



Programmable Controller

MELSEC iQ-F
series

MELSEC iQ-F
FX5 PROFIBUS-DP Master Module User's Manual



-FX5-DP-M

SAFETY PRECAUTIONS

(Read these precautions before use.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.

This manual classifies the safety precautions into two categories: [⚠️ WARNING] and [⚠️ CAUTION].

 WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
 CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Depending on the circumstances, procedures indicated by [⚠️ CAUTION] may also cause severe injury.

It is important to follow all precautions for personal safety.

Store this manual in a safe place so that it can be read whenever necessary. Always forward it to the end user.


[DESIGN PRECAUTIONS]

WARNING

- Make sure to set up the following safety circuits outside the programmable controller to ensure safe system operation even during external power supply problems or programmable controller failure. Otherwise, malfunctions may cause serious accidents.
 - Most importantly, set up the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit to prevent damage (to the equipment at the upper and lower positioning limits).
 - Note that when the CPU module detects an error, such as a watchdog timer error, during selfdiagnosis, all outputs are turned off. Also, when an error that cannot be detected by the CPU module occurs in an input/output control block, output control may be disabled. External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
 - Note that when an error occurs in a relay, transistor or triac of an output circuit, the output might stay on or off. For output signals that may lead to serious accidents, external circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
 - In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
 - For the operating status of each station after a communication failure of the network, refer to relevant manuals for the network. Incorrect output or malfunction may result in an accident.
 - Construct an interlock circuit in the program so that the whole system always operates on the safe side before executing the control (for data change) of the programmable controller in operation. Read the manual thoroughly and ensure complete safety before executing other controls (for program change, parameter change, forcible output and operation status change) of the programmable controller in operation.

Otherwise, the machine may be damaged and accidents may occur due to erroneous operations.
 - Especially, in the case of a control from an external device to a remote programmable controller, immediate action cannot be taken for a problem on the programmable controller due to a communication failure. Determine the handling method as a system when communication failure occurs along with configuration of interlock circuit on a program, by considering the external equipment and CPU module.
-

WARNING

- Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Executing data writing to the "system area" or "write protect area" may cause malfunction of the programmable controller alarm. For the "system area" and "write-protect area", refer to  Page 124 Buffer Memory.
 - If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Construct an interlock circuit in the program so that the system always operates on the safe side even if communications fail. Incorrect output or malfunction may result in an accident.
-

[DESIGN PRECAUTIONS]

CAUTION

- Do not bundle the control lines or communication cables together with or lay them close to the main circuit or power line. As a guideline, lay the control line and communication cables at least 100 mm away from the main circuit or power line. Failure to do so may result in malfunction due to noise.
 - When an inductive load such as a lamp, heater, or solenoid valve is controlled, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Take proper measures so that the flowing current does not exceed the value corresponding to the maximum load specification of the resistance load.
 - After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size.
Design circuits so that the entire system will always operate safely, regardless of the time.
 - Simultaneously turn on and off the power supplies of the CPU module and extension modules.
 - If a long-time power failure or an abnormal voltage drop occurs, the programmable controller stops, and output is turned off. When the power supply is restored, it will automatically restart (when the RUN/STOP/RESET switch is on RUN side).
-

[Security Precautions]

WARNING

- To maintain the security (confidentiality, integrity, and availability) of the programmable controller and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from unreliable networks and devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.
-

[INSTALLATION PRECAUTIONS]

WARNING

- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
- Use the product within the generic environment specifications described in the User's Manual (Hardware) for the CPU module used.

Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl₂, H₂S, SO₂ or NO₂), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind.

If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.

[INSTALLATION PRECAUTIONS]

CAUTION

- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.
 - When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits of the programmable controller. Failure to do so may cause fire, equipment failures or malfunctions.
 - For product supplied together with a dust proof sheet, the sheet should be affixed to the ventilation slits before the installation and wiring work to prevent foreign objects such as cutting and wiring debris.
However, when the installation work is completed, make sure to remove the sheet to provide adequate ventilation. Failure to do so may cause a fire, equipment failure, or malfunctions.
 - Install the product on a flat surface. If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.
 - Install the product securely using a DIN rail or mounting screws.
 - Work carefully when using a screwdriver such as installation of the product. Failure to do so may cause damage to the product or an accident.
 - Connect the extension cables, peripheral device cables, input/output cables and battery connecting cable securely to their designated connectors. Loose connections may cause malfunctions.
 - Turn off the power to the programmable controller before attaching or detaching the following devices. Failure to do so may cause equipment failures or malfunctions.
 - Peripheral devices, extension board, extension adapter, and connector conversion adapter
 - Extension modules, bus conversion module, and connector conversion module
 - Battery
-

[WIRING PRECAUTIONS]

WARNING

- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
 - Make sure to attach the terminal cover, provided as an accessory, before turning on the power or initiating operation after installation or wiring work. Failure to do so may cause electric shock.
 - Make sure to wire the screw terminal block in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the User's Manual (Hardware) of the CPU module used.
 - Tightening torque should follow the specifications in the User's Manual (Hardware) of the CPU module used.
 - Tighten the screws using a Phillips-head screwdriver No.2 (shaft diameter 6 mm or less). Make sure that the screwdriver does not touch the partition part of the terminal block.
-

[WIRING PRECAUTIONS]

CAUTION

- Perform class D grounding (grounding resistance: 100 Ω or less) of the grounding terminal on the CPU module and extension modules with a wire 2 mm² or thicker.
Do not use common grounding with heavy electrical systems (refer to the User's Manual (Hardware) of the CPU module used).
 - Connect the power supply wiring to the dedicated terminals described in this manual. If an AC power supply is connected to a DC input/output terminal or DC power supply terminal, the programmable controller will burn out.
 - Do not wire vacant terminals externally. Doing so may cause damage to the product.
 - Install module so that excessive force will not be applied to terminal blocks, power connectors, I/O connectors, communication connectors, or communication cables. Failure to do so may result in wire damage/breakage or programmable controller failure.
 - Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to malfunction of the programmable controller caused by abnormal data written to the programmable controller due to the effects of noise.
 - Do not bundle the power line, control line, and communication cables together with or lay them close to the main circuit, high-voltage line, load line, or power line. As a guideline, lay the power line, control line and connection cables at least 100 mm away from the main circuit, high-voltage line, load line or power line.
 - Ground the shield of the shield wire or shielded cable at one point on the programmable controller. However, do not use common grounding with heavy electrical systems.
 - Use a cable dedicated for the PROFIBUS system. Otherwise, the performance of the PROFIBUS system cannot be guaranteed. Also, for the total extension length of the cables and cable length between stations, make sure to follow the specifications described in this manual. If wiring not in accordance with the specifications is performed, normal data transmission cannot be guaranteed.
 - Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.
-

[STARTUP AND MAINTENANCE PRECAUTIONS]

WARNING

- Do not touch any terminal while the programmable controller's power is on. Doing so may cause electric shock or malfunctions.
 - Before cleaning or retightening terminals, cut off all phases of the power supply externally. Failure to do so in the power ON status may cause electric shock.
 - Before modifying the program in operation, forcible output, running or stopping the programmable controller, read through this manual carefully, and ensure complete safety. An operation error may damage the machinery or cause accidents.
 - Do not change the program in the programmable controller from two or more peripheral equipment devices at the same time. (i.e. from an engineering tool and a GOT) Doing so may cause destruction or malfunction of the programmable controller program.
-

[STARTUP AND MAINTENANCE PRECAUTIONS]

CAUTION

- Do not disassemble or modify the programmable controller. Doing so may cause fire, equipment failures, or malfunctions.
For repair, contact your local Mitsubishi Electric representative.
 - Turn off the power to the programmable controller before connecting or disconnecting any extension cable. Failure to do so may cause equipment failures or malfunctions.
 - Turn off the power to the programmable controller before attaching or detaching the following devices. Failure to do so may cause equipment failure or malfunction.
 - Peripherals, extension board, extension adapter, and connector conversion adapter
 - Extended module, bus conversion module, and connector conversion module
 - Battery
-

[OPERATION PRECAUTIONS]

CAUTION

- Construct an interlock circuit in the program so that the whole system always operates on the safe side before executing the control (for data change) of the PLC in operation. Read the manual thoroughly and ensure complete safety before executing other controls (for program change, parameter change, forcible output and operation status change) of the PLC in operation. Otherwise, the machine may be damaged and accidents may occur by erroneous operations.
 - Note that the whole system may not be reset by the RUN/STOP/RESET switch when the CPU module or intelligent function module detects an error, such as a watchdog timer error, during self-diagnosis. In that case, turn off and on the power.
-

[DISPOSAL PRECAUTIONS]

CAUTION

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.
-

[TRANSPORTATION PRECAUTIONS]

CAUTION

- The programmable controller is a precision instrument. During transportation, avoid impacts larger than those specified in the general specifications described in the User's Manual (Hardware) of the CPU module used by using dedicated packaging boxes and shock-absorbing palettes. Failure to do so may cause failures in the programmable controller. After transportation, verify operation of the programmable controller and check for damage of the mounting part, etc.
-

INTRODUCTION

This manual contains text, diagrams and explanations which will guide the reader in the correct installation, safe use and operation of the PROFIBUS-DP master module of MELSEC iQ-F series and should be read and understood before attempting to install or use the module.

Always forward it to the end user.

Regarding use of this product

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Note

- If in doubt at any stage during the installation of the product, always consult a professional electrical engineer who is qualified and trained in the local and national standards. If in doubt about the operation or use, please consult the nearest Mitsubishi Electric representative.
- Since the examples indicated by this manual, technical bulletin, catalog, etc. are used as a reference, please use it after confirming the function and safety of the equipment and system. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- This manual content, specification, etc. may be changed, without a notice, for improvement.
- The information in this manual has been carefully checked and is believed to be accurate; however, if you notice a doubtful point, an error, etc., please contact the nearest Mitsubishi Electric representative. When doing so, please provide the manual number given at the end of this manual.

CONTENTS

SAFETY PRECAUTIONS	1
INTRODUCTION	7
RELEVANT MANUALS	11
TERMS	11
GENERIC TERMS AND ABBREVIATIONS	12
CHAPTER 1 DESCRIPTION	13
CHAPTER 2 SPECIFICATIONS	15
2.1 General Specifications	15
2.2 Power Supply Specifications	15
2.3 Performance Specifications	16
2.4 Part Names	17
LED display	17
CHAPTER 3 PROCEDURES UP TO OPERATION	18
CHAPTER 4 FUNCTIONS	20
4.1 Function List	20
4.2 PROFIBUS-DPV0	21
Data exchange function	21
Acquisition of diagnostic information and extended diagnostic information	23
Global control function	25
4.3 PROFIBUS-DPV1	28
Acyclic communication function	28
Alarm acquisition function	30
4.4 Data Swap Function	32
4.5 Data Consistency Function	33
4.6 Output Setting Function for CPU Stop Error	35
4.7 Temporarily Reserved Station Specification Function	37
CHAPTER 5 SYSTEM CONFIGURATION	38
5.1 Configuration of PROFIBUS-DP network	38
5.2 Available Software Packages	42
CHAPTER 6 WIRING	43
6.1 Connectors	43
6.2 Wiring Products	45
CHAPTER 7 PARAMETER SETTINGS	46
7.1 Setting Parameters	46
7.2 Module Parameter	47
7.3 PROFIBUS Module Setting	48
7.4 Update of PROFIBUS Labels	48
7.5 Writing Parameters	48
CHAPTER 8 PROFIBUS Configuration Tool	49
8.1 Window Structure	49

8.2	"PROFIBUS Configurator Tasks" Window	50
	Online Tasks	51
	Setup Tasks	56
	Export Tasks	69
	Import Tasks	71
	Documentation	72
	Diagnostics	74
	Version	78
8.3	"PROFIBUS Network" window	79
	Master Settings	81
	Bus Parameter Settings	83
	CPU Device Access	84
	Slave Settings	85
8.4	Checking the Software Version	91
CHAPTER 9 PROGRAMMING		92
9.1	System Configuration Example	92
9.2	DP-Master settings	93
9.3	Settings for DP-Slaves	99
9.4	Checking the Network Status	99
9.5	Program Example of Data Exchange Function	100
9.6	Program Example of the Diagnostic Information Acquisition Function	101
9.7	Program Example of the Acquisition Function of Extended Diagnostic Information	102
9.8	Program Example of the Global Control Function	103
9.9	Program Example of Acyclic Communication (Acyclic Communication)	107
9.10	Program Example of the Alarm Acquisition Function	109
CHAPTER 10 TROUBLESHOOTING		111
10.1	Checking with LED	111
10.2	Checking the Network Status	112
	Checking with PROFIBUS Configuration Tool	112
	Checking with the buffer memory	112
10.3	Troubleshooting by Symptom	113
10.4	List of Error Codes	114
10.5	List of Status Codes	115
APPENDIX		121
Appendix 1 External Dimensions		121
Appendix 2 Standards		122
	Certification of UL, cUL standards	122
	Compliance with EU Directive (CE marking)	122
	Requirement for compliance with EMC Directive	122
	Caution for compliance with EU Directive	123
	Requirement for compliance with EMC directive	123
Appendix 3 Buffer Memory		124
	List of buffer memory addresses	124
	Details of buffer memory addresses	126
Appendix 4 Processing Time		162
	Bus cycle time	162
	Transmission delay time	164

INDEX

166

REVISIONS	168
WARRANTY	169
TRADEMARKS	170

RELEVANT MANUALS

Manual name <manual number>	Description
MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware) <SH-082452ENG>	Describes the details of hardware of the FX5 CPU module, including performance specifications, wiring, installation, and maintenance.
MELSEC iQ-F FX5 User's Manual (Application) <JY997D55401>	Describes the basic knowledge required for program design, functions of the CPU module, devices/labels, and parameters.
MELSEC iQ-F FX5 Programming Manual (Program Design) <JY997D55701>	Describes the specifications of ladders, ST, FBD/LD, and other programs and labels.
MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) <JY997D55801>	Describes the specifications of instructions and functions that can be used in programs.
MELSEC iQ-F FX5 PROFIBUS-DP Master Module User's Manual <SH-081910ENG> (This manual)	Describes the functions of the PROFIBUS-DP master module.
GX Works3 Operating Manual <SH-081215ENG>	Describes the system configuration, parameter settings, and online operations of GX Works3.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Device	A device (X, Y, M, D, or others) in a CPU module
Diagnostic information	Diagnostic information of PROFIBUS-DP detected from DP-Master or notified from DP-Slave.
DP-Master (Class 1)	A device that exchanges I/O data with DP-Slaves.
DP-Master (Class 2)	A device that communicates with DP-Slaves to check the FDL address setting and the operating status. This device can perform start-up, maintenance, and diagnosis of the network as the DP-Master for the network control.
DP-Slave	A device that exchanges I/O data with DP-Master.
Engineering tool	The product name of the software package for the MELSEC programmable controllers
Extended diagnostic information	Diagnostic information of each DP-Slave. DP-Slave notifies an error detection to DP-Master.
FDL address	The number is assigned to DP-Master and each DP-Slave. Set the range of 0 to 125.
Global control function	This function is to send the synchronization command for I/O data from DP-Master (Class 1) to DP-Slave.
GSD database	The database that batch manages information of the module with registered GSD file Use when the module is set with PROFIBUS Configuration Tool.
GSD file	The file that is written the parameter of DP-Slave. Use when the slave parameter is set with PROFIBUS Configuration Tool.
Ident No.	The number of each module to connect PROFIBUS-DP network. The number is written to GSD file of each module.
Label	A label that represents a device in a given character string
Module label	A label that represents one of memory areas (I/O signals and buffer memory areas) specific to each module in a given character string. For the module used, GX Works3 automatically generates this label, which can be used as a global label.
PROFIBUS-DPV0	Basic version of PROFIBUS-DP that is configured by the following basic functions. <ul style="list-style-type: none"> • Acquisition of diagnostic information and extended diagnostic information • Global control function
PROFIBUS-DPV1	Version of PROFIBUS-DP that contains the following functions in addition to the basic functions of PROFIBUS-DPV0. <ul style="list-style-type: none"> • Acyclic communication function • Alarm acquisition function
Repeater	A device that connects segments of the PROFIBUS-DP network.

GENERIC TERMS AND ABBREVIATIONS

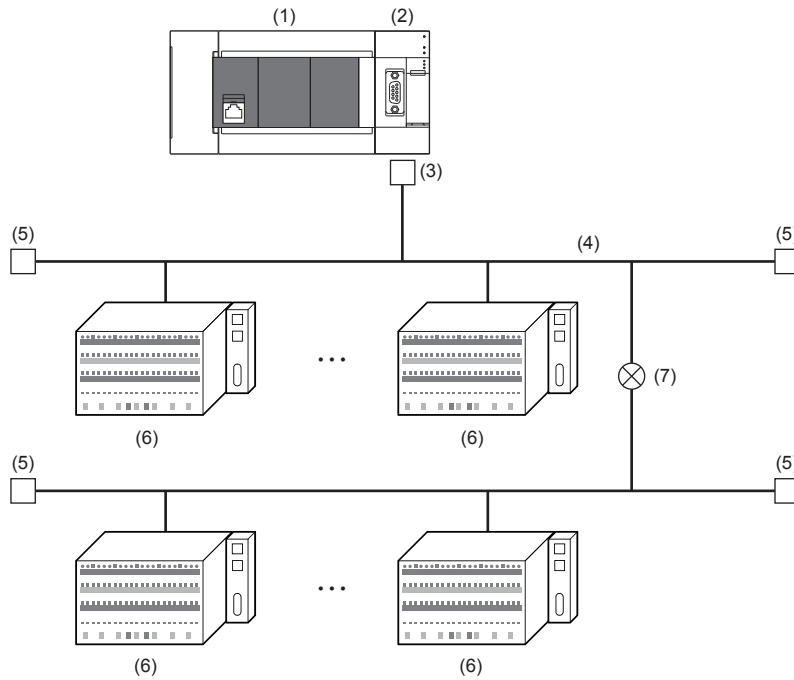
Unless otherwise specified, this manual uses the following generic terms and abbreviations.

