

Panasonic[®]

PROFIBUS

FP0-DP Slave Unit

Hardware Manual

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Important Symbols

One or more of the following symbols may be used in this manual:



Warning.

The warning triangle indicates especially important safety instructions. If they are not adhered to, the results could be:

- fatal or critical injury and/or
- significant damage to instruments or their contents, e.g. data



◆ **NOTE**

Contains important additional information.



◆ **EXAMPLE**

Contains an illustrative example of the previous text section.



◆ **REFERENCE**

Indicates where you can find additional information on the subject at hand.



◆ **CAUTION**

Indicates that you should proceed with caution.



◆ **KEY POINTS**

Summarizes key points in a concise manner.



◆ **SHORTCUTS**

Provides helpful keyboard shortcuts.

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1 Introduction



Please read the safety instructions and notes in the FP0, FP Σ or FP-X manual regarding installation and operation.

The FP0-DP Slave unit allows you to connect the FP0, FP Σ or FP-X PLC to PROFIBUS-DP, or it can stand alone as a remote I/O unit.

In the PROFIBUS network it works as an intelligent Slave and controls your process safely, even if communication is interrupted.

This hardware description provides you with all the necessary information on the FP0-DP Slave and its installation. If you need more information about PROFIBUS, please read the PROFIBUS standard *EN 50 170 Volume 2*, or the documentation on your PROFIBUS Master. In addition to this, you will find detailed information about PROFIBUS in the documentation of the PROFIBUS User's Organization.

1.1 FP0-DP Slave Unit Package

The FP0-DP Slave unit package contains:

- one FP0-DP Slave unit
- a 24V DC power cable
- a leaflet providing installation instructions

You can download the NAI50531.gsd file at:
www.panasonic-electric-works.com or www.profibus.com



◆ NOTE

The PROFIBUS-DP network will be configured via the PROFIBUS Master.

2 Parts and Functions

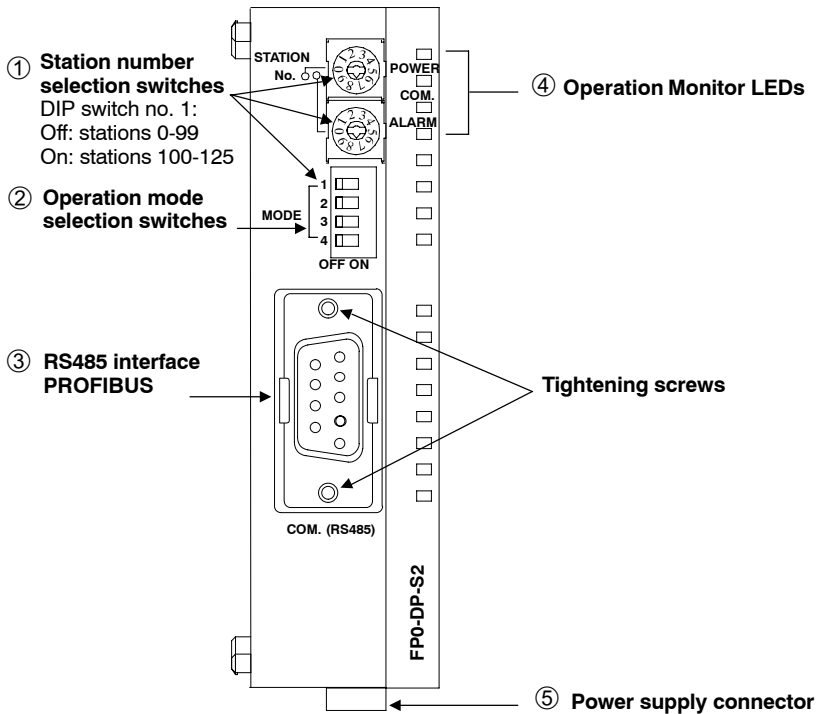


Figure 1: Front view of the FP0 PROFIBUS DP module

1. **Station No.**
Use these two knobs and DIP switch no. 1 to set the station number of the Slave ([see page 4](#)).
2. **Operation mode selection switches**
Use these switches to select the operation mode ([see page 3](#)).
3. **RS485 Interface**
Connect the PROFIBUS Master here ([see page 8](#)).
4. **Operation Monitor LEDs**
They indicate the communication status and operation modes ([see page 9](#)).
5. **Power Supply Connector DC**
Use this to connect the unit with the 24V power supply unit ([see page 7](#)).

