal detection	The input on the plus side of the limit turned on.	Each axis	A	Move the motor into the range of the limit by an operation such as the JOG operation. Check the limit signal is correct.
3011H	Limit – signal detection	The input on the minus side of the limit turned on.	Each axis	A	
3012H	Limit signal error	Both inputs on the plus and minus sides of the limit turned on.	Each axis	A	Check the status of the limit signal.
3020H	Software limit (plus side) detection	The movement amount of the motor exceeded the upper limit of the software limit.	Each axis	A	Move the motor into the range of the limit by an operation such as the JOG operation. Check the setting values of the software limit.
3021H	Software limit (minus side) detection	The movement amount of the motor exceeded the lower limit of the software limit.	Each axis	A	
3025H	Command speed operation error 1	The internal calculation of command speed was overflowed.	Each axis	A	- Slow down the setting speed. - Check the settings of the pulse number per rotation and movement amount per rotation.
3026H	Command speed operation error 2				
3027H	Command speed operation error 3				
3030H	Axis operation error	An error occurred in the operation processing of each axis due to any reason.	Each axis	A	Check the setting values and parameters of the positioning unit. If the error occurred repeatedly with the correct setting values, please contact us.
3031H	Operation abnormal end	An error occurred in the operation processing of each axis due to any reason.	Each axis All axes	A	If the error occurred repeatedly, please contact us.
3032H	Axis group operation error	- The setting of axis group was changed during the operation or when requesting the stop. - An unconnected axis was specified for the axis group.	Each axis	A	- Changing the axis group should be performed when the axis stops. Also, do not make the stop request. - Check the setting of the axis group.
3033H	Interpolation operation error	The operation stopped as an error occurred on other interpolation axis during the interpolation operation.	Each axis	A	Check the setting values of the positioning data for the interpolation operation. If the error occurred repeatedly with the correct setting values, please contact us.
3034H	Axis group not settable (In pulser operation)	The setting of the axis group was changed during the pulser operation.	Each axis	A	Changing the axis group should be performed when the pulser operation enabled signal is off.

A: Available N/A: Not available

Error code	Error name	Description	Object	Clear	Countermeasures
3040H	Synchronous operation group error	The synchronous group was changed during the synchronous operation or when requesting the stop in the synchronous operation. An unconnected axis number was specified. An error occurred in the home return of the synchronous operation.	Each axis	A	- Changing the synchronous group should be performed when the busy signal for the axes to be synchronized is off. Also, it should be performed when various stop request signals (system stop, emergency stop, deceleration stop) are off. - Specify an axis number existing on the network.
3042H	Synchronous operation Home return error	- The home return process was executed with setting the synchronous operation to “Enabled” when using the synchronous mode A. - A method other than the usable home return methods was executed when using the synchronous mode B.	Each axis	A	- Synchronous mode A: Set the simultaneous operation to “Disabled” when performing the home return. - Synchronous mode B: Select a usable home return method.
3043H	Synchronous operation error	The operation was stopped as an error has occurred on another axis in the synchronous operation.	Each axis	A	- Check the unit setting of the stopped axis and the AMP setting. - If the error occurred repeatedly with the correct setting value, please contact us.
3044H	Synchronous operation not settable (In pulser operation)	The setting of the synchronous operation was changed during the pulser operation.	Each axis	A	Changing the setting of the synchronous operation should be performed when the pulser operation enabled signal is off.
3045H	Synchronous axis operation mismatch error	The difference between the movement amounts of the target axes for the synchronous operation exceeded the specified difference threshold.	Each axis	A	Check the operation of the target axes for the synchronous operation.
3050H	Torque judgment error	The torque value exceeds the setting upper and lower limit values. This error occurs when setting - torque judgment to “Available” - annunciation method to “Error”	Each axis	A	Design the system within the range that the torque of the motor does not exceed the judgment value. Check the torque judgment value.
3051H	Actual speed judgment value error	The actual speed exceeded the setting upper and lower limit values. This error occurs when setting -actual speed judgment to “Available” - annunciation method to “Error”	Each axis	A	Design the system within the range that the actual speed of the motor does not exceed the judgment value. Check the actual speed judgment value.
3060H	Home return not executable error	The home return could not be executed as AMP parameter settings and signal input were not correct. This error occurs when using A6N/A5N as AMP.	Each axis	A	Check the parameters of AMP and signal inputs.

15.2.5 Setting Value Errors (From 4000H)

These are the errors in the various setting values specified using the Configurator PM or ladder programs.

A: Available N/A: Not available

Error code	Error name	Description	Object	Clear	Countermeasures
4000H	Axis group setting error	The settings of axis groups are not correct.	Each axis	A	Check the following items in the settings of the axis group and independent axis. - The same axis number has been registered in more than one group. - Four or more axes have been set in one group. - The group is composed of one axis only.
4002H	Unit setting error	The unit system for the axis setting is out of the range.	Each axis	A	Check if the unit is one of the followings. Pulse, um, inch, degree
4004H	Pulse number error per rotation	The pulse number is out of the range.	Each axis	A	Check the setting value. If the setting value is out of the range, reduce it by the following formula. (Pulse number per rotation) / (Movement amount per rotation)
4005H	Movement amount error per rotation	The movement amount is out of the range.	Each axis	A	
4010H	Software limit setting error	The upper or lower limit value of software limit is out of the range.	Each axis	A	Check the setting value. If the error occurred repeatedly with the correct setting value, please contact us.
4020H	Limit stop deceleration time error	The limit stop deceleration time is out of the range.	Each axis	A	
4021H	Error stop deceleration time error	The error stop deceleration time is out of the range.	Each axis	A	
4022H	Emergency stop deceleration time error	The emergency stop deceleration time is out of the range.	Each axis	A	
4028H	Auxiliary output setting error	The settings of auxiliary output are not correct. - A mode other than With mode or Delay mode has been set for the auxiliary output mode. - A value other than 0 to 100 (%) was specified for the auxiliary output delay ratio in the delay mode.	Each axis	A	
4030H	Synchronous group setting error	The settings of synchronous group are not correct. - The same axis has been set for the synchronous groups 1 and 2. - Either master axis or slave axis has not been set. (All bits are off.) - Multiple axes have been set for the master or slave axis. - The same axis has been set for the master and slave axes. - The slave axis has been set to the interpolation group.	Each axis	A	

A: Available N/A: Not available

Error code	Error name	Description	Object	Clear	Countermeasures
4031H	Synchronous operation method setting error	The operation settings of the synchronous operation difference check function are not correct.	Each axis	A	Check the setting value. If the error occurred repeatedly with the correct setting value, please contact us.
4041H	Positioning completion width error	The positioning completion width is out of the range.	Each axis	A	
4042H	Pulser setting error	The pulser input mode is incorrect. The pulser operation method is incorrect. The maximum speed for the pulser operation is incorrect.	Each axis	A	
4044H	Speed rate error	The setting of the speed rate is out of the range.	Each axis	A	
4080H	JOG positioning acceleration/decelerati on type error	The acceleration/deceleration method of the JOG positioning is out of the range.	Each axis	A	
4081H	JOG positioning operation acceleration time error	The acceleration time of the JOG positioning is out of the range.	Each axis	A	
4082H	JOG positioning operation deceleration time error	The deceleration time of the JOG positioning is out of the range.	Each axis	A	
4083H	JOG positioning operation target speed error	The target speed of the JOG positioning is out of the range.	Each axis	A	
4102H	Home return target speed error	The target speed of the home return is out of the range.	Each axis	A	
4105H	Home return acceleration time error	The acceleration time of the home return is out of the range.	Each axis	A	
4106H	Home return deceleration time error	The deceleration time of the home return is out of the range.	Each axis	A	
4107H	Home return setting code error	The home return setting code is incorrect.	Each axis	A	
4110H	Home return creep speed error	The creep speed of the home return is out of the range.	Each axis	A	
4111H	Home return returning direction error	The moving direction of the home return is out of the range.	Each axis	A	
4112H	Home return Limit error	The limit switch is disabled. (It occurs when the home return method is set to the stop-on-contact method 1 or 2.)	Each axis	A	
4115H	Home return Stop-on-contact torque value error	The home return stop-on-contact torque value is out of the range. (It occurs when the home return method is set to the stop-on-contact method 1 or 2.)	Each axis	A	
4116H	Home return Stop-on-contact judgment time error	The home return stop-on-contact judgment time is out of the range. (It occurs when the home return method is set to the stop-on-contact method 1 or 2.)	Each axis	A	
4120H	Coordinate origin error	The coordinate origin is out of the range.	Each axis	A	

A: Available N/A: Not available

Error code	Error name	Description	Object	Clear	Countermeasures
4201H	JOG operation target speed error	The target speed of the JOG operation is out of the range.	Each axis	A	Check the setting value. If the error occurred repeatedly with the correct setting value, please contact us.
4203H	JOG operation acceleration/deceleration type error	The acceleration/deceleration type of the JOG operation is incorrect.	Each axis	A	
4204H	JOG operation acceleration time error	The acceleration time of the JOG operation is out of the range.	Each axis	A	
4205H	JOG operation deceleration time error	The deceleration time of the JOG operation is out of the range.	Each axis	A	
4250H	Current value update error	The setting value of the current value update is out of the range.	Each axis	A	
4251H	Realtime torque limit value error	The specified realtime torque value is out of the range.	Each axis	A	
4301H	Absolute/Incremental setting error	A value other than the absolute/increment is set for the move method.	Each axis	A	
4302H	Dwell time error	The setting value of the dwell time is out of the range.	Each axis	A	
4303H	Positioning starting table No. error	The specified table number is 0, or it exceeds the maximum table number.	Each axis	A	
4304H	Table setting error	The last table of the positioning setting tables is not point E.	Each axis	A	
4400H	Positioning movement amount setting error	The movement amount of the positioning operation is out of the range.	Each axis	A	
4401H	Positioning rotating acceleration/deceleration type error	The acceleration/deceleration type of the positioning operation is incorrect.	Each axis	A	
4402H	Positioning acceleration time error	The acceleration time of the positioning operation is out of the range.	Each axis	A	
4403H	Positioning deceleration time error	The deceleration time of the positioning operation is out of the range.	Each axis	A	
4404H	Positioning target speed error	The target speed of the positioning operation is out of the range.	Each axis	A	
4500H	Interpolation type error	The setting of the interpolation type is incorrect.	Each axis	A	
4504H	Circular interpolation not executable	The parameter of the circular interpolation (such as center point or pass point) is incorrect.	Each axis	A	
4505H	Spiral interpolation not executable	The error occurred during the spiral interpolation as the setting value is incorrect.	Each axis	A	

15.3 List of Warning Codes

Warning codes are from A000H to differentiate from the error codes.

15.3.1 AMP Warnings (From A000H)

Warnings occurred on the AMP side are output from the positioning unit RTEX as warning codes. The warning codes output from this unit are written in hexadecimal, however, the warning codes output from the AMP are written in hexadecimal when using A6N/A5N, and decimal when using A4N. Also, the AMP warnings differ depending on the types of AMP. For details of the processing for AMP warnings, refer to the manuals of servo amplifiers.

How to read AMP warning codes [For A6N/A5N]
The warning numbers of AMP are obtained by subtracting A000H from the warning codes of this unit.

Example) When an overload protection occurred;

Warning code of this unit: A0A0 H
↓
Subtract A000H from the warning code: 00A0 H
↓
Warning number of AMP: A0 H

How to read AMP warning codes [For A4N]
The warning numbers of AMP are obtained by converting to decimal after subtracting A000H from the warning codes of this unit.

Example) When an overload protection occurred;

Warning code of this unit: A010 H
↓
Subtract A000H from the warning code: 0010 H
↓
Convert hexadecimal code to decimal code

Warning number of AMP: 16

AMP warning code table [For A6N]

Warning code of FPΣ/FP2 Positioning Unit RTEX	Warning code (Hex)	Warning name
A0A0H	A0	Overload protection
A0A1H	A1	Over-regeneration alarm
A0A2H	A2	Battery alarm
A0A3H	A3	Fan alarm
A0A4H	A4	Encoder communication alarm
A0A5H	A5	Encoder overheat alarm
A0A6H	A6	Oscillation detection alarm
A0A7H	A7	Lifetime detection alarm
A0A8H	A8	External scale error alarm
A0A9H	A9	External scale communication alarm
A0ACH	AC	Predictor monitoring warning
A0D2H	D2	PANATERM command execution warning
A0C0H	C0	RTEX continuous communication error warning
A0C1H	C1	RTEX accumulated communication error warning
A0C2H	C2	RTEX_Update_Counter error warning
A0C3H	C3	Main power off warning

AMP warning code table [For A5N]

Warning code of FPΣ/FP2 Positioning Unit RTEX	Warning code (Hex)	Warning name
A0A0H	A0	Overload protection
A0A1H	A1	Over-regeneration alarm
A0A2H	A2	Battery alarm
A0A3H	A3	Fan alarm
A0A4H	A4	Encoder communication alarm
A0A5H	A5	Encoder overheat alarm
A0A6H	A6	Oscillation detection alarm
A0A7H	A7	Lifetime detection alarm
A0A8H	A8	External scale error alarm
A0A9H	A9	External scale communication alarm
A0C0H	C0	RTEX continuous communication error warning
A0C1H	C1	RTEX accumulated communication error warning
A0C2H	C2	RTEX_Update_Counter error warning
A0C3H	C3	Main power off warning

AMP warning code table [For A4N]

Warning code of FPΣ/FP2 Positioning Unit RTEX	Warning code No. (Decimal)	Warning function
A010H	16	Overload warning
A012H	18	Regenerative overload warning
A028H	40	Battery warning
A053H	83	Continuous communication error warning
A054H	84	Communication error accumulated warning
A056H	86	Update Counter warning
A058H	88	Fan lock warning
A059H	89	External scale warning

15.3.2 Unit Warnings (From B000H)

These are the warning codes to be given when the warnings occurred in the positioning unit.

A: Available N/A: Not available

Error code	Error name	Description	Object	Clear	Countermeasures
B001H	Host CPU operation mode warning	The operation mode of the host CPU (control unit or CPU) was changed to PROG. mode.	Each axis	A	Check the status of the host CPU. Change the operation mode of the CPU to RUN mode.
B004H	Realtime speed limit protection	The realtime torque limit was not executed as the AMP parameter operation or AMP monitor operation was being executed.	Each axis	A	Execute the realtime torque limit when the AMP parameter operation and AMP monitor are not used.
B010H	Duplicate startup	The same axis was requested to start even though the axis operation has not completed.	Each axis	A	The requests for the axes being operated cannot be executed, except the following requests. - Deceleration stop request flag (each axis) - Emergency stop request flag (each axis) - System stop request flag (all axes)
B030H	J point simultaneous startup warning	“J point speed change contact” and J point positioning start contact” was turned on simultaneously during the JOG positioning operation.	Each axis	A	When the both contacts have been turned on simultaneously, “J point positioning start contact” has a priority, and “J point speed change contact” is ignored.
B031H	J point speed change warning	"J point speed change contact" was turned on when the J point positioning was not performed.	Each axis	A	Check the timing to turn on "J point speed change contact".
B032H	J point positioning start warning	"J point positioning start contact" was turned on when the J point positioning was not performed.	Each axis	A	Check the timing to turn on "J point positioning start contact".
B045H	Synchronous operation difference check warning	The difference between the movement amounts of the target axes for the synchronous operation exceeded the specified difference threshold. This warning occurs when setting the synchronous operation method and synchronous operation difference check function to "Warning".	Each axis	A	Check the operation of the target axes for the synchronous operation.
B046H	Movement amount automatic check threshold over warning	With the movement amount automatic check function, the difference between the specified movement amount and feedback exceeded the threshold. This warning occurs when setting the movement amount automatic check function to "Warning".	Each axis	A	Check the operation of the target axes. Check the parameter of the movement amount automatic check function.
B050H	Torque judgment value warning	The monitored torque value exceeded the specified upper/lower limit value. This warning occurs when setting - torque judgment to “Available” - annunciation method to “Warning”	Each axis	A	Design the system within the range that the torque of the motor does not exceed the judgment value. Check the torque judgment value.

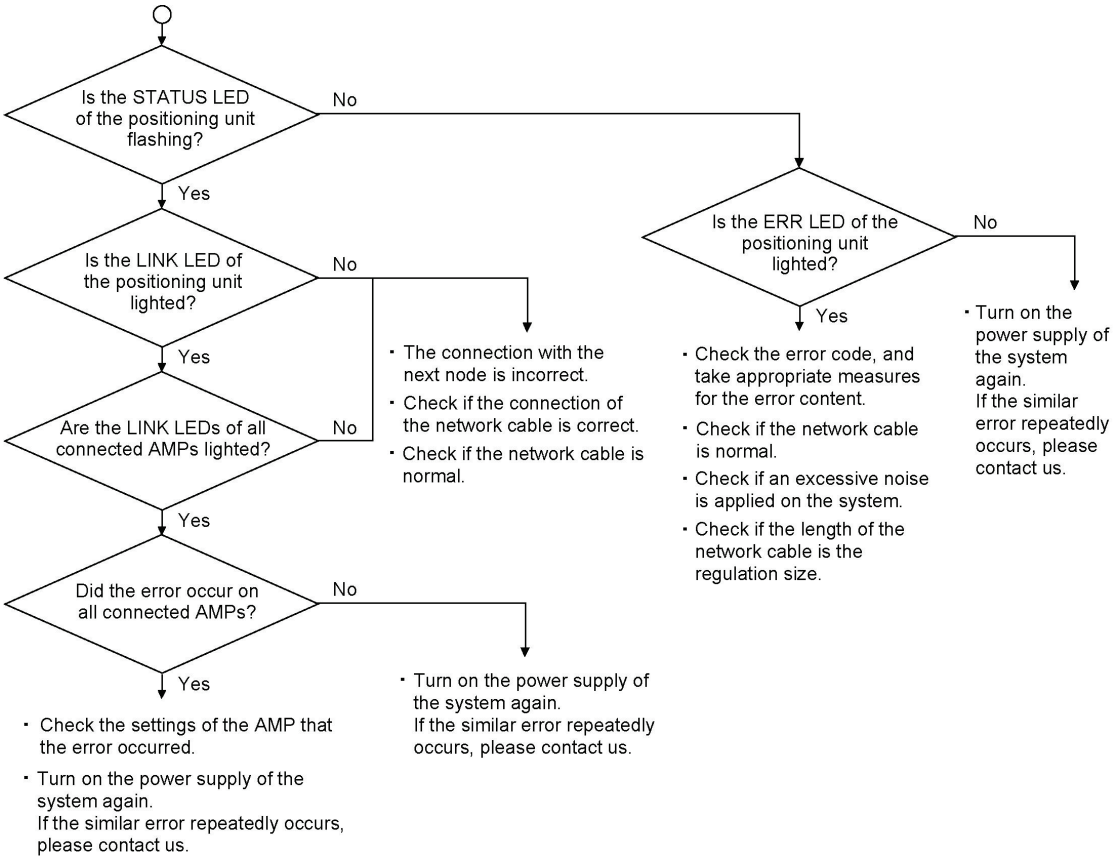
A: Available N/A: Not available

Error code	Error name	Description	Object	Clear	Countermeasures
B051H	Actual speed judgment value warning	The monitored actual speed exceeded the specified upper/lower limit value. This warning occurs when setting - actual speed judgment to “Available” - annunciation method to “Warning”	Each axis	A	Design the system within the range that the actual speed of the motor does not exceed the judgment value. Check the actual speed judgment value.
B304H	Recalculation error warning	An error occurred when recalculation was performed.	Each axis	A	Even when the error occurred, recalculation process in which no error occurs is executed. Check the settings and execute the recalculation process again.

Chapter 16

Troubleshooting

16.1 Cannot Communication With AMP



Chapter 17

Specifications

17.1 Table of Specificationa

17.1.1 General Specifications

Item	Description	
	FPΣ Positioning Unit RTEX	FP2 Positioning Unit RTEX
Ambient operating temperature	0 to +55 °C	
Ambient storage temperature	-20 to +70 °C	
Ambient operating humidity	30 to 85 % RH (at25 °C non-condensing)	
Ambient storage humidity	30 to 85 % RH (at25 °C non-condensing)	
Breakdown voltage	500 V AC, 1 minute Between the various pins of the external connector and the ground (However, excluding F.E. terminal)	1500 V AC, 1 minute Between the various pins of the external connector and the ground (However, excluding F.E. terminal)
Insulation resistance	100MΩ or more (measured with 500 V DC testing) Between the various pins of the external connector and the ground (However, excluding F.E. terminal)	
Vibration resistance	10 to 55 Hz, 1 cycle/min. Double amplitude of 0.75 mm, 10 min. each in the X, Y, Z directions	
Shock resistance	Shock of 98 m/s^2 or more, 4 times in the X, Y, Z directions	
Noise immunity	1000 V[P-P] with pulse widths 50ns and 1μs (By noise simulator)	1500 V[P-P] with pulse widths 50ns and 1μs (By noise simulator)
Operating environment	Free of corrosive gases and excessive dust	
Internal current consumption	300 mA or less	300 mA or less
Weight	Approx. 90 g	Approx. 120 g

17.1.2 Network Specifications

Item	Description
Baud rate	100 Mbps
Physical layer	100 BASE-TX Full duplex
Cable	Shielded twisted-pair cable (category 5e or more)
Topology	Ring
Insulation	Pulse transformer (Common mode choke is built in.)
Connector	8-pin RJ45
Max. cable length	Between nodes: 60 m Total length: 200 m
Communication cycle	0.5 ms (1 ms for update of position command)
Max. number of axes	8 axes
Operation command	Position command

17.1.3 Performance Specifications of Units

FPΣ Positioning unit RTEX individual specifications

Item	Description		
	2-axis type	4-axis type	8-axis type
Product number	AFPG43610	AFPG43620	AFPG43630
Part number	FPG-PN2AN	FPG-PN4AN	FPG-PN8AN
Number of axes controlled	2 axes/1 system	4 axes/1 system	8 axes/1 system
Occupied I/O points	Input: 128 points, Output: 128 points (SX128, SY128)		
Restriction on installation	A maximum of 2 units can be connected on the left side of the control unit regardless of number of axes.		

FP2 Positioning unit RTEX individual specifications

Item	Description		
	2-axis type	4-axis type	8-axis type
Product number	AFP243610	AFP243620	AFP243630
Part number	FP2-PN2AN	FP2-PN4AN	FP2-PN8AN
Number of axes controlled	2 axes/1 system	4 axes/1 system	8 axes/1 system
Occupied I/O points	Input: 128 points, Output: 128 points (SX128, SY128)		
Restriction on installation	Only the restriction of the supply current of power supply unit.		