Generic term/abbreviation	Description
ACK	The abbreviation for ACKnowledgement. This signal is sent to inform the sending side that the data transfer has been normally completed.
DP-Master	Different name for DP-Master (Class 1).
FX5	Generic term for FX5UJ, FX5U and FX5UC PLCs
FX5 CPU module	Generic term for FX5UJ CPU module, FX5U CPU module and FX5UC CPU module
FX5U CPU module	Generic term for FX5U-32MR/ES, FX5U-32MT/ES, FX5U-32MT/ESS, FX5U-64MR/ES, FX5U-64MT/ES, FX5U-64MT/ESS, FX5U-80MR/ES, FX5U-80MT/ES, FX5U-80MT/ESS, FX5U-32MR/DS, FX5U-32MT/DS, FX5U-32MT/DSS, FX5U-64MR/DS, FX5U-64MT/DS, FX5U-64MT/DSS, FX5U-80MR/DS, FX5U-80MT/DS, and FX5U-80MT/DSS
FX5UC CPU module	Generic term for FX5UC-32MT/D, FX5UC-32MT/DSS, FX5UC-64MT/D, FX5UC-64MT/DSS, FX5UC-96MT/D, FX5UC-96MT/DSS, FX5UC-32MT/DS-TS, FX5UC-32MT/DSS-TS, and FX5UC-32MR/DS-TS
FX5UJ CPU module	Generic term for FX5UJ-24MR/ES, FX5UJ-24MT/ES, FX5UJ-24MT/ESS, FX5UJ-24MR/DS, FX5UJ-24MT/DS, FX5UJ-24MT/DSS, FX5UJ-40MR/ES, FX5UJ-40MT/ES, FX5UJ-40MT/ESS, FX5UJ-40MR/DS, FX5UJ-40MT/DS, FX5UJ-40MT/DSS, FX5UJ-60MR/ES, FX5UJ-60MT/ES, FX5UJ-60MT/ESS, FX5UJ-60MR/DS, FX5UJ-60MT/DS, and FX5UJ-60MT/DSS
GX Works3	The product name of the software package, SWnDND-GXW3, for the MELSEC programmable controllers (The 'n' represents a version.)

1 DESCRIPTION

FX5-DP-M type PROFIBUS-DP master module (hereinafter referred to as FX5-DP-M) is an intelligent function module for connecting to a PROFIBUS-DP network as a master station.

In the FX5 CPU module and FX5-DP-M, the data can be read/written by the FROM/TO instruction. Also, by using Autorefresh, the data can be automatically transferred to the CPU module of the device and used in the sequence program.



- (1) FX5 CPU module
- (2) FX5-DP-M
- (3) PROFIBUS connector
- (4) PROFIBUS cable
- (5) BUS terminator
- (6) PROFIBUS slave station
- (7) Repeaters

MEMO

2 SPECIFICATIONS

This section describes the specifications of FX5-DP-M.

2.1 General Specifications

General specifications other than the following are the same as the CPU module to be connected.

Refer to the following manual for general specifications.

 MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware)

Item	Specifications	
Dielectric withstand voltage	500 V AC for 1 minute	Between all terminals and frame of communication connector
Insulation resistance	10 M Ω or higher with 500 V DC insulation resistance tester	

2.2 Power Supply Specifications

Shows power supply specifications.

Item	Specifications	
Internal power supply	Power-supply voltage	24 V DC
	Current consumption	150 mA

2.3 Performance Specifications

Shows performance specifications of FX5-DP-M.

Item		Description
PROFIBUS-DP station type		DP-Master (Class 1)
Transmission specifications	Electrical standard and characteristics	Compliant with EIA-RS485
	Medium	Shielded twisted pair cable (☞ Page 43 Wiring for PROFIBUS cable)
	Network configuration	Bus topology (or tree topology when repeaters are used)
	Data link method	<ul style="list-style-type: none"> Between DP-Masters: Token passing Between DP-Master and DP-Slave: Polling
	Encoding method	NRZ
	Transmission speed ^{*1}	9.6 kbps, 19.2 kbps, 93.75 kbps, 187.5 kbps, 500 kbps, 1.5 Mbps, 3 Mbps, 6 Mbps, 12 Mbps
	Transmission distance	Differs depending on the transmission speed. (☞ Page 16 Transmission distance)
	Max. No. of repeaters (Between DP-Master and DP-Slave)	3 repeaters
	No. of connectable modules (per segment)	32 per segment (including repeaters)
	Max. No. of DP-Slaves	64 (☞ Page 38 Configuration of PROFIBUS-DP network)
	No. of connectable nodes (No. of repeaters)	32, 62(1), 92(2), 122(3), 126(4)
Transmittable data	Input data	Max. of 2048 bytes (Max. of 244 bytes per DP-Slave)
	Output data	Max. of 2048 bytes (Max. of 244 bytes per DP-Slave)
No. of occupied I/O points		8 points
Applicable CPU module		<ul style="list-style-type: none"> FX5UJ CPU module (From the first) FX5U CPU module (Ver.1.110 or later) FX5UC CPU module^{*2} (Ver.1.110 or later)
Applicable engineering tool		<ul style="list-style-type: none"> FX5UJ CPU module: GX Works3 (Ver.1.060N or later), PROFIBUS Configuration Tool (Ver.1.03D or later) FX5U/FX5UC CPU module: GX Works3 (Ver.1.050C or later), PROFIBUS Configuration Tool (Ver.1.02C or later)
No. of connectable units		1 unit

*1 Transmission speed accuracy is within $\pm 0.2\%$ (compliant with IEC61158-2).

*2 FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-DP-M to the FX5UC CPU module.

Transmission distance

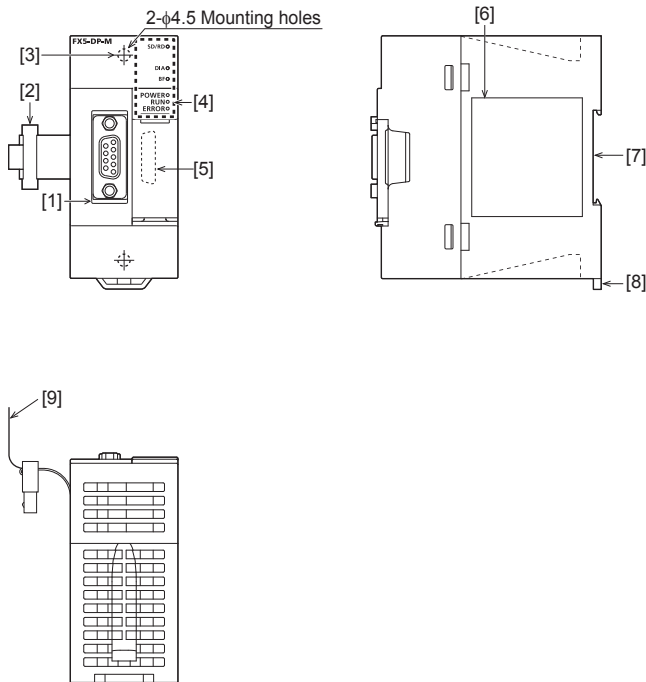
Transmission speed	Transmission distance	Maximum transmission distance when repeaters are used ^{*1}
9.6 kbps	1200 m/segment	4800 m/network
19.2 kbps		
93.75 kbps		
187.5 kbps	1000 m/segment	4000 m/network
500 kbps	400 m/segment	1600 m/network
1.5 Mbps	200 m/segment	800 m/network
3 Mbps	100 m/segment	400 m/network
6 Mbps		
12 Mbps		

*1 The maximum transmission distance shown in the above table indicates the distance when three repeaters are used. To calculate the maximum transmission distance when repeaters are used and the transmission distance is extended, use the following formula.

Maximum transmission distance [m/network] = (Number of repeaters + 1) × Transmission distance [m/segment]

2.4 Part Names

Shows the name of each section of the FX5-DP-M.



No.	Name	Description
[1]	PROFIBUS-DP interface connector	This connector connects a cable for PROFIBUS-DP network. (9-pin D-Sub connector: #4-40 UNC inch screw)
[2]	Extension cable	Cable for connecting the module when adding the FX5-DP-M.
[3]	Direct mounting hole	Screw holes (2-φ4.5, mounting screw: M4 screw) for direct installation
[4]	Operation status display LEDs	Indicates the operating status of the module. (Page 17 Transmission distance)
[5]	Extension connector	Connector for connecting the extension cable of an extension module.
[6]	Name plate	The product model name and manufacturer's serial number are shown.
[7]	DIN rail mounting groove	The module can be installed on DIN46277 rail (35 mm wide).
[8]	DIN rail mounting hook	Hook for mounting the module on a DIN rail of DIN46277 (35 mm wide).
[9]	Pullout tab	They are used when drawing out an extension cable.

LED display

LED name	LED color	Description
SD/RD	Green	Indicates the communication status with DP-Slaves. On or flashing: During data exchange, or Acyclic communication.*1 Off: During data exchange stop.
DIA	Red	Indicates the diagnostic information and the alarm detected. On: Diagnostic information or alarm is detected. Off: No diagnostic information and no alarm.
BF	Red	Indicates the occurrence of a communication error. On: Diagnostic information is detected. Off: No diagnostic information.
POWER	Green	Indicates the power supply status. On: Power on Off: Power off or module failure
RUN	Green	Indicates the operating status. On: Normal operation Off: Error
ERROR	Red	Indicates the error status. On: Minor error or major error Flashing: Moderate error or major error Off: Normal operation

*1 Flashes when the module requests or responds to the Acyclic communication.

3 PROCEDURES UP TO OPERATION

This chapter describes the procedures before operation.

1. Check of FX5-DP-M specifications

Check the FX5-DP-M specifications. (☞ Page 15 SPECIFICATIONS)

2. Installation of FX5-DP-M

Install an FX5-DP-M to a CPU module. For details, refer to the following.

📖 MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware)

3. Wiring

Perform wiring of external devices to an FX5-DP-M.

4. Adding a module

Add an FX5-DP-M to a module configuration by using GX Works3.

5. Parameter settings

Set parameters of the FX5-DP-M by using PROFIBUS Configuration Tool and GX Works3.

6. Programming

Create a program. (☞ Page 92 PROGRAMMING)

4 FUNCTIONS

4.1 Function List

The following table lists the functions of the FX5-DP-M.

Function		Description	Reference
PROFIBUS-DPV0	Data exchange function	Performs data exchange of up to 2048 bytes by connecting up to 64 DP-Slaves to one FX5-DP-M.	Page 21
	Acquisition of diagnostic information and extended diagnostic information	Acquires the diagnostic information and the extended diagnostic error information occurring in DP-Slaves during data exchange using buffer memory.	Page 23
	Global control function	Sends service (SYNC, UNSYNC, FREEZE, UNFREEZE) to each DP-Slave in a group, and synchronously controls I/O data of DP-Slaves.	Page 25
PROFIBUS-DPV1	Acyclic communication function	Reads/writes data from/to DP-Slaves at a different timing from the data exchange.	Page 28
	Alarm acquisition function	Acquires up to eight items of the alarm or status information occurring in a DP-Slave.	Page 30
Data swap function		Swaps upper and lower bytes in units of words when I/O data is sent/received.	Page 32
Data consistency function		Maintains consistency of I/O data of DP-Slaves when it is read/written from/to the buffer memory.	Page 33
Output status setting function for CPU stop error		Sets whether to stop or continue the data exchange with DP-Slaves when a CPU stop error occurs in the CPU module to which the FX5-DP-M is mounted.	Page 35
Temporarily reserved station specification function		Temporarily changes a DP-Slave to a reserved station without changing slave parameters of PROFIBUS Configuration Tool.	Page 37

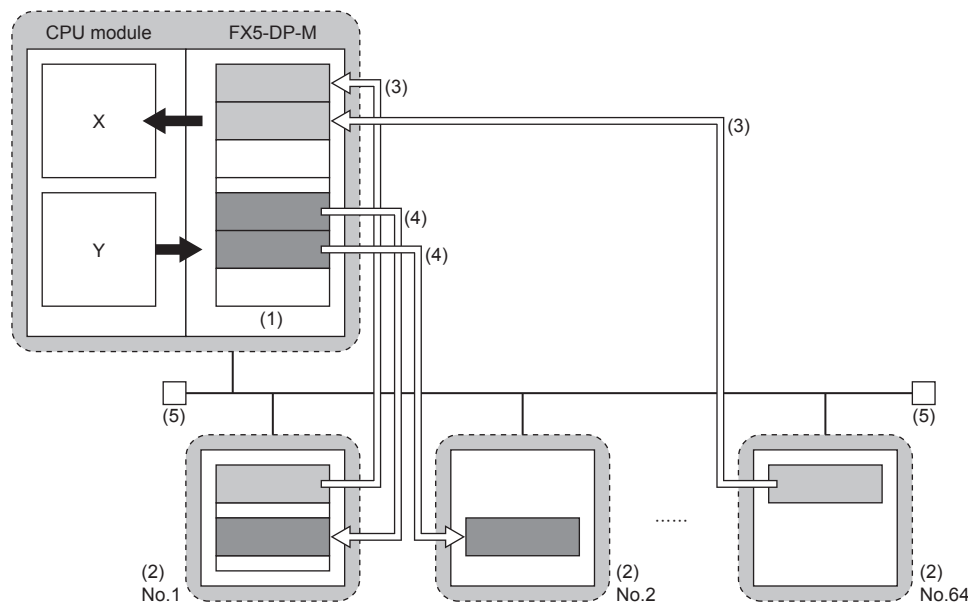
4.2 PROFIBUS-DPV0

The following PROFIBUS-DPV0 functions are available on the FX5-DP-M.

Function	Reference
Data exchange function	Page 21
Acquisition of diagnostic information and extended diagnostic information	Page 23
Global control function	Page 25

Data exchange function

This function enables this module to work as DP-Master (Class 1) of PROFIBUS-DP and exchange data with DP-Slaves. A maximum of 64 DP-Slaves can be connected to one FX5-DP-M and they can exchange data of a maximum of 2048 bytes.



- (1) Buffer memory
- (2) DP-Slave
- (3) Input data
- (4) Output data
- (5) Bus terminator

Reading/Writing I/O data from/to the CPU module

■ Buffer Memory

I/O data are read/written between the devices of the CPU module and the buffer memory of the FX5-DP-M.

- Input data: 'Input data area' (Un\G6144 to Un\G7167)
- Output data: 'Output data area' (Un\G14336 to Un\G15359)

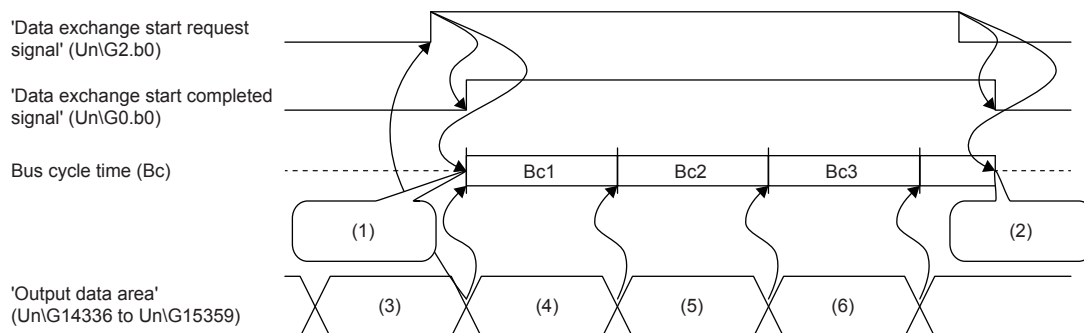
■ Read/write method

I/O data are read/written between the devices of the CPU module and the buffer memory of the FX5-DP-M by using one of the following methods.