3 Installation



Be sure to install the FP0-DP Slave unit in locations designed for electrical equipment, e.g. in a closed metal cabinet such as a switch cabinet.

ATTENTION!

Make sure you are not electrostatically charged before you touch the CPU or one of its units: the discharge of static electricity can damage parts and equipment.

Please read all notes and safety instructions in the FP0, FPΣ or FP-X manual in the section on installation.

Please install the FP0-DP Slave unit in the following order:

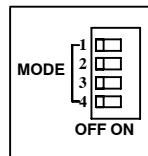


◆ **PROCEDURE**

1. Mount the unit on a DIN rail (see leaflet).
2. Set the PROFIBUS address (see page 4)

Functional description
- Sets the station number of the FP0-DP module.
- The working range is 00-99.

3. Set operation mode selection switch



Switch No.	Function	OFF	ON	
1	Extends PROFIBUS address (see note 1)	Address +0	Address +100	
4	Error flag	No	Yes	
2	3	(see previous columns)		
OFF	OFF			DPS normal
ON	OFF			DPS +1 virtual unit
OFF	ON			DPS +2 virtual units
ON	ON	I/O remote mode		

4. Connect the 24V DC power supply (see page 7)
5. Connect the PROFIBUS via the RS485 interface (see page 8)

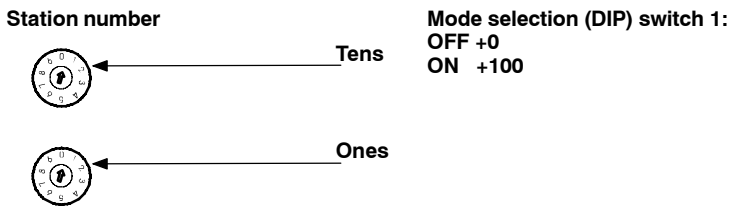


◆ **NOTES**

- 1) When switch 1 is ON, the station address is +100
If the address greater than 125, the alarm LED flashes at 2Hz.
- 2) If the error flag is activated, the most significant bit (i.e. bit 31) is of the two words received is used to indicate an error. Thereby the number of input bits is reduced by 1 to 31.

3.1 Set the Station Address

Use a screw driver to set the station address of the Slave.



All addresses between 0 and 125 are allowed.

If the red LED is flashing at 2Hz, you have set the address improperly.



◆ NOTES

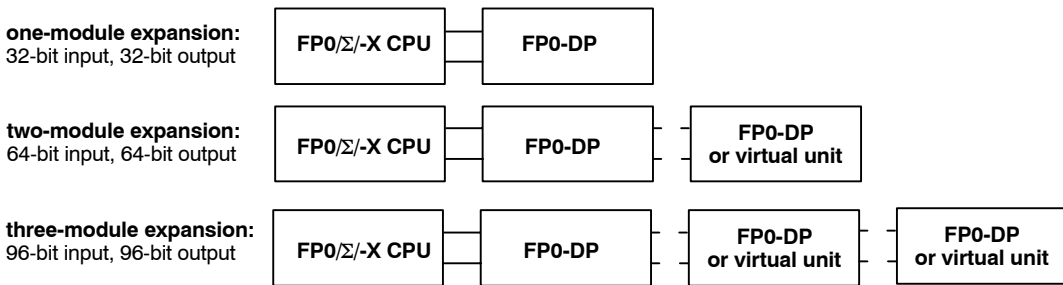
- Switch the power OFF before you reset an address.
- All addresses between 0 and 125 are valid but can only be assigned once in a PROFIBUS network.