17.1.4 Common Specifications

Item				Description		
				2-axis type	4-axis type	8-axis type
Number of axes controlled				2 axes/1 system	4 axes/1 system	8 axes/1 system
Interpolation control				2-axis linear interpolation, 2-axis circular interpolation	2-axis linear interpolation, 3-axis linear interpolation 2-axis circular interpolation, 3-axis spiral interpolation	
Occupied I/O points				Input: 128 points, Output: 128 points (SX128, SY128)		
Automatic operation	Position control	Position setting modes		Absolute (absolute position setting), Increment (relative position setting)		
		Position setting units		pulse μm (Minimum command unit is selected from 0.1 μm or 1 μm.) inch ((Minimum command unit is selected from 0.00001 inch or 0.0001 inch.) degree ((Minimum command unit is selected from 0.1 degree or 1 degree.)		
		Position command range		Pulse: -1,073,741,823 to 1,073,741, 823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): 1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 107,374.1823 inch degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree degree (1 degree): -1,073,741,823 to 1,073,741,823 degree		
		Speed command range		Pulse:1 to 32,767,000 pps μm: 1 to 32,767,000 μm/s inch: 0.001 to 32,767.000 inch/s degree: 0.001 to 32,767.000 rev/s		
		Acceleration/ deceleration		Linear acceleration/deceleration, S-shaped acceleration/deceleration		
		Acceleration time		0 to 10,000 ms (can set in 1 ms)		
		Deceleration time		0 to 10,000 ms (can set in 1 ms)		
		Number of positioning tables		Each axis Standard area: 600 points, extended area: 25 points		
		Control method	Independent	PTP control (E point control, C point control), CP control (P point control), Speed control (J point control)		
			2-axis inter-polation Linear	E point, P point, C point control Composite speed or long axis speed specification		
			2-axis inter-polation Circu-lar	E point, P point, C point control Center point or pass point specification		
			3-axis inter-polation Linear	E point, P point, C point control Composite speed or long axis speed specification		
			3-axis inter-polation Spiral	E point, P point, C point control Center point or pass point specification		
		Start-up speed		Standard area: 3 ms or less, extended area: 5 ms or less		
		Other functions	Dwell time	0 to 32,767 ms (can set in 1ms)		

Item				Description		
				2-axis type	4-axis type	8-axis type
Manual operation	JOG	Speed command range		Pulse:1 to 32,767,000 pps μm: 1 to 32,767,000 μm/s inch: 0.001 to 32,767.000 inch/s degree: 0.001 to 32,767.000 rev/s		
		Acceleration/ deceleration		Linear acceleration/deceleration, S-shaped acceleration/deceleration		
		Acceleration time		0 to 10,000 ms (can set in 1 ms)		
		Deceleration time		0 to 10,000 ms (can set in 1 ms)		
	Home return	Speed command range		Pulse:1 to 32,767,000 pps μm: 1 to 32,767,000 μm/s inch: 0.001 to 32,767.000 inch/s degree: 0.001 to 32,767.000 rev/s		
		Acceleration/ deceleration		Linear acceleration/deceleration		
		Acceleration time		0 to 10,000 ms (can set in 1 ms)		
		Deceleration time		0 to 10,000 ms (can set in 1 ms)		
		Return method		DOG method (3 types), Limit method (2 types), Home position method (2 types), Stop-on-contact method (2 types), Data set method		
	Pulser	Speed command range		Activates in synchronization with pulser input		
		Operation method		Standard operation, Speed limit (pulse retention), Speed limit (Round down)		
Stop function	Deceleration stop		Deceleration time	Deceleration time of active operation		
	Pause		Deceleration time	Stops in deceleration time of the control being operated, and restarts the stopped control once the deceleration stop is reset.		
	Emergency stop		Deceleration time	0 to 10,000 ms (can set in 1 ms)		
	Limit stop		Deceleration time	0 to 10,000 ms (can set in 1 ms)		
	Error stop		Deceleration time	0 to 10,000 ms (can set in 1 ms)		
	System stop		Deceleration time	Immediate stop (0 ms)		
Other specifications	Software limit function		Setting range	Pulse: -1,073,741,823 to 1,073,741, 823 pulse μm (0.1 μm): -107,374,182.3 to 107,374,182.3 μm μm (1 μm): 1,073,741,823 to 1,073,741,823 μm inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch inch (0.0001 inch): -107,374.1823 to 107,374.1823 inch degree (0.1 degree): 0.0 to 359.9 degree degree (1 degree): 0 to 359 degree		
	Monitor judgment		Torque judgment	Torque judgment Valid/invalid Error/warning selectable 0.0 to 500%		
			Actual speed judgment	Actual speed judgment Valid/invalid Error/warning selectable 0.0 to ±5000 rpm		
	Backup			Parameters and positioning data are stored in flash memory. (Battery is not required.)		
	- Limit input CWL, CCWL monitor, Near home (DOG) monitor - General-purpose input: 2 points, general-purpose output: 2 points (Input/output from AMP) - Auxiliary output contact, auxiliary output code - Torque					

17.2 Table of I/O Area

Followings are occupied I/O when FPΣ/FP2 Positioning unit RTEX is installed in the slot 0.

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WX10	X100	WX0	X0	All axes	Link establishment annunciation	Indicates that the network link was established, and announce the system started running.
	X101		X1	-	-	-
	X102		X2	-	-	-
	X103		X3	All axes	Write FROM	Announces that data such as positioning parameters in the shared memory is being written in FROM.
	X104		X4	All axes	Tool operation	Contact to indicate the Tool operation from Configurator PM. The start-up from I/O is not available during the Tool operation. If it performs, a warning will occur.
	X105		X5	-	-	-
	X106		X6	-	-	-
	X107		X7	All axes	Recalculation done	If the recalculation request contact (Y_7) turns on, the positioning data of the shared memory (standard area) will be restructured. This contact will turn on after restructuring completes. If the recalculation request contact (Y_7) turns on again, this contact will be off once. Note) It is used only when the positioning data has been rewritten by ladder programs.
	X108		X8	1 axis	Each axis connection confirmation	Turns on when the corresponding axis exists.
	X109		X9	2 axis		
	X10A		XA	3 axis		
	X10B		XB	4 axis		
	X10C		XC	5 axis		
	X10D		XD	6 axis		
	X10E		XE	7 axis		
	X10F		XF	8 axis		
WX11	X110	WX1	X10	1 axis	Servo lock	Turns on when the corresponding axis is in the state of servo lock.
	X111		X11	2 axis		
	X112		X12	3 axis		
	X113		X13	4 axis		
	X114		X14	5 axis		
	X115		X15	6 axis		
	X116		X16	7 axis		
	X117		X17	8 axis		
	X118		X18	1 axis	BUSY	Turns on when the corresponding axis is operating.
	X119		X19	2 axis		
	X11A		X1A	3 axis		
	X11B		X1B	4 axis		
	X11C		X1C	5 axis		
	X11D		X1D	6 axis		
	X11E		X1E	7 axis		
	X11F		X1F	8 axis		

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WX12	X120	WX2	X20	1 axis	Operation done	Turns on when the operation command for the corresponding axis completed and the position error became in the specified completion width. For P point control and C point control of the automatic operation, turns on when the operation for all the tables completed. After this contact turned on, the on-state continues until the next control activates.
	X121		X21	2 axis		
	X122		X22	3 axis		
	X123		X23	4 axis		
	X124		X24	5 axis		
	X125		X25	6 axis		
	X126		X26	7 axis		
	X127		X27	8 axis		
	X128		X28	1 axis	Home return done	Turns on when the home return operation for the corresponding axis completed. After this contact turned on, the on-state continues until the next control activates.
	X129		X29	2 axis		
	X12A		X2A	3 axis		
	X12B		X2B	4 axis		
	X12C		X2C	5 axis		
	X12D		X2D	6 axis		
	X12E		X2E	7 axis		
	X12F		X2F	8 axis		
WX13	X130	WX3	X30	-	-	-
	X131		X31	-	-	-
	X132		X32	-	-	-
	X133		X33	-	-	-
	X134		X34	-	-	-
	X135		X35	-	-	-
	X136		X36	-	-	-
	X137		X37	-	-	-
	X138		X38	1 axis	Near home	Monitor contact for the near home input connected to the corresponding AMP.
	X139		X39	2 axis		
	X13A		X3A	3 axis		
	X13B		X3B	4 axis		
	X13C		X3C	5 axis		
	X13D		X3D	6 axis		
	X13E		X3E	7 axis		
	X13F		X3F	8 axis		
WX14	X140	WX4	X40	1 axis	Imposition	Turns on when the position error of the corresponding axis is within the imposition range specified in AMP. The setting of the imposition range can be changed by PANATERM that is a tool of AMP.
	X141		X41	2 axis		
	X142		X42	3 axis		
	X143		X43	4 axis		
	X144		X44	5 axis		
	X145		X45	6 axis		
	X146		X46	7 axis		
	X147		X47	8 axis		
	X148		X48	1 axis	Auxiliary contact	Turns on when the corresponding positioning table of the corresponding axis was executed. Use Configurator PM or directly write in the shared memory for setting to able/disable the auxiliary contact.
	X149		X49	2 axis		
	X14A		X4A	3 axis		
	X14B		X4B	4 axis		
	X14C		X4C	5 axis		
	X14D		X4D	6 axis		
	X14E		X4E	7 axis		
	X14F		X4F	8 axis		

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WX15	X150	WX5	X50	1 axis	Limit +	Monitor contact of the limit + and – connected to the corresponding AMP. During the positioning operation, JOG operation or pulser operation, performs the deceleration stop when the limit input that is an extension of the operating direction turned on. The deceleration stop time during the limit input can be changed in the shared memory. It will be the contact for the automatic inversion when performing the home return.
	X151		X51		Limit -	
	X152		X52	2 axis	Limit +	
	X153		X53		Limit -	
	X154		X54	3 axis	Limit +	
	X155		X55		Limit -	
	X156		X56	4 axis	Limit +	
	X157		X57		Limit -	
	X158		X58	5 axis	Limit +	
	X159		X59		Limit -	
	X15A		X5A	6 axis	Limit +	
	X15B		X5B		Limit -	
	X15C		X5C	7 axis	Limit +	
	X15D		X5D		Limit -	
	X15E		X5E	8 axis	Limit +	
	X15F		X5F		Limit -	
WX16	X160	WX6	X60	1 axis	Error annunciation	Turns on when an error occurs on the corresponding axis. The contacts of all axes turn on if an error occurs on all axes. The details of the error can be confirmed in the error annunciation area of the shared memory.
	X161		X61	2 axis		
	X162		X62	3 axis		
	X163		X63	4 axis		
	X164		X64	5 axis		
	X165		X65	6 axis		
	X166		X66	7 axis		
	X167		X67	8 axis		
	X168		X68	1 axis	Warning annunciation	Turns on when a warning occurs on the corresponding axis. The contacts of all axes turn on if a warning occurs on all axes. The details of the warning can be confirmed in the warning annunciation area of the shared memory.
	X169		X69	2 axis		
	X16A		X6A	3 axis		
	X16B		X6B	4 axis		
	X16C		X6C	5 axis		
	X16D		X6D	6 axis		
	X16E		X6E	7 axis		
	X16F		X6F	8 axis		
WX17	X170	WX7	X70	1 axis	General-purpose input 1	Monitor contact for the general-purpose input connected to the corresponding AMP. The input status of this contact does not affect on the operation of the motor or positioning unit.
	X171		X71		General-purpose input 2	
	X172		X72	2 axis	General-purpose input 1	
	X173		X73		General-purpose input 2	
	X174		X74	3 axis	General-purpose input 1	
	X175		X75		General-purpose input 2	
	X176		X76	4 axis	General-purpose input 1	
	X177		X77		General-purpose input 2	
	X178		X78	5 axis	General-purpose input 1	
	X179		X79		General-purpose input 2	
	X17A		X7A	6 axis	General-purpose input 1	
	X17B		X7B		General-purpose input 2	
	X17C		X7C	7 axis	General-purpose input 1	
	X17D		X7D		General-purpose input 2	
	X17E		X7E	8 axis	General-purpose input 1	
	X17F		X7F		General-purpose input 2	

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WY10	Y100	WY8	Y80	All axes	System stop	Contact for requesting the system stop. When it turns on, all axes will stop at the deceleration time 0.
	Y101		Y81	-	-	-
	Y102		Y82	-	-	-
	Y103		Y83	-	-	-
	Y104		Y84	-	-	-
	Y105		Y85	-	-	-
	Y106		Y86	-	-	-
	Y107		Y87	All axes	Recalculation request	Turn on this signal when each positioning data (standard area) in the shared memory was changed. The positioning data after the table number starting the recalculation specified in the shared memory can be restructured and will be executable by turning on this signal. When restructuring of the positioning data completes, the recalculation done contact (X_7) will turn on. Note) It is used only when the positioning data has been rewritten by ladder programs.
	Y108		Y88	1 axis	Servo ON request	Requests the servo lock for the corresponding AMP. The servo lock is executed by the ON edge of this contact. The servo cannot be free automatically even in the program mode. To make the servo free, turn on the servo OFF request contact. (The operation is the edge type.)
	Y109		Y89	2 axis		
	Y10A		Y8A	3 axis		
	Y10B		Y8B	4 axis		
	Y10C		Y8C	5 axis		
	Y10D		Y8D	6 axis		
	Y10E		Y8E	7 axis		
	Y10F		Y8F	8 axis		
WY11	Y110	WY9	Y90	1 axis	Positioning start-up	Requests the positioning control for the corresponding AMP. The starting table is specified in the area for specifying the position control starting table number in the shared memory. (The operation is the edge type.) If this contact turns on during the Tool operation by Configurator PM, a warning will be output.
	Y111		Y91	2 axis		
	Y112		Y92	3 axis		
	Y113		Y93	4 axis		
	Y114		Y94	5 axis		
	Y115		Y95	6 axis		
	Y116		Y96	7 axis		
	Y117		Y97	8 axis		
	Y118		Y98	1 axis	Home return start-up	Requests the home return for the corresponding AMP. The settings for the direction or pattern of the home return are specified by Configurtor PM or the home return operation setting area in the shared memory. (The operation is the edge type.) If this contact turns on during the Tool operation by Configurator PM, a warning will be output.
	Y119		Y99	2 axis		
	Y11A		Y9A	3 axis		
	Y11B		Y9B	4 axis		
	Y11C		Y9C	5 axis		
	Y11D		Y9D	6 axis		
	Y11E		Y9E	7 axis		
	Y11F		Y9F	8 axis		
WY12	Y120	WY10	Y100	1 axis	JOG forward	Requests the JOG operation for the corresponding AMP. The settings for acceleration time, etc are specified by Configurator PM or the JOG operation settings in the shared memory. (The operation is the level type.) If this contact turns on during the Tool operation by Configurator PM, a warning will be output.
	Y121		Y101		JOG reverse	
	Y122		Y102	2 axis	JOG forward	
	Y123		Y103		JOG reverse	
	Y124		Y104	3 axis	JOG forward	
	Y125		Y105		JOG reverse	
	Y126		Y106	4 axis	JOG forward	
	Y127		Y107		JOG reverse	
	Y128		Y108	5 axis	JOG forward	
	Y129		Y109		JOG reverse	
	Y12A		Y10A	6 axis	JOG forward	
	Y12B		Y10B		JOG reverse	
	Y12C		Y10C	7 axis	JOG forward	
	Y12D		Y10D		JOG reverse	
	Y12E		Y10E	8 axis	JOG forward	
	Y12F		Y10F		JOG reverse	

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WY13	Y130	WY11	Y110	1 axis	Emergency stop	Requests the emergency stop for the corresponding AMP. The deceleration time for the emergency stop is specified by Configurator PM or the emergency stop setting in the shared memory. (The operation is the level type.) Note) The deviation counter cannot be cleared.
	Y131		Y111	2 axis		
	Y132		Y112	3 axis		
	Y133		Y113	4 axis		
	Y134		Y114	5 axis		
	Y135		Y115	6 axis		
	Y136		Y116	7 axis		
	Y137		Y117	8 axis		
	Y138		Y118	1 axis	Deceleration stop	Requests the deceleration stop for the corresponding AMP. The deceleration time for the deceleration stop is specified by Configurator PM or the deceleration stop setting in the shared memory. (The operation is the level type.) Note) The deviation counter cannot be cleared.
	Y139		Y119	2 axis		
	Y13A		Y11A	3 axis		
	Y13B		Y11B	4 axis		
	Y13C		Y11C	5 axis		
	Y13D		Y11D	6 axis		
	Y13E		Y11E	7 axis		
	Y13F		Y11F	8 axis		
WY14	Y140	WY12	Y120	1 axis	Pulser operation enabled	Requests the permission for the pulser operation of the corresponding AMP. The multiple setting and other settings for the pulser operation are specified by Configurator PM or the pulser operation setting area in the shared memory. (The operation is the level type.)
	Y141		Y121	2 axis		
	Y142		Y122	3 axis		
	Y143		Y123	4 axis		
	Y144		Y124	5 axis		
	Y145		Y125	6 axis		
	Y146		Y126	7 axis		
	Y147		Y127	8 axis		
	Y148		Y128	1 axis	J point speed change contact	The speed changes by turning on this signal during the J-point operation to the target speed with the specified acceleration/ deceleration time and pattern. (The operation is the edge type.)
	Y149		Y129	2 axis		
	Y14A		Y12A	3 axis		
	Y14B		Y12B	4 axis		
	Y14C		Y12C	5 axis		
	Y14D		Y12D	6 axis		
	Y14E		Y12E	7 axis		
	Y14F		Y12F	8 axis		
WY15	Y150	WY13	Y130	1 axis	Request servo off	Requests the servo free for the corresponding AMP. The servo free is executed by the ON edge of this contact. (The operation is the edge type.)
	Y151		Y131	2 axis		
	Y152		Y132	3 axis		
	Y153		Y133	4 axis		
	Y154		Y134	5 axis		
	Y155		Y135	6 axis		
	Y156		Y136	7 axis		
	Y157		Y137	8 axis		
	Y158		Y138	1 axis	J point positioning start contact	Turning on this signal during the J-point operation for the appropriate axis ends the J-point operation, and moves to the process for the next table. (The operation is the edge type.)
	Y159		Y139	2 axis		
	Y15A		Y13A	3 axis		
	Y15B		Y13B	4 axis		
	Y15C		Y13C	5 axis		
	Y15D		Y13D	6 axis		
	Y15E		Y13E	7 axis		
	Y15F		Y13F	8 axis		

Contact allocation				Target axis	Name	Descriptions
FPΣ		FP2				
WY16	Y160	WY14	Y140	1 axis	Request error clear	Requests the error clear for the corresponding AMP. The processing to recover from errors is performed and the error logs are cleared by turning on this signal.
	Y161		Y141	2 axis		
	Y162		Y142	3 axis		
	Y163		Y143	4 axis		
	Y164		Y144	5 axis		
	Y165		Y145	6 axis		
	Y166		Y146	7 axis		
	Y167		Y147	8 axis		
	Y168		Y148	1 axis	Request warning clear	Requests the warning clear for the corresponding AMP. The warning logs are cleared by turning on this signal.
	Y169		Y149	2 axis		
	Y16A		Y14A	3 axis		
	Y16B		Y14B	4 axis		
	Y16C		Y14C	5 axis		
	Y16D		Y14D	6 axis		
	Y16E		Y14E	7 axis		
	Y16F		Y14F	8 axis		
WY17	Y170	WY15	Y150	1 axis	General-purpose output 1	Contact for the general-purpose output connected to the corresponding AMP. The input status of this contact does not affect on the operation of the motor or positioning unit.
	Y171		Y151		General-purpose output 2	
	Y172		Y152	2 axis	General-purpose output 1	
	Y173		Y153		General-purpose output 2	
	Y174		Y154	3 axis	General-purpose output 1	
	Y175		Y155		General-purpose output 2	
	Y176		Y156	4 axis	General-purpose output 1	
	Y177		Y157		General-purpose output 2	
	Y178		Y158	5 axis	General-purpose output 1	
	Y179		Y159		General-purpose output 2	
	Y17A		Y15A	6 axis	General-purpose output 1	
	Y17B		Y15B		General-purpose output 2	
	Y17C		Y15C	7 axis	General-purpose output 1	
	Y17D		Y15D		General-purpose output 2	
	Y17E		Y15E	8 axis	General-purpose output 1	
	Y17F		Y15F		General-purpose output 2	

17.3 Configuration of Shared Memory Areas

The positioning unit RTEX manages all the setting values of parameters and positioning data in the shared memory. Therefore, all the setting values can be specified by ladder programs as well as Configurator PM.
Followings are the details of the shared memory.

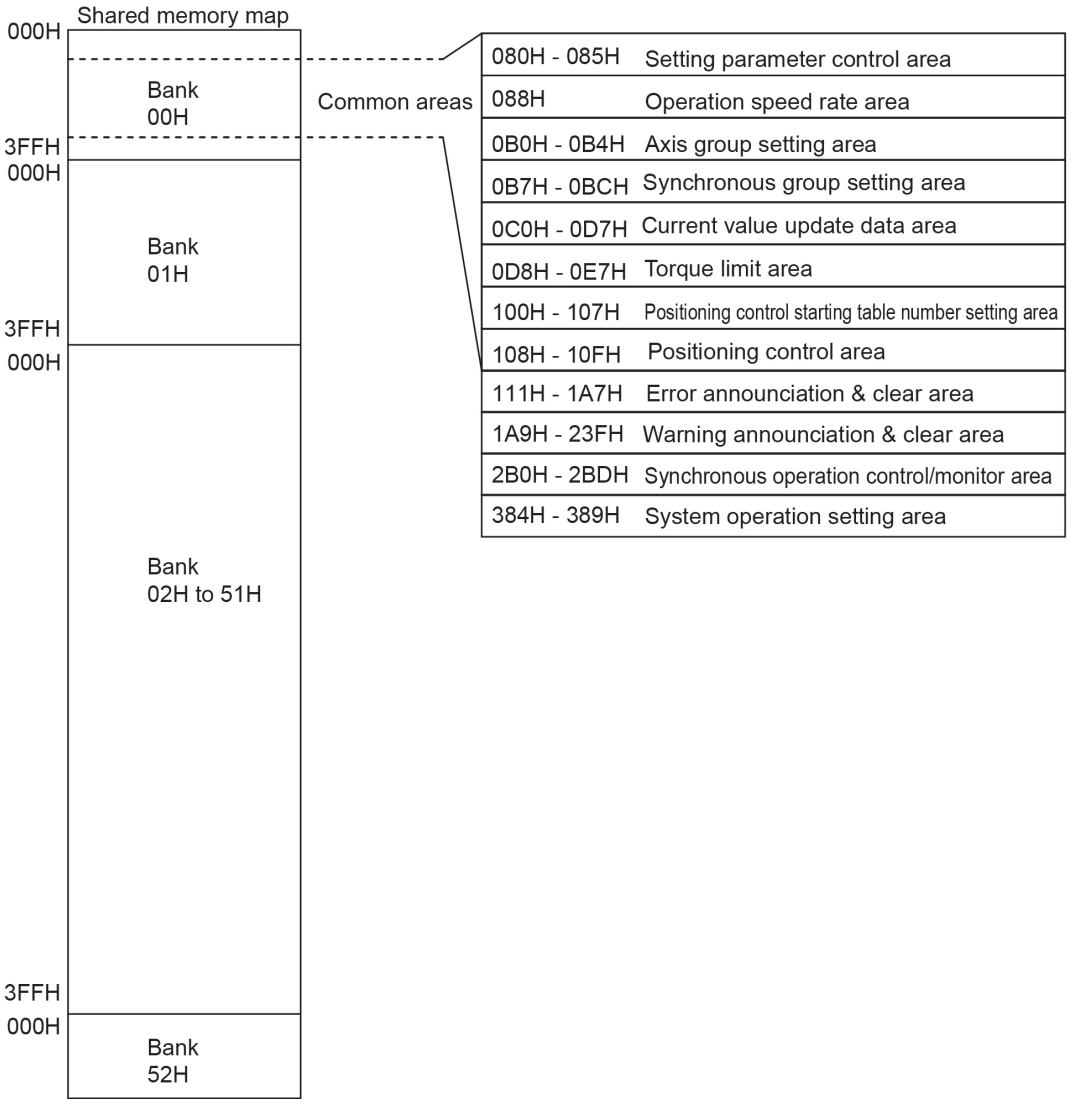
Area name	Shared memory bank	Individual name of each area	
Common area	00H	Setting parameter control area	
		Operation speed rate area	
		Axis group setting area	
		Synchronous group setting area	
		Current value update data area	
		Torque limit area	
		Positioning control starting table number setting area	
		Positioning control area	
		Error annunciation & clear area	
		Warning annunciation & clear area	
		Synchronous operation control/monitor area	
		System operation setting area	
Each axis information area Note)	01H	1 axis	Each axis information & monitor area
		2 axis	Each axis information & monitor area
		3 axis	Each axis information & monitor area
		4 axis	Each axis information & monitor area
		5 axis	Each axis information & monitor area
		6 axis	Each axis information & monitor area
		7 axis	Each axis information & monitor area
		8 axis	Each axis information & monitor area
Each axis setting area	02H to 0BH	1 axis	Parameter setting area
			Positioning data setting area (Standard: for 600 points, Extended: for 25 points)
	0CH to 15H	2 axis	Parameter setting area
			Positioning data setting area (Standard: for 600 points, Extended: for 25 points)
	16H to 1FH	3 axis	Parameter setting area
			Positioning data setting area (Standard: for 600 points, Extended: for 25 points)
	20H to 29H	4 axis	Parameter setting area
			Positioning data setting area (Standard: for 600 points, Extended: for 25 points)
	2AH to 33H	5 axis	Parameter setting area
			Positioning data setting area (Standard: for 600 points, Extended: for 25 points)
	34H to 3DH	6 axis	Parameter setting area
			Positioning data setting area (Standard: for 600 points, Extended: for 25 points)
	3EH to 47H	7 axis	Parameter setting area
			Positioning data setting area (Standard: for 600 points, Extended: for 25 points)
	48H to 51H	8 axis	Parameter setting area
			Positioning data setting area (Standard: for 600 points, Extended: for 25 points)
AMP parameter control area	52H		

Note) Firstly confirm that the link establishment annunciation flag is on when reading the axis information area using the ladder program.