Item	Method	Data consistency
Refresh Setting	PROFIBUS Configuration Tool	Available
MOV instruction or FROM/TO instructions	Program	Unavailable

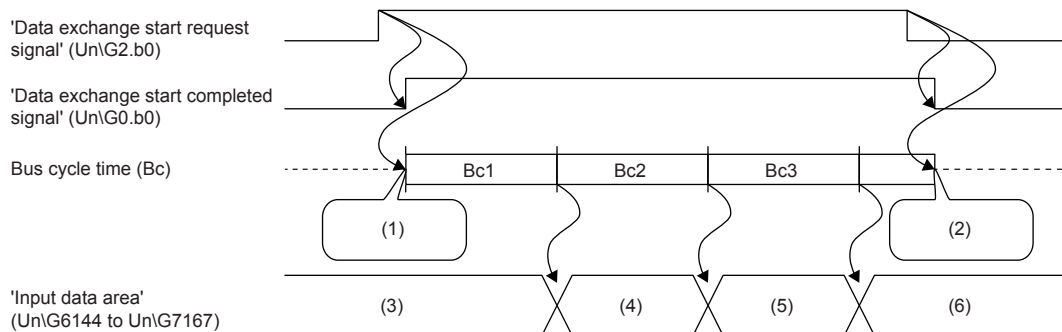
Data exchange starts and stops

1. Write the initial values of output data to 'Output data area' (Un\G14336 to Un\G15359).
(☞ Page 137 Output data area)
 2. Turn on 'Data exchange start request signal' (Un\G2.b0).
 3. Turn on 'Data exchange start request signal' (Un\G2.b0) and data exchange starts, 'Data exchange start completed signal' (Un\G0.b0) turns on.
 4. The input data from the DP-Slaves are stored in 'Input data area' (Un\G6144 to Un\G7167).
 5. Turn off 'Data exchange start request signal' (Un\G2.b0), 'Data exchange start completed signal' (Un\G0.b0) turns off, and the data exchange stops.
- Output data communication



- (1) Data exchange starts
- (2) Data exchange stops
- (3) Output data at Bc1 (initial value)
- (4) Output data at Bc2
- (5) Output data at Bc3
- (6) Output data at Bc4

- Input data communication



- (1) Data exchange starts
- (2) Data exchange stops
- (3) Data from the last data exchange
- (4) Input data at Bc1
- (5) Input data at Bc2
- (6) Input data at Bc3



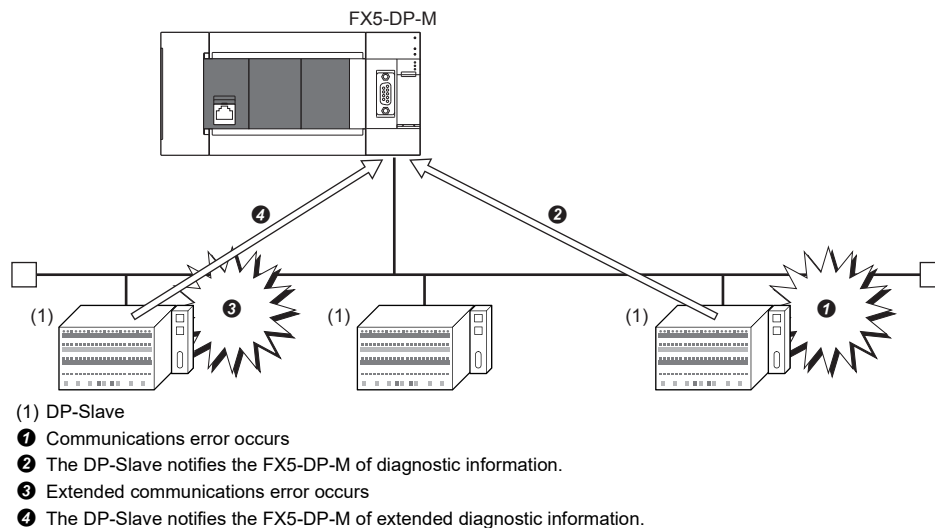
For a program example of the data exchange function, refer to the following.

☞ Page 100 Program Example of Data Exchange Function

Acquisition of diagnostic information and extended diagnostic information

This function enables acquisition of diagnostic information and extended diagnostic information generated at DP-Slaves during data exchange by using the buffer memory.

An error causes in the DP-Slaves can be checked with the diagnostic information and extended diagnostic information on the FX5-DP-M.



Procedure for acquisition of diagnostic information/extended diagnostic information

The procedure for acquisition of diagnostic information and extended diagnostic information is as follows.

1. Check if diagnostic information is generated.
 - BF LED turns on.
 - 'Diagnostic information detection signal' (Un\G0.b1) turns on.
2. Check which DP-Slave sent the diagnostic information.
 - (☞ Page 23 How to check DP-Slaves with communications errors)
3. Acquire the diagnostic information sent from the DP-Slave from the buffer memory of the FX5-DP-M.
 - (☞ Page 23 Acquisition of diagnostic information)
4. Check whether that occurrence of extended diagnostic information has been notified from DP-Slave.
 - (☞ Page 24 How to check if extended diagnostic occurs)
5. If the DP-Slave has extended diagnostic information stored in it, acquire the information from the DP-Slave.
 - (☞ Page 24 Acquisition of extended diagnostic information from DP-Slaves)
6. Check the diagnostic information and extended diagnostic information for the error cause and take necessary action.

How to check DP-Slaves with communications errors

Diagnostic information detection status of DP-Slaves is stored in 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060).

For stations that sent diagnostic information, the relevant bit of 'Each station's diagnostic status' (Un\G23057 to Un\G23060) is turned on.

Acquisition of diagnostic information

Acquire diagnostic information of DP-Slaves from the following buffer memory area. (☞ Page 142 Diagnostic information area)

- 'Diagnostic information area' (Un\G23072 to Un\G23199)

Acquisition of extended diagnostic information

■How to check if extended diagnostic occurs

To check if extended diagnostic information is stored in DP-Slaves, check the status 1 information on DP-Slave stored in 'Diagnostic information area' (Un\G23072 to Un\G23199).

For the first DP-Slave, check b11 of 'Diagnostic information area (1st station)' (Un\G23073).

■Acquisition of extended diagnostic information from DP-Slaves

Acquire extended diagnostic information by the following procedure.

1. Write the FDL address for the DP-Slave from which to acquire extended diagnostic information to 'Extended diagnostic information read request area' (Un\G23456). (👉 Page 144 Extended diagnostic information read request area)
2. Turn on 'Extended diagnostic information read request signal' (Un\G2.b6).
3. After reading the extended diagnostic information is complete, 'Extended diagnostic information read response signal' (Un\G0.b6) turns on and the extended diagnostic information is stored in 'Extended diagnostic information read response area' (Un\G23457 to Un\G23583).
4. After checking the acquired extended diagnostic information, turn off 'Extended diagnostic information read request signal' (Un\G2.b6).

Point

- The latest extended diagnostic information generated during data exchange is stored in the buffer memory of the FX5-DP-M. To check the latest extended diagnostic information, acquire it from the following buffer memory area.

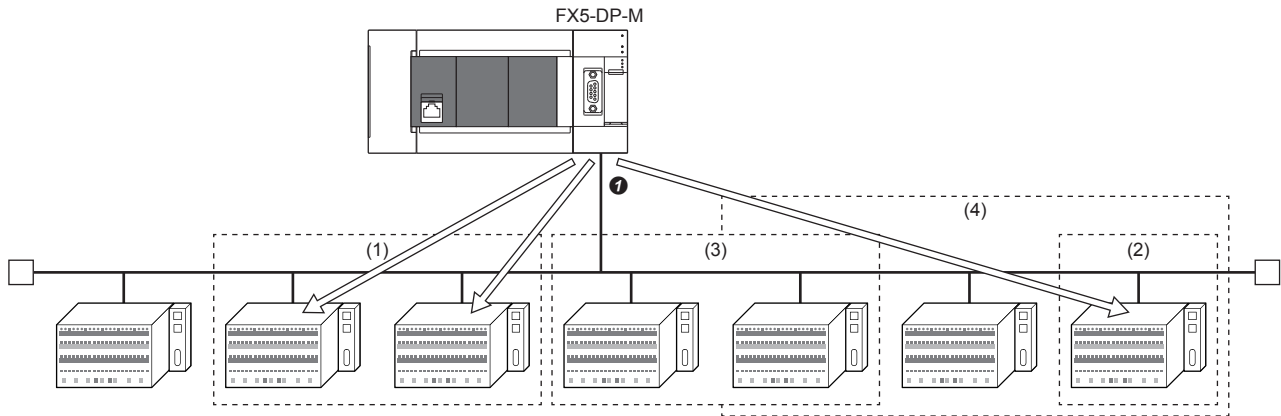
'Extended diagnostic information area' (Un\G23328 to Un\G23454)

- For a program example of acquisition of extended diagnostic information, refer to the following.

👉 Page 101 Program Example of the Diagnostic Information Acquisition Function

Global control function

This function enables controlling I/O data of DP-Slaves synchronously for each specified group by multicast (broadcast communications) from the FX5-DP-M.



- (1) Group 1
- (2) Group 2
- (3) Group 5
- (4) Group 8
- ❶ Multicast (Broadcast communications)

Precautions

The global control function cannot execute with the Acyclic communication function.

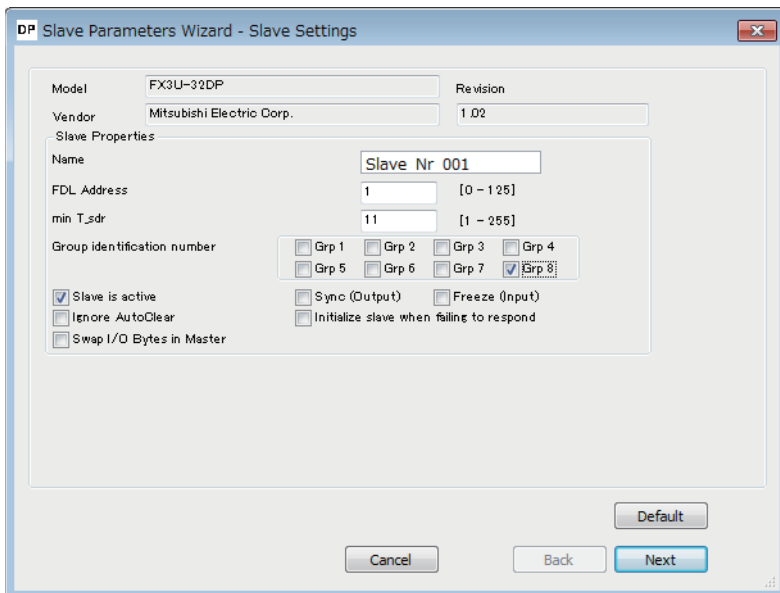
Configuring groups

Configure groups by the "Group identification number" in the "Slave Settings" window of PROFIBUS Configuration Tool.

(👉 Page 85 Slave Settings)

A maximum of eight groups, or group 1 to 8, are available.

One DP-Slave can be assigned with multiple groups.



Global control function services

Specify which service is applied to which group through the buffer memory.

■SYNC service

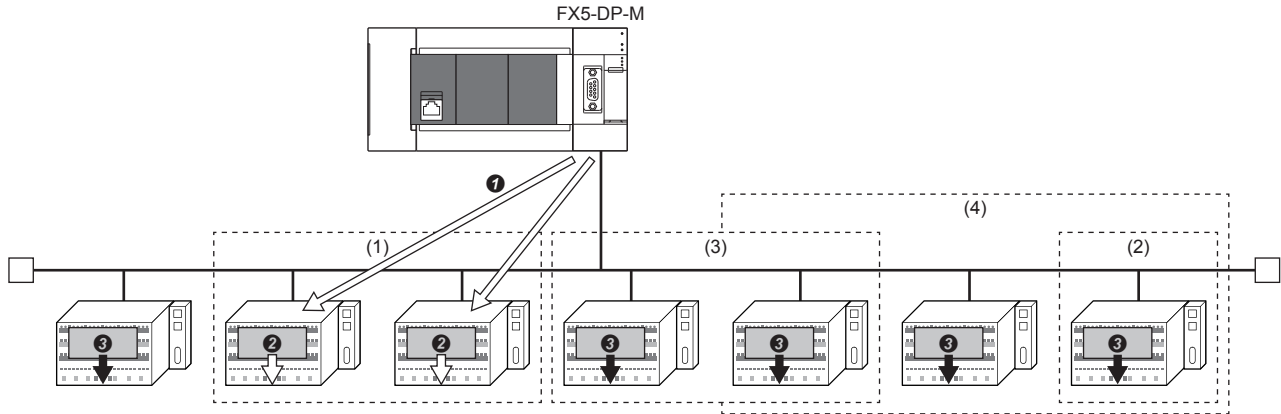
This service starts SYNC (output synchronization) mode.

During SYNC mode, DP-Slaves refresh the output status every time when receiving a SYNC service.

Without a SYNC service received, DP-Slaves hold the output status.

■UNSYNC service

This service stops SYNC (output synchronization) mode.



- (1) Group 1
- (2) Group 2
- (3) Group 5
- (4) Group 8

- ❶ Send a SYNC service to group 1.
- ❷ When SYNC service is executed: Output image memory values are output once at the timing of receiving a SYNC service.
- ❸ When UNSYNC service is executed: Output image memory values are output without change. (Normally in this mode)

■FREEZE service

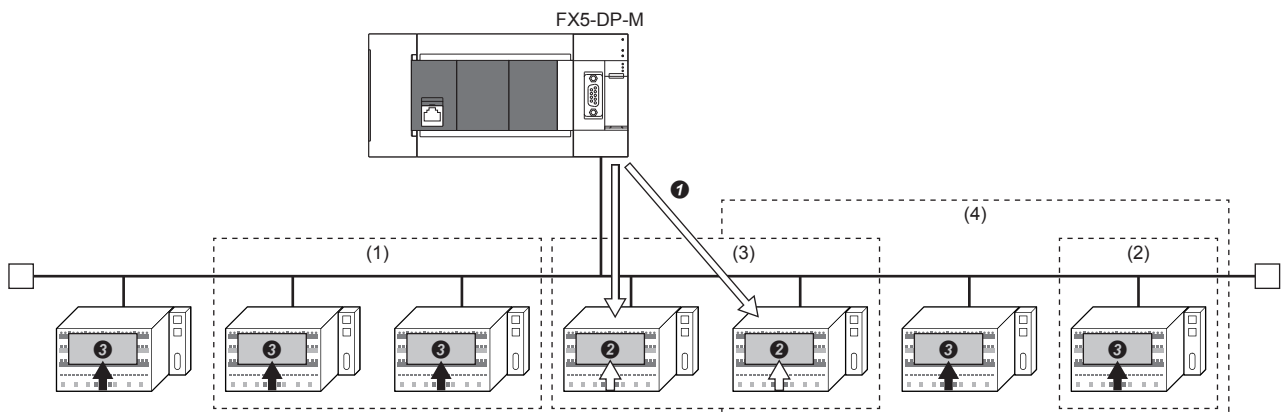
This service starts FREEZE (input synchronization) mode.

During FREEZE mode, DP-Slaves refresh the input status every time when receiving a FREEZE service.

Without a FREEZE service received, DP-Slaves hold the input status.

■UNFREEZE service

This service stops FREEZE (input synchronization) mode.




- (1) Group 1
- (2) Group 2
- (3) Group 5
- (4) Group 8


- ❶ Send a FREEZE service to group 5.
- ❷ When FREEZE service is executed: Actual input is input to the input image memory once at the timing of receiving a FREEZE service.
- ❸ When UNFREEZE service is executed: Actual input is input to the input memory without change. (Normally in this mode)

Execution of the global control function

Execute the global control function by the following procedure.

1. Write services to send and target groups to 'Global control area' (Un\G2081).
( Page 133 Global control area)
2. Turn on 'Global control request signal' (Un\G2.b4).
3. When the global control processing is completed, 'Global control completed signal' (Un\G0.b4) turns on. If the processing was completed with an error, 'Global control failed signal' (Un\G0.b5) turns on.
4. Check that the global control processing has been completed and then turn off 'Global control request signal' (Un\G2.b4).

Point

- To execute the global control function to all the DP-Slaves (including those without a group number), set all of b8 to b15 of 'Global control area' (Un\G2081) to 0.
- For a program example of the global control function, refer to the following.
( Page 103 Program Example of the Global Control Function)

4.3 PROFIBUS-DPV1

The following PROFIBUS-DPV1 functions are available on the FX5-DP-M.

Function	Reference
Acyclic communication function	Page 28
Alarm acquisition function	Page 30

Point

- To use the PROFIBUS-DPV1 functions, use DP-Slaves that support the PROFIBUS-DPV1.

For details, refer to the following.

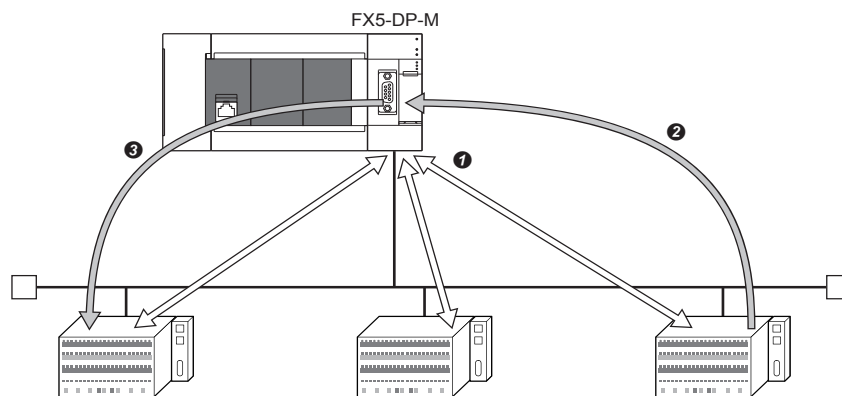
Manuals for the DP-Slave

- Use the PROFIBUS-DPV1 functions by setting MSI (Min. slave interval) to a value larger than the bus cycle time calculated from Pt (Polling time), T_{sd}i (FX5-DP-M request/response processing time ÷ transmission speed [bps]), and L_r (Data refresh time). If MSI is smaller than a value calculated from Pt, T_{sd}i, and L_r, function processing may take longer than expected. (☞ Page 162 Bus cycle time)

Acyclic communication function

This function enables reading/writing data from/to DP-Slaves at any time apart from the data exchange.