3.2 Connecting Units

Please refer to the chapter on installation in the FP0, FPΣ or FP-X manual. The FP0-DP Slave unit can be used in two different ways:

- As a DP Slave connected to an FP0, FPΣ or FP-X CPU.
 - Connect the FP0-DP Slave unit with the CPU as any expansion module. You can connect up to three FP0-DP Slave units to one CPU. Each FP0-DP Slave unit allows 32 bits (2 words) of data to be transferred.
 - You may also connect one FP0-DP Slave unit and one or two virtual units. This allows more data to be transferred without actually having to connect real units!
 - If you install various expansion units, the FP0-DP Slave unit must be the last expansion unit!
- As a remote I/O unit.
 - You may connect up to three expansion modules.

Expansion examples, with CPU (DPS mode):



Software	I/O	FP0-DP Addresses					
		IEC	Phys.	IEC	Phys.	IEC	Phys.
FPWIN GR	Input	–	WX2 WX3	–	WX4 WX5	–	WX6 WX7
	Output	–	WY2 WY3	–	WY4 WY5	–	WY6 WY7
FPWIN Pro	Input	%IW2 %IW3	WX2 WX3	%IW4 %IW5	WX4 WX5	%IW6 %IW7	WX6 WX7
	Output	%QW2 %QW3	WY2 WY3	%QW4 %QW5	WY4 WY5	%QW6 %QW7	WY6 WY7

Expansion example, without CPU (I/O remote mode):



In the PROFIBUS DP Configurator, choose among the expansion units offered: e.g. FP0 A21, FP0 TC4, etc., in the order in which they are installed (from left to right).

3.3 Configuring the System

On the **Slave** side, choose the appropriate dip switch setting (see page 3).

On the **Master** side, use a PROFIBUS configurator to make your settings.

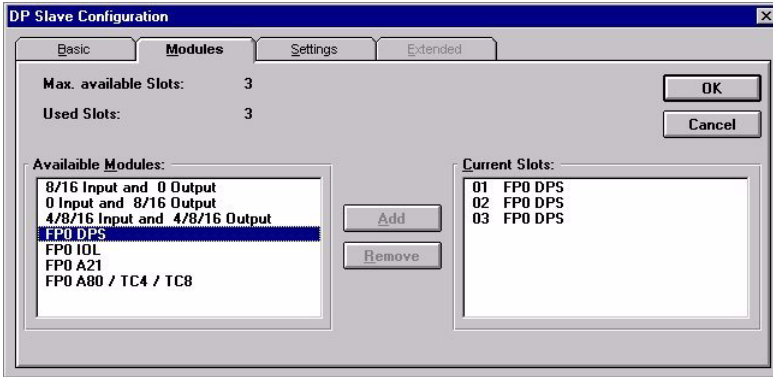


Figure 2: An FP0 and PROFIBUS unit plus 2 virtual units

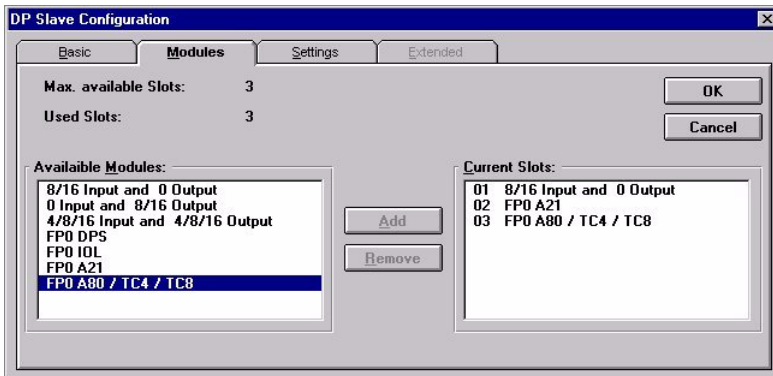


Figure 3: Remote I/O, 3 expansion units

3.4 Connect the Power Supply

The FP0-DP Slave unit and its green POWER LED will turn ON (see page 9) if two conditions are met:

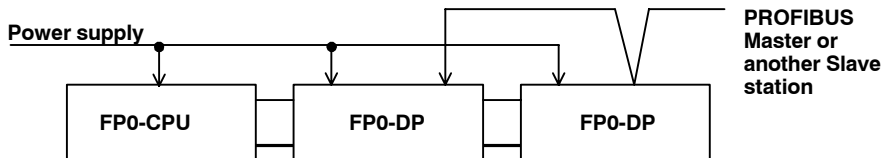
1. the station no. is valid and
2. power supply (24V DC) is connected

If the address is invalid, the red ALARM LED flashes twice per second (2Hz). To reset an invalid address, see page 4.



◆ NOTES

- When connecting the power supply make sure the polarity (+/-) is correct.
- If power is supplied, the green POWER LED will be ON.
- The FP0-DP Slave unit(s) and the PLC or the FP0-DP Slave unit and expansion units have to be supplied by the same power supply unit.



3.5 Connect the PROFIBUS

To connect the PROFIBUS with the FP0-DP Slave unit, use either a ready-made PROFIBUS cable or our accessories:

Accessories	Types	Order No.
2-wire cables 12 MBd	standard cable	PR 2170221T
	underground cable	PR 2170223T
9-Pin SUB-D connector 12 MBd	angled node type	PR 103-648
	straight node type	PR 103-658
	angled closing type	PR 103-649
	straight closing type	PR 103-659
	angled node type with service connector	PR 103-663

Pin assignment of the bus connector:

Pin	Signal	Description
1	Shield	shield and protective earth
2	–	–
3	RxD/TxD-P	+ for received and sent P data
4	–	–
5	DGND	ground for 5V; electric potential for data transfer
6	VP	power supply for the bleeder resistors (P5V)
7	–	–
8	RxD/TxD-N	- for received and sent N data
9	–	–

You need a repeater if you use a 2-wire cable and want to:

- connect more than 32 stations or
- use a bus structure with nodes or
- use a cable with a length that exceeds the allowed value:

Baudrate in kb/s	9.6	19.2	93.75	187.5	500	1500	12000
Cable length (m)	1200	1200	1200	1000	400	200	100

- or you want to use a fiber-optic cable

Matsushita offers the following combi repeaters (repeater with cable and fiber-optic converter 1.5 MBd):

Combi Repeater	Order No.
RS 485 and plastic fiber cable converter	OZD PROFI P4A
RS 485 and glass fiber cable converter	OZD PROFI G4A

4 Unit Status

The unit's status can be determined by observing the behavior of the LEDs: Power, COM and Alarm, as described below.

Power LED	COM LED	Alarm LED	Status
Flashing, 6Hz	OFF	Flashing, 6Hz	Nothing connected to FP0-DPS2 (no PLC, no expansion unit), only power
ON	OFF	Flashing, 6Hz	FP0-DPS2 in DPS virtual mode. FP0-DPS2 is not the first expansion unit and virtual units = 2, i.e. there are more than the max. 3 units allowed
ON	OFF	Flashing, 2Hz	PROFIBUS address > 125
ON	OFF	OFF	DPS mode: PLC connected, no error in configuration, PROFIBUS cable not connected or Master not active
ON	OFF	OFF	Remote I/O mode: min. 1 expansion unit, no error in configuration, PROFIBUS cable not connected or Master not active
ON	OFF	OFF	DPS/Remote I/O mode: Master sent wrong PROFIBUS parameter (PROFIBUS Ext. Diagnosis)*
ON	ON	OFF	DPS mode: PLC connected, no error in configuration, PROFIBUS cable connected, PROFIBUS data exchange, PLC in Prog or Run mode. If PLC is in Prog. mode, the PROFIBUS diagnostic bit, STAT_DIAG, is set
ON	ON	OFF	Remote I/O mode: min. 1 expansion unit, no error in configuration, PROFIBUS cable connected, PROFIBUS data exchange