17.4 Details of Common Area in Shared Memory

17.4.1 Configuration of Common Area

The shared memory is composed of banks. The common area is allocated in the bank 00H in the shared memory, and is used for the common settings of each axis.



17.4.2 Setting Parameter Control Area

This is the area to write the setting values of the positioning parameters and positioning data in the shared memory into FROM, or to execute the recalculation of the positioning data.
The number of writing to FROM in the positioning unit is announced to the CPU unit (control unit) through this area, and writing the positioning parameters and positioning data in the shared memory to FROM is requested. Also, the recalculation starting table number is set to recalculate the positioning data in the standard area.

Bank	Offset address	Name	Descriptions	Default value	Setting range	Unit
00H	080H	Annunciation of number of writing to FROM	Announces the number of writing the positioning parameters and data in the shared memory into FROM.	0	-	times
	081H	Request for writing to FROM	When writing into FROM by Configurator PM, the following procedures will be automatically performed. When writing into FROM by ladder programs, it is necessary to achieve the following Configurator PM operation by the ladder programs. 1. Write 5555H in this area by the ladder program. 2. The positioning unit checks 5555H, and write 6666H over in the same area. 3. Check 6666H by the ladder program, and write AAAAH over. (Time out of 6666H is 30 seconds.) 4. The positioning unit copies the content of the shared memory into FROM. 5. The positioning unit checks writing. When OK: The unit sets 0000H. When NG: The unit sets FFFFH. 6. When confirming 0000H by the ladder program, the operation will be completed successfully. When confirming FFFFH, an error will occur. In that case, write 0000H over in this area.	0000H	-	-
	085H	Recalculation starting table number	When the recalculation request signal (Y_7 contact) turns on, the positioning unit will recalculate the positioning data of all the axes from this table number to No. 600.	1	1 to 600	-

17.4.3 Operation Speed Rate Area

Bank	Offset address	Name	Descriptions	Default value	Setting range	Unit
00H	088H	Operation speed rate	All operations relating to axes (positioning, JOG, home return) can be performed at the specified rate. The unit is %, and can be input in the range of 1 to 100 (%).	100	1 to 100	%

17.4.4 Axis Group Setting Area

The interpolation groups for each axis are set in this area. For the axis connected to network, set the bit of the corresponding axis to 1 in any setting as below.

<table>
<tr><th>Bank</th><th>Offset address</th><th>Name</th><th>Descriptions</th></tr>
<tr><td rowspan="5">00H</td><td>0B0H</td><td>Group A axis settings</td><td rowspan="4">Set either independent or interpolation for each axis in this area. In case of interpolation, each axis belongs to any group among A to D. For example, the axes 1, 2, and 3 belong to group A and are 3-axis interpolation, set the corresponding 3 bits to 1 in the interpolation axis setting of group A. In case of single axis independent setting, it does not belong to any group. Turn on the corresponding bits of the rest of the independent axis settings.
Maximum number of interpolation axis per group is 3. The same axis cannot be set in more than one group.

<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Group attribute of axis 1</td><td>0</td><td rowspan="9">0: Not belong to the group.
1: Belong to the group.

An error occurs if more than 4 bits are set to 1 in the group, or the same axis is set to 1 in another group.</td></tr>
<tr><td>1</td><td>Group attribute of axis 2</td><td>0</td></tr>
<tr><td>2</td><td>Group attribute of axis 3</td><td>0</td></tr>
<tr><td>3</td><td>Group attribute of axis 4</td><td>0</td></tr>
<tr><td>4</td><td>Group attribute of axis 5</td><td>0</td></tr>
<tr><td>5</td><td>Group attribute of axis 6</td><td>0</td></tr>
<tr><td>6</td><td>Group attribute of axis 7</td><td>0</td></tr>
<tr><td>7</td><td>Group attribute of axis 8</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>0B1H</td><td>Group B axis settings</td></tr>
<tr><td>0B2H</td><td>Group C axis settings</td></tr>
<tr><td>0B3H</td><td>Group D axis settings</td></tr>
<tr><td>0B4H</td><td>Independent axis settings</td><td>For the axes that do not belong to the interpolation relation, set the corresponding bits to 1.

<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Independent axis attribute of axis 1</td><td>0</td><td rowspan="9">0: Not belong to the independent axis
1: Belong to the independent axis

An error occurs if the same axis is set to 1 in another group (A to D)</td></tr>
<tr><td>1</td><td>Independent axis attribute of axis 1</td><td>0</td></tr>
<tr><td>2</td><td>Independent axis attribute of axis 1</td><td>0</td></tr>
<tr><td>3</td><td>Independent axis attribute of axis 1</td><td>0</td></tr>
<tr><td>4</td><td>Independent axis attribute of axis 1</td><td>0</td></tr>
<tr><td>5</td><td>Independent axis attribute of axis 1</td><td>0</td></tr>
<tr><td>6</td><td>Independent axis attribute of axis 1</td><td>0</td></tr>
<tr><td>7</td><td>Independent axis attribute of axis 1</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
</table>

17.4.5 Synchronous Group Setting Area

For the synchronous operation, one slave axis is set for one master axis. Up to two groups can be set.

<table>
<tr><th>Bank</th><th>Offset address</th><th>Name</th><th>Descriptions</th></tr>
<tr><td rowspan="6">00H</td><td>0B7H</td><td>Synchronous group 1 Synchronous mode</td><td>Sets the operation mode of the synchronous operation.
00H: Synchronous mode A 01H: Synchronous mode B</td></tr>
<tr><td>0B8H</td><td>Synchronous group 1 Master axis</td><td rowspan="2">Turn on the corresponding bit for the axes to be the master and slave axes in the synchronous operation.
Each synchronous axis can be set for only one axis.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Synchronous attribute of axis 1</td><td>0</td><td rowspan="8">0: Not execute synchronous operation.
1: Synchronous operation master/slave axis setting of group</td></tr>
<tr><td>1</td><td>Synchronous attribute of axis 2</td><td>0</td></tr>
<tr><td>2</td><td>Synchronous attribute of axis 3</td><td>0</td></tr>
<tr><td>3</td><td>Synchronous attribute of axis 4</td><td>0</td></tr>
<tr><td>4</td><td>Synchronous attribute of axis 5</td><td>0</td></tr>
<tr><td>5</td><td>Synchronous attribute of axis 6</td><td>0</td></tr>
<tr><td>6</td><td>Synchronous attribute of axis 7</td><td>0</td></tr>
<tr><td>7</td><td>Synchronous attribute of axis 8</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>0B9H</td><td>Synchronous group 1 Slave axis</td></tr>
<tr><td>0BAH</td><td>Synchronous group 2 Synchronous mode</td><td>Sets the operation mode of the synchronous operation.
00H: Synchronous mode A 01H: Synchronous mode B</td></tr>
<tr><td>0BBH</td><td>Synchronous group 2 Master axis</td><td rowspan="2">Turn on the corresponding bit for the axes to be the master and slave axes in the synchronous operation.
Each synchronous axis can be set for only one axis.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Synchronous attribute of axis 1</td><td>0</td><td rowspan="8">0: Not execute synchronous operation.
1: Synchronous operation master/slave axis setting of group</td></tr>
<tr><td>1</td><td>Synchronous attribute of axis 2</td><td>0</td></tr>
<tr><td>2</td><td>Synchronous attribute of axis 3</td><td>0</td></tr>
<tr><td>3</td><td>Synchronous attribute of axis 4</td><td>0</td></tr>
<tr><td>4</td><td>Synchronous attribute of axis 5</td><td>0</td></tr>
<tr><td>5</td><td>Synchronous attribute of axis 6</td><td>0</td></tr>
<tr><td>6</td><td>Synchronous attribute of axis 7</td><td>0</td></tr>
<tr><td>7</td><td>Synchronous attribute of axis 8</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>0BCH</td><td>Synchronous group 2 Slave axis</td></tr>
</table>

17.4.6 Current Value Update Data Area

For changing the current value of each axis controlled in the positioning unit, store the changed coordinates in this area and turn on the current value update request flag.

<table>
<tr><th>Bank</th><th>Offset address</th><th>Name</th><th>Descriptions</th></tr>
<tr><td rowspan="17">00H</td><td>0C0H</td><td>Current value update request flag</td><td>Only when the corresponding bit for each axis changes to 1 from 0, the current values controlled by the positioning unit are changed to the following values.
After the change, the positioning unit clears the corresponding bits to 0 automatically.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Current value update request for axis 1</td><td>0</td><td rowspan="8">0: No change
1: Updates the current value of a target axis. (After change, the positioning unit clears the corresponding bits to 0 automatically.)</td></tr>
<tr><td>1</td><td>Current value update request for axis 2</td><td>0</td></tr>
<tr><td>2</td><td>Current value update request for axis 3</td><td>0</td></tr>
<tr><td>3</td><td>Current value update request for axis 4</td><td>0</td></tr>
<tr><td>4</td><td>Current value update request for axis 5</td><td>0</td></tr>
<tr><td>5</td><td>Current value update request for axis 6</td><td>0</td></tr>
<tr><td>6</td><td>Current value update request for axis 7</td><td>0</td></tr>
<tr><td>7</td><td>Current value update request for axis 8</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>0C8H</td><td rowspan="2">Current value update coordinate of axis 1</td><td rowspan="2">Stores the coordinate to update the current value of axis 1.</td></tr>
<tr><td>0C9H</td></tr>
<tr><td>0CAH</td><td rowspan="2">Current value update coordinate of axis 2</td><td rowspan="2">Stores the coordinate to update the current value of axis 2.</td></tr>
<tr><td>0CBH</td></tr>
<tr><td>0CCH</td><td rowspan="2">Current value update coordinate of axis 3</td><td rowspan="2">Stores the coordinate to update the current value of axis 3.</td></tr>
<tr><td>0CDH</td></tr>
<tr><td>0CEH</td><td rowspan="2">Current value update coordinate of axis 4</td><td rowspan="2">Stores the coordinate to update the current value of axis 4.</td></tr>
<tr><td>0CFH</td></tr>
<tr><td>0D0H</td><td rowspan="2">Current value update coordinate of axis 5</td><td rowspan="2">Stores the coordinate to update the current value of axis 5.</td></tr>
<tr><td>0D1H</td></tr>
<tr><td>0D2H</td><td rowspan="2">Current value update coordinate of axis 6</td><td rowspan="2">Stores the coordinate to update the current value of axis 6.</td></tr>
<tr><td>0D3H</td></tr>
<tr><td>0D4H</td><td rowspan="2">Current value update coordinate of axis 7</td><td rowspan="2">Stores the coordinate to update the current value of axis 7.</td></tr>
<tr><td>0D5H</td></tr>
<tr><td>0D6H</td><td rowspan="2">Current value update coordinate of axis 8</td><td rowspan="2">Stores the coordinate to update the current value of axis 8.</td></tr>
<tr><td>0D7H</td></tr>
</table>

17.4.7 Torque Limit Area

- The output torque from the AMP to motor can be changed. The setting range of 1 to 5000 is equivalent to 0.1 to 500.0 %.
- It cannot be changed during the positioning operation. The change done during the positioning operation will be affected at the next start-up.

<table>
<tr><th>Bank</th><th>Offset address</th><th>Name</th><th>Descriptions</th><th>Default value</th><th>Setting range</th><th>Unit</th></tr>
<tr><td rowspan="9">00H</td><td>0D8H</td><td>Torque limit enabled flag</td><td>Sets whether to enable or disable the execution of the torque limit for each axis. To enable the torque limit, set the corresponding bit to 1.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Torque limit of axis 1</td><td>0</td><td rowspan="8">0: Torque limit disabled (Default)
1: Torque limit enabled</td></tr>
<tr><td>1</td><td>Torque limit of axis 2</td><td>0</td></tr>
<tr><td>2</td><td>Torque limit of axis 3</td><td>0</td></tr>
<tr><td>3</td><td>Torque limit of axis 4</td><td>0</td></tr>
<tr><td>4</td><td>Torque limit of axis 5</td><td>0</td></tr>
<tr><td>5</td><td>Torque limit of axis 6</td><td>0</td></tr>
<tr><td>6</td><td>Torque limit of axis 7</td><td>0</td></tr>
<tr><td>7</td><td>Torque limit of axis 8</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>0E0H</td><td>Torque limit value of axis 1</td><td>Stores the torque limit value of axis 1.</td><td>3000</td><td>1 to 5000</td><td>0.1 %</td></tr>
<tr><td>0E1H</td><td>Torque limit value of axis 2</td><td>Stores the torque limit value of axis 2.</td><td>3000</td><td>1 to 5000</td><td>0.1 %</td></tr>
<tr><td>0E2H</td><td>Torque limit value of axis 3</td><td>Stores the torque limit value of axis 3.</td><td>3000</td><td>1 to 5000</td><td>0.1 %</td></tr>
<tr><td>0E3H</td><td>Torque limit value of axis 4</td><td>Stores the torque limit value of axis 4.</td><td>3000</td><td>1 to 5000</td><td>0.1 %</td></tr>
<tr><td>0E4H</td><td>Torque limit value of axis 5</td><td>Stores the torque limit value of axis 5.</td><td>3000</td><td>1 to 5000</td><td>0.1 %</td></tr>
<tr><td>0E5H</td><td>Torque limit value of axis 6</td><td>Stores the torque limit value of axis 6.</td><td>3000</td><td>1 to 5000</td><td>0.1 %</td></tr>
<tr><td>0E6H</td><td>Torque limit value of axis 7</td><td>Stores the torque limit value of axis 7.</td><td>3000</td><td>1 to 5000</td><td>0.1 %</td></tr>
<tr><td>0E7H</td><td>Torque limit value of axis 8</td><td>Stores the torque limit value of axis 8.</td><td>3000</td><td>1 to 5000</td><td>0.1 %</td></tr>
</table>

17.4.8 Positioning Table Number Setting Area

Used to specify the table number to start the position control.
The setting ranges are 1 to 600 in the standard area, and 10001 to 10025 in the extended area.

Bank	Offset address	Name	Descriptions	Default value	Setting range	Unit
00H	100H	Position control starting table number of 1st axis	Stores the table number of 1st axis starting the position control.	1	1 to 600 10001 to 10025	-
	101H	Position control starting table number of 2nd axis	Stores the table number of 2nd axis starting the position control.	1	1 to 600 10001 to 10025	-
	102H	Position control starting table number of 3rd axis	Stores the table number of 3rd axis starting the position control.	1	1 to 600 10001 to 10025	-
	103H	Position control starting table number of 4th axis	Stores the table number of 4th axis starting the position control.	1	1 to 600 10001 to 10025	-
	104H	Position control starting table number of 5th axis	Stores the table number of 5th axis starting the position control.	1	1 to 600 10001 to 10025	-
	105H	Position control starting table number of 6th axis	Stores the table number of 6th axis starting the position control.	1	1 to 600 10001 to 10025	-
	106H	Position control starting table number of 7th axis	Stores the table number of 7th axis starting the position control.	1	1 to 600 10001 to 10025	-
	107H	Position control starting table number of 8th axis	Stores the table number of 8th axis starting the position control.	1	1 to 600 10001 to 10025	-

17.4.9 Positioning Control Area

- This is the area to set the repeat count of the positioning control to be started by axis.
- The positioning unit repeats the started positioning control for the specified repeat count and then completes the operation. The repeat count is changed to the default value on completion of the operation.

Bank	Offset address	Name	Descriptions	Default value	Setting range	Unit
00H	108H	Positioning repeat count of axis 1	Stores the number of times for repeating the operation starting from the position control starting table number of the first axis until the E point. When 255 is stored, the positioning control is repeated unlimitedly until the operation is stopped.	0	0 to 255	times
	109H	Positioning repeat count of axis 2	Stores the number of times for repeating the operation starting from the position control starting table number of the second axis until the E point. When 255 is stored, the positioning control is repeated unlimitedly until the operation is stopped.	0	0 to 255	times
	10AH	Positioning repeat count of axis 3	Stores the number of times for repeating the operation starting from the position control starting table number of the third axis until the E point. When 255 is stored, the positioning control is repeated unlimitedly until the operation is stopped.	0	0 to 255	times
	10BH	Positioning repeat count of axis 4	Stores the number of times for repeating the operation starting from the position control starting table number of the fourth axis until the E point. When 255 is stored, the positioning control is repeated unlimitedly until the operation is stopped.	0	0 to 255	times
	10CH	Positioning repeat count of axis 5	Stores the number of times for repeating the operation starting from the position control starting table number of the fifth axis until the E point. When 255 is stored, the positioning control is repeated unlimitedly until the operation is stopped.	0	0 to 255	times
	10DH	Positioning repeat count of axis 6	Stores the number of times for repeating the operation starting from the position control starting table number of the sixth axis until the E point. When 255 is stored, the positioning control is repeated unlimitedly until the operation is stopped.	0	0 to 255	times
	10EH	Positioning repeat count of axis 7	Stores the number of times for repeating the operation starting from the position control starting table number of the seventh axis until the E point. When 255 is stored, the positioning control is repeated unlimitedly until the operation is stopped.	0	0 to 255	times
	10FH	Positioning repeat count of axis 8	Stores the number of times for repeating the operation starting from the position control starting table number of the eighth axis until the E point. When 255 is stored, the positioning control is repeated unlimitedly until the operation is stopped.	0	0 to 255	times

17.4.10 Error Annunciation & Clear Area

When an error occurs (that leads to the stop), the error and the number of occurrences for each axis will be stored in this area. Once the error clear is executed, the error and number of occurrences will be cleared, and then the error will be judged again. If the error condition still continues, the error will occur again even after the execution of error clear. When an error targeted to all axes such as a network failure occurs, it will be stored in the error annunciation buffers of all axes. Up to 7 errors are stored in the error history.
The error clear can be executed by the error clear contact as well.

<table>
<tr><th>Bank</th><th>Offset address</th><th>Name</th><th>Descriptions</th></tr>
<tr><td rowspan="25">00H</td><td>111H</td><td>Error clear individual axis setting</td><td>Executes the error clear for each axis.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Error clear of axis 1</td><td>0</td><td rowspan="8">0: No error clear
1: Executes error clear
(After the execution of error clear, the positioning unit sets to 0 automatically.)</td></tr>
<tr><td>1</td><td>Error clear of axis 2</td><td>0</td></tr>
<tr><td>2</td><td>Error clear of axis 3</td><td>0</td></tr>
<tr><td>3</td><td>Error clear of axis 4</td><td>0</td></tr>
<tr><td>4</td><td>Error clear of axis 5</td><td>0</td></tr>
<tr><td>5</td><td>Error clear of axis 6</td><td>0</td></tr>
<tr><td>6</td><td>Error clear of axis 7</td><td>0</td></tr>
<tr><td>7</td><td>Error clear of axis 8</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>129H</td><td>Number of error occurrences of axis 1</td><td>Announces the number of occurrences of errors at axis 1.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>No. of error occurrences at axis 1</td><td>0</td><td>Announces No. of errors of axis 1 currently occurred.</td></tr>
</table></td></tr>
<tr><td>12AH</td><td rowspan="2">Error code annunciation buffer 1 of axis 1</td><td rowspan="12">Stores the latest error code from the buffer number 1 in order.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>31 to 0</td><td>Error code annunciation buffer n of each axis</td><td>0</td><td>Announces error codes.</td></tr>
</table></td></tr>
<tr><td>12BH</td></tr>
<tr><td>12CH</td><td rowspan="2">Error code annunciation buffer 2 of axis 1</td></tr>
<tr><td>12DH</td></tr>
<tr><td>12EH</td><td rowspan="2">Error code annunciation buffer 3 of axis 1</td></tr>
<tr><td>12FH</td></tr>
<tr><td>130H</td><td rowspan="2">Error code annunciation buffer 4 of axis 1</td></tr>
<tr><td>131H</td></tr>
<tr><td>132H</td><td rowspan="2">Error code annunciation buffer 5 of axis 1</td></tr>
<tr><td>133H</td></tr>
<tr><td>134H</td><td rowspan="2">Error code annunciation buffer 6 of axis 1</td></tr>
<tr><td>135H</td></tr>
<tr><td>136H</td><td rowspan="2">Error code annunciation buffer 7 of axis 1</td></tr>
<tr><td>137H</td></tr>
<tr><td>139H</td><td>Number of error occurrences of axis 2</td><td>Announces the number of occurrences of errors at axis 2.</td></tr>
<tr><td>13AH</td><td rowspan="2">Error code annunciation buffer 1 of axis 2</td><td rowspan="2">Announces the code when an error occurred.</td></tr>
<tr><td>13BH</td></tr>
<tr><td>13CH</td><td rowspan="2">Error code annunciation buffer 2 of axis 2</td><td rowspan="2">Announces the code when an error occurred.</td></tr>
<tr><td>13DH</td></tr>
<tr><td>13EH</td><td rowspan="2">Error code annunciation buffer 3 of axis 2</td><td rowspan="2">Announces the code when an error occurred.</td></tr>
<tr><td>13FH</td></tr>
</table>

Bank	Offset address	Name	Descriptions
00H	140H	Error code annunciation buffer 4 of axis 2	Announces the code when an error occurred.
	141H		
	142H	Error code annunciation buffer 5 of axis 2	Announces the code when an error occurred.
	143H		
	144H	Error code annunciation buffer 6 of axis 2	Announces the code when an error occurred.
	145H		
	146H	Error code annunciation buffer 7 of axis 2	Announces the code when an error occurred.
	147H		
	149H	Number of error occurrences of axis 3	Announces the number of occurrences of errors at axis 3.
	14AH	Error code annunciation buffer 1 of axis 3	Announces the code when an error occurred.
	14BH		
	14CH	Error code annunciation buffer 2 of axis 3	Announces the code when an error occurred.
	14DH		
	14EH	Error code annunciation buffer 3 of axis 3	Announces the code when an error occurred.
	14FH		
	150H	Error code annunciation buffer 4 of axis 3	Announces the code when an error occurred.
	151H		
	152H	Error code annunciation buffer 5 of axis 3	Announces the code when an error occurred.
	153H		
	154H	Error code annunciation buffer 6 of axis 3	Announces the code when an error occurred.
	155H		
	156H	Error code annunciation buffer 7 of axis 3	Announces the code when an error occurred.
	157H		
	159H	Number of error occurrences of axis 4	Announces the number of occurrences of errors at axis 4.
	15AH	Error code annunciation buffer 1 of axis 4	Announces the code when an error occurred.
	15BH		
	15CH	Error code annunciation buffer 2 of axis 4	Announces the code when an error occurred.
	15DH		
	15EH	Error code annunciation buffer 3 of axis 4	Announces the code when an error occurred.
	15FH		
	160H	Error code annunciation buffer 4 of axis 4	Announces the code when an error occurred.
	161H		
	162H	Error code annunciation buffer 5 of axis 4	Announces the code when an error occurred.
	163H		
	164H	Error code annunciation buffer 6 of axis 4	Announces the code when an error occurred.
	165H		
	166H	Error code annunciation buffer 7 of axis 4	Announces the code when an error occurred.
	167H		