A maximum of eight requests can be issued.



- 1 Data exchange
- 2 Data reading from a DP-Slave
- 3 Data writing to a DP-Slave

Precautions

The Acyclic communication function cannot execute with the global control function.

Services available on the FX5-DP-M

For Acyclic communication, a Class 1 service is available.

Check 'Slave status area (Normal communication detection)' (Un\G23040 to Un\G23043) for whether bits relevant to the targets are on before executing a Class 1 service.

Service name	Description
READ service	Reads data from a specified DP-Slave.*1
WRITE service	Writes data to a specified DP-Slave.*1

*1 Data readable/writable by READ and WRITE services differs depending on the DP-Slave used.
For details, refer to the following.
Manuals for the DP-Slave

Execution of Acyclic communication function

Execute the Acyclic communication function by the following procedure.

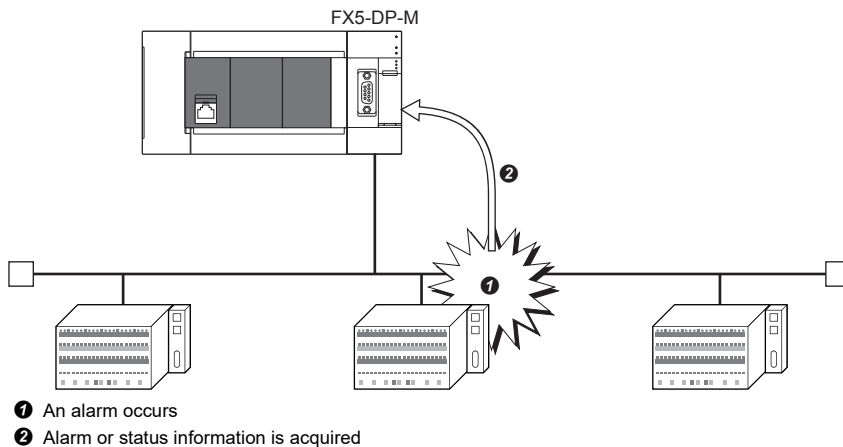
1. Set the request instruction data (request code or FDL address) to 'Acyclic communication request area' (Un\G23809 to Un\G24832) using a request format. (☞ Page 148 Acyclic communication request area (Un\G23809 to Un\G24832))
2. Turn on bits of 'Acyclic communication request execution instruction area' (Un\G23808) that are relevant to the request instruction numbers to execute. (☞ Page 148 Acyclic communication request execution instruction area (Un\G23808))
3. When the FX5-DP-M accepts the Acyclic communication request instructions, the acceptance statuses of 'Acyclic communication request result area' (Un\G25120) turns on. (☞ Page 150 Acyclic communication request result area (Un\G25120))
4. When Acyclic communication is completed, the request execution completed statuses of 'Acyclic communication request result area' (Un\G25120) turns on and the request execution result is stored in 'Acyclic communication response area' (Un\G25121 to Un\G26144). (☞ Page 150 Acyclic communication response area (Un\G25121 to Un\G26144))
5. Turn off bits of 'Acyclic communication request execution instruction area' (Un\G23808) that are relevant to the request instruction numbers to execute.
6. When Acyclic communication is completed, the request acceptance status and request execution completion status of 'Acyclic communication request result area' (Un\G25120) turn off.

Point

- Communications with DP-Slaves may be initialized if a problematic cable or noise causes a problem to the communications during a Class 1 service. (Input and output are turned off)
- For a program example of the Acyclic communication function, refer to the following.
☞ Page 107 Program Example of Acyclic Communication (Acyclic Communication)

Alarm acquisition function

The alarm acquisition function acquires the DP-Master on alarms or the status information occurring to DP-Slaves. A maximum of eight pieces of information can be acquired for a DP-Slave.



Requests available on the FX5-DP-M

Alarms can be acquired by the following two methods.

- An Alarm read request (without ACK) or Alarm ACK request can be used
- Using Alarm read request (with ACK)

■An Alarm read request (without ACK) or Alarm ACK request can be used

Use an Alarm read request (without ACK) when an interval is required until ACK is returned after an alarm is acquired from a DP-Slave.

Alarm ACK request enables returning of ACK for each acquired alarm.

1. An alarm occurs.
2. Acquire the alarm from the DP-Slave. (Alarm read request (without ACK))
3. Take action against the cause of the problem occurring to the DP-Slave.
4. Return ACK for the alarm that has been resolved. (Alarm ACK request)


■Using Alarm read request (with ACK)





Use Alarm read request (with ACK) to automatically return ACK to all acquired alarms after acquiring the alarms from the DP-Slave.

1. An alarm occurs.
2. Acquire the alarm from the DP-Slave and return ACK to all alarms. (Alarm read request (with ACK))
3. Take action against the cause of the problem occurring to the DP-Slave.

Execution of the alarm acquisition function

The procedure for execution the Alarm acquisition function (Alarm read request without ACK) and Alarm ACK request. For a program example of the alarm acquisition function, refer to the following.

 Page 109 Program Example of the Alarm Acquisition Function

- 1.** When an alarm occurs, the DIA LED turns on and bit corresponding to the DP-Slave where the alarm is occurring turns on in 'Slave status area (Alarm detection)' (Un\G26416 to Un\G26420). ( Page 153 Slave status area (Alarm detection))
- 2.** Write Alarm read request (without ACK) to 'Alarm request area' (Un\G26432 to Un\G26434). ( Page 154 Alarm request area)
- 3.** Turn on 'Alarm read request signal' (Un\G3.b8).
- 4.** Alarms are acquired and the results are stored in 'Alarm response area' (Un\G26446 to Un\G26768). ( Page 155 Normal response format when the alarm is read (without ACK))
- 5.** 'Alarm read response signal' (Un\G1.b8) turns on. Check the alarm stored in 'Alarm response area' (Un\G26446 to Un\G26768) and turn off 'Alarm read request signal' (Un\G3.b8).
- 6.** Write Alarm ACK request to 'Alarm request area' (Un\G26432 to Un\G26434).
- 7.** Turn on 'Alarm read request signal' (Un\G3.b8).
- 8.** ACK is returned and the results are stored in 'Alarm response area' (Un\G26446 to Un\G26768). ( Page 157 Normal response format for alarm ACK)
- 9.** If ACK is returned for all alarms of the DP-Slave, the corresponding bit in 'Slave status area (Alarm detection)' (Un\G26416 to Un\G26420) and the DIA LED turn off. If ACK is not returned for some alarms, the corresponding bit and the DIA LED remain on.
- 10.** 'Alarm read response signal' (Un\G1.b8) turns on. Check the alarm stored in 'Alarm response area' (Un\G26446 to Un\G26768) and turn off 'Alarm read request signal' (Un\G3.b8).

Point

DIA LED turns off when ACK is returned for all alarms if all of the following conditions are met.

- Bits of all DP-Slaves are off in 'Slave status area (Alarm detection)' (Un\G26416 to Un\G26420).
- Bit 11 is off for status 1 in 'Diagnostic information area' (Un\G23072 to Un\G23199).

BF LED turns off when ACK is returned for all alarms if all of the following conditions are met.

- Bits of all DP-Slaves are off in 'Slave status area (Alarm detection)' (Un\G26416 to Un\G26420).
- Bits of all DP-Slaves are off in 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060).

If ACK is not returned for all alarms, BF LED turns off when bits of all DP-Slaves are off in 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060), regardless of the alarm detection status.

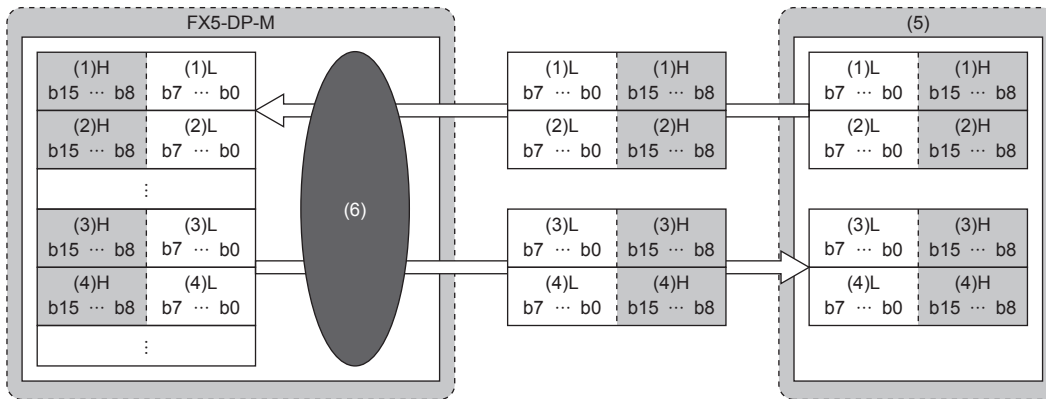
4.4 Data Swap Function

This function swaps the upper byte and lower byte of exchanged data in units of words when I/O data are sent/received. This function can be used when data is exchanged with DP-Slaves whose word configuration differs from the FX5-DP-M (upper and lower bytes are opposite).

This function enables data exchange by swapping the upper and lower bytes without creating a program for the processing.

For the data swap

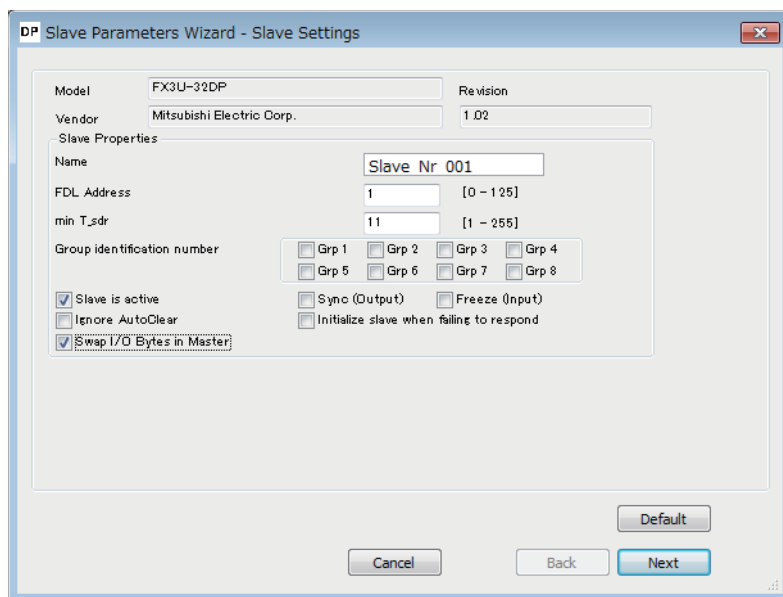
For DP-Slaves whose word configuration is opposite to the FX5-DP-M, activate the data swap function.



- (1) Data 1
 - (2) Data 2
 - (3) Data 3
 - (4) Data 4
 - (5) DP-Slave
 - (6) Swap
- H: Upper byte, L: Lower byte

Data swap function setting

Set the data swap function in the "Slave Settings" window of PROFIBUS Configuration Tool. (Page 85 Slave Settings) Check "Swap I/O Bytes in Master" for each DP-Slave to which the swap function is applied.



4.5 Data Consistency Function

This function maintains consistency of I/O data when the data from each DP-Slave is read/written from/to the buffer memory. Data inconsistency is an issue where new and old two-word size (32 bits) link data is divided in units of words (16 bits) at the timing of refresh of I/O data.

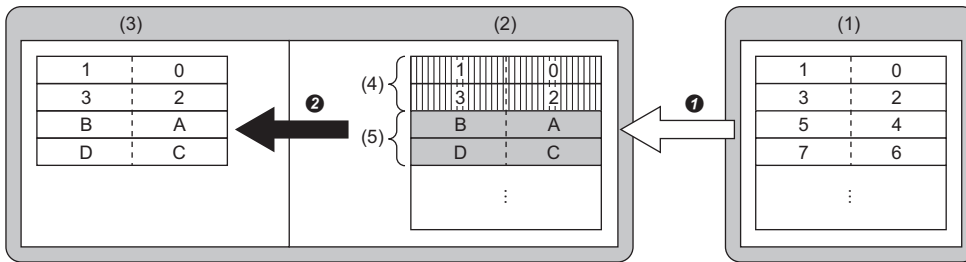
I/O data consistency and occurrence

Without the data consistency function

The PROFIBUS-DP bus cycle is asynchronous with the sequence scan by the CPU module.

Therefore, if the CPU module reads input data from the buffer memory while a DP-Slave is transferring the data to it, data inconsistency occurs. (This problem also applies to output data)

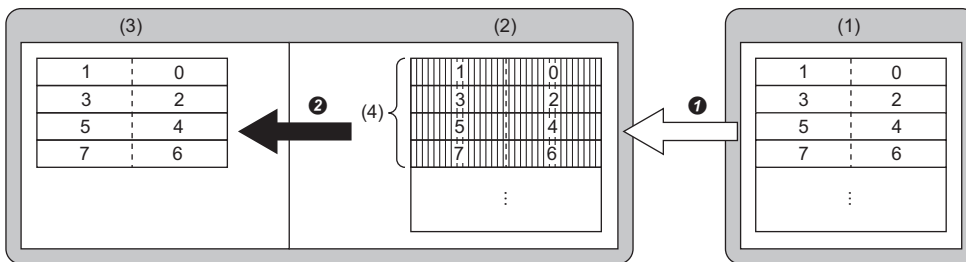
The following example shows data inconsistency that data is read from CPU module while the I/O data is transferring to the buffer memory.



- (1) DP-Slave
- (2) Buffer memory of the FX5-DP-M
- (3) CPU module
- (4) Area already updated with data transferred from a DP-Slave
- (5) Area not yet updated with data transferred from a DP-Slave
- ➊ Data being transferred
- ➋ Data read while transferred

With the data consistency function

When the data consistency function is used, reading data from CPU module is not performed while the data is transferring from the DP-Slave to the buffer memory of FX5-DP-M (Input data area). When the data has transferred, reading data starts. In addition, transferring data is not performed to the DP-Slave until the data has written from the CPU module to the buffer memory of FX5-DP-M (Output data area). When the write data has completed, transferring data starts.



- (1) DP-Slave
- (2) Buffer memory of the FX5-DP-M
- (3) CPU module
- (4) Area already updated with data transferred from a DP-Slave
- ➊ Data transfer completed
- ➋ Data read after transferred

How to activate the data consistency function

Enable the data consistency function.

Set "Data consistency" to "Enable (Use Autorefresh)" in the settings below.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [FX5-DP-M] ⇨ [Module Parameter] ⇨ [Basic Setting]

Item	Setting Value
<input type="checkbox"/> Data Exchange Setting	
Consistency	Enable (Use Autorefresh) ▼

Enable the refresh settings when enabling the data consistency function. (☞ Page 84 CPU Device Access)


Precautions

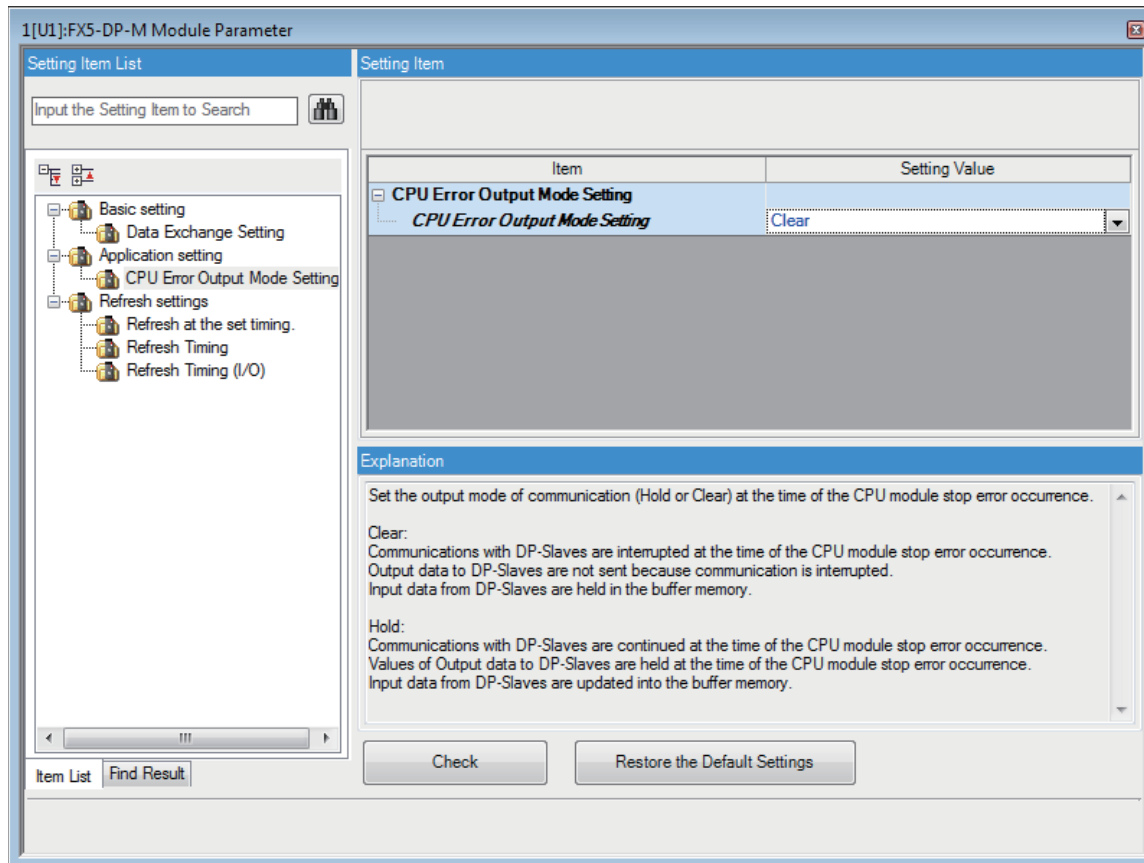
- The data consistency function requires waiting time to read/ write data from CPU module or to transfer with DP-Slave, which results in transmission delay time.
- The data consistency function is unavailable for executing refresh between the buffer memory of the FX5-DP-M and the CPU module with the MOV instruction or FROM/TO instructions.