*PROFIBUS Ext. Diagnostic data

Error code	Hex. No.
DIAG_ERR_PRM_LEN	16#01
DIAG_ERR_PRM_ENTRY	16#02
DIAG_ERR_CFG_LEN	16#04
DIAG_ERR_CFG_ENTRY	16#08

5 FP0-DP Communication Error in DPS Mode

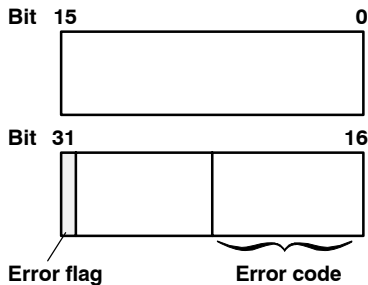
You can check the communication status of the Slave from the FP0 or FPΣ CPU, but only if the Slave's operation mode switch 4 is set to ON. The flag indicates the communication status between the FP0-DP Slave unit and the Master.

Communication status	Normal	Error
FP0-DP-S2 error flag	0	1



◆ NOTES

- If the error flag is activated, the most significant bit (i.e. bit 31) of the two words received is used to indicate an error.



Error code	Hex. No.
ERR_DPRAM	16#03
ERR_SLAVE_ADDRESS	16#04
ERR_Offline	16#05
ERR_MaxModule	16#06
DP_wait_prm	16#10
DP_wait_cfg	16#11
ERR_PRM_FAULT	16#20
ERR_CFG_FAULT	16#21

- **Attention!** If this error flag is ON, the PROFIBUS data is not valid!

6 Reset Into a Safe State

In case of a data exchange error and operation mode switch 4 is ON, bit 32 will be set.

Bit 32	Data exchange
0	successful
1	ERROR

Check the status of bit 32 regularly to avoid the transfer of faulty data.



If bit 32 has the status “1” (TRUE), all relevant outputs have to be reset by the FP0/FPΣ/FP-X to guarantee a safe state. Clear the error and NEVER use data transferred in an error state.

7 Specifications

Item	Description
Order number	FP0DPS2
Field bus standard	EN 50170 Volume 2 DIN 19245: PROFIBUS, Process Field Bus (part 1 and 3)
Baudrate [kBps]	9,600, 19,200, 93,750, 187,500, 500,000, 1500,000, 3,000,000, 6,000,000, 12,000,000 automatic baudrate detection
Address area	0 to 125 (can be set)
PROFIBUS services	supported are the PROFIBUS-DP Slave services: Slave_Diag, Set_Prm, Get_Cfg, Chk_Cfg, Data_Exchange, Global_Control (Sync, Freeze, Clear), RD_Inp, RD_Outp
PROFIBUS connector	9-Pin SUB-D
PROFIBUS terminator	external
FP communication	via FP0 bus
Configuration	32 bit input / 32 bit output
Power supply	24V DC (21.6V - 26.4V DC)
Current consumption	max. 100 mA
Protection class	IP20
Ambient temperature	0 to 55°C
Storage temperature	-20 to 70°C
Ambient humidity	max. 30% to 85% - no condensation allowed
Vibration resistance	10Hz to 55Hz; 1 cycle/min.; double amplitude 0.75mm; 10 min. each X-, Y-, and Z- axis
Shock resistance	min. 10g; 4 times on each (X, Y, Z) axis
Size (mm)	25 x 90 x 60 (LxWxH)
Operating conditions	free of corrosive gases and excessive dust
CE Standard	EMC guidelines 89/336/EEC 1989 <ul style="list-style-type: none"> • EN50081-2; 1993 • EN50082-2; 1995

Record of Changes

Manual No.	Date	Description of Changes
ACGM0123END V1.0 ACGM0123V2.0END	Sept. 2000 August 2003	First edition Second edition FP0-DP unit can now function without being connected to a CPU (remote I/O). Dip switches modified. Configuration possibilities updated.
ACGM0123V2.1END ACGM0123V3EN	May 2007 October 2009	Changeover to Panasonic. FP-X as CPU added. In Specifications, size corrected.

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