Bank	Offset address	Name	Descriptions
00H	169H	Number of error occurrences of axis 5	Announces the number of occurrences of errors at axis 5.
	16AH	Error code annunciation buffer 1 of axis 5	Announces the code when an error occurred.
	16BH		
	16CH	Error code annunciation buffer 2 of axis 5	Announces the code when an error occurred.
	16DH		
	16EH	Error code annunciation buffer 3 of axis 5	Announces the code when an error occurred.
	16FH		
	170H	Error code annunciation buffer 4 of axis 5	Announces the code when an error occurred.
	171H		
	172H	Error code annunciation buffer 5 of axis 5	Announces the code when an error occurred.
	173H		
	174H	Error code annunciation buffer 6 of axis 5	Announces the code when an error occurred.
	175H		
	176H	Error code annunciation buffer 7 of axis 5	Announces the code when an error occurred.
	177H		
	179H	Number of error occurrences of axis 6	Announces the number of occurrences of errors at axis 6.
	17AH	Error code annunciation buffer 1 of axis 6	Announces the code when an error occurred.
	17BH		
	17CH	Error code annunciation buffer 2 of axis 6	Announces the code when an error occurred.
	17DH		
	17EH	Error code annunciation buffer 3 of axis 6	Announces the code when an error occurred.
	17FH		
	180H	Error code annunciation buffer 4 of axis 6	Announces the code when an error occurred.
	181H		
	182H	Error code annunciation buffer 5 of axis 6	Announces the code when an error occurred.
	183H		
	184H	Error code annunciation buffer 6 of axis 6	Announces the code when an error occurred.
	185H		
	186H	Error code annunciation buffer 7 of axis 6	Announces the code when an error occurred.
	187H		

Bank	Offset address	Name	Descriptions
00H	189H	Number of error occurrences of axis 7	Announces the number of occurrences of errors at axis 7.
	18AH	Error code annunciation buffer 1 of axis 7	Announces the code when an error occurred.
	18BH		
	18CH	Error code annunciation buffer 2 of axis 7	Announces the code when an error occurred.
	18DH		
	18EH	Error code annunciation buffer 3 of axis 7	Announces the code when an error occurred.
	18FH		
	190H	Error code annunciation buffer 4 of axis 7	Announces the code when an error occurred.
	191H		
	192H	Error code annunciation buffer 5 of axis 7	Announces the code when an error occurred.
	193H		
	194H	Error code annunciation buffer 6 of axis 7	Announces the code when an error occurred.
	195H		
	196H	Error code annunciation buffer 7 of axis 7	Announces the code when an error occurred.
	197H		
	199H	Number of error occurrences of axis 8	Announces the number of occurrences of errors at axis 8.
	19AH	Error code annunciation buffer 1 of axis 8	Announces the code when an error occurred.
	19BH		
	19CH	Error code annunciation buffer 2 of axis 8	Announces the code when an error occurred.
	19DH		
	19EH	Error code annunciation buffer 3 of axis 8	Announces the code when an error occurred.
	19FH		
	1A0H	Error code annunciation buffer 4 of axis 8	Announces the code when an error occurred.
	1A1H		
	1A2H	Error code annunciation buffer 5 of axis 8	Announces the code when an error occurred.
	1A3H		
	1A4H	Error code annunciation buffer 6 of axis 8	Announces the code when an error occurred.
	1A5H		
	1A6H	Error code annunciation buffer 7 of axis 8	Announces the code when an error occurred.
	1A7H		

17.4.11 Warning Annunciation & Clear Area

When a warning occurs (that does not lead to the stop), the warning and the number of occurrences for each axis will be stored in this area. Once the warning clear is executed, the warning and number of occurrences will be cleared, and then the warning will be judged again. If the warning condition still continues, the warning will occur again even after the execution of warning clear. When a warning targeted to all axes occurs, it will be stored in the warning annunciation buffers of all axes. Up to 7 warnings are stored in the warning history.
The warning clear can be executed by the warning clear contact as well.

<table>
<tr><th>Bank</th><th>Offset address</th><th>Name</th><th>Descriptions</th></tr>
<tr><td rowspan="25">00H</td><td>1A9H</td><td>Warning clear individual axis setting</td><td>Executes the warning clear for each axis.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Warning clear of axis 1</td><td>0</td><td rowspan="8">0: No warning clear
1: Executes warning clear
(After the execution of warning clear, the positioning unit sets to 0 automatically.)</td></tr>
<tr><td>1</td><td>Warning clear of axis 2</td><td>0</td></tr>
<tr><td>2</td><td>Warning clear of axis 3</td><td>0</td></tr>
<tr><td>3</td><td>Warning clear of axis 4</td><td>0</td></tr>
<tr><td>4</td><td>Warning clear of axis 5</td><td>0</td></tr>
<tr><td>5</td><td>Warning clear of axis 6</td><td>0</td></tr>
<tr><td>6</td><td>Warning clear of axis 7</td><td>0</td></tr>
<tr><td>7</td><td>Warning clear of axis 8</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>1C1H</td><td>Number of warning occurrences of axis 1</td><td>Announces the number of occurrences of warnings at axis 1.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>No. of warning occurrences at axis 1</td><td>0</td><td>Announces No. of warnings of axis 1 currently occurred.</td></tr>
</table></td></tr>
<tr><td>1C2H</td><td rowspan="2">Warning code annunciation buffer 1 of axis 1</td><td rowspan="16">Stores the latest warning code from the buffer number 1 in order.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>31 to 0</td><td>Warning code annunciation buffer n of each axis</td><td>0</td><td>Announces warning codes.</td></tr>
</table></td></tr>
<tr><td>1C3H</td></tr>
<tr><td>1C4H</td><td rowspan="2">Warning code annunciation buffer 2 of axis 1</td></tr>
<tr><td>1C5H</td></tr>
<tr><td>1C6H</td><td rowspan="2">Warning code annunciation buffer 3 of axis 1</td></tr>
<tr><td>1C7H</td></tr>
<tr><td>1C8H</td><td rowspan="2">Warning code annunciation buffer 4 of axis 1</td></tr>
<tr><td>1C9H</td></tr>
<tr><td>1CAH</td><td rowspan="2">Warning code annunciation buffer 5 of axis 1</td></tr>
<tr><td>1CBH</td></tr>
<tr><td>1CCH</td><td rowspan="2">Warning code annunciation buffer 6 of axis 1</td></tr>
<tr><td>1CDH</td></tr>
<tr><td>1CEH</td><td rowspan="2">Warning code annunciation buffer 7 of axis 1</td></tr>
<tr><td>1CFH</td></tr>
<tr><td>1D1H</td><td>No. of warning occurrences of axis 2</td><td>Announces the number of occurrences of warnings at axis 2.</td></tr>
<tr><td>1D2H</td><td rowspan="2">Warning code annunciation buffer 1 of axis 2</td><td rowspan="2">Announces the code when a warning occurred.</td></tr>
<tr><td>1D3H</td></tr>
<tr><td>1D4H</td><td rowspan="2">Warning code annunciation buffer 2 of axis 2</td><td rowspan="2">Announces the code when a warning occurred.</td></tr>
<tr><td>1D5H</td></tr>
<tr><td>1D6H</td><td rowspan="2">Warning code annunciation buffer 3 of axis 2</td><td rowspan="2">Announces the code when an error occurred.</td></tr>
<tr><td>1D7H</td></tr>
</table>

Bank	Offset address	Name	Descriptions
00H	1D8H	Warning code annunciation buffer 4 of axis 2	Announces the code when a warning occurred.
	1D9H		
	1DAH	Warning code annunciation buffer 5 of axis 2	Announces the code when a warning occurred.
	1DBH		
	1DCH	Warning code annunciation buffer 6 of axis 2	Announces the code when a warning occurred.
	1DDH		
	1DEH	Warning code annunciation buffer 7 of axis 2	Announces the code when a warning occurred.
	1DFH		
	1E1H	No. of warning occurrences of axis 3	Announces the number of occurrences of warnings at axis 3.
	1E2H	Warning code annunciation buffer 1 of axis 3	Announces the code when a warning occurred.
	1E3H		
	1E4H	Warning code annunciation buffer 2 of axis 3	Announces the code when a warning occurred.
	1E5H		
	1E6H	Warning code annunciation buffer 3 of axis 3	Announces the code when a warning occurred.
	1E7H		
	1E8H	Warning code annunciation buffer 4 of axis 3	Announces the code when a warning occurred.
	1E9H		
	1EAH	Warning code annunciation buffer 5 of axis 3	Announces the code when a warning occurred.
	1EBH		
	1ECH	Warning code annunciation buffer 6 of axis 3	Announces the code when a warning occurred.
	1EDH		
	1EEH	Warning code annunciation buffer 7 of axis 3	Announces the code when a warning occurred.
	1EFH		
	1F1H	No. of warning occurrences of axis 4	Announces the number of occurrences of warnings at axis 4.
	1F2H	Warning code annunciation buffer 1 of axis 4	Announces the code when a warning occurred.
	1F3H		
	1F4H	Warning code annunciation buffer 2 of axis 4	Announces the code when a warning occurred.
	1F5H		
	1F6H	Warning code annunciation buffer 3 of axis 4	Announces the code when a warning occurred.
	1F7H		
	1F8H	Warning code annunciation buffer 4 of axis 4	Announces the code when a warning occurred.
	1F9H		
	1FAH	Warning code annunciation buffer 5 of axis 4	Announces the code when a warning occurred.
	1FBH		
	1FCH	Warning code annunciation buffer 6 of axis 4	Announces the code when a warning occurred.
	1FDH		
	1FEH	Warning code annunciation buffer 7 of axis 4	Announces the code when a warning occurred.
	1FFH		

Bank	Offset address	Name	Descriptions
00H	201H	No. of warning occurrences of axis 5	Announces the number of occurrences of warnings at axis 5.
	202H	Warning code annunciation buffer 1 of axis 5	Announces the code when a warning occurred.
	203H		
	204H	Warning code annunciation buffer 2 of axis 5	Announces the code when a warning occurred.
	205H		
	206H	Warning code annunciation buffer 3 of axis 5	Announces the code when a warning occurred.
	207H		
	208H	Warning code annunciation buffer 4 of axis 5	Announces the code when a warning occurred.
	209H		
	20AH	Warning code annunciation buffer 5 of axis 5	Announces the code when a warning occurred.
	20BH		
	20CH	Warning code annunciation buffer 6 of axis 5	Announces the code when a warning occurred.
	20DH		
	20EH	Warning code annunciation buffer 7 of axis 5	Announces the code when a warning occurred.
	20FH		
	211H	No. of warning occurrences of axis 6	Announces the number of occurrences of warnings at axis 6.
	212H	Warning code annunciation buffer 1 of axis 6	Announces the code when a warning occurred.
	213H		
	214H	Warning code annunciation buffer 2 of axis 6	Announces the code when a warning occurred.
	215H		
	216H	Warning code annunciation buffer 3 of axis 6	Announces the code when a warning occurred.
	217H		
	218H	Warning code annunciation buffer 4 of axis 6	Announces the code when a warning occurred.
	219H		
	21AH	Warning code annunciation buffer 5 of axis 6	Announces the code when a warning occurred.
	21BH		
	21CH	Warning code annunciation buffer 6 of axis 6	Announces the code when a warning occurred.
	21DH		
	21EH	Warning code annunciation buffer 7 of axis 6	Announces the code when a warning occurred.
	21FH		

Bank	Offset address	Name	Descriptions
00H	221H	No. of warning occurrences of axis 7	Announces the number of occurrences of warnings at axis 7.
	222H	Warning code annunciation buffer 1 of axis 7	Announces the code when a warning occurred.
	223H		
	224H	Warning code annunciation buffer 2 of axis 7	Announces the code when a warning occurred.
	225H		
	226H	Warning code annunciation buffer 3 of axis 7	Announces the code when a warning occurred.
	227H		
	228H	Warning code annunciation buffer 4 of axis 7	Announces the code when a warning occurred.
	229H		
	22AH	Warning code annunciation buffer 5 of axis 7	Announces the code when a warning occurred.
	22BH		
	22CH	Warning code annunciation buffer 6 of axis 7	Announces the code when a warning occurred.
	22DH		
	22EH	Warning code annunciation buffer 7 of axis 7	Announces the code when a warning occurred.
	22FH		
	231H	No. of warning occurrences of axis 8	Announces the number of occurrences of warnings at axis 8.
	232H	Warning code annunciation buffer 1 of axis 8	Announces the code when a warning occurred.
	233H		
	234H	Warning code annunciation buffer 2 of axis 8	Announces the code when a warning occurred.
	235H		
	236H	Warning code annunciation buffer 3 of axis 8	Announces the code when a warning occurred.
	237H		
	238H	Warning code annunciation buffer 4 of axis 8	Announces the code when a warning occurred.
	239H		
	23AH	Warning code annunciation buffer 5 of axis 8	Announces the code when a warning occurred.
	23BH		
	23CH	Warning code annunciation buffer 6 of axis 8	Announces the code when a warning occurred.
	23DH		
	23EH	Warning code annunciation buffer 7 of axis 8	Announces the code when a warning occurred.
	23FH		

17.4.12 Synchronous Operation Control/Monitor Area

This is the area to set the synchronous operation to be enabled or disabled and to confirm the current synchronous settings.

<table>
<tr><th>Bank</th><th>Offset address</th><th>Name</th><th>Descriptions</th></tr>
<tr><td rowspan="10">00H</td><td>2B0H</td><td>Synchronous group 1 Operation enabled/disabled</td><td>Switches the setting for the synchronous operation between “Enabled” and “Disabled”.
When using the synchronous mode B, this setting is ignored, and an operation always being synchronized is performed.</td></tr>
<tr><td>2B1H</td><td>Synchronous group 2 Operation enabled/disabled</td><td>
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Group attribute of axis 1</td><td>0</td><td rowspan="8">0: Executes synchronous operation.
1:Cancel synchronous operation.</td></tr>
<tr><td>1</td><td>Group attribute of axis 2</td><td>0</td></tr>
<tr><td>2</td><td>Group attribute of axis 3</td><td>0</td></tr>
<tr><td>3</td><td>Group attribute of axis 4</td><td>0</td></tr>
<tr><td>4</td><td>Group attribute of axis 5</td><td>0</td></tr>
<tr><td>5</td><td>Group attribute of axis 6</td><td>0</td></tr>
<tr><td>6</td><td>Group attribute of axis 7</td><td>0</td></tr>
<tr><td>7</td><td>Group attribute of axis 8</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>2B4H</td><td>Synchronous operation monitor</td><td>In this area, the bits of the axes where the synchronous operation is performed are turned on regardless of synchronous groups, master or slave axes.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Axis 1 synchronous state</td><td>0</td><td rowspan="8">0: Asynchronous state
1: Synchronous operation target axis</td></tr>
<tr><td>1</td><td>Axis 2 synchronous state</td><td>0</td></tr>
<tr><td>2</td><td>Axis 3 synchronous state</td><td>0</td></tr>
<tr><td>3</td><td>Axis 4 synchronous state</td><td>0</td></tr>
<tr><td>4</td><td>Axis 5 synchronous state</td><td>0</td></tr>
<tr><td>5</td><td>Axis 6 synchronous state</td><td>0</td></tr>
<tr><td>6</td><td>Axis 7 synchronous state</td><td>0</td></tr>
<tr><td>7</td><td>Axis 8 synchronous state</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>2B8H</td><td>Synchronous group 1 Synchronous operation difference value</td><td>Difference threshold of the movement amounts of the master/slave axes in synchronous group 1 that the synchronous operation is performed.
Verifies whether the difference value of the movement amounts of master/slave axes exceed the threshold or not.
This difference value is specified in a unit used for the master axis.
Default: 10000</td></tr>
<tr><td>2B9H</td><td>—</td><td>—</td></tr>
<tr><td>2BAH</td><td>Synchronous group 1 Synchronous operation difference value</td><td>Difference threshold of the movement amounts of the master/slave axes in synchronous group 2 that the synchronous operation is performed.
Verifies whether the difference value of the movement amounts of master/slave axes exceed the threshold or not.
This difference value is specified in a unit used for the master axis.
Default: 10000</td></tr>
<tr><td>2BBH</td><td>—</td><td>—</td></tr>
<tr><td>2BCH</td><td>Synchronous group 1 Operation method</td><td rowspan="2">Specify the operation of difference check (that is a function to check whether the difference of the movement amount between the master and slave axis exceeds "Synchronous operation difference value" or not) to be performed during the synchronous operation.
<table>
<tr><td>0: Error occurs</td><td>Performs difference check. When the difference of the movement amount between the master and slave axis exceeds the threshold, an error will occur and the operation will stop.</td></tr>
<tr><td>1: Warning occurs</td><td>Performs difference check. When the difference of the movement amount between the master and slave axis exceeds the threshold, a warning will occur and the operation will continue.</td></tr>
<tr><td>2: Not check difference</td><td>Not perform difference check.</td></tr>
</table>
Default: 0</td></tr>
<tr><td>2BDH</td><td>Synchronous group 2 Operation method</td></tr>
</table>

17.4.13 System Operation Setting Area

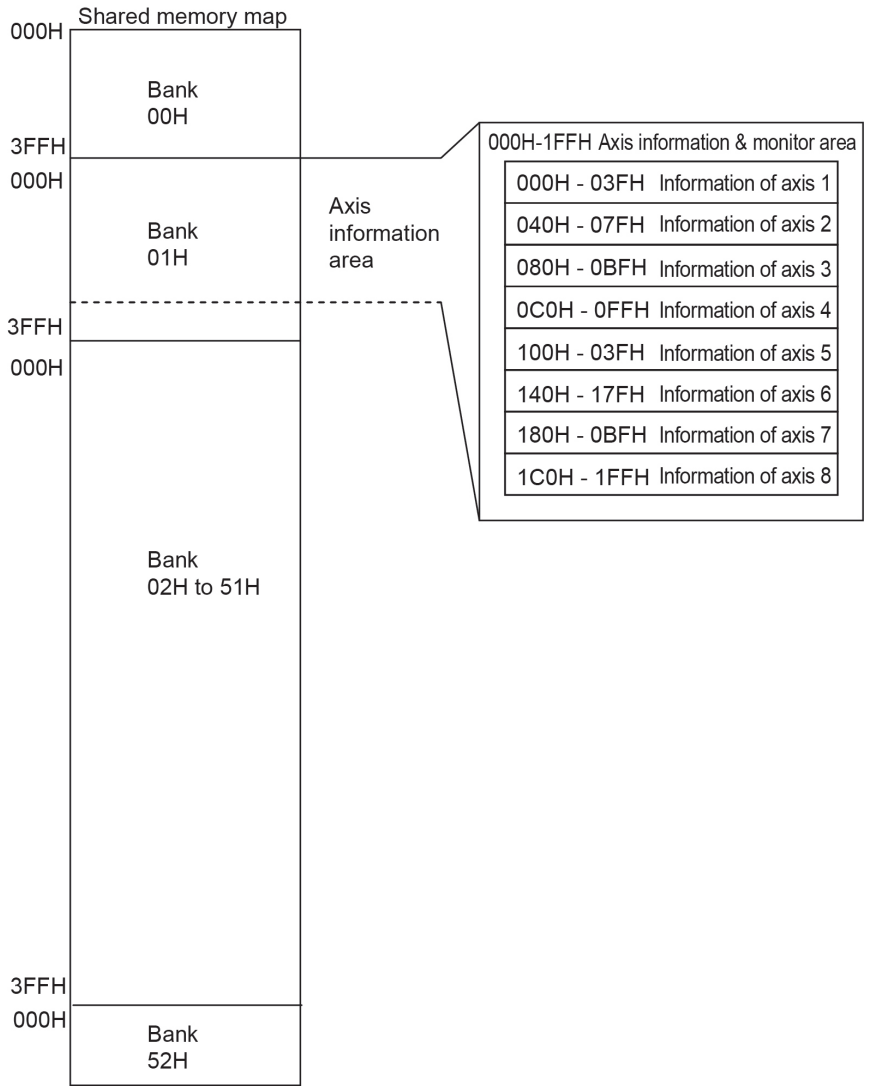
This area is used to switch the operation of the positioning unit.

Bank	Offset address	Name	Descriptions	Default value	Setting range	Unit
00H	384H	AMP control mode	Executes operations such as changing the parameters of AMP (A4N/A5N/A6N). The following operations can be executed by changing this area to "AMP control enable". - Reading AMP parameters - Writing AMP parameters - Saving AMP parameters (EEPROM write) - Resetting AMP (Restart) When this area is set to 1H (AMP control enable), the settings of "Operating direction" and "Limit connection" which are parameters of each axis of positioning unit RTEX are invalid. After completion of operation, always set this area to 0H (AMP control disable). 00H: Set AMP parameter 01H: Not set AMP parameter	0	0 to 1	-
	389H	Deceleration stop operation	Specify the operation when setting the deceleration stop request signal to "Active" (from OFF to ON). 0: Deceleration stop When performing the repeat operation, stops after reaching E point that is targeted for the repeat operation. 1: Pause - Performs the deceleration stop, and restarts the positioning operation when turning "Deceleration stop request signal" to OFF from ON. - Also, performs the same operation as the deceleration stop in all states except during the positioning operation. - When performing the repeat operation, stops after reaching E point that is targeted for the repeat operation, and restarts the positioning operation when turning "Deceleration stop request signal" to OFF from ON. - If the system stop or emergency stop is executed during the pause, the pause will be cancelled. The operation will not restart even if turning "Deceleration stop request signal" to OFF from ON.	0	0 to 1	-

17.5 Details of Each Axis Information Area in Shared Memory

17.5.1 Configuration of Each Axis Information Area

The shared memory is composed of banks. The each axis information area is allocated in the bank 01H in the shared memory. Also the information on the axes 1 to 8 is allocated for each address in this area.



Note: Firstly confirm that the link establishment annunciation flag is on when reading the axis information area using the ladder program.

17.5.2 Each Axis Information & Monitor Area

These are the areas for the AMP system information of each axis and monitoring operation states.