4.6 Output Setting Function for CPU Stop Error

This function can be set whether to stop data exchange with DP-Slaves when a CPU stop error occurs to the CPU module mounting the FX5-DP-M.

The output status for CPU stop errors can be configured in the following.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [Module Parameter] ⇒ [Application setting]



When "Clear" is selected for "CPU Error Output Mode Setting"

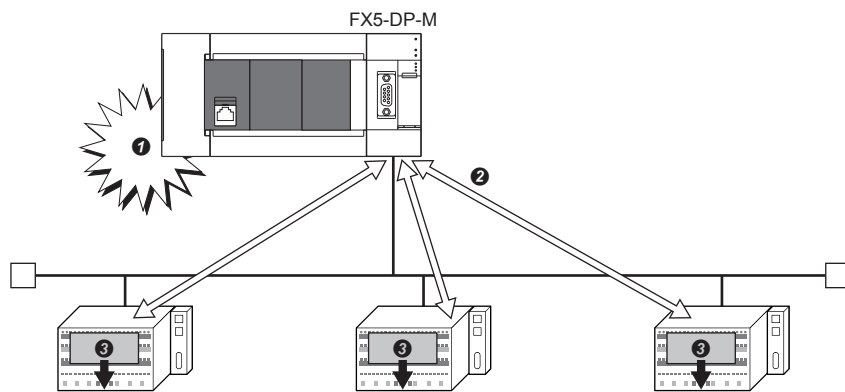
- Data exchange with the DP-Slave is interrupted.
- The output data of the FX5-DP-M buffer memory is cleared and is not sent.
- Input data that was already received from the DP-Slave when the CPU module stop error occurred is held in the FX5-DP-M buffer memory.

Point

Data output after I/O data exchange is stopped may be output from the DP-Slave to an external device depending on the settings of the DP-Slave. (Refer to the manual for the DP-Slave)

When "Hold" is selected for "CPU Error Output Mode Setting"

- Data exchange with the DP-Slave continues.
- The output data in the buffer memory of the FX5-DP-M are held when the CPU module stop error occurs and the data is sent to the DP-Slaves.
- The buffer memory of the FX5-DP-M is updated with the input data received from the DP-Slave.



- 1 A stop error occurs.
- 2 Data exchange
- 3 Output data before a stop error occurrence are held.

4.7 Temporarily Reserved Station Specification Function


This function can be used to switch a DP-Slave to a temporarily reserved station when the DP-Slave from network is isolated temporarily.

A temporarily reserved station can be changed by the buffer memory without changing the slave parameter in PROFIBUS Configuration Tool.

Point

For the FX5-DP-M to reflect the settings for the temporarily reserved station specification function, suspend data exchange and then turn off and on 'Data exchange start request signal' (Un\G2.b0) when module is in communication mode.

DP-Slaves that can be switched

- DP-Slaves can be switched into temporarily reserved stations.
- Temporarily reserved stations can be switched into DP-Slaves.
- Reserved station (Unchecked DP-Slaves in "Slave is active" of "Slave Settings" window) cannot be switched into a DP-Slave or temporarily reserved station. ( Page 85 Slave Settings)

Point



DP-Slaves which are checked in "Slave is active" in "Slave Settings" window support the temporarily reserved station specification function.

The corresponding DP-Slaves can be checked in 'Parameter setting status area (Active station)' (Un\G23584 to Un\G23587).

Temporarily reserved stations specification and clear

Execute the temporarily reserved station specification function by the following procedure.

■Setting method

1. Set the DP-Slaves to switch into temporarily reserved stations as 'Temporarily reserved station specification request area' (Un\G23608 to Un\G23611). ( Page 147 Temporarily reserved station specification request area (Un\G23608 to Un\G23611))
2. Turn on 'Data exchange start request signal' (Un\G2.b0).
3. When temporarily reserved stations have been specified, the result is stored in 'Temporarily reserved station specification status area' (Un\G23600 to Un\G23603) and 'Data exchange start completed signal' (Un\G0.b0) turns on. ( Page 146 Temporarily reserved station specification status area)

■Clear method

1. Turn off 'Data exchange start request signal' (Un\G2.b0).
2. Through 'Temporarily reserved station specification request area' (Un\G23608 to Un\G23611), clear temporarily reserved stations of the specified DP-Slaves.
3. Turn on 'Data exchange start request signal' (Un\G2.b0).
4. When temporarily reserved stations have been cleared the result is stored in 'Temporarily reserved station specification status area' (Un\G23600 to Un\G23603) and 'Data exchange start completed signal' (Un\G0.b0) turns on.

Point

The reserved stations specified by the current slave parameters and temporarily reserved stations specified by the temporarily reserved station specification function can be checked in 'Slave status area (Reserved station setting)' (Un\G23048 to Un\G23051).

5 SYSTEM CONFIGURATION

5.1 Configuration of PROFIBUS-DP network

This section describes the basic configuration of the PROFIBUS-DP network using the FX5-DP-M as DP-Master (Class 1). To configure the PROFIBUS-DP network, following conditions should be met.

Configuration condition	Description
Number of connectable modules in the entire network (when repeaters are used)	DP-Master ^{*1} + DP-Slave ≤ 126
Number of connectable modules per segment	DP-Master ^{*1} + DP-Slave + Repeater ^{*2} ≤ 32
Number of repeaters	Maximum of 3 repeaters between the FX5-DP-M and a DP-Slave
Number of connectable DP-Slaves per FX5-DP-M	64

*1 Includes the FX5-DP-M.

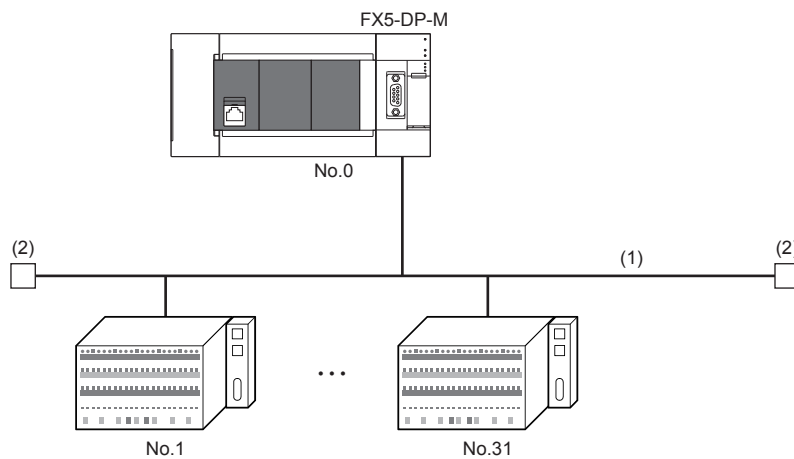
*2 Repeaters are counted as modules for both segments.

Maximum configuration when repeaters are not connected

Up to 32 modules can be connected in one segment.

DP-Master (FX5-DP-M): 1

DP-Slave: 31



No.: FDL address (1 to 31 are for DP-Slaves, and 0 is for DP-Master)^{*1}

(1) Segment

(2) Bus terminator

*1 Any FDL address can be assigned to the DP-Master.

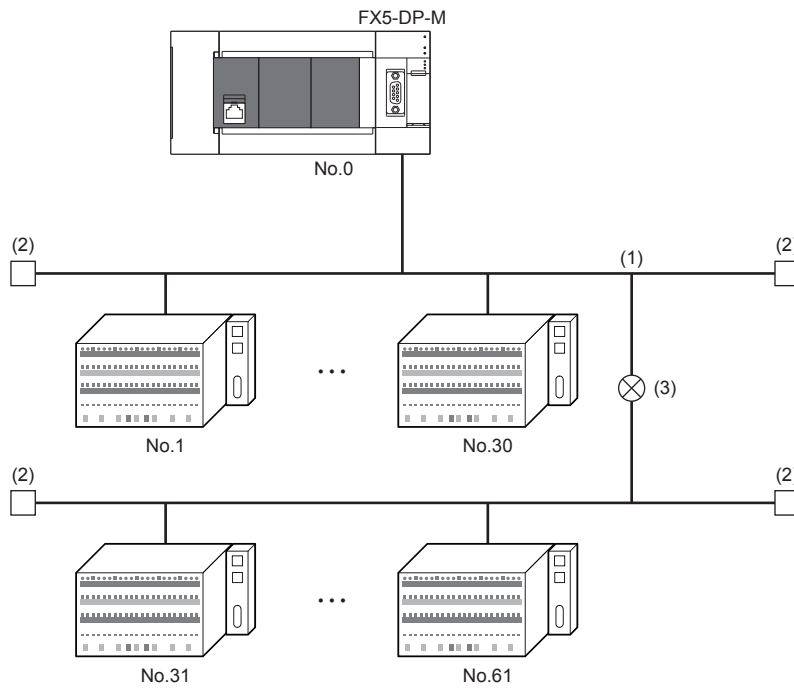
Maximum configuration when one repeater is connected

Up to 32 modules can be connected in one segment.

DP-Master (FX5-DP-M): 1

DP-Slave: 61

Repeater: 1



No.: FDL address (1 to 61 are for DP-Slaves, and 0 is for DP-Master)^{*1}

- (1) Segment
- (2) Bus terminator
- (3) Repeater

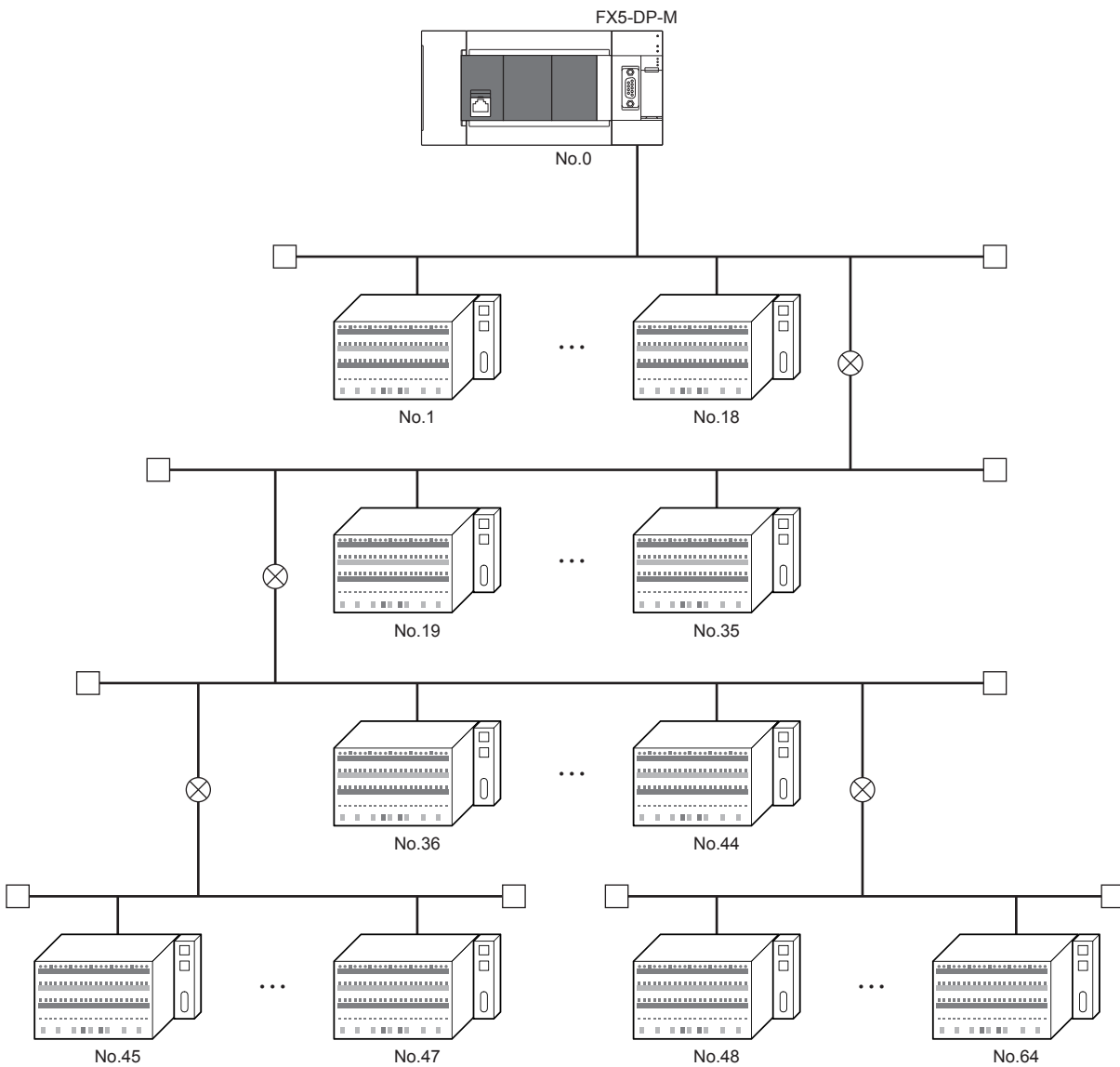
*1 Any FDL address can be assigned to the DP-Master.

When 64 DP-Slaves are connected

DP-Master (FX5-DP-M): 1

DP-Slave: 64

Repeater: 4



No.: FDL address (1 to 64 are for DP-Slaves, and 0 is for DP-Master)*1

*1 Any FDL address can be assigned to the DP-Master.

When multiple DP-Masters are connected (multi-master system)

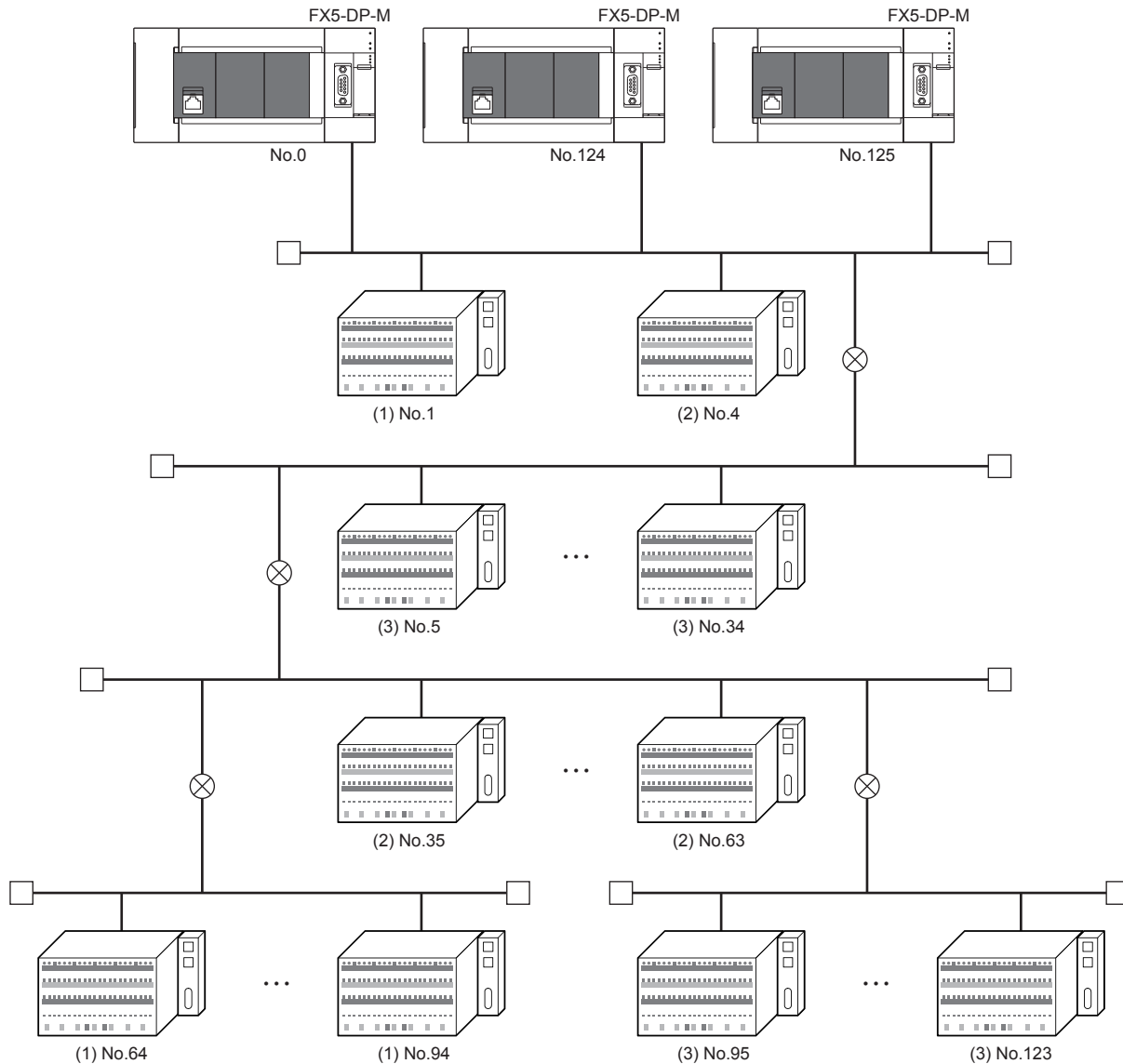
Multiple DP-Masters having different FDL addresses can be connected in one network.