Axis information of axis 1

Bank	Offset address	Name	Descriptions	Default value	Setting range	Unit
01H	000H	System ID of axis 1 (Brand name or vendor name)	Stores the brand name or vendor name. Each information is stored as ASCII code of 16 bytes (Max. 16 characters).	0H	-	-
	001H					
	002H					
	003H					
	004H					
	005H					
	006H					
	007H					
	008H	System ID of axis 1 (Model code of AMP)	Stores the model code of AMP. Each information is stored as ASCII code of 16 bytes (Max. 16 characters).	0H	-	-
	009H					
	00AH					
	00BH					
	00CH					
	00DH					
	00EH					
	00FH					
	010H	System ID of axis 1 (Version of firmware)	Stores the version of firmware of AMP. Each information is stored as ASCII code of 16 bytes (Max. 16 characters).	0H	-	-
	011H					
	012H					
	013H					
	014H					
	015H					
	016H					
	017H					
	018H	System ID of axis 1 (Model code of motor)	Stores the model code of motor. Each information is stored as ASCII code of 16 bytes (Max. 16 characters).	0H	-	-
	019H					
	01AH					
	01BH					
	01CH					
	01DH					
	01EH					
	01FH					
	020H	System ID of axis 1 (Serial number of motor)	Stores the serial number of motor. Each information is stored as ASCII code of 16 bytes (Max. 16 characters).	0H	-	-
	021H					
	022H					
	023H					
	024H					
	025H					
	026H					
	027H					

<table>
<tr><th>Bank</th><th>Offset address</th><th>Name</th><th>Descriptions</th><th>Default value</th><th>Setting range</th><th>Unit</th></tr>
<tr><td rowspan="17">01H</td><td>030H</td><td>Status indication of axis 1</td><td>Stores the status indication of AMP
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Imposition</td><td>0</td><td>0: Deviation counter is outside of the imposition range.
1: Deviation counter is in the imposition range.</td></tr>
<tr><td>1</td><td>-</td><td>0</td><td>-</td></tr>
<tr><td>2</td><td>Home return done</td><td>0</td><td>0: Home return has not completed.
1: Home return has completed.</td></tr>
<tr><td>3</td><td>Torque limit</td><td>0</td><td>0: Normal
1: Contact detection (Torque limit)</td></tr>
<tr><td>4</td><td>Warning</td><td>0</td><td>0: Normal
1: Warning occurred.</td></tr>
<tr><td>5</td><td>Alarm</td><td>0</td><td>0: Normal
1: Alarm occurred.</td></tr>
<tr><td>6</td><td>Servo ready</td><td>0</td><td>0: Cannot shift to the on-state
1: Servo ready</td></tr>
<tr><td>7</td><td>Servo active</td><td>0</td><td>0: Servo off
1: Servo on</td></tr>
<tr><td>15 to 8</td><td>-</td><td>0</td><td>-</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>031H</td><td>External terminal input monitor of axis 1</td><td>Stores the information of I/O connected to the AMPs of each axis.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>CWL</td><td>0</td><td rowspan="8">0: Non active
1: Active</td></tr>
<tr><td>1</td><td>CCWL</td><td>0</td></tr>
<tr><td>2</td><td>HOME (proximity)</td><td>0</td></tr>
<tr><td>3</td><td>EX-IN1</td><td>0</td></tr>
<tr><td>4</td><td>EX-IN2</td><td>0</td></tr>
<tr><td>5</td><td>EX-IN3</td><td>0</td></tr>
<tr><td>6</td><td>EX-SON/EX-IN4</td><td>0</td></tr>
<tr><td>7</td><td>EMG-STP</td><td>0</td></tr>
<tr><td>15 to 8</td><td>-</td><td>-</td><td>-</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>032H</td><td>Torque command of axis 1</td><td>Stores the torque monitor value.</td><td>-</td><td>0 to 5000</td><td>0.1 %</td></tr>
<tr><td>033H</td><td>Actual speed of axis 1</td><td>Stores the actual speed monitor value.</td><td>-</td><td>0 to 5000</td><td>0.1 rps or 0.1 rpm</td></tr>
<tr><td>034H</td><td rowspan="2">Posiition deviation of axis 1</td><td rowspan="2">Stores the position deviation calculated by the unit.</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td></tr>
<tr><td>035H</td></tr>
<tr><td>038H</td><td>Active table or execution done table of axis 1</td><td>Stores the number of active positioning table or when the operation completed.</td><td>1</td><td>1 to 600</td><td>-</td></tr>
<tr><td>039H</td><td>Auxiliary output code of axis 1</td><td>Stores the auxiliary output code.</td><td>0</td><td></td><td>-</td></tr>
<tr><td>03AH</td><td>Repeat count setting value of axis 1</td><td>Stores the setting value of positioning repeat count.
Stores 1 when no repeat operation is performed.
Stores 255 when the repeat count is unlimited.</td><td>0</td><td>0 to 255</td><td>Times</td></tr>
<tr><td>03BH</td><td>Repeat count current value of axis 1</td><td>Stores the repeat count during the operation.
Stores 1 when no repeat operation is performed.
Returns to 0 when the repeat count exceeds the upper limit.</td><td>0</td><td>0 to 65,535</td><td>times</td></tr>
<tr><td>03CH</td><td rowspan="2">Feedback value of axis 1</td><td rowspan="2">Stores the current value (absolute coordinate) of AMP.</td><td rowspan="2">0</td><td rowspan="2">-</td><td rowspan="2">pulse</td></tr>
<tr><td>03DH</td></tr>
<tr><td>03EH</td><td rowspan="2">Unit system conversion feedback value of axis 1</td><td rowspan="2">Stores the current value after the unit was converted.</td><td rowspan="2">0</td><td rowspan="2">-</td><td rowspan="2">-</td></tr>
<tr><td>03FH</td></tr>
</table>

Axis information of axis 2

Bank	Offset address	Name	Descriptions
01H	040H	System ID of axis 2 (Brand name or vendor name)	Refer to the descriptions of axis 1.
	041H		
	042H		
	043H		
	044H		
	045H		
	046H		
	047H		
	048H	System ID of axis 2 (Model code of AMP)	Refer to the descriptions of axis 1.
	049H		
	04AH		
	04BH		
	04CH		
	04DH		
	04EH		
	04FH		
	050H	System ID of axis 2 (Version of firmware)	Refer to the descriptions of axis 1.
	051H		
	052H		
	053H		
	054H		
	055H		
	056H		
	057H		
	058H	System ID of axis 2 (Model code of motor)	Refer to the descriptions of axis 1.
	059H		
	05AH		
	05BH		
	05CH		
	05DH		
	05EH		
	05FH		
	060H	System ID of axis 2 (Serial number of motor)	Refer to the descriptions of axis 1.
	061H		
	062H		
	063H		
	064H		
	065H		
	066H		
	067H		
	070H	Status indication of axis 2	Refer to the descriptions of axis 1.
	071H	External terminal input monitor of axis 2	Refer to the descriptions of axis 1.
	072H	Torque command of axis 2	Refer to the descriptions of axis 1.
	073H	Actual speed of axis 2	Refer to the descriptions of axis 1.
	074H	Posiition deviation of axis 2	Refer to the descriptions of axis 1.
	078H	Active table or execution done table of axis 2	Refer to the descriptions of axis 1.
	079H	Auxiliary output code of axis 2	Refer to the descriptions of axis 1.
	07AH	Repeat count setting value of axis 2	Refer to the descriptions of axis 1.
	07BH	Repeat count current value of axis 2	Refer to the descriptions of axis 1.
	07CH	Feedback value of axis 2	Refer to the descriptions of axis 1.
	07DH		
	07EH	Unit system conversion feedback value of axis 2	Refer to the descriptions of axis 1.
	07FH		

Axis information of axis 3

Bank	Offset address	Name	Descriptions
01H	080H	System ID of axis 3 (Brand name or vendor name)	Refer to the descriptions of axis 1.
	081H		
	082H		
	083H		
	084H		
	085H		
	086H		
	087H		
	088H	System ID of axis 3 (Model code of AMP)	Refer to the descriptions of axis 1.
	089H		
	08AH		
	08BH		
	08CH		
	08DH		
	08EH		
	08FH		
	090H	System ID of axis 3 (Version of firmware)	Refer to the descriptions of axis 1.
	091H		
	092H		
	093H		
	094H		
	095H		
	096H		
	097H		
	098H	System ID of axis 3 (Model code of motor)	Refer to the descriptions of axis 1.
	099H		
	09AH		
	09BH		
	09CH		
	09DH		
	09EH		
	09FH		
	0A0H	System ID of axis 3 (Serial number of motor)	Refer to the descriptions of axis 1.
	0A1H		
	0A2H		
	0A3H		
	0A4H		
	0A5H		
	0A6H		
	0A7H		
	0B0H	Status indication of axis 3	Refer to the descriptions of axis 1.
	0B1H	External terminal input monitor of axis 3	Refer to the descriptions of axis 1.
	0B2H	Torque command of axis 3	Refer to the descriptions of axis 1.
	0B3H	Actual speed of axis 3	Refer to the descriptions of axis 1.
	0B4H	Posiition deviation of axis 3	Refer to the descriptions of axis 1.
	0B8H	Active table or execution done table of axis 3	Refer to the descriptions of axis 1.
	0B9H	Auxiliary output code of axis 3	Refer to the descriptions of axis 1.
	0BAH	Repeat count setting value of axis 3	Refer to the descriptions of axis 1.
	0BBH	Repeat count current value of axis 3	Refer to the descriptions of axis 1.
	0BCH	Feedback value of axis 3	Refer to the descriptions of axis 1.
	0BDH		
	0BEH	Unit system conversion feedback value of axis 3	Refer to the descriptions of axis 1.
	0BFH		

Axis information of axis 4

Bank	Offset address	Name	Descriptions
01H	0C0H	System ID of axis 4 (Brand name or vendor name)	Refer to the descriptions of axis 1.
	0C1H		
	0C2H		
	0C3H		
	0C4H		
	0C5H		
	0C6H		
	0C7H		
	0C8H	System ID of axis 4 (Model code of AMP)	Refer to the descriptions of axis 1.
	0C9H		
	0CAH		
	0CBH		
	0CCH		
	0CDH		
	0CEH		
	0CFH		
	0D0H	System ID of axis 4 (Version of firmware)	Refer to the descriptions of axis 1.
	0D1H		
	0D2H		
	0D3H		
	0D4H		
	0D5H		
	0D6H		
	0D7H		
	0D8H	System ID of axis 4 (Model code of motor)	Refer to the descriptions of axis 1.
	0D9H		
	0DAH		
	0DBH		
	0DCH		
	0DDH		
	0DEH		
	0DFH		
	0E0H	System ID of axis 4 (Serial number of motor)	Refer to the descriptions of axis 1.
	0E1H		
	0E2H		
	0E3H		
	0E4H		
	0E5H		
	0E6H		
	0E7H		
	0E0H	Status indication of axis 4	Refer to the descriptions of axis 1.
	0E1H	External terminal input monitor of axis 4	Refer to the descriptions of axis 1.
	0E2H	Torque command of axis 4	Refer to the descriptions of axis 1.
	0E3H	Actual speed of axis 4	Refer to the descriptions of axis 1.
	0F4H	Posiition deviation of axis 4	Refer to the descriptions of axis 1.
	0E8H	Active table or execution done table of axis 4	Refer to the descriptions of axis 1.
	0E9H	Auxiliary output code of axis 4	Refer to the descriptions of axis 1.
	0FAH	Repeat count setting value of axis 4	Refer to the descriptions of axis 1.
	0FBH	Repeat count current value of axis 4	Refer to the descriptions of axis 1.
	0ECH	Feedback value of axis 4	Refer to the descriptions of axis 1.
	0EDH		
	0EEH	Unit system conversion feedback value of axis 4	Refer to the descriptions of axis 1.
	0EFH		

Axis information of axis 5

Bank	Offset address	Name	Descriptions
01H	100H	System ID of axis 5 (Brand name or vendor name)	Refer to the descriptions of axis 1.
	101H		
	102H		
	103H		
	104H		
	105H		
	106H		
	107H		
	108H	System ID of axis 5 (Model code of AMP)	Refer to the descriptions of axis 1.
	109H		
	10AH		
	10BH		
	10CH		
	10DH		
	10EH		
	10FH		
	110H	System ID of axis 5 (Version of firmware)	Refer to the descriptions of axis 1.
	111H		
	112H		
	113H		
	114H		
	115H		
	116H		
	117H		
	118H	System ID of axis 5 (Model code of motor)	Refer to the descriptions of axis 1.
	119H		
	11AH		
	11BH		
	11CH		
	11DH		
	11EH		
	11FH		
	120H	System ID of axis 5 (Serial number of motor)	Refer to the descriptions of axis 1.
	121H		
	122H		
	123H		
	124H		
	125H		
	126H		
	127H		
	130H	Status indication of axis 5	Refer to the descriptions of axis 1.
	131H	External terminal input monitor of axis 5	Refer to the descriptions of axis 1.
	132H	Torque command of axis 5	Refer to the descriptions of axis 1.
	133H	Actual speed of axis 5	Refer to the descriptions of axis 1.
	134H	Posiition deviation of axis 5	Refer to the descriptions of axis 1.
	138H	Active table or execution done table of axis 5	Refer to the descriptions of axis 1.
	139H	Auxiliary output code of axis 5	Refer to the descriptions of axis 1.
	13AH	Repeat count setting value of axis 5	Refer to the descriptions of axis 1.
	13BH	Repeat count current value of axis 5	Refer to the descriptions of axis 1.
	13CH	Feedback value of axis 5	Refer to the descriptions of axis 1.
	13DH		
	13EH	Unit system conversion feedback value of axis 5	Refer to the descriptions of axis 1.
	13FH		

Axis information of axis 6

Bank	Offset address	Name	Descriptions
01H	140H	System ID of axis 6 (Brand name or vendor name)	Refer to the descriptions of axis 1.
	141H		
	142H		
	143H		
	144H		
	145H		
	146H		
	147H		
	148H	System ID of axis 6 (Model code of AMP)	Refer to the descriptions of axis 1.
	149H		
	14AH		
	14BH		
	14CH		
	14DH		
	14EH		
	14FH		
	150H	System ID of axis 6 (Version of firmware)	Refer to the descriptions of axis 1.
	151H		
	152H		
	153H		
	154H		
	155H		
	156H		
	157H		
	158H	System ID of axis 6 (Model code of motor)	Refer to the descriptions of axis 1.
	159H		
	15AH		
	15BH		
	15CH		
	15DH		
	15EH		
	15FH		
	160H	System ID of axis 6 (Serial number of motor)	Refer to the descriptions of axis 1.
	161H		
	162H		
	163H		
	164H		
	165H		
	166H		
	167H		
	170H	Status indication of axis 6	Refer to the descriptions of axis 1.
	171H	External terminal input monitor of axis 6	Refer to the descriptions of axis 1.
	172H	Torque command of axis 6	Refer to the descriptions of axis 1.
	173H	Actual speed of axis 6	Refer to the descriptions of axis 1.
	174H	Posiition deviation of axis 6	Refer to the descriptions of axis 1.
	178H	Active table or execution done table of axis 6	Refer to the descriptions of axis 1.
	179H	Auxiliary output code of axis 6	Refer to the descriptions of axis 1.
	17AH	Repeat count setting value of axis 6	Refer to the descriptions of axis 1.
	17BH	Repeat count current value of axis 6	Refer to the descriptions of axis 1.
	17CH	Feedback value of axis 6	Refer to the descriptions of axis 1.
	17DH		
	17EH	Unit system conversion feedback value of axis 6	Refer to the descriptions of axis 1.
	17FH		

Axis information of axis 7

Bank	Offset address	Name	Descriptions
01H	180H	System ID of axis 7 (Brand name or vendor name)	Refer to the descriptions of axis 1.
	181H		
	182H		
	183H		
	184H		
	185H		
	186H		
	187H		
	188H	System ID of axis 7 (Model code of AMP)	Refer to the descriptions of axis 1.
	189H		
	18AH		
	18BH		
	18CH		
	18DH		
	18EH		
	18FH		
	190H	System ID of axis 7 (Version of firmware)	Refer to the descriptions of axis 1.
	191H		
	192H		
	193H		
	194H		
	195H		
	196H		
	197H		
	198H	System ID of axis 7 (Model code of motor)	Refer to the descriptions of axis 1.
	199H		
	19AH		
	19BH		
	19CH		
	19DH		
	19EH		
	19FH		
	1A0H	System ID of axis 7 (Serial number of motor)	Refer to the descriptions of axis 1.
	1A1H		
	1A2H		
	1A3H		
	1A4H		
	1A5H		
	1A6H		
	1A7H		
	1B0H	Status indication of axis 7	Refer to the descriptions of axis 1.
	1B1H	External terminal input monitor of axis 7	Refer to the descriptions of axis 1.
	1B2H	Torque command of axis 7	Refer to the descriptions of axis 1.
	1B3H	Actual speed of axis 7	Refer to the descriptions of axis 1.
	1B4H	Posiition deviation of axis 7	Refer to the descriptions of axis 1.
	1B8H	Active table or execution done table of axis 7	Refer to the descriptions of axis 1.
	1B9H	Auxiliary output code of axis 7	Refer to the descriptions of axis 1.
	1BAH	Repeat count setting value of axis 7	Refer to the descriptions of axis 1.
	1BBH	Repeat count current value of axis 7	Refer to the descriptions of axis 1.
	1BCH	Feedback value of axis 7	Refer to the descriptions of axis 1.
	1BDH		
	1BEH	Unit system conversion feedback value of axis 7	Refer to the descriptions of axis 1.
	1BFH		

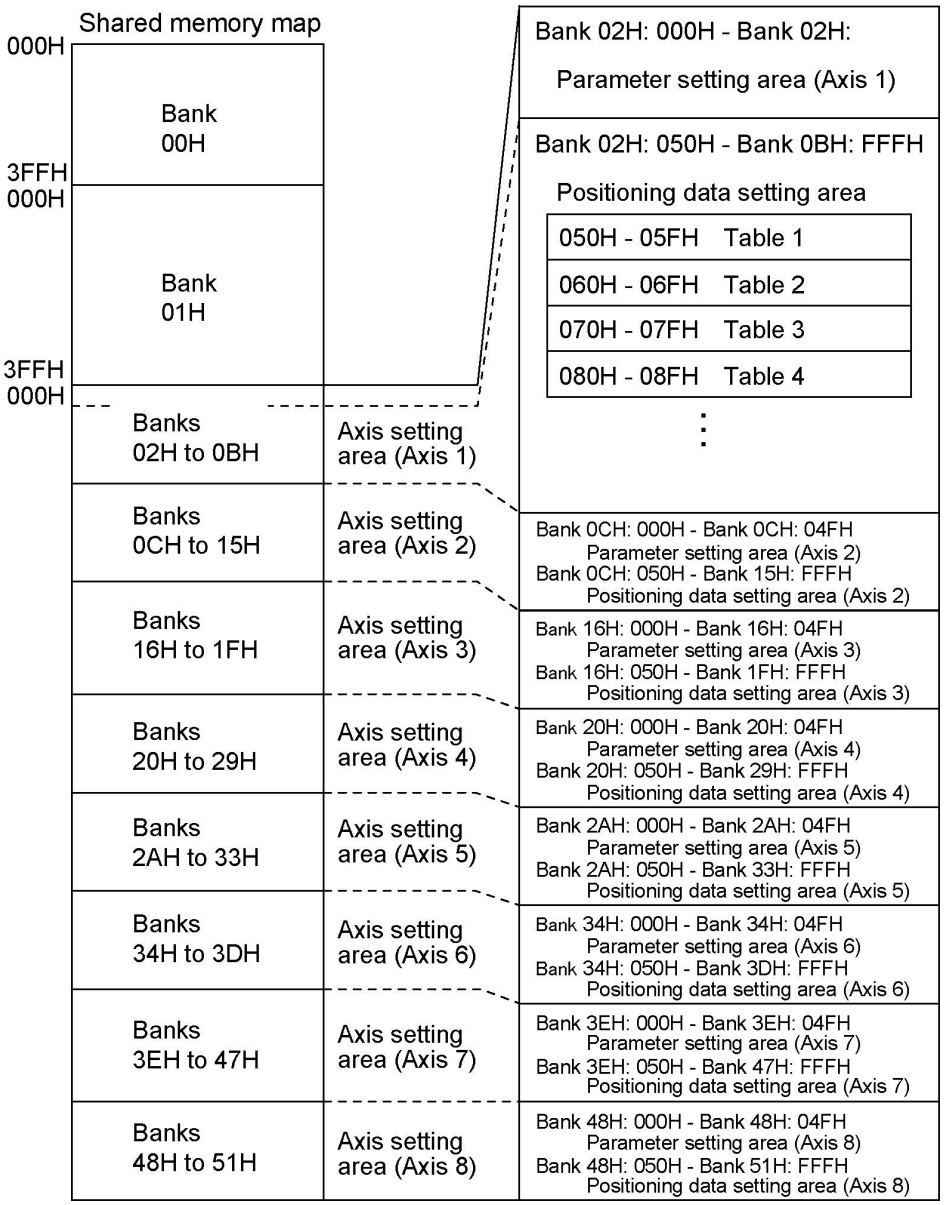
Axis information of axis 8

Bank	Offset address	Name	Descriptions
01H	1C0H	System ID of axis 8 (Brand name or vendor name)	Refer to the descriptions of axis 1.
	1C1H		
	1C2H		
	1C3H		
	1C4H		
	1C5H		
	1C6H		
	1C7H		
	1C8H	System ID of axis 8 (Model code of AMP)	Refer to the descriptions of axis 1.
	1C9H		
	1CAH		
	1CBH		
	1CCH		
	1CDH		
	1CEH		
	1CFH		
	1D0H	System ID of axis 8 (Version of firmware)	Refer to the descriptions of axis 1.
	1D1H		
	1D2H		
	1D3H		
	1D4H		
	1D5H		
	1D6H		
	1D7H		
	1D8H	System ID of axis 8 (Model code of motor)	Refer to the descriptions of axis 1.
	1D9H		
	1DAH		
	1DBH		
	1DCH		
	1DDH		
	1DEH		
	1DFH		
	1E0H	System ID of axis 8 (Serial number of motor)	Refer to the descriptions of axis 1.
	1E1H		
	1E2H		
	1E3H		
	1E4H		
	1E5H		
	1E6H		
	1E7H		
	1F0H	Status indication of axis 8	Refer to the descriptions of axis 1.
	1F1H	External terminal input monitor of axis 8	Refer to the descriptions of axis 1.
	1F2H	Torque command of axis 8	Refer to the descriptions of axis 1.
	1F3H	Actual speed of axis 8	Refer to the descriptions of axis 1.
	1F4H	Posiition deviation of axis 8	Refer to the descriptions of axis 1.
	1F8H	Active table or execution done table of axis 8	Refer to the descriptions of axis 1.
	1F9H	Auxiliary output code of axis 8	Refer to the descriptions of axis 1.
	1FAH	Repeat count setting value of axis 8	Refer to the descriptions of axis 1.
	1FBH	Repeat count current value of axis 8	Refer to the descriptions of axis 1.
	1FCH	Feedback value of axis 8	Refer to the descriptions of axis 1.
	1FDH		
	1FEH	Unit system conversion feedback value of axis 8	Refer to the descriptions of axis 1.
	1FFH		

17.6 Details of Each Axis Setting Area in Shared Memory

17.6.1 Configuration of Each Axis Setting Area

The shared memory is composed of banks. The each axis setting area is allocated in the banks 02H to 51H in the shared memory. The each axis setting area is used to store positioning parameters and positioning data, and the setting values are allocated to every address from the axes 1 to 8. The positioning setting area of each axis is composed of 600 tables of the standard area and 25 tables of the extended area.



17.6.2 Parameter Setting Area

Positioning parameters of each axis

Data in the following formats are stored from the starting address of positioning parameters of each axis.