Up to 123 DP-Slaves can be connected using up to three FX5-DP-M modules as follows.

DP-Master (FX5-DP-M): 3

DP-Slave: 123

Repeater: 4



No.: FDL address (1 to 123 are for DP-Slaves, and 0, 124, 125 are for DP-Master)*1

- (1) DP-Slave controlled by DP-Master (Class 1) (FDL address 0)
- (2) DP-Slave controlled by DP-Master (Class 1) (FDL address 124)
- (3) DP-Slave controlled by DP-Master (Class 1) (FDL address 125)

*1 Any FDL address can be assigned to the DP-Master.

5.2 Available Software Packages

GX Works3 and PROFIBUS Configuration Tool are required to configure the FX5-DP-M.

Software	Supported version	
	FX5UJ	FX5U/FX5UC
GX Works3	Version 1.060N or later	Version 1.050C or later
PROFIBUS Configuration Tool	Version 1.03D or later	Version 1.02C or later

Restriction

If GX Works3 is installed or upgraded in the system having PROFIBUS Configuration Tool, the parameters of the FX5-DP-M may not be configured properly.

In such a case, uninstall PROFIBUS Configuration Tool → install or upgrade GX Works3 → install PROFIBUS Configuration Tool again.

6 WIRING

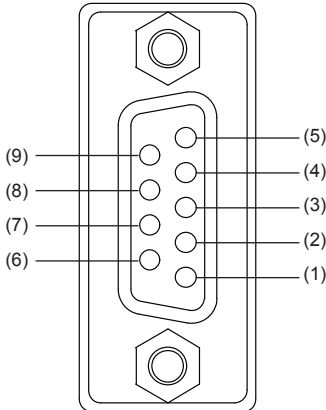
6.1 Connectors

Wiring for PROFIBUS cable

This section describes the pin assignment of the PROFIBUS-DP interface connector of the FX5-DP-M, wiring specifications of the PROFIBUS cable, and the bus terminator.

Pin assignment of the PROFIBUS-DP interface connector

The following table shows the pin assignment of the PROFIBUS-DP interface connector (D-sub 9-pin connector: #4-40 UNC inch screw).

Pin assignment	No.	Name	Application
	(1)	NC	Not connected
	(2)	NC	Not connected
	(3)	RxD/TxD-P	Receive/send data-P
	(4)	CNTR-P ^{*1}	Control signal of repeaters
	(5)	DGND ^{*2}	Data ground
	(6)	VP ^{*2}	Voltage+
	(7)	NC	Not connected
	(8)	RxD/TxD-N	Receive/send data-N
	(9)	NC	Not connected

*1 Optional signal

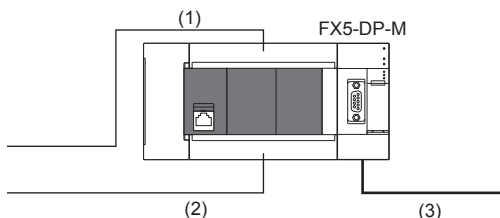
*2 Signal used for connecting a bus terminator

Precautions

To make full use of the functions of the FX5-DP-M and to configure a highly reliable system, the external wiring should be resistant to noise.

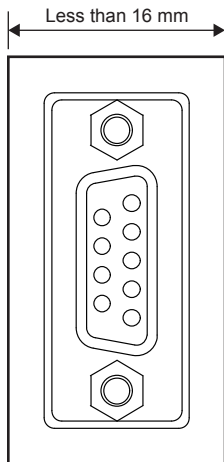
The following are precautions for the external wiring of the FX5-DP-M.

- Do not route the communication cable of the FX5-DP-M near the main circuit, power cable, or load cable other than that of the programmable controller. In addition, do not bundle those cables together. Otherwise the FX5-DP-M may be affected by noise or surge induction.
- Place the PROFIBUS cable as far away from input/output wiring of the module as possible.



- (1) Input wiring
- (2) Output wiring
- (3) PROFIBUS cable

- Place the communication cables and power cables connected to the module in a duct or clamp them. If not, dangling cable can swing or inadvertently be pulled, resulting in damage to the module or the cable or malfunction due to poor contact.
- Do not touch the core of the cable-side or module-side connector, and protect it from dirt or dust. If oil from your hand, dirt, or dust is attached to the core, transmission loss can increase, causing communication failures.
- Securely connect the connector to the module.
- Use a connector with a width of less than 16 mm. If a width of the connector is 16 mm or more, the connector may interfere with the extension cover when the connector is connected, and the extension cover may not be removed.



- Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.

6.2 Wiring Products

PROFIBUS devices such as PROFIBUS cables and connectors should be prepared by users. For details on PROFIBUS devices, refer to the following.

- PI: www.profibus.com

PROFIBUS cable

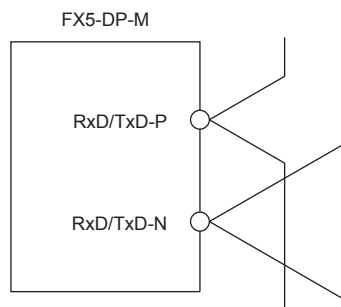
The following are the specifications and wiring specifications of PROFIBUS cables.

- PROFIBUS cable

Use PROFIBUS cables that satisfy the following specifications (compliant with TypeA (IEC 61158-2)).

Item	Specifications
Applicable cable	Shielded twisted pair cable
Impedance	135 to 165 Ω (f = 3 to 20 MHz)
Capacity	Less than 30 pF/m
Conductor resistance	Less than 110 Ω /km
Cross-sectional area	0.34 mm ² or larger
Wire diameter	AWG 22
Type	Stranded wire
Material	Copper wire

- Wiring specifications



RxD/TxD-P: Red
RxD/TxD-N: Green

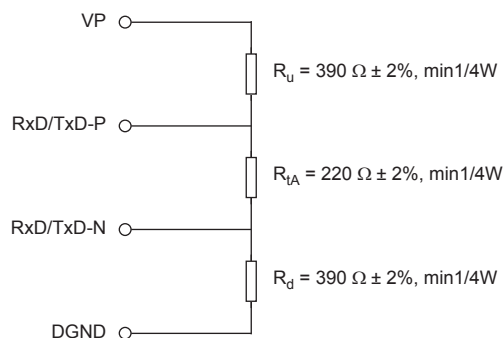
Connectors

Use D-sub 9-pin male connectors for PROFIBUS cables.

Use #4-40 UNC screws for the connector. Tighten the screws within the range of 0.20 to 0.28 N·m.










Wiring specifications of terminating resistor

When the FX5-DP-M is the terminal station, use the connector with built-in bus terminator that satisfies the following wiring specifications.



7 PARAMETER SETTINGS

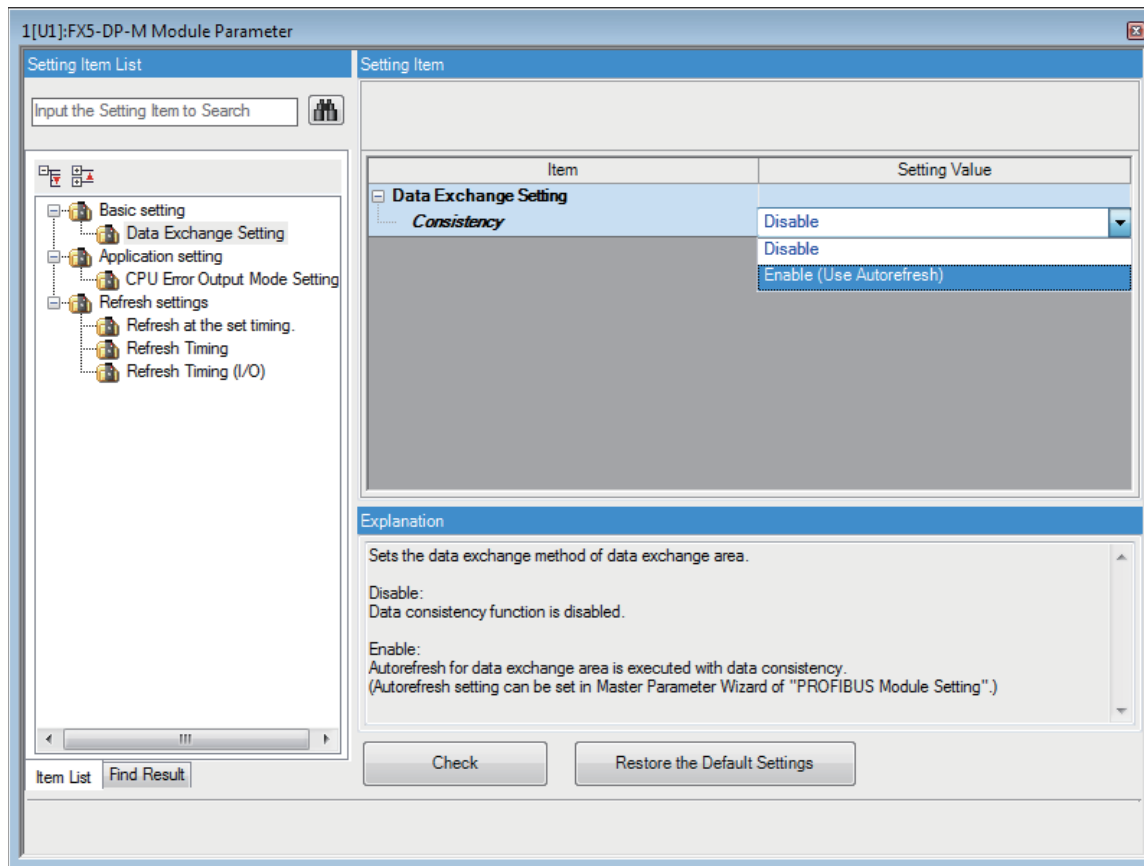
7.1 Setting Parameters

- 1.** Add the FX5-DP-M in the GX Works3. ( Page 93 Create a new project)
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Right-click ⇒ [Add New Module]
- 2.** Set the module parameters.
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [Module Parameter]
- 3.** Start PROFIBUS Configuration Tool and configure the PROFIBUS module settings. ( Page 48 PROFIBUS Module Setting)
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [PROFIBUS Module Setting]
- 4.** Update the PROFIBUS labels.
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [PROFIBUS Module Settings] ⇒ [PROFIBUS Configurator Tasks] ⇒ [Setup Tasks] ⇒ [Update PROFIBUS Label]
- 5.** Convert some program codes or all program codes.
 [Convert] ⇒ [Convert] or [Rebuild All]
- 6.** Write the set parameters by the above procedure to the CPU module or the SD memory card in the CPU module with the GX Works3. ( Page 48 Writing Parameters)
 [Online] ⇒ [Write to PLC]
- 7.** The settings are applied by powering off and on the system or resetting the CPU module.

7.2 Module Parameter

This section describes the "Module parameter" window of the GX Works3.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [Module Parameter]



Name	Item	Description	Setting
Basic setting	Consistency	Sets the I/O data exchange method. (☞ Page 33 Data Consistency Function) <ul style="list-style-type: none"> • Disable: Disables the data consistency function. • Enable (Use Autorefresh): Enables the data consistency function. Configure the refresh settings of "Master Settings" under "Setup Tasks" in the "PROFIBUS Configurator Tasks" window. (☞ Page 56 Setup Tasks)	<ul style="list-style-type: none"> • Disable • Enable (Use Autorefresh) (Default: Disable)
Application setting	CPU Error Output Mode Setting	Sets the FX5-DP-M status when a CPU module stop error occurs. (☞ Page 35 Output Setting Function for CPU Stop Error) ■Clear <ul style="list-style-type: none"> • The data exchange with DP-Slaves are interrupted. • The output data in the buffer memory of the FX5-DP-M are cleared and not sent. • When the CPU module stop error occurs, the input data received from DP-Slaves are held in the buffer memory of the FX5-DP-M. ■Hold <ul style="list-style-type: none"> • The data exchange with DP-Slaves are continued. • The output data in the buffer memory of the FX5-DP-M are held when the CPU module stop error occurs and then sends the data to the DP-Slaves. • The input data received from DP-Slaves are updated into the buffer memory of the FX5-DP-M. 	<ul style="list-style-type: none"> • Clear • Hold (Default: Clear)
Refresh setting	Refresh Timing	Sets the refresh timing.	At the Execution Time of END Instruction (fixed)
	Refresh Group	Specifies the refresh group of the program.	1 (fixed)

Precautions

After the "Module Parameter" screen is displayed, make sure to update the PROFIBUS labels. (☞ Page 48 Update of PROFIBUS Labels)

7.3 PROFIBUS Module Setting

Start PROFIBUS Configuration Tool and configure the PROFIBUS module settings. (☞ Page 49 PROFIBUS Configuration Tool)

☞ [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [PROFIBUS Module Setting]

7.4 Update of PROFIBUS Labels

This function creates and updates the structures used for global labels and module function blocks by enabling the refresh settings. (☞ Page 64 Update PROFIBUS Label)

☞ [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [PROFIBUS Module Settings] ⇒ [PROFIBUS Configurator Tasks] ⇒ [Setup Tasks] ⇒ [Update PROFIBUS Label]

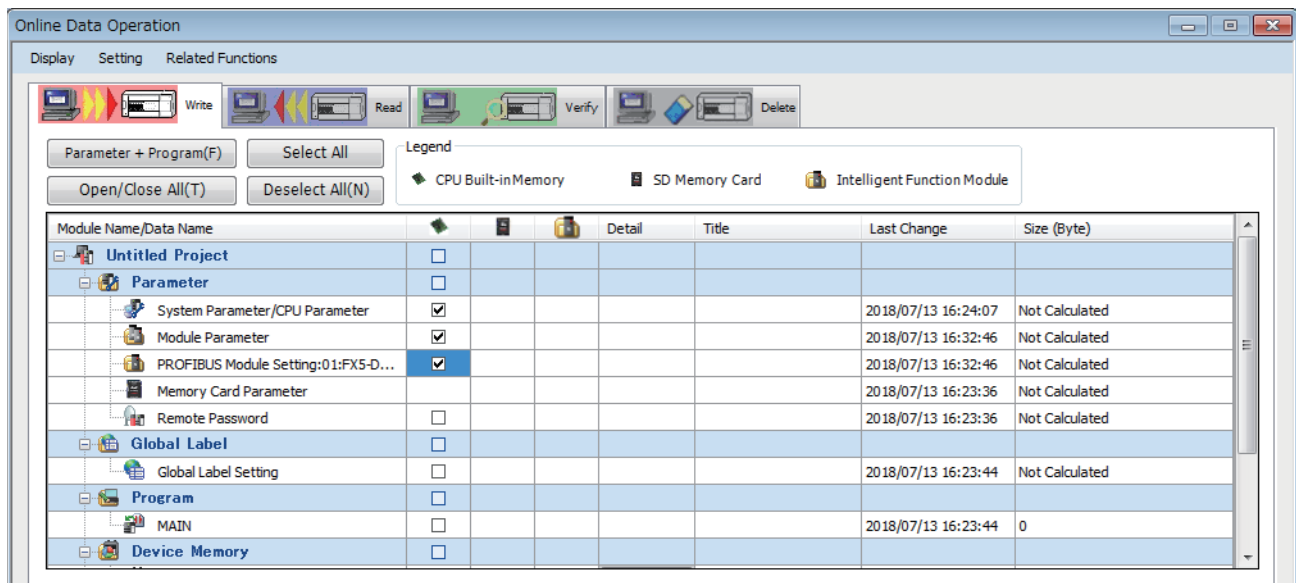
Precautions

After the "Module Parameter" screen is displayed, make sure to update the PROFIBUS labels.

7.5 Writing Parameters

Check the boxes in the "Module Parameter and the "PROFIBUS Module Setting" on the "Online Data Operation" window of the GX Works3 before writing.

☞ [Online] ⇒ [Write to PLC]



The parameters have different write destinations.

Checked item	Written parameters	Write destination
Module Parameter	Refresh Setting	CPU module or the SD memory card of the CPU module
PROFIBUS Module Setting	PROFIBUS communications parameters	If the parameters are written to both the CPU module and the SD memory card, the operation is performed according to the memory card parameter setting of the CPU module.

For the writing parameters to the CPU module or the SD memory card of the CPU module, refer to the following.

☞ GX Works3 Operating Manual

The written parameters are enabled when resetting the CPU module or powering off and on the system.

Point

The set parameters using PROFIBUS Configuration Tool can be written with the GX Works3, but cannot be read.

8 PROFIBUS Configuration Tool

This chapter describes the operation of PROFIBUS Configuration Tool.

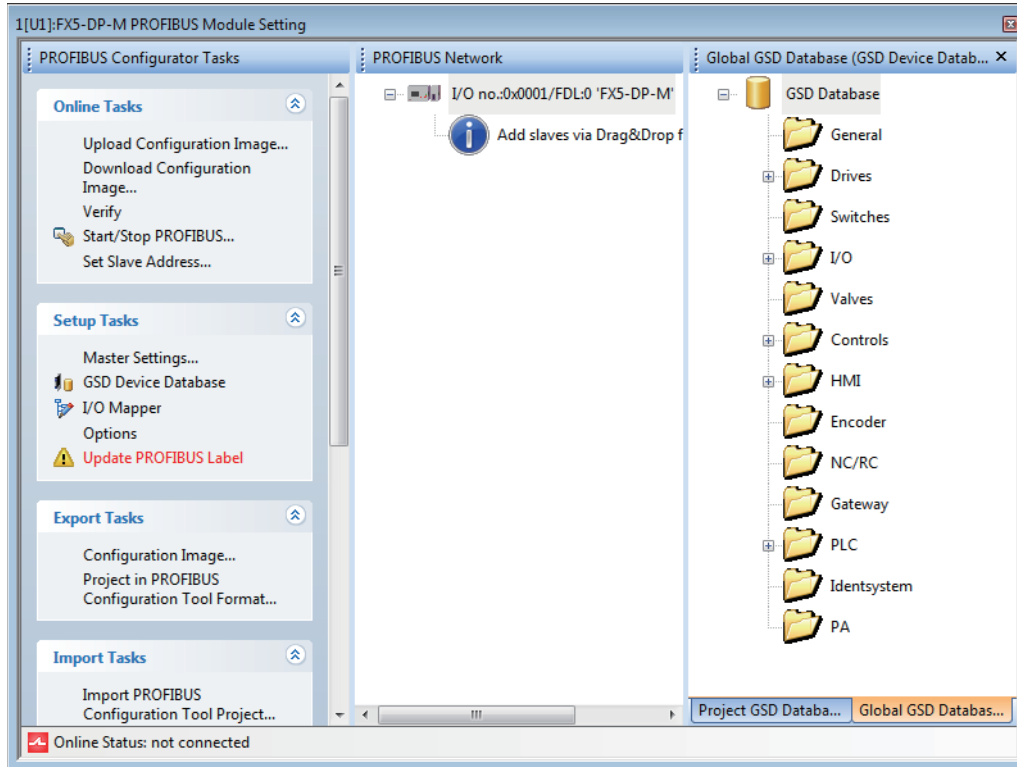
[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [PROFIBUS Module Setting]

8.1 Window Structure

This section describes the overall structure of the window.

The layout of each function window can be customized and saved.

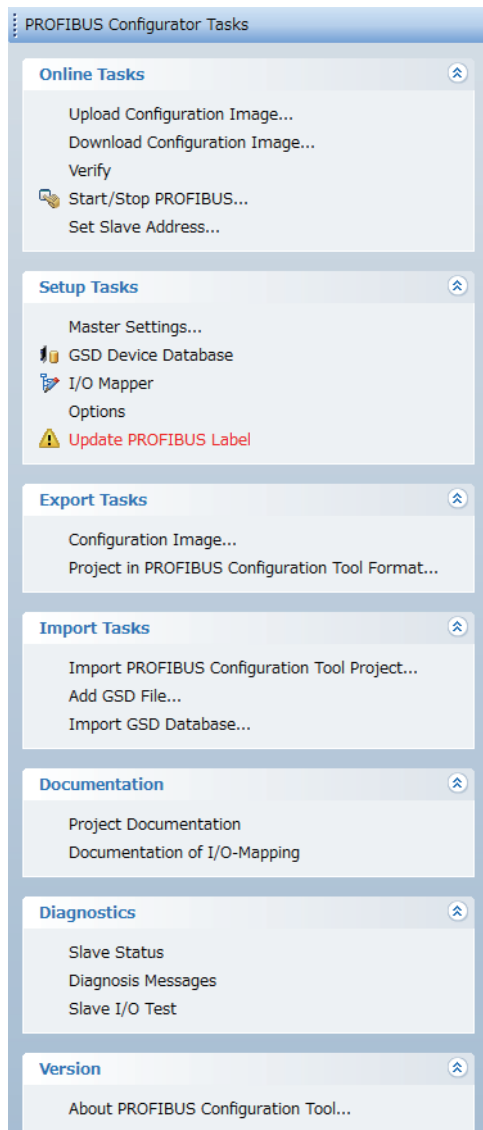
The window below is an example.



Name of function window	Reference
"PROFIBUS Configurator Tasks" window	Page 50 "PROFIBUS Configurator Tasks" Window
"PROFIBUS Network" window	Page 79 "PROFIBUS Network" window

8.2 "PROFIBUS Configurator Tasks" Window

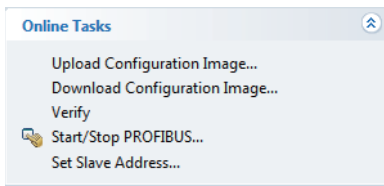
The "PROFIBUS Configurator Tasks" window displays the project management functions by group. The following figure shows the items in the "PROFIBUS Configurator Tasks" window.



Group name	Reference
Online Tasks	Page 51 Online Tasks
Setup Tasks	Page 56 Setup Tasks
Export Tasks	Page 69 Export Tasks
Import Tasks	Page 71 Import Tasks
Documentation	Page 72 Documentation
Diagnostics	Page 74 Diagnostics
Version	Page 78 Version

Online Tasks

This section describes the items of "Online Tasks".



Menu	Description	Reference
Upload Configuration Image	Uploads (reads) setting details from the CPU module or the SD memory card of the CPU module and saves them as a configuration image file.	Page 52 Upload Configuration Image
Download Configuration Image	Downloads (writes) setting details from a configuration image file to the CPU module or the SD memory card of the CPU module.	Page 53 Download Configuration Image
Verify	Verifies the setting details of a project against the setting details stored in the CPU module or the SD memory card of the CPU module.	Page 54 Verify
Start/Stop PROFIBUS	Starts/stops the PROFIBUS-DP Network data exchange.	Page 54 Start/Stop PROFIBUS
Set Slave Address	Changes the FDL address of the DP-Slaves with Online.	Page 55 Set Slave Address

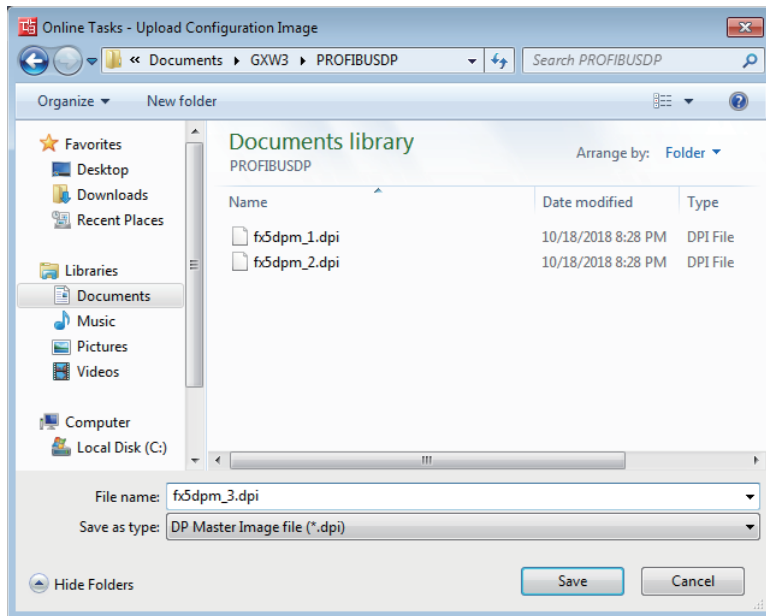
Upload Configuration Image

Uploads (reads) setting details from the CPU module or the SD memory card of the CPU module and saves them as a configuration image file.

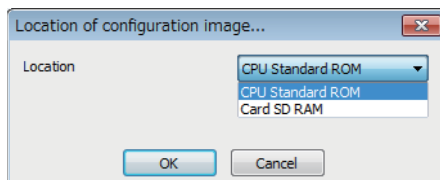
Only the FX5-DP-M projects can be uploaded.

Operating procedure

1. Select "Upload Configuration Image" in Online Tasks".
2. Select the configuration image file to be uploaded.



3. Select the drive containing the setting details to be uploaded in "Location" of the "Location of configuration image" window.



Item	Description	Setting range
Location	Select the drive containing the setting details to be uploaded. The following items are displayed even when the corresponding setting details do not store in the drive. • CPU Standard ROM: The memory of the CPU module • Card SD RAM: The SD memory card inserted in the CPU module	• CPU Standard ROM • Card SD RAM (Default: CPU Standard ROM)

4. Upon establishing a connection to the CPU module, the current configuration is uploaded from the drive selected in the "Location of configuration image" window and saved as a configuration image file in .dpi format.

For downloading (writing) the configuration image file, refer to the following.

📖 Page 53 Download Configuration Image

Precautions

- The uploaded configuration image file contains master parameters and slave parameters. The refresh settings are not contained.
- The uploaded configuration image file cannot be imported to PROFIBUS Configuration Tool projects. (Master parameters and slave parameters cannot be changed.)

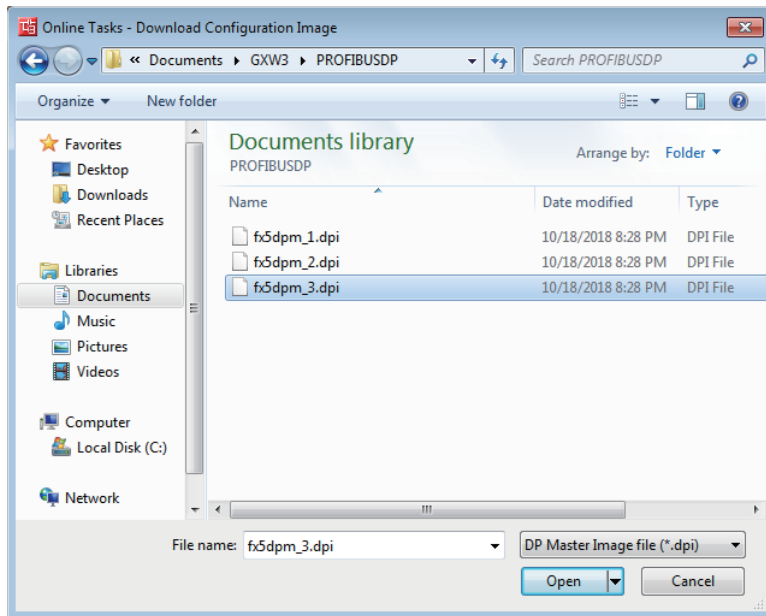
Download Configuration Image

Downloads (writes) setting details from a configuration image file to the CPU module or the SD memory card of the CPU module.

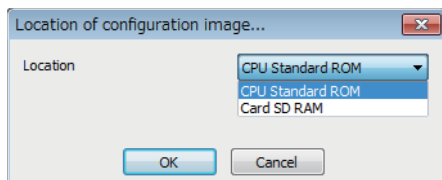
This function is enabled for FX5-DP-M projects.

Operating procedure

1. Select "Download Configuration Image" in "Online Tasks".
2. Select the configuration image file to be downloaded.



3. Select the drive storing the setting details in "Location" of the "Location of configuration image" window.



Item	Description	Setting range
Location	Select the drive to store the setting details. <ul style="list-style-type: none"> • CPU Standard ROM: The memory of the CPU module • Card SD RAM: The SD memory card inserted in the CPU module 	<ul style="list-style-type: none"> • CPU Standard ROM • Card SD RAM (Default: CPU Standard ROM)

4. Upon establishing a connection to the CPU module, the current configuration is uploaded from the drive, and the master setting and slave setting are saved to the CPU module or the SD memory card.

Precautions

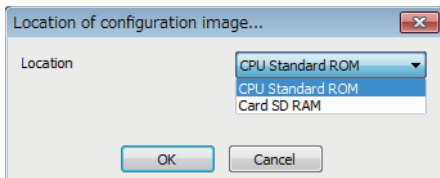
Configuration image files that are uploaded or exported by PROFIBUS Configuration Tool can be downloaded only.

Verify

Uploads setting details stored in the CPU module and the SD memory card of the CPU module and verifies them against the current setting details of a project.

Operating procedure

1. Select "Verify" in "Online Tasks".
2. Select the drive containing the setting details to be verified against the setting details of the current project in "Location" of the "Location of configuration image" window.



Item	Description	Setting range
Location	Select the drive containing the setting details to be verified against the setting details of the current project. The following items are displayed even when the corresponding setting details do not store in the drive. <ul style="list-style-type: none">• CPU Standard ROM: The memory of the CPU module• Card SD RAM: The SD memory card inserted in the CPU module	<ul style="list-style-type: none">• CPU Standard ROM• Card SD RAM (Default: CPU Standard ROM)

3. Displays the results of the verification between the configuration image file stored in the drive selected of the "Location of configuration image" window and the configuration image file created from the current project.

Precautions

The refresh settings are not verified.

Start/Stop PROFIBUS

This item is used to manually start or stop data exchange with DP-Slaves.

- If the PROFIBUS-DP module is not exchanging data: Data exchange starts.
- If the PROFIBUS-DP module is exchanging data: Data exchange stops.

Point

For "Start/Stop PROFIBUS", Data exchange is started or stopped by turning on and off 'Data exchange start request signal' (Un\G2.b0).

Starting/stopping of data exchange may fail if "Start/Stop PROFIBUS" is executed while the program is running.

Set Slave Address

Changes the FDL address of the DP-Slaves with Online.

Item	Description	Setting range
Old address	Sets the current DP-Slave number. When the DP-Slave is selected in a project tree, the FDL address of DP-Slave is displayed. When the DP-Master is selected in a project tree, input an arbitrary effective FDL address.	0 to 126
New address	Sets a new DP-Slave number.	0 to 125
Ident-No.	Sets the Ident No. of the DP-Slave of which FDL address is to be changed. When the DP-Slave is selected in a project tree, the Ident No. of the selected DP-Slave is displayed. When the DP-Master is selected in a project tree, set the Ident No. in hexadecimal.	0H to FFFFH
Messages	Displays the new FDL address when the [Set] button is clicked. Below are examples of displayed messages. <ul style="list-style-type: none"> • FDL address change request has been sent: A request to change the FDL address was sent. • Failed to change FDL address: The system failed to change the FDL address. • For setting the slave address the data exchange on the PROFIBUS network must be stopped!: The FDL address cannot be changed during data exchange. 	—

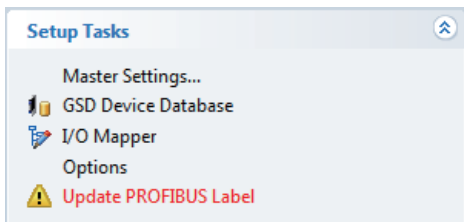
Precautions

"FDL address change request has been sent" in "Messages" indicates only a request to change the FDL address was sent successfully.

- Check that the FDL address has changed.
- The FDL address of DP-Slave can change only if the DP-Slave is supported by changing it from DP-Master. (Refer to the manual for the DP-Slave)

Setup Tasks

This section describes the items of "Setup Tasks".



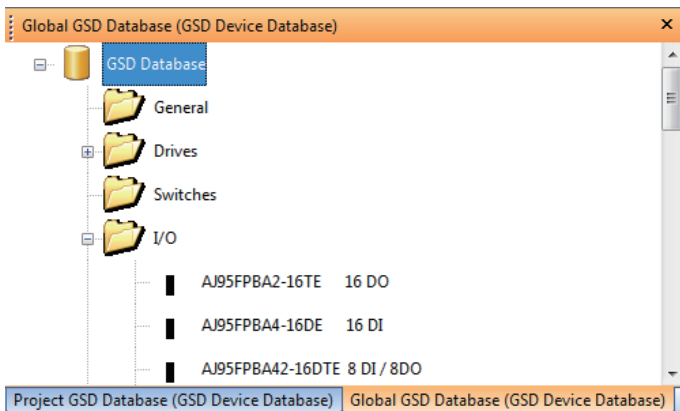
Item	Description	Reference
Master Settings	Sets the transmission speed, FDL address, bus parameters, refresh, or other items of the DP-Master.	<ul style="list-style-type: none"> • Page 81 Master Settings • Page 83 Bus Parameter Settings • Page 84 CPU Device Access
GSD Device Database	Operates the GSD database.	<ul style="list-style-type: none"> • Page 56 [Global GSD Database] tab • Page 60 [Project GSD Database] tab
I/O Mapper	Edits the configuration settings for accessing input/output of the DP-Slave.	Page 61 I/O Mapper
Options	Sets the GSD file to be prioritized.	Page 63 Options
Update PROFIBUS Label	This function creates and updates the structures used for global labels and module function blocks by enabling the refresh settings.	Page 64 Update PROFIBUS Label

[Global GSD Database] tab

Click "GSD Device Database" to display the GSD database that batch manages DP-Slaves used on the PROFIBUS-DP network.