<table>
<tr><th>Offset address</th><th>Name</th><th>Descriptions</th><th>Default value</th><th>Setting range</th><th>Unit</th></tr>
<tr><td>000H</td><td>Unit setting</td><td>Sets the unit system of movement amounts of the positioning control for each axis. The same unit system should be set for all interpolation axes.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Unit setting</td><td>000H</td><td>Sets the unit of movement amount of positioning control.
000H: Pulse
0100H: mm (Min. position command 0.1μm)
0101H: mm (Min. position command 1μm)
0200H: inch (Min. position command 0.00001 inch)
0201H: inch (Min. position command 0.0001 inch)
0300H: degree (Min. position command 0.1 degree)
0301H: degree (Min. position command 1 degree)
Any other settings will be errors.</td></tr>
</table></td></tr>
<tr><td>001H</td><td>-</td><td>-</td></tr>
<tr><td>002H
003H</td><td>Pulse number per rotation</td><td>Sets the pulse number per rotation. It is necessary for the conversion of the pulse number in the settings of mm, inch and degree.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Pulse number per rotation</td><td>1</td><td>Pulse number per rotation
Setting range: 1 to 32,767
Any other settings will be errors.</td></tr>
</table></td></tr>
<tr><td>004H
005H</td><td>Movement amount per rotation</td><td>Sets the movement amount per rotation. It is necessary for the conversion of the pulse number in the settings of mm, inch and degree.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>31 to 0</td><td>Movement amount per rotation</td><td>1</td><td>Movement amount per rotation
Setting range: 1 to 32,767
Any other settings will be errors.
Interpretation is changed by the unit setting.
mm: 1μm)
inch: 1/10,000 inch)
degree: 1 degree</td></tr>
</table></td></tr>
<tr><td>006H</td><td>-</td><td>-</td></tr>
<tr><td>007H</td><td>-</td><td>-</td></tr>
<tr><td>008H</td><td>-</td><td>-</td></tr>
<tr><td>009H</td><td>-</td><td>-</td></tr>
<tr><td>00AH</td><td>-</td><td>-</td></tr>
<tr><td>00BH</td><td>Software limit enabled/ disabled setting</td><td>Sets the software limit to be enabled or disabled for each control.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Software limit enabled/disabled setting for positioning control</td><td>0</td><td>0: Disables the software limit in positioning control
1: Enables the software limit in positioning control</td></tr>
<tr><td>1</td><td>Software limit enabled/disabled setting for home return</td><td>0</td><td>0: Disables the software limit in home return
1: Enables the software limit in home return</td></tr>
<tr><td>2</td><td>Software limit enabled/disabled setting for JOG operation</td><td>0</td><td>0: Disables the software limit in JOG operation
1: Enables the software limit in JOG operation</td></tr>
<tr><td>15 to 3</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>00CH
00DH</td><td>Upper limit of software limit</td><td>Sets the upper limit value of the software limit for absolute coordinates.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>31 to 0</td><td>Upper limit of software limit</td><td>1,073,741,823</td><td>Upper limit of software limit
Interpretation is changed by the unit setting.
Pulse: -1,073,741,823 to 1,073,741,823 pulse
μm (0.1μm): -107,374,182.3 to 107,374,182.3 μm
μm (1μm): -1,073,741,823 to 1,073,741,823 μm
inch: (0.00001 inch): -10,737.41823 to 10,737.41823 inch
inch: (0.0001 inch): -107,374.1823 to 107,374.1823 inch
degree (0.1): -107,374,182.3 to 107,374,182.3
degree (1): -1,073,741,823 to 1,073,741,823
Any other settings will be errors.</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Offset address</th><th>Name</th><th>Descriptions</th><th>Default value</th><th>Setting range</th><th>Unit</th></tr>
<tr><td>00EH
00FH</td><td>Lower limit of software limit</td><td>Sets the lower limit value of the software limit for absolute coordinates.
<table><tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr><tr><td>31 to 0</td><td>Lower limit of software limit</td><td>1,073,741,823</td><td>Lower limit of software limit
Interpretation is changed by the unit setting.
Pulse: -1,073,741,823 to 1,073,741,823 pulse
μm (0.1μm): -107,374,182.3 to 107,374,182.3 μm
μm (1μm): -1,073,741,823 to 1,073,741,823 μm
inch: (0.00001 inch): -10,737.41823 to 10,737.41823 inch
inch: (0.0001 inch): -107,374.1823 to 107,374.1823 inch
degree (0.1): -107,374,182.3 to 107,374,182.3
degree (1): -1,073,741,823 to 1,073,741,823
Any other settings will be errors.</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>010H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>011H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>012H</td><td>Auxiliary output mode</td><td>Sets the auxiliary output function of the auxiliary output contact and code to be enabled or disabled. The time that the auxiliary output contact is on is determined by the following auxiliary output ON time.
<table><tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr><tr><td>7to 0</td><td>Auxiliary output mode</td><td>00H</td><td>00H: Not use the auxiliary output function (auxiliary output contact, code).
01H: Use With mode.
02H: Use Delay mode.</td></tr><tr><td>15 to 8</td><td>Auxiliary output ON time</td><td>0AH (10ms)</td><td>Setting range: 00H (0ms) to FFH (255 ms)</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>013H</td><td>Auxiliary output Delay ratio</td><td>When using the delay mode for the auxiliary output, specify the ratio (%) to output. The setting range is 0(%) to 100(%). If the setting is 50%, the auxiliary output will be performed when the positioning movement amount exceeds 50%.
Default: 0 (%)</td><td></td><td></td><td></td></tr>
<tr><td>014H</td><td>AMP operation settings</td><td>Sets to enable or disable the limit input of the AMP, and sets the moving direction and connection method.
Note) This setting is should be written in the EEPROM within the AMP, and the AMP should be rebooted after changing the setting.
<table><tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr><tr><td>0</td><td>Limit enabled/disabled</td><td>0</td><td>0: Uses the input of limit signal
1: Ignores the input of limit signal</td></tr><tr><td>1</td><td>CW/CCW moving direction</td><td>0</td><td>0: CW+ / CCW-
1: CCW+ / CW-</td></tr><tr><td>2</td><td>Limit connection</td><td>0</td><td>0: Standard connection (Forward: CWL, Reverse: CCWL)
1: Reverse connection (Forward: CWL, Reverse: CCWL)</td></tr><tr><td>15 to 3</td><td>-</td><td>-</td><td>-</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>015H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>016H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>017H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>018H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>018H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>01AH</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>01BH</td><td>Completion width</td><td>After the movement of the specified amount in the positioning control or JOG operation, the completion flag will turn on when the current value of the AMP becomes in this completion width.</td><td>10</td><td>Positive</td><td>Pulse</td></tr>
<tr><td>01CH</td><td>Monitor value error settings</td><td>This is the setting to give an error or warning by setting judgment values for the torque monitor values and actual speed of each axis.
<table><tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr><tr><td>0</td><td>Torque judgment value enabled</td><td>0</td><td>0: Disables the torque judgment value
1: Enables the torque judgment value</td></tr><tr><td>1</td><td>Torque judgment value error/warning setting</td><td>0</td><td>0: Announces an error when it is enabled
1: Announces a warning when it is enabled</td></tr><tr><td>2</td><td>Actual speed judgment value enabled</td><td>0</td><td>0: Disables the actual speed judgment value
1: Enables the actual speed judgment value</td></tr><tr><td>3</td><td>Actual speed judgment value error/warning setting</td><td>0</td><td>0: Announces an error when it is enabled
1: Announces a warning when it is enabled</td></tr><tr><td>15 to 4</td><td>-</td><td>-</td><td>-</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>01DH</td><td>Torque judgment value</td><td>Sets the limit value of the torque.</td><td>5000</td><td>0 to 5000</td><td>0.1%</td></tr>
<tr><td>01EH</td><td>Actual speed judgment value</td><td>Sets the limit value of the actual speed.</td><td>5000</td><td>0 to 5000</td><td>0.1rps or 0.1rpm</td></tr>
<tr><td>01FH</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
</table>

<table>
<tr><th>Offset address</th><th>Name</th><th>Descriptions</th><th>Default value</th><th>Setting range</th><th>Unit</th></tr>
<tr><td>020H</td><td>Home return setting code</td><td>Sets the pattern of the home return.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Home return setting code</td><td>0</td><td>0: DOG method 1
1: DOG method 2
2: DOG method 3
3: Limit method: 1
4: Limit method 2
5: Phase Z method
6: Stop-on-contact method 1
7: Stop-on-contact method 2
8: Data set
Any other settings will be errors.</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>021H</td><td>Home return direction</td><td>Sets the operating direction of the home return.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Home return direction</td><td>0</td><td>0: Elapsed value decreasing direction (Limit “-“ direction)
1: Elapsed value increasing direction (Limit “-“ direction)
Any other settings will be errors.</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>022H</td><td>Home return acceleration time</td><td rowspan="2">Sets the acceleration/deceleration time when performing the home return.
At the beginning of the home return, accelerates for the specified acceleration time, decelerates for the specified deceleration time after the proximity input and changes to the creep speed.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Home return acceleration time
Home return deceleration time</td><td>100</td><td>Setting range: 0 to 10,000 (ms)
Any other settings will be errors.</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>023H</td><td>Home return deceleration time</td></tr>
<tr><td>024H</td><td rowspan="2">Home return target speed</td><td>Sets the target speed when performing the home return.
When there is no proximity input after starting the home return, accelerates to the target speed.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>31 to 0</td><td>Home return target speed</td><td>1,000</td><td>Setting range: 1 to 32,767,000
Any other settings will be errors.
The ranges vary depending on the unit settings as below.
pulse: 1 to 32,767,000 pps
μm: 1 to 32,767,000 μm/s
inch: 0.001 to 32,767.000 inch/s
degree: 0.001 to 32,767.000 rev/s</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>025H</td></tr>
<tr><td>026H</td><td rowspan="2">Home return creep speed</td><td>Sets the speed to search the home position after the proximity input.
Sets the value lower than the home return target speed.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>31 to 0</td><td>Home return search speed</td><td>100</td><td>Setting range: 1 to 32,767,000
Any other settings will be errors.
The ranges vary depending on the unit settings as below.
pulse: 1 to 32,767,000 pps
μm: 1 to 32,767,000 μm/s
inch: 0.001 to 32,767.000 inch/s
degree: 0.001 to 32,767.000 rev/s</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>027H</td></tr>
<tr><td>028H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>029H</td><td>JOG operation setting code</td><td>Sets the mode of the JOG operation.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>1</td><td>Acceleration/deceleration pattern setting</td><td>0</td><td>0: Linear acceleration/deceleration
1: S-shaped acceleration/deceleration</td></tr>
<tr><td>15 to 2</td><td>-</td><td>-</td><td>-</td></tr>
</table></td><td></td><td></td><td></td></tr>
</table>

<table>
<tr><th>Offset address</th><th>Name</th><th>Descriptions</th><th>Default value</th><th>Setting range</th><th>Unit</th></tr>
<tr><td>02AH
02BH</td><td>JOG operation acceleration time
JOG operation deceleration time</td><td colspan="4">Sets the acceleration/deceleration time when performing the JOG operation.
At the beginning of the JOG operation, accelerates for the specified acceleration time, decelerates for the specified deceleration time when the starting contact of the JOG operation turns off.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>JOG operation acceleration time
JOG operation deceleration time</td><td>100</td><td>Setting range: 0 to 10,000 (ms)
Any other settings will be errors.</td></tr>
</table></td></tr>
<tr><td>02CH
02DH</td><td>JOG operation target speed</td><td colspan="4">Sets the target speed when performing the JOG operation.
After starting the JOG operation, accelerates with the specified operation to the target speed while the starting contact of the JOG operation is on. After reaching the target speed, operates with the target speed.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>31 to 0</td><td>JOG operation target speed</td><td>1,000</td><td>Setting range: 1 to 32,767,000
Any other settings will be errors.
The ranges vary depending on the unit setting.
pulse: 1 to 32,767,000 pps
μm: 1 to 32,767,000 μm/s
inch: 0.001 to 32,767.000 inch/s
degree: 0.001 to 32,767.000 rev/s</td></tr>
</table></td></tr>
<tr><td>02EH</td><td>-</td><td colspan="4">-</td></tr>
<tr><td>02FH</td><td>-</td><td colspan="4">-</td></tr>
<tr><td>030H</td><td>-</td><td colspan="4">-</td></tr>
<tr><td>031H</td><td>-</td><td colspan="4">-</td></tr>
<tr><td>032H</td><td>-</td><td colspan="4">-</td></tr>
<tr><td>033H</td><td>Emergency stop deceleration time</td><td colspan="4">When the emergency stop is requested by I/O, it will be valid, and the deceleration operation will complete in this deceleration time.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Emergency stop deceleration time</td><td>100</td><td>Setting range: 0 to 10,000 (ms)
Any other settings will be errors.</td></tr>
</table></td></tr>
<tr><td>034H</td><td>-</td><td colspan="4">-</td></tr>
<tr><td>035H</td><td>Limit stop deceleration time</td><td colspan="4">When the limit is input, the deceleration operation will complete in this deceleration time.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Limit stop deceleration time</td><td>100</td><td>Setting range: 0 to 10,000 (ms)
Any other settings will be errors.</td></tr>
</table></td></tr>
<tr><td>036H</td><td>-</td><td colspan="4">-</td></tr>
<tr><td>037H</td><td>Error stop deceleration time</td><td colspan="4">When an error occurred, it will be valid, and the deceleration operation will complete in this deceleration time.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Error stop deceleration time</td><td>100</td><td>Setting range: 0 to 10,000 (ms)
Any other settings will be errors.</td></tr>
</table></td></tr>
<tr><td>038H</td><td>Pulser operation setting code</td><td colspan="4">Specify one pulser among 1 to 3 for the input, for the case that pulser operation is requested by I/O.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Pulse operation setting code</td><td>0</td><td>0: Pulser input 1
1: Pulser input 2
2: Pulser input 3
Any other settings will be errors.</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Offset address</th><th>Name</th><th>Descriptions</th><th>Default value</th><th>Setting range</th><th>Unit</th></tr>
<tr><td>039H</td><td>Pulser operation ratio numerator</td><td>Sets the multiplier for the input pulse string in the pulser operation.
(Moving pulse number of AMP) = (Pulse strings of input from pulser) x (Numerator of ratio of pulser operation) / (Denominator of ratio of pulser operation).
<table><tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr><tr><td>15 to 0</td><td>Pulser operation ratio numerator</td><td>1</td><td>Setting range: 0 to 32,767
Any other settings will be errors.</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>03AH</td><td>Pulser operation ratio denominator</td><td>Sets the divisor for the input pulse string in the pulser operation.
(Moving pulse number of AMP) = (Pulse strings of input from pulser) x (Denominator of ratio of pulser operation) / (Numerator of ratio of pulser operation).
<table><tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr><tr><td>15 to 0</td><td>Pulser operation ratio denominator</td><td>1</td><td>Setting range: 0 to 32,767
Any other settings will be errors.</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>03BH</td><td>Pulser operation method</td><td>Sets the operation method for the pulser operation.
<table><tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr><tr><td>15 to 0</td><td>Pulser operation method</td><td>0</td><td>0: Standard operation
1: Speed limit (Pulse retention)
2: Speed limit (Round down)
Any other settings will be errors.</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>03CH</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>03DH</td><td>Home return Stop-on-contact torque value</td><td>Used when the stop-on-contact method 1 or 2 has been specified for the home return method.
It is regarded as a criterion for judging the home return once the torque value of the AMP exceeded this set value by the stop-on-contact.
Default: 100(%) Unit: % Setting range: 0 to 5,000</td><td></td><td></td><td></td></tr>
<tr><td>03EH</td><td>Home return Stop-on-contact judgment time</td><td>Used when the stop-on-contact method 1 or 2 has been specified for the home return method.
It is regarded as a criterion for judging the home return once this set time has passed after the torque value of the AMP exceeded the “home return stop-on-contact torque value ” by the stop-on-contact.
Default: 100(ms) Unit: ms Setting range: 0 to 10,000</td><td></td><td></td><td></td></tr>
<tr><td>03FH</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>040H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>041H</td><td>J point control code</td><td>Sets the control code for the J point control.
<table><tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr><tr><td>0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>1</td><td>Acceleration/deceleration pattern setting</td><td>0</td><td>0: Linear acceleration/deceleration
1: S-shaped acceleration/deceleration</td></tr><tr><td>15 to 2</td><td>-</td><td>-</td><td>-</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>042H</td><td>J point acceleration time</td><td rowspan="2">Sets the acceleration/deceleration time for the J point control.
<table><tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr><tr><td>15 to 0</td><td>J point acceleration time
J point deceleration time</td><td>100</td><td>Setting range: 0 to 10,000 (ms)
Any other settings will be errors.</td></tr></table></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td>043H</td><td>J point deceleration time</td></tr>
<tr><td>044H</td><td rowspan="2">J point target speed</td><td rowspan="2">Sets the target speed for the J point control.
<table><tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr><tr><td>31 to 0</td><td>J point target speed</td><td>1,000</td><td>Setting range: 1 to 32,767,000
Any other settings will be errors.
The ranges vary depending on the unit setting.
pulse: 1 to 32,767,000 pps
μm: 1 to 32,767,000 μm/s
inch: 0.001 to 32,767.000 inch/s
degree: 0.001 to 32,767.000 rev/s</td></tr></table></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td>045H</td></tr>
<tr><td>046H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
<tr><td>047H</td><td>-</td><td>-</td><td></td><td></td><td></td></tr>
</table>

Offset address	Name	Descriptions	Default value	Setting range	Unit
048H 049H	Pulser operation maximum speed	The maximum speed when selecting the speed limit for the pulser operation method. When the speed calculated by multiplying the pulser input by (Pulser operation numerator / Pulser operation denominator) is over the specified maximum speed, the operation is performed at the maximum speed. Unit: pulse/s (= kHz) Input range: 0 to 32767000 （pulse/s） Default: 0 * When zero is set in this area, the operation is performed at the minimum speed (1 pulse/s (1kHz)) as the maximum speed.			
04AH 04BH	Cooridnate origin	Stores the value of coordinate origin after the home return.			
04CH	-	-			
04DH	-	-			
04EH	-	-			
04FH	-	-			

Starting address of each positioning parameter

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								Add-ress	Descriptions
02H	0CH	16H	20H	2AH	34H	3EH	48H	050H	Starting address of parameters

17.6.3 Positioning Data Setting Areas

They are the areas for setting positioning data. The positioning data for 8 axes can be set individually. The positioning data is stored in the table format of 625 points per axis.

When executing the automatic operation (position control) with the positioning unit RTEX, specify the number of the positioning table that has been specified in advance, and start the position control. After the start-up, the motor is automatically controlled according to the settings of the table. There are the method that creates the positioning table using Configurator PM that is an exclusive setting tool, and the other method that writes the positioning table in a prescribed address by ladder programs.
There are the standard area of 600 points that is specified by No. 1 to 600, and the extended area of 25 points that is specified by No. 10001 to 10025.

The standard area is used when the setting values of the positioning table are predetermined. It can be set using Configurator PM, and can be rewritten from the ladder programs, too. However, if the positioning table is changed by the ladder program, the calculation is necessary to restructure the positioning data before executing the automatic operation. This function enables to read the positioning data of 600 points in advance and to prepare for the start-up within the positioning unit, and enables to shorten the start-up time for the positioning. When using Configurator PM to download the positioning data, the data is restructured automatically, so the calculation is not necessary. However, the calculation is necessary after rewriting the positioning data from the ladder program. The procedures for the calculation are as follows.
1. Change the positioning table in the shared memory.
2. Turn on the output contact Y_7 (recalculation request contact).
3. Confirm the input contact X_7 (recalculation done contact) is on (Confirm the completion of the recalculation.)

If the data is not recalculated after rewriting the positioning table by the ladder program, note that the operation will be executed with the positioning table before the rewriting.

The extended area is used when the setting values of the positioning table cannot be determined until just before executing the positioning operation. For example, in the application of alignment using an image processing, the moving distance is determined by the image processing. Therefore, the positioning table cannot be determined until just before starting the positioning operation. In that case, the positioning table is set just before the start-up of the positioning. In the extended area, the positioning table can be rewritten as needed, and the recalculation is not necessary. However, it is up to 25 tables, and Configurator PM cannot be used. The ladder programs should be used to write the positioning table in the prescribed address in the shared memory. The start-up time is longer than the standard area, and when performing the P point control or C point control in the extended area, note that the start-up time varies depending on the number of tables to be executed consecutively.

How to use each area and the precautions are as below.

	How to use	Number of points	Table number	Setting using Configurator PM	Setting using ladder program
Standard area	Area to be used when the setting value of the positioning table is predetermined.	600 points	1 to 600	Available	Available (Calculation for restructuring is necessary.)
Extended area	Area to be used when the setting value of the positioning table cannot be determined until just before executing the positioning operation.	25 points	10001 to 10025	Not available	Available (Calculation for restructuring is not necessary.)

Positioning tables

Data in the following formats is stored from the starting address of positioning tables of each axis.

<table>
<tr><th>Offset address</th><th>Name</th><th>Descriptions</th></tr>
<tr><td>000H</td><td>Control code</td><td>Sets the position setting mode and acceleration/deceleration pattern for the positioning operation.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>0</td><td>Increment /absolute setting</td><td>0H</td><td>0: Increment mode
1: Absolute mode</td></tr>
<tr><td>1</td><td>Acceleration/deceleration pattern setting</td><td>0H</td><td>0: Linear acceleration/deceleration
1: S-shaped acceleration/deceleration</td></tr>
<tr><td>15 to 2</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>001H</td><td>Operation pattern</td><td>Sets the independent and interpolation patterns for the positioning operation.
The relation of the interpolation depends on the settings in the axis group setting area in the common area of the shared memory. In the interpolation operation, the setting for the axis with the smallest number in an axis group is effective.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>7 to 0</td><td>Control pattern</td><td>00H</td><td>00H: E point control (End point control)
01H: P point control (Pass point control)
02H: C point control (Continuance point control)
03H: J point control (Speed point control)
Any other settings will be errors.</td></tr>
<tr><td>15 to 8</td><td>Interpolation setting</td><td>00H</td><td>00H: Linear interpolation (Composite speed)
01H: Linear interpolation (Long axis speed)
10H: Circular interpolation (Center point/CW direction)
11H: Circular interpolation (Center point/ CCW direction)
20H: Circular interpolation (Pass point)
50H: Spiral interpolation (Center point/CW direction/X-axis movement)
51H: Spiral interpolation (Center point/CCW direction/X-axis movement)
52H: Spiral interpolation (Center point/CW direction/Y-axis movement)
53H: Spiral interpolation (Center point/CCW direction/Y-axis movement)
54H: Spiral interpolation (Center point/CW direction/Z-axis movement)
55H: Spiral interpolation (Center point/CCW direction/Z-axis movement)
60H: Spiral interpolation (Pass point/X-axis movement)
61H: Spiral interpolation (Pass point/Y-axis movement)
62H: Spiral interpolation (Pass point/Z-axis movement)
Any other settings will be errors.</td></tr>
</table></td></tr>
<tr><td>002H</td><td>-</td><td>-</td></tr>
<tr><td>003H</td><td>-</td><td>-</td></tr>
<tr><td>004H</td><td>Positioning acceleration time</td><td rowspan="2">Sets the acceleration and deceleration time for the positioning operation.
The acceleration time and deceleration time can be set individually. In the interpolation operation, the setting for the axis with the smallest number in an axis group is effective.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Acceleration time
Deceleration time</td><td>100</td><td>Setting range: 0 to 10,000 (ms)
Any other settings will be errors.</td></tr>
</table></td></tr>
<tr><td>005H</td><td>Positioning deceleration time</td></tr>
<tr><td>006H</td><td rowspan="2">Positioning target speed (interpolation speed)</td><td rowspan="2">In case of the individual operation (no interpolation), it is the target speed of the corresponding axis. In case of the interpolation operation, it is the target speed of the interpolation.
In the interpolation operation, the target speed for the axis of the smallest number in a group is valid.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>31 to 0</td><td>Positioning target speed (Interpolation speed)</td><td>1,000</td><td>Setting range: 1 to 32,767,000
Any other settings will be errors.
The interpretation is changed by the unit setting.
pulse: 1 to 32,767,000 pps
μm: 1 to 32,767,000 μm/s
inch: 0.001 to 32,767.000 inch/s
degree: 0.001 to 32,767.000 rev/s</td></tr>
</table></td></tr>
<tr><td>007H</td></tr>
</table>

<table>
<tr><th>Offset address</th><th>Name</th><th>Descriptions</th></tr>
<tr><td>008H
009H</td><td>Positioning movement amount</td><td>The area to set the movement amount for the positioning operation.
The interpretation is changed for the increment movement amount or absolute coordinate by the control code setting.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>31 to 0</td><td>Positioning movement amount</td><td>0</td><td>Setting range: -1,073,741,823 to 1,073,741,823
Any other settings will be errors.
The interpretation varies depending on the unit setting.
pulse: -1,073,741,823 to 1,073,741,823 pulse
μm (0.1μm): -107,374,182.3 to 107,374,182.3 μm/s
μm (1μm): -1,073,741,823 to 1,073,741,823 μm/s
inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch
inch (0.0001 inch): -107,374.1823 to 107,374.1823 inch
degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree
degree (1 degree): -1,073,741,823 to 1,073,741,823 degree</td></tr>
</table></td></tr>
<tr><td>00AH
00BH</td><td>Auxiliary point</td><td>The area to set the auxiliary points (center point, pass point coordinates) in case of the circular interpolation or spiral interpolation control.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>31 to 0</td><td>Auxiliary point</td><td>0</td><td>Setting range: -1,073,741,823 to 1,073,741,823
Any other settings will be errors.
The interpretation varies depending on the unit setting.
pulse: -1,073,741,823 to 1,073,741,823 pulse
μm (0.1μm): -107,374,182.3 to 107,374,182.3 μm/s
μm (1μm): -1,073,741,823 to 1,073,741,823 μm/s
inch (0.00001 inch): -10,737.41823 to 10,737.41823 inch
inch (0.0001 inch): -107,374.1823 to 107,374.1823 inch
degree (0.1 degree): -107,374,182.3 to 107,374,182.3 degree
degree (1 degree): -1,073,741,823 to 1,073,741,823 degree</td></tr>
</table></td></tr>
<tr><td>00CH</td><td>Dwell time</td><td>After the completion of the positioning control of this table;
when the mode is C: Continuation point, stops the motor operation for the dwell time and starts the operation of the next table.
when the mode is P: Pass point, this setting is ignored.
when the mode is E: End point, the positioning done contact will turn on after waiting for the dwell time.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Dwell time</td><td>0</td><td>0 to 32,767: The unit is ms.
Any other settings will be errors.</td></tr>
</table></td></tr>
<tr><td>00DH</td><td>Auxiliary output code</td><td>Sets the data to be output to the auxiliary output code in each axis information & monitor area by the setting of the auxiliary output mode in the parameter setting area.
<table>
<tr><th>Bit</th><th>Name</th><th>Default</th><th>Description</th></tr>
<tr><td>15 to 0</td><td>Auxiliary output code</td><td>0</td><td>No specific setting range.</td></tr>
</table></td></tr>
<tr><td>00EH</td><td>-</td><td>-</td></tr>
<tr><td>00DH</td><td>-</td><td>-</td></tr>
</table>