This item is used to add a DP-Slave device to be used in a project using the tree on the [Global GSD Database] tab. The device group is displayed as a folder, and the device type of that group is displayed in the lower layer of the tree. The device type is displayed using the device image and the type name.

The default image is displayed when an image unique to the device is not assigned. (👉 Page 58 Properties)



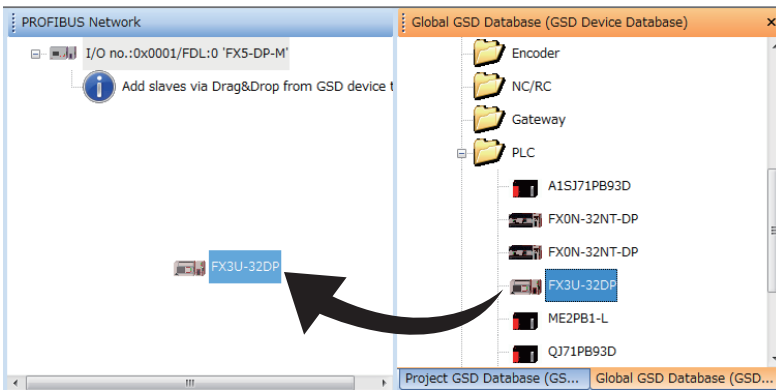
Right-clicking a folder or device type in the [Global GSD Database] tab displays the following items.

Item	Description	Reference
Add Slave to Project	Adds the selected DP-Slave to a project. The DP-Slave can be added also by dragging and dropping the DP-Slave or double-clicking a node.	Page 57 Add Slave to Project
Add GSD File	Opens the window for selecting the GSD file. The selected GSD file is analyzed and added to the GSD database.	Page 57 Add GSD File
Import GSD Database	Imports the device type from the GSD database (.mdb), GSD export file (.ext), or GXDP project file.	Page 58 Import GSD Database
Properties	Opens the property window of the selected slave type. In the tree on the [Global GSD Database] tab, some property items can be changed. In the tree on the [Project GSD Database] tab, some property items can be read.	Page 58 Properties
Remove Type	Deletes the DP-Slave from the GSD database.	Page 60 Remove Type

■ Add Slave to Project

Operating procedure

1. Perform any of the operations described below to add the DP-Slave to a project.
 - Right-click the DP-Slave to be added to the project, and select "Add Slave to Project".
 - Double-click the DP-Slave to be added to the project.
 - Drag and drop the DP-Slave to be added to the project from the [Global GSD Database] tab to the "PROFIBUS Network" window.



2. The "Slave Settings" window is displayed. (☞ Page 85 Slave Settings)
3. When DP-Slave is set in the "Slave Settings" window, the DP-Slave is added to the "PROFIBUS Network" window, and the information on that DP-Slave is copied to the project file. The information on the DP-Slave that is copied to the project file can be checked in the [Project GSD Database] tab.

The DP-Slave information can be added or edited even when the project is opened on another personal computer because that information was copied to the project file.

When the project file contains the DP-Slave information of the selected type, the project file information is not changed.

Point

When the DP-Slave having a smaller FDL address than that of the existing DP-Slave is added, the buffer memory is re-assigned.

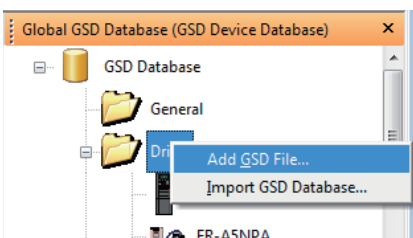
- When the parameter is changed, review the program and the refresh settings. (☞ Page 84 CPU Device Access)
- If the refresh settings are enabled, update the PROFIBUS labels again. (☞ Page 64 Update PROFIBUS Label)

■ Add GSD File

Operating procedure

1. Open the file to be added.

☞ [Global GSD Database] tab ⇒ Right-click ⇒ [Add GSD File]



2. The GSD file is analyzed and added to the GSD database.

When the GSD file refers to slave device images, PROFIBUS Configuration Tool automatically reads the images and saves them to the GSD database.

When applicable files do not exist, the default image is used alternatively. The image can be replaced with that unique to the device later. (☞ Page 58 Properties)

■ Import GSD Database

This item can be imported the DP-Slave information from the existing GSD database (.mdb), GSD export file (*.ext), or GXDP project file when the DP-Slave information of device type does not exist in the GSD database.

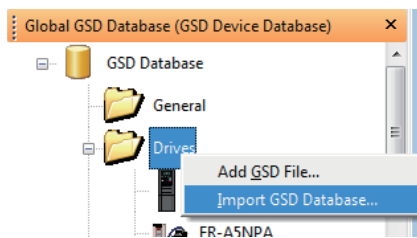
Point

The recommended method is to register the GSD (DDB) file to the GSD database using "AddGSDFile". If the information is imported using "Import GSD Database", the parameters in the old GSD (DDB) file may not be imported correctly.

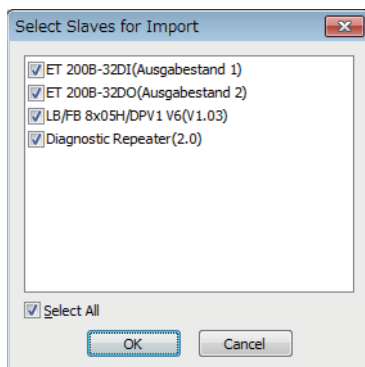
Operating procedure

1. Open the selection window.

[Global GSD Database] tab ⇒ Right-click ⇒ [Import GSD Database]



2. Displays the list of the slave types that do not exist in the GSD database out of the files selected for import on the "Select Slaves for Import" window.

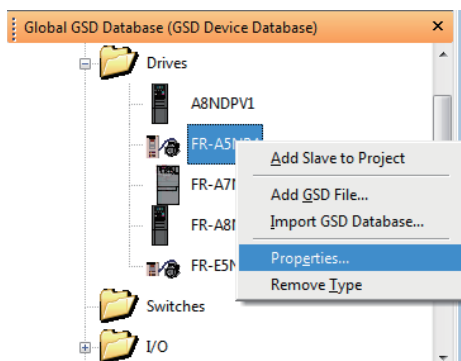


■ Properties

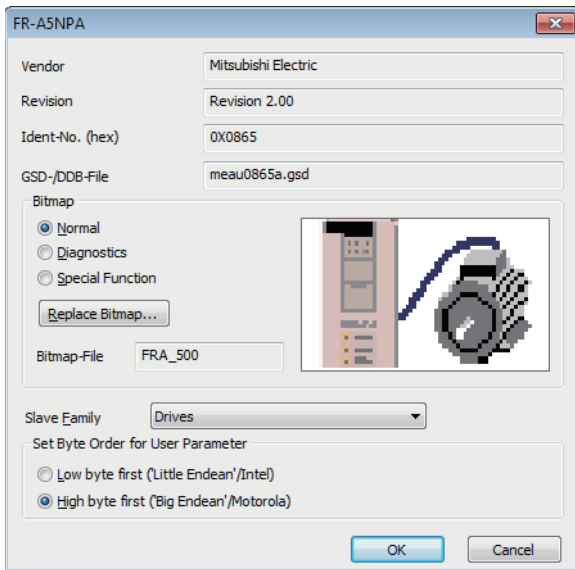
Operating procedure

1. Displays the property window of the selected slave type.

[Global GSD Database] tab ⇒ Right-click the module for which to edit information ⇒ [Properties]



2. Change the settings and click the [OK] button. The information in the GSD database is changed.



Item	Description
Vendor	Displays the manufacturer of the DP-Slave.
Revision	Displays the version of the GSD file of the DP-Slave or the version of the device.
Ident-No.	Displays the Ident No. of the DP-Slave in hexadecimal.
GSD-/DDB-File	Displays the name of the GSD file of the DP-Slave.
Bitmap	Displays or changes the image registered in the GSD database. <ul style="list-style-type: none"> • Normal^{*1}: The image for normal operation is displayed. • Diagnostics^{*1}: The image for diagnostics is displayed. • Special Function^{*1}: The image for special function is displayed.
[Replace Bitmap] button	Changes the image registered in the GSD database. Click this button to display the image data selection window. The specifications of images that can be registered are as follows. Other images cannot be displayed properly. <ul style="list-style-type: none"> • Height × width: 40 pixels × 70 pixels • Colors: 16 colors • Extension: .bmp or .dib
Bitmap-File	Displays the image name.
Slave Family	Selects the group of the module to be displayed in the [Global GSD Database] tab.
Set Byte Order for User Parameter ^{*2}	Changes the byte order (big-endian or little-endian) of user parameters set for the DP-Slave. ^{*3} <ul style="list-style-type: none"> • Low byte first ('Little Endean'/Intel): Little-endian • High byte first ('Big Endean'/Motorola): Big-endian

*1 The image set for "Normal" is displayed in the [Global GSD Database] tab and the [Project GSD Database] tab. The image set for "Diagnostics" or "Special Function" is not displayed.

*2 This item changes the byte order of user parameters. (☞ Page 85 Slave Settings)

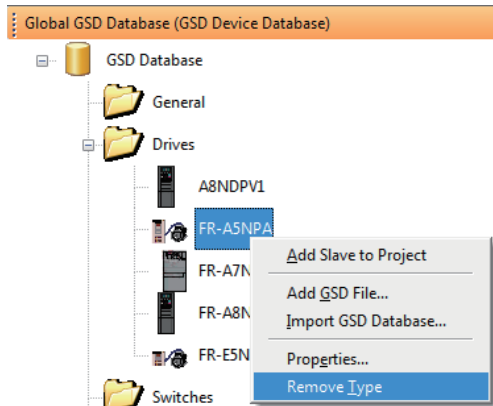
*3 For the byte order of newly added DP-Slaves, contact the manufacturer of each DP-Slaves. Improper change may cause malfunction or damage of the module.

■ Remove Type

Operating procedure

1. Display the confirmation window in the following operations.

 [Global GSD Database] tab ⇒ Right-click the module to be deleted ⇒ [Remove Type]



2. A confirmation window is displayed. Click the [Yes] button. The selected module is deleted from the GSD device database.

Point

The GSD file and the image of the device are not deleted. Delete those files manually.

[Project GSD Database] tab

Displays information on DP-Slaves in the current project file.



Right-clicking a folder or device type displays the following items.

Item	Description	Reference
Add/Replace GSD File	Directly adds the GSD file to a project, and replaces the existing entry of the same type as necessary.	Page 60 Add/Replace GSD File
Add Slave to Project	Adds the selected DP-Slave to a project. The DP-Slave can be added also by dragging and dropping the DP-Slave or double-clicking a node.	Page 57 Add Slave to Project
Properties	Opens the property window of the selected slave type. In the tree on the [Global GSD Database] tab, some property items can be changed. In the tree on the [Project GSD Database] tab, some property items can be read.	Page 58 Properties

■ Add/Replace GSD File

This item is used to directly add the GSD file to the specified project file. The [Global GSD Database] tab does not change.

Operating procedure

1. Open the file to be additionally registered/updated in the following operations.


 [Project GSD Database] tab ⇒ Right-click ⇒ [Add/Replace GSD File]

I/O Mapper

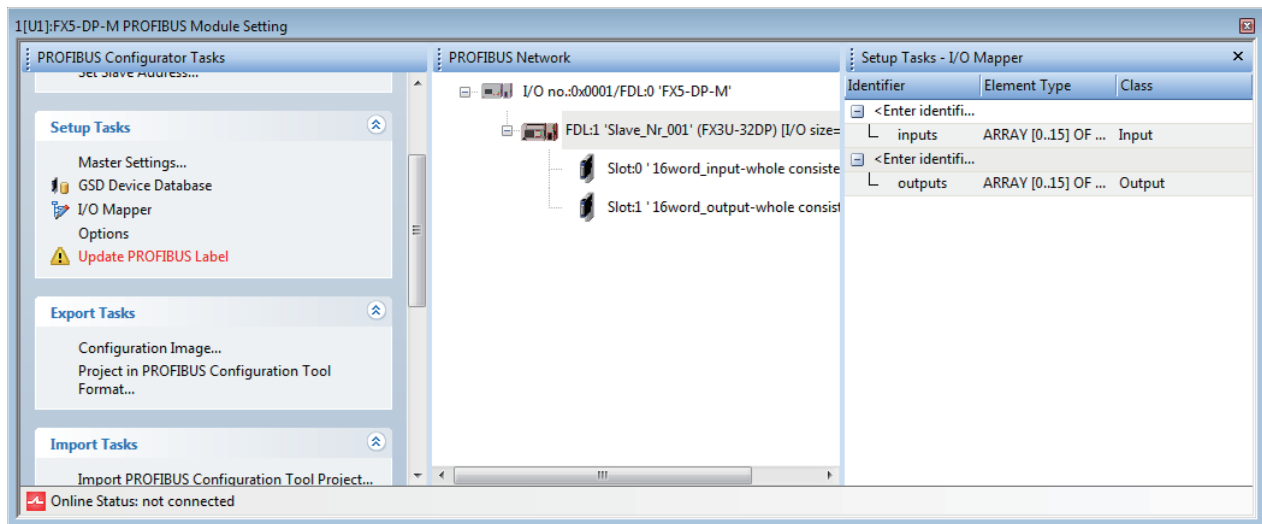
In I/O Mapping, names and data types can be edited for the DUT (structure) elements of the global labels created by updating the PROFIBUS labels.

Operating procedure

1. Display the "I/O Mapper" window.

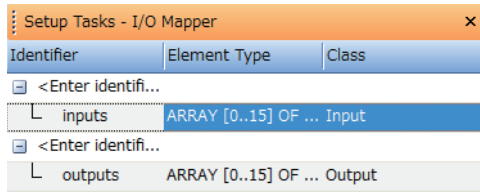
 [Task Panel] ⇨ [I/O Mapper]

2. DUT is displayed in the "I/O Mapper" window when the DP-Slave to be set or the module mounted on the DP-Slave is selected in the "PROFIBUS Network" window.



3. Edit the DUT elements. The DUT names and data types edited are applied in the DUT of global labels created when updating the PROFIBUS labels.

■ "I/O Mapper" window



Item	Description	Setting range
Identifier	Sets the global variable name and the DUT element name.	1 to 32 characters
Element Type	Sets the data type of the DUT element.	<ul style="list-style-type: none"> • ARRAY • BOOL • INT • WORD
Class	Sets the send direction of data handled by the DUT element. <ul style="list-style-type: none"> • Input: Input data (DP-Slave → CPU module) • Output: Output data (CPU module → DP-Slave) 	Refer to the left column.

Point

The DUT type name is automatically set as follows. It cannot be set manually.

stSLV<FDL address of DP-Slave>MOD<slot number>_<serial number>

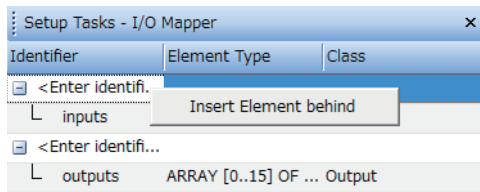
Example: Unit in slot 3 of the DP-Slave (FDL address 2): stSLV002MOD003_1

The configuration of DUT can be changed by inserting or deleting DUT elements.

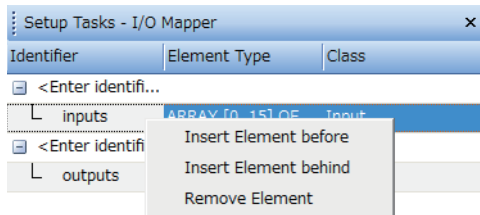
However, DUT elements cannot be inserted or deleted to/from the module of which DUT elements are fixed.

[I/O Mapper] ⇒ Right-click

- When a row of the DUT variable is selected



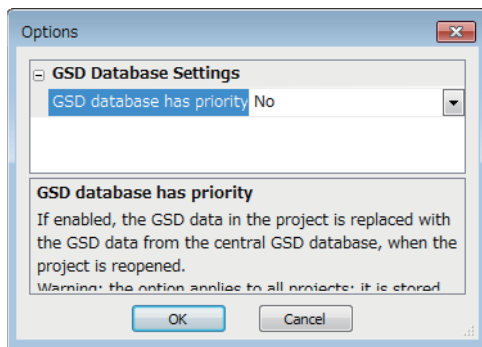
- When a row of the DUT element is selected