Starting address of each positioning table

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								Add-ress	Descriptions
02H	0CH	16H	20H	2AH	34H	3EH	48H	050H	Starting address of table 1
								060H	Starting address of table 2
								070H	Starting address of table 3
								080H	Starting address of table 4
								090H	Starting address of table 5
								0A0H	Starting address of table 6
								0B0H	Starting address of table 7
								0C0H	Starting address of table 8
								0D0H	Starting address of table 9
								0E0H	Starting address of table 10
								0F0H	Starting address of table 11
								100H	Starting address of table 12
								110H	Starting address of table 13
								120H	Starting address of table 14
								130H	Starting address of table 15
								140H	Starting address of table 16
								150H	Starting address of table 17
								160H	Starting address of table 18
								170H	Starting address of table 19
								180H	Starting address of table 20
								190H	Starting address of table 21
								1A0H	Starting address of table 22
								1B0H	Starting address of table 23
								1C0H	Starting address of table 24
								1D0H	Starting address of table 25
								1E0H	Starting address of table 26
								1F0H	Starting address of table 27
								200H	Starting address of table 28
								210H	Starting address of table 29
								220H	Starting address of table 30
								230H	Starting address of table 31
								240H	Starting address of table 32
								250H	Starting address of table 33
								260H	Starting address of table 34
								270H	Starting address of table 35
								280H	Starting address of table 36
								290H	Starting address of table 37
								2A0H	Starting address of table 38
								2B0H	Starting address of table 39
								2C0H	Starting address of table 40
								2D0H	Starting address of table 41
								2E0H	Starting address of table 42
								2F0H	Starting address of table 43
								300H	Starting address of table 44
								310H	Starting address of table 45
								320H	Starting address of table 46
								330H	Starting address of table 47
								340H	Starting address of table 48
								350H	Starting address of table 49
								360H	Starting address of table 50
								370H	Starting address of table 51
								380H	Starting address of table 52
								390H	Starting address of table 53
								3A0H	Starting address of table 54
								3B0H	Starting address of table 55
								3C0H	Starting address of table 56
								3D0H	Starting address of table 57
								3E0H	Starting address of table 58
								3F0H	Starting address of table 59

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								**Add-ress**	**Descriptions**
03H	0DH	17H	21H	2BH	35H	3FH	49H	000H	Starting address of table 60
								010H	Starting address of table 61
								020H	Starting address of table 62
								030H	Starting address of table 63
								040H	Starting address of table 64
								050H	Starting address of table 65
								060H	Starting address of table 66
								070H	Starting address of table 67
								080H	Starting address of table 68
								090H	Starting address of table 69
								0A0H	Starting address of table 70
								0B0H	Starting address of table 71
								0C0H	Starting address of table 72
								0D0H	Starting address of table 73
								0E0H	Starting address of table 74
								0F0H	Starting address of table 75
								100H	Starting address of table 76
								110H	Starting address of table 77
								120H	Starting address of table 78
								130H	Starting address of table 79
								140H	Starting address of table 80
								150H	Starting address of table 81
								160H	Starting address of table 82
								170H	Starting address of table 83
								180H	Starting address of table 84
								190H	Starting address of table 85
								1A0H	Starting address of table 86
								1B0H	Starting address of table 87
								1C0H	Starting address of table 88
								1D0H	Starting address of table 89
								1E0H	Starting address of table 90
								1F0H	Starting address of table 91
								200H	Starting address of table 92
								210H	Starting address of table 93
								220H	Starting address of table 94
								230H	Starting address of table 95
								240H	Starting address of table 96
								250H	Starting address of table 97
								260H	Starting address of table 98
								270H	Starting address of table 99
								280H	Starting address of table 100
								290H	Starting address of table 101
								2A0H	Starting address of table 102
								2B0H	Starting address of table 103
								2C0H	Starting address of table 104
								2D0H	Starting address of table 105
								2E0H	Starting address of table 106
								2F0H	Starting address of table 107
								300H	Starting address of table 108
								310H	Starting address of table 109
								320H	Starting address of table 110
								330H	Starting address of table 111
								340H	Starting address of table 112
								350H	Starting address of table 113
								360H	Starting address of table 114
								370H	Starting address of table 115
								380H	Starting address of table 116
								390H	Starting address of table 117
								3A0H	Starting address of table 118
								3B0H	Starting address of table 119
								3C0H	Starting address of table 120
								3D0H	Starting address of table 121
								3E0H	Starting address of table 122
								3F0H	Starting address of table 123

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								Add-ress	Descriptions
04H	0EH	18H	22H	2CH	36H	40H	4AH	000H	Starting address of table 124
								010H	Starting address of table 125
								020H	Starting address of table 126
								030H	Starting address of table 127
								040H	Starting address of table 128
								050H	Starting address of table 129
								060H	Starting address of table 130
								070H	Starting address of table 131
								080H	Starting address of table 132
								090H	Starting address of table 133
								0A0H	Starting address of table 134
								0B0H	Starting address of table 135
								0C0H	Starting address of table 136
								0D0H	Starting address of table 137
								0E0H	Starting address of table 138
								0F0H	Starting address of table 139
								100H	Starting address of table 140
								110H	Starting address of table 141
								120H	Starting address of table 142
								130H	Starting address of table 143
								140H	Starting address of table 144
								150H	Starting address of table 145
								160H	Starting address of table 146
								170H	Starting address of table 147
								180H	Starting address of table 148
								190H	Starting address of table 149
								1A0H	Starting address of table 150
								1B0H	Starting address of table 151
								1C0H	Starting address of table 152
								1D0H	Starting address of table 153
								1E0H	Starting address of table 154
								1F0H	Starting address of table 155
								200H	Starting address of table 156
								210H	Starting address of table 157
								220H	Starting address of table 158
								230H	Starting address of table 159
								240H	Starting address of table 160
								250H	Starting address of table 161
								260H	Starting address of table 162
								270H	Starting address of table 163
								280H	Starting address of table 164
								290H	Starting address of table 165
								2A0H	Starting address of table 166
								2B0H	Starting address of table 167
								2C0H	Starting address of table 168
								2D0H	Starting address of table 169
								2E0H	Starting address of table 170
								2F0H	Starting address of table 171
								300H	Starting address of table 172
								310H	Starting address of table 173
								320H	Starting address of table 174
								330H	Starting address of table 175
								340H	Starting address of table 176
								350H	Starting address of table 177
								360H	Starting address of table 178
								370H	Starting address of table 179
								380H	Starting address of table 180
								390H	Starting address of table 181
								3A0H	Starting address of table 182
								3B0H	Starting address of table 183
								3C0H	Starting address of table 184
								3D0H	Starting address of table 185
								3E0H	Starting address of table 186
								3F0H	Starting address of table 187

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								**Add-ress**	**Descriptions**
05H	0FH	19H	23H	2DH	37H	41H	4BH	000H	Starting address of table 188
								010H	Starting address of table 189
								020H	Starting address of table 190
								030H	Starting address of table 191
								040H	Starting address of table 192
								050H	Starting address of table 193
								060H	Starting address of table 194
								070H	Starting address of table 195
								080H	Starting address of table 196
								090H	Starting address of table 197
								0A0H	Starting address of table 198
								0B0H	Starting address of table 199
								0C0H	Starting address of table 200
								0D0H	Starting address of table 201
								0E0H	Starting address of table 202
								0F0H	Starting address of table 203
								100H	Starting address of table 204
								110H	Starting address of table 205
								120H	Starting address of table 206
								130H	Starting address of table 207
								140H	Starting address of table 208
								150H	Starting address of table 209
								160H	Starting address of table 210
								170H	Starting address of table 211
								180H	Starting address of table 212
								190H	Starting address of table 213
								1A0H	Starting address of table 214
								1B0H	Starting address of table 215
								1C0H	Starting address of table 216
								1D0H	Starting address of table 217
								1E0H	Starting address of table 218
								1F0H	Starting address of table 219
								200H	Starting address of table 220
								210H	Starting address of table 221
								220H	Starting address of table 222
								230H	Starting address of table 223
								240H	Starting address of table 224
								250H	Starting address of table 225
								260H	Starting address of table 226
								270H	Starting address of table 227
								280H	Starting address of table 228
								290H	Starting address of table 229
								2A0H	Starting address of table 230
								2B0H	Starting address of table 231
								2C0H	Starting address of table 232
								2D0H	Starting address of table 233
								2E0H	Starting address of table 234
								2F0H	Starting address of table 235
								300H	Starting address of table 236
								310H	Starting address of table 237
								320H	Starting address of table 238
								330H	Starting address of table 239
								340H	Starting address of table 240
								350H	Starting address of table 241
								360H	Starting address of table 242
								370H	Starting address of table 243
								380H	Starting address of table 244
								390H	Starting address of table 245
								3A0H	Starting address of table 246
								3B0H	Starting address of table 247
								3C0H	Starting address of table 248
								3D0H	Starting address of table 249
								3E0H	Starting address of table 250
								3F0H	Starting address of table 251

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								Add-ress	Descriptions
06H	10H	1AH	24H	2EH	38H	42H	4CH	000H	Starting address of table 252
								010H	Starting address of table 253
								020H	Starting address of table 254
								030H	Starting address of table 255
								040H	Starting address of table 256
								050H	Starting address of table 257
								060H	Starting address of table 258
								070H	Starting address of table 259
								080H	Starting address of table 260
								090H	Starting address of table 261
								0A0H	Starting address of table 262
								0B0H	Starting address of table 263
								0C0H	Starting address of table 264
								0D0H	Starting address of table 265
								0E0H	Starting address of table 266
								0F0H	Starting address of table 267
								100H	Starting address of table 268
								110H	Starting address of table 269
								120H	Starting address of table 270
								130H	Starting address of table 271
								140H	Starting address of table 272
								150H	Starting address of table 273
								160H	Starting address of table 274
								170H	Starting address of table 275
								180H	Starting address of table 276
								190H	Starting address of table 277
								1A0H	Starting address of table 278
								1B0H	Starting address of table 279
								1C0H	Starting address of table 280
								1D0H	Starting address of table 281
								1E0H	Starting address of table 282
								1F0H	Starting address of table 283
								200H	Starting address of table 284
								210H	Starting address of table 285
								220H	Starting address of table 286
								230H	Starting address of table 287
								240H	Starting address of table 288
								250H	Starting address of table 289
								260H	Starting address of table 290
								270H	Starting address of table 291
								280H	Starting address of table 292
								290H	Starting address of table 293
								2A0H	Starting address of table 294
								2B0H	Starting address of table 295
								2C0H	Starting address of table 296
								2D0H	Starting address of table 297
								2E0H	Starting address of table 298
								2F0H	Starting address of table 299
								300H	Starting address of table 300
								310H	Starting address of table 301
								320H	Starting address of table 302
								330H	Starting address of table 303
								340H	Starting address of table 304
								350H	Starting address of table 305
								360H	Starting address of table 306
								370H	Starting address of table 307
								380H	Starting address of table 308
								390H	Starting address of table 309
								3A0H	Starting address of table 310
								3B0H	Starting address of table 311
								3C0H	Starting address of table 312
								3D0H	Starting address of table 313
								3E0H	Starting address of table 314
								3F0H	Starting address of table 315

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								**Add-ress**	**Descriptions**
07H	11H	1BH	25H	2FH	39H	43H	4DH	000H	Starting address of table 316
								010H	Starting address of table 317
								020H	Starting address of table 318
								030H	Starting address of table 319
								040H	Starting address of table 320
								050H	Starting address of table 321
								060H	Starting address of table 322
								070H	Starting address of table 323
								080H	Starting address of table 324
								090H	Starting address of table 325
								0A0H	Starting address of table 326
								0B0H	Starting address of table 327
								0C0H	Starting address of table 328
								0D0H	Starting address of table 329
								0E0H	Starting address of table 330
								0F0H	Starting address of table 331
								100H	Starting address of table 332
								110H	Starting address of table 333
								120H	Starting address of table 334
								130H	Starting address of table 335
								140H	Starting address of table 336
								150H	Starting address of table 337
								160H	Starting address of table 338
								170H	Starting address of table 339
								180H	Starting address of table 340
								190H	Starting address of table 341
								1A0H	Starting address of table 342
								1B0H	Starting address of table 343
								1C0H	Starting address of table 344
								1D0H	Starting address of table 345
								1E0H	Starting address of table 346
								1F0H	Starting address of table 347
								200H	Starting address of table 348
								210H	Starting address of table 349
								220H	Starting address of table 350
								230H	Starting address of table 351
								240H	Starting address of table 352
								250H	Starting address of table 353
								260H	Starting address of table 354
								270H	Starting address of table 355
								280H	Starting address of table 356
								290H	Starting address of table 357
								2A0H	Starting address of table 358
								2B0H	Starting address of table 359
								2C0H	Starting address of table 360
								2D0H	Starting address of table 361
								2E0H	Starting address of table 362
								2F0H	Starting address of table 363
								300H	Starting address of table 364
								310H	Starting address of table 365
								320H	Starting address of table 366
								330H	Starting address of table 367
								340H	Starting address of table 368
								350H	Starting address of table 369
								360H	Starting address of table 370
								370H	Starting address of table 371
								380H	Starting address of table 372
								390H	Starting address of table 373
								3A0H	Starting address of table 374
								3B0H	Starting address of table 375
								3C0H	Starting address of table 376
								3D0H	Starting address of table 377
								3E0H	Starting address of table 378
								3F0H	Starting address of table 379

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								Add-ress	Descriptions
08H	12H	1CH	26H	30H	3AH	44H	4EH	000H	Starting address of table 380
								010H	Starting address of table 381
								020H	Starting address of table 382
								030H	Starting address of table 383
								040H	Starting address of table 384
								050H	Starting address of table 385
								060H	Starting address of table 386
								070H	Starting address of table 387
								080H	Starting address of table 388
								090H	Starting address of table 389
								0A0H	Starting address of table 390
								0B0H	Starting address of table 391
								0C0H	Starting address of table 392
								0D0H	Starting address of table 393
								0E0H	Starting address of table 394
								0F0H	Starting address of table 395
								100H	Starting address of table 396
								110H	Starting address of table 397
								120H	Starting address of table 398
								130H	Starting address of table 399
								140H	Starting address of table 400
								150H	Starting address of table 401
								160H	Starting address of table 402
								170H	Starting address of table 403
								180H	Starting address of table 404
								190H	Starting address of table 405
								1A0H	Starting address of table 406
								1B0H	Starting address of table 407
								1C0H	Starting address of table 408
								1D0H	Starting address of table 409
								1E0H	Starting address of table 410
								1F0H	Starting address of table 411
								200H	Starting address of table 412
								210H	Starting address of table 413
								220H	Starting address of table 414
								230H	Starting address of table 415
								240H	Starting address of table 416
								250H	Starting address of table 417
								260H	Starting address of table 418
								270H	Starting address of table 419
								280H	Starting address of table 420
								290H	Starting address of table 421
								2A0H	Starting address of table 422
								2B0H	Starting address of table 423
								2C0H	Starting address of table 424
								2D0H	Starting address of table 425
								2E0H	Starting address of table 426
								2F0H	Starting address of table 427
								300H	Starting address of table 428
								310H	Starting address of table 429
								320H	Starting address of table 430
								330H	Starting address of table 431
								340H	Starting address of table 432
								350H	Starting address of table 433
								360H	Starting address of table 434
								370H	Starting address of table 435
								380H	Starting address of table 436
								390H	Starting address of table 437
								3A0H	Starting address of table 438
								3B0H	Starting address of table 439
								3C0H	Starting address of table 440
								3D0H	Starting address of table 441
								3E0H	Starting address of table 442
								3F0H	Starting address of table 443

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								**Add-ress**	**Descriptions**
09H	13H	1DH	27H	31H	3BH	45H	4FH	000H	Starting address of table 444
								010H	Starting address of table 445
								020H	Starting address of table 446
								030H	Starting address of table 447
								040H	Starting address of table 448
								050H	Starting address of table 449
								060H	Starting address of table 450
								070H	Starting address of table 451
								080H	Starting address of table 452
								090H	Starting address of table 453
								0A0H	Starting address of table 454
								0B0H	Starting address of table 455
								0C0H	Starting address of table 456
								0D0H	Starting address of table 457
								0E0H	Starting address of table 458
								0F0H	Starting address of table 459
								100H	Starting address of table 460
								110H	Starting address of table 461
								120H	Starting address of table 462
								130H	Starting address of table 463
								140H	Starting address of table 464
								150H	Starting address of table 465
								160H	Starting address of table 466
								170H	Starting address of table 467
								180H	Starting address of table 468
								190H	Starting address of table 469
								1A0H	Starting address of table 470
								1B0H	Starting address of table 471
								1C0H	Starting address of table 472
								1D0H	Starting address of table 473
								1E0H	Starting address of table 474
								1F0H	Starting address of table 475
								200H	Starting address of table 476
								210H	Starting address of table 477
								220H	Starting address of table 478
								230H	Starting address of table 479
								240H	Starting address of table 480
								250H	Starting address of table 481
								260H	Starting address of table 482
								270H	Starting address of table 483
								280H	Starting address of table 484
								290H	Starting address of table 485
								2A0H	Starting address of table 486
								2B0H	Starting address of table 487
								2C0H	Starting address of table 488
								2D0H	Starting address of table 489
								2E0H	Starting address of table 490
								2F0H	Starting address of table 491
								300H	Starting address of table 492
								310H	Starting address of table 493
								320H	Starting address of table 494
								330H	Starting address of table 495
								340H	Starting address of table 496
								350H	Starting address of table 497
								360H	Starting address of table 498
								370H	Starting address of table 499
								380H	Starting address of table 500
								390H	Starting address of table 501
								3A0H	Starting address of table 502
								3B0H	Starting address of table 503
								3C0H	Starting address of table 504
								3D0H	Starting address of table 505
								3E0H	Starting address of table 506
								3F0H	Starting address of table 507

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								Add-ress	Descriptions
0AH	14H	1EH	28H	32H	3CH	46H	50H	000H	Starting address of table 508
								010H	Starting address of table 509
								020H	Starting address of table 510
								030H	Starting address of table 511
								040H	Starting address of table 512
								050H	Starting address of table 513
								060H	Starting address of table 514
								070H	Starting address of table 515
								080H	Starting address of table 516
								090H	Starting address of table 517
								0A0H	Starting address of table 518
								0B0H	Starting address of table 519
								0C0H	Starting address of table 520
								0D0H	Starting address of table 521
								0E0H	Starting address of table 522
								0F0H	Starting address of table 523
								100H	Starting address of table 524
								110H	Starting address of table 525
								120H	Starting address of table 526
								130H	Starting address of table 527
								140H	Starting address of table 528
								150H	Starting address of table 529
								160H	Starting address of table 530
								170H	Starting address of table 531
								180H	Starting address of table 532
								190H	Starting address of table 533
								1A0H	Starting address of table 534
								1B0H	Starting address of table 535
								1C0H	Starting address of table 536
								1D0H	Starting address of table 537
								1E0H	Starting address of table 538
								1F0H	Starting address of table 539
								200H	Starting address of table 540
								210H	Starting address of table 541
								220H	Starting address of table 542
								230H	Starting address of table 543
								240H	Starting address of table 544
								250H	Starting address of table 545
								260H	Starting address of table 546
								270H	Starting address of table 547
								280H	Starting address of table 548
								290H	Starting address of table 549
								2A0H	Starting address of table 550
								2B0H	Starting address of table 551
								2C0H	Starting address of table 552
								2D0H	Starting address of table 553
								2E0H	Starting address of table 554
								2F0H	Starting address of table 555
								300H	Starting address of table 556
								310H	Starting address of table 557
								320H	Starting address of table 558
								330H	Starting address of table 559
								340H	Starting address of table 560
								350H	Starting address of table 561
								360H	Starting address of table 562
								370H	Starting address of table 563
								380H	Starting address of table 564
								390H	Starting address of table 565
								3A0H	Starting address of table 566
								3B0H	Starting address of table 567
								3C0H	Starting address of table 568
								3D0H	Starting address of table 569
								3E0H	Starting address of table 570
								3F0H	Starting address of table 571

Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Axis 7	Axis 8		
Bank No.								**Add-ress**	**Descriptions**
0BH	15H	1FH	29H	33H	3DH	47H	51H	000H	Starting address of table 572
								010H	Starting address of table 573
								020H	Starting address of table 574
								030H	Starting address of table 575
								040H	Starting address of table 576
								050H	Starting address of table 577
								060H	Starting address of table 578
								070H	Starting address of table 579
								080H	Starting address of table 580
								090H	Starting address of table 581
								0A0H	Starting address of table 582
								0B0H	Starting address of table 583
								0C0H	Starting address of table 584
								0D0H	Starting address of table 585
								0E0H	Starting address of table 586
								0F0H	Starting address of table 587
								100H	Starting address of table 588
								110H	Starting address of table 589
								120H	Starting address of table 590
								130H	Starting address of table 591
								140H	Starting address of table 592
								150H	Starting address of table 593
								160H	Starting address of table 594
								170H	Starting address of table 595
								180H	Starting address of table 596
								190H	Starting address of table 597
								1A0H	Starting address of table 598
								1B0H	Starting address of table 599
								1C0H	Starting address of table 600
								1D0H	-
								1E0H	-
								1F0H	-
								200H	-
								210H	-
								220H	-
								230H	-
								240H	-
								250H	-
								260H	-
								270H	Starting address of table 10001
								280H	Starting address of table 10002
								290H	Starting address of table 10003
								2A0H	Starting address of table 10004
								2B0H	Starting address of table 10005
								2C0H	Starting address of table 10006
								2D0H	Starting address of table 10007
								2E0H	Starting address of table 10008
								2F0H	Starting address of table 10009
								300H	Starting address of table 10010
								310H	Starting address of table 10011
								320H	Starting address of table 10012
								330H	Starting address of table 10013
								340H	Starting address of table 10014
								350H	Starting address of table 10015
								360H	Starting address of table 10016
								370H	Starting address of table 10017
								380H	Starting address of table 10018
								390H	Starting address of table 10019
								3A0H	Starting address of table 10020
								3B0H	Starting address of table 10021
								3C0H	Starting address of table 10022
								3D0H	Starting address of table 10023
								3E0H	Starting address of table 10024
								3F0H	Starting address of table 10025

AMP parameter control area

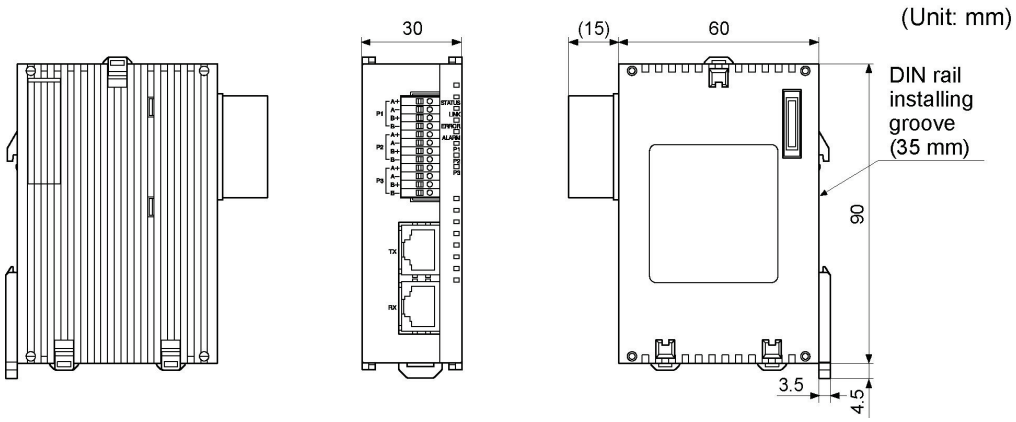
This area is used to read/write, save and reset parameters for the AMP.

Bank	Offset address	Name	Descriptions	Default value	Setting range	Unit
52H	000H	AMP ID No.	Specify the target axis number (AMP ID No.) to perform each operation such as changing parameters.	1	1 to 8	-
	001H	Control flag	Specify the process of AMP parameters. This area will be set to 0H when the positioning unit RTEX completes the process. 0H: No request 2H: Read request 4H: Write request 5H: EEPROM request 6H: AMP reset request	0	0 to 6	-
	002H	Status	Stores the processing state of AMP parameters. 0H: No operation 1H: During processing 2H: Normal end （Read / Write / EEPROM / Reset） 3H: Abnormal end （Read/Write / EEPROM / Reset） 4H : ID error 5H: Parameter error 6H: Request not executable state	0	0 to 6	-
	003H	A6N/A5N parameter classification	Specify the classification code of the parameter to be read/written using A6N/A5N. No writing is required in this area when executing EEPROM write or AMP reset.	0	0 to 8	-
	024H	Individual parameter No.	Specify the target parameter number for read/write. With A4N: Specify the parameter number. With A6N/A5N: Specify the parameter number in the classification code. No writing is required in this area when executing EEPROM write or AMP reset.	FFFFH	00 to 7FH	-
	025H	A4N parameter data	Stores each parameter data when using A4N. When reading: Stores the parameter values of AMP. When writing: Stores the parameter values to be updated.	0	-	-
	026H	A6N/A5N parameter data	Stores each parameter data when using A6N/A5N. When reading: Stores the parameter values of AMP. When writing: Stores the parameter values to be updated.	0	-	-
	027H					

Chapter 18

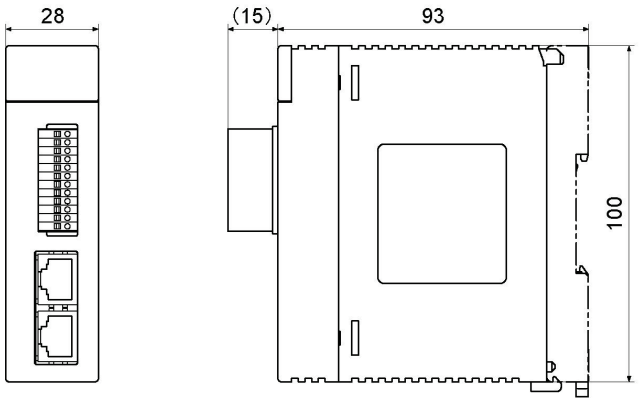
Dimensions

18.1 FPSigma Positioning Unit RTEX



18.2 FP2 Positioning Unit RTEX

(Unit: mm)



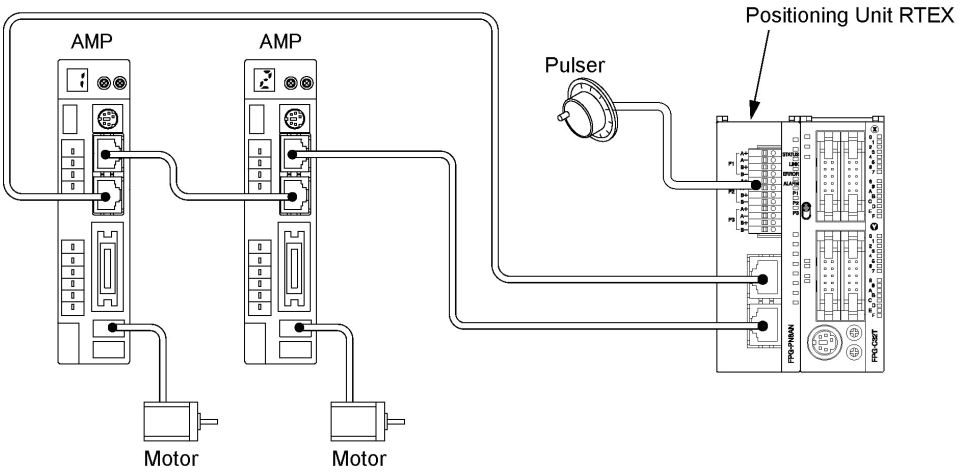
Chapter 19

Sample Programs

19.1 I/O Allocation of Sample Programs

In the sample programs, the internal relays are used as the activation request signal for each operation. If necessary, replace them with the input contacts that switches, etc are connected.

Basic Configuration



The FPΣ positioning unit RTEX is installed in the slot 0. Also, the axes 1 and 2 are designated as the axes used, and the linear interpolation of 2 axes is designated as a sample operation, by the Configurator PM in advance.
The FP2 positioning unit RTEX is also installed in the slot 0.

Used contacts and data registers

Number	Descriptions
R0	Request servo on
R1	Request servo off
R2	Request home return
R3	Request positioning start
R4	Request forward JOG for axis 1
R5	Request reverse JOG for axis 1
R6	Request forward JOG for axis 2
R7	Request reverse JOG for axis 2
R8	Request pulser operation for axis 1
R9	Request pulser operation for axis 2
R10	Error clear
R11	Request setting value change
R100	Operation enabled flag for axis 1
R101	Off edge of forward JOG for axis 1
R102	Off edge of reverse JOG for axis 1
R103	Off edge of pulser operation for axis 1
R200	Operation enabled flag for axis 2
R201	Off edge of forward JOG for axis 2
R202	Off edge of reverse JOG for axis 2
R203	Off edge of pulser operation for axis 2

Number		Descriptions
FPΣ	FP2	
X100	X0	Link establishment for all axes
X104	X4	Tool operation for all axes
X107	X7	Recalculation done flag
X108	X8	Connection confirmation for axis 1
X109	X9	Connection confirmation for axis 2
X110	X10	Servo lock for axis 1
X111	X11	Servo lock for axis 2
X118	X18	Busy flag for axis 1
X119	X19	Busy flag for axis 2
X160	X60	Error occurrence annunciation for axis 1
X161	X61	Error occurrence annunciation for axis 2
Y107	Y87	Request recalculation
Y108	Y88	Servo on for axis 1
Y109	Y89	Servo on for axis 2
Y110	Y90	Positioning start for axis 1
Y118	Y98	Home return for axis 1
Y119	Y99	Home return for axis 2
Y120	Y100	Forward JOG for axis 1
Y121	Y101	Reverse JOG for axis 1
Y122	Y102	Forward JOG for axis 2
Y123	Y103	Reverse JOG for axis 2
Y140	Y120	Pulser operation for axis 1
Y141	Y121	Pulser operation for axis 2
Y150	Y130	Servo off for axis 1
Y151	Y131	Servo off for axis 2
Y160	Y140	Error clear for axis 1
Y161	Y141	Error clear for axis 2

Number	Descriptions
DT0	Starting table number
DT101	Number of errors of axis 1
DT102 to DT115	Error contents of axis 1
DT121	Number of errors of axis 2
DT122 to DT135	Error contents of axis 2
DT10 to DT25	Positioning data (of 1 table) of axis 1
DT30 to DT45	Positioning data (of 1 table) of axis 2

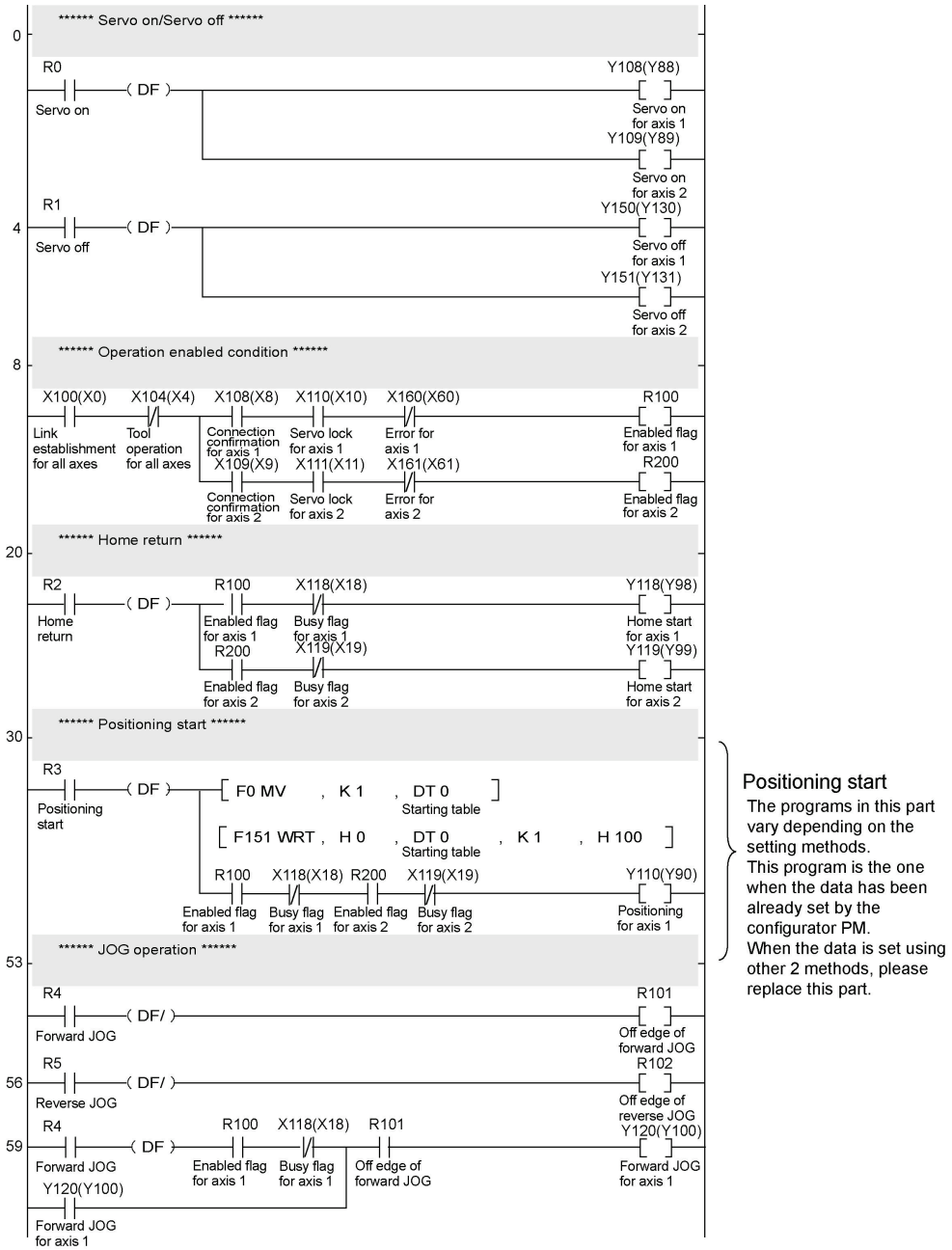
19.2 Sample Programs

There are 3 patterns for setting positioning data.

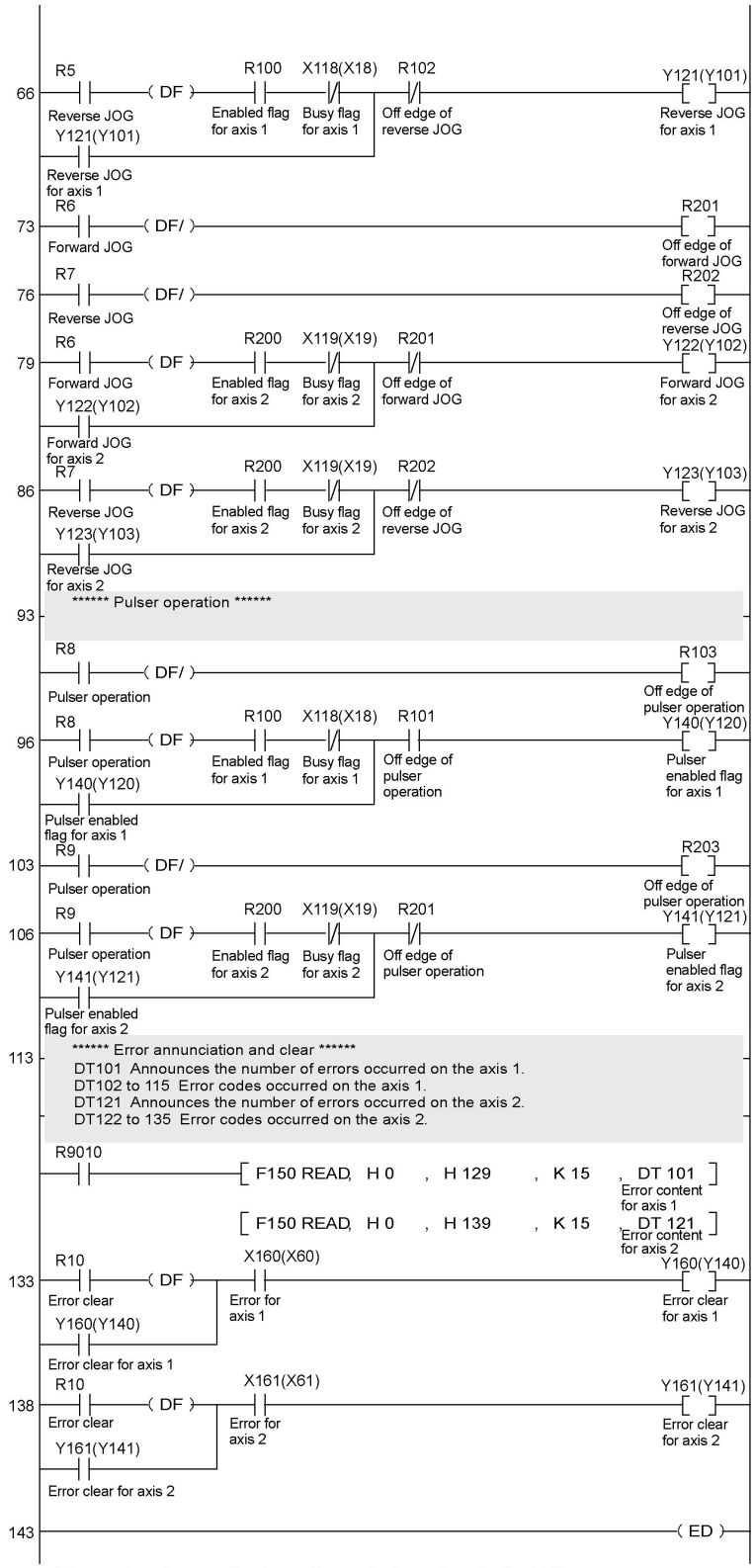
1. When the positioning data has been already set in the standard area with the Configurator PM.
2. When setting the positioning data in the extended area using the ladder program.
3. When setting the positioning data in the standard area using the ladder program.

Sample program

The positioning start is the setting that has been already set in the standard area by the Configurator PM.



The numbers in parenthesis are the contact numbers for the FP2.



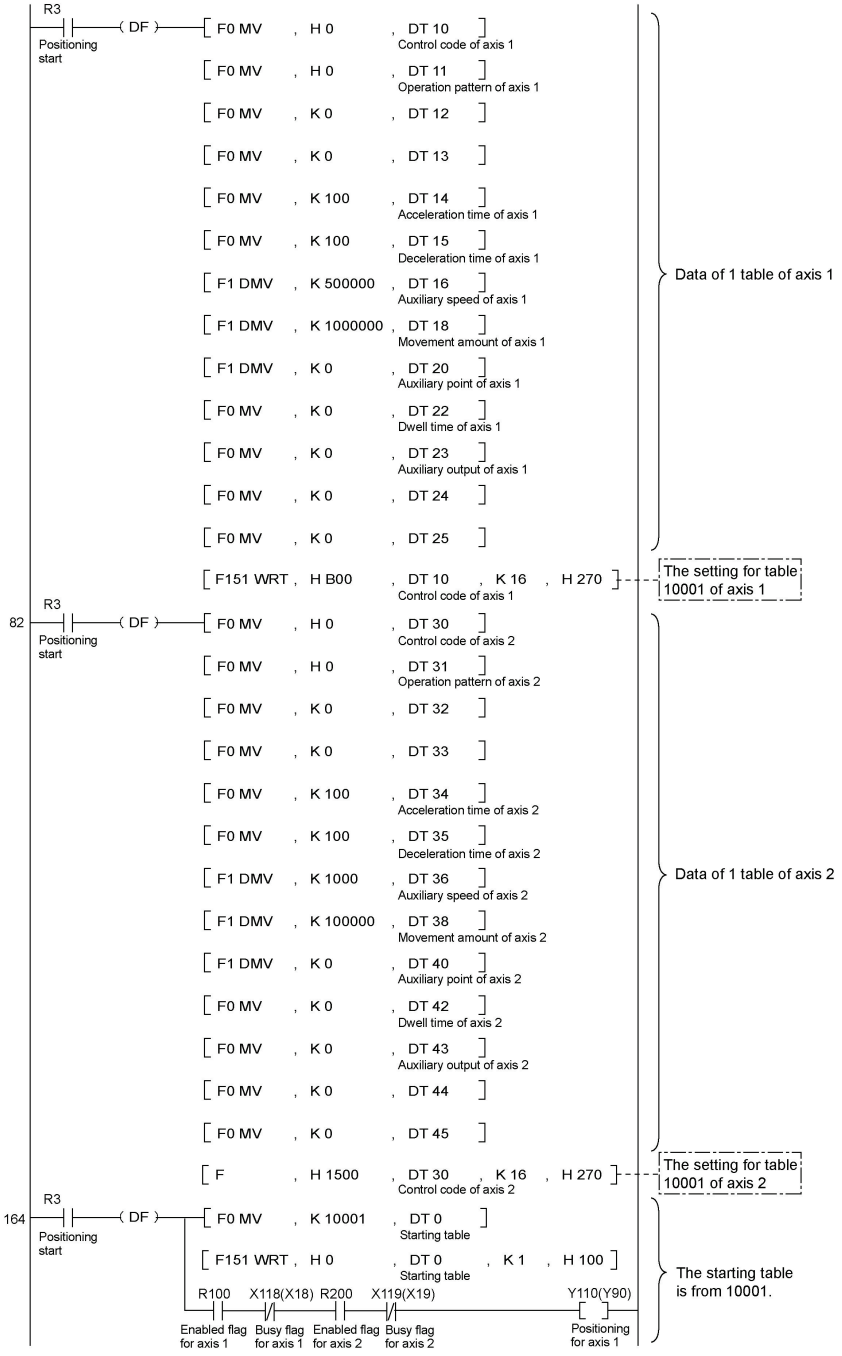
The numbers in parenthesis are the contact numbers for the FP2.

19.2.1 When Setting Positioning Data in Extended Area Using Ladder Program

Write positioning data in the extended area using the ladder program.
Recalculating the positioning data is not necessary as the extended area is used.

Replace the part of the positioning start program in the sample program

Positioning start program



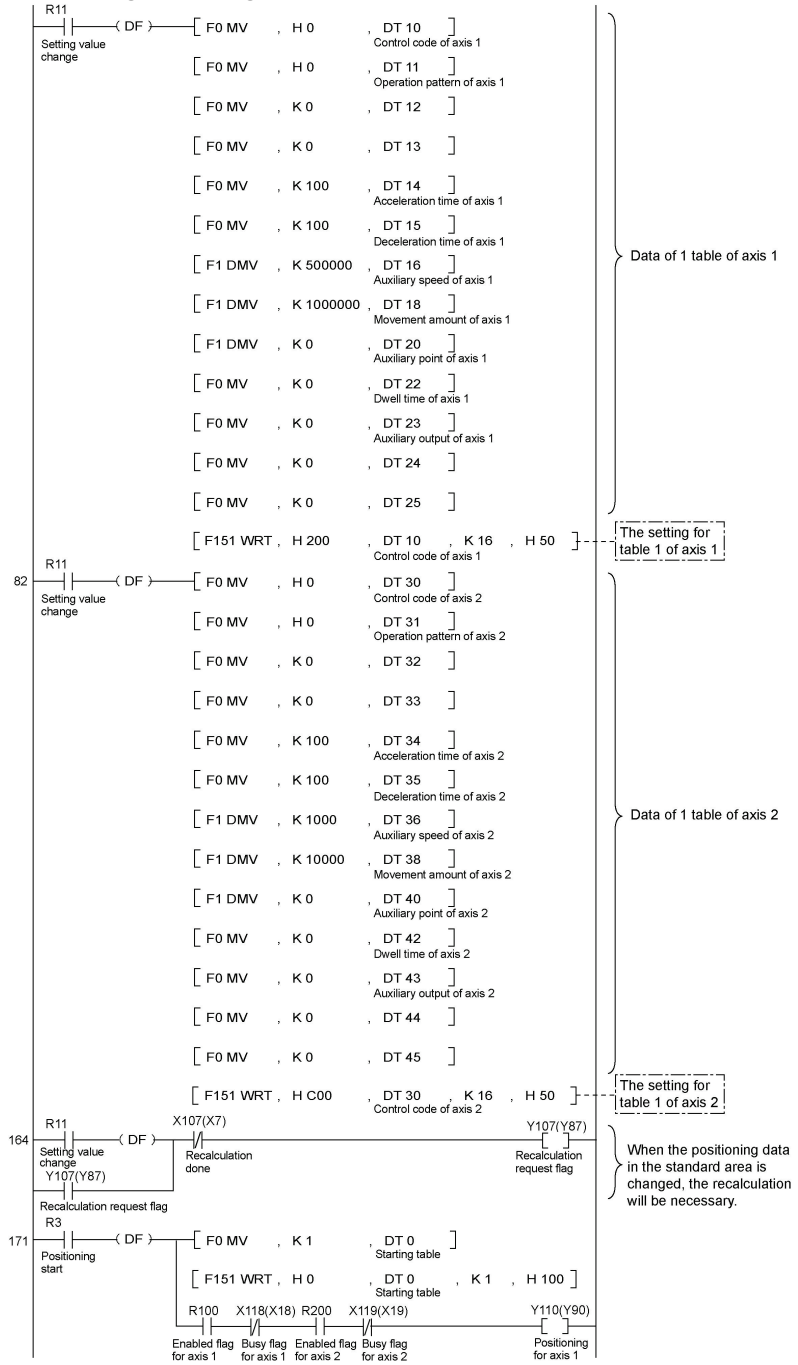
The numbers in parenthesis are the contact numbers for the FP2.

19.2.2 When Setting Positioning Data in Standard Area Using Ladder Program

Write positioning data in the standard area using the ladder program.
Recalculating the positioning data is necessary after setting the positioning data.

Replace the part of the positioning start program in the sample program

Positioning start program



The numbers in parenthesis are the contact numbers for the FP2.

Record of changes

Manual No.	Date	Description of changes
ARCT1F421E	NOV.2006	First edition
ARCT1F421E-1	FEB.2008	Second edition - Addition of functions (Ver1.13)
ARCT1F421E-2	NOV.2008	Third edition - Change in Corporate name
ARCT1F421E-3	JUL.2009	Fourth edition
ARCT1F421E-4	OCT.2011	Fifth edition - Addition of functions (Ver.1.30) Supported MINAS A5N, AMP parameter R/W function - Change of Corporate name
ARCT1F421E-5	JUL.2013	Sixth edition - Change in Corporate name
ARCT1F421E-6	OCT.2016	Seventh edition - Addition of functions (Ver.1.40) Supported MINAS A6N - Error correction

Please contact .....

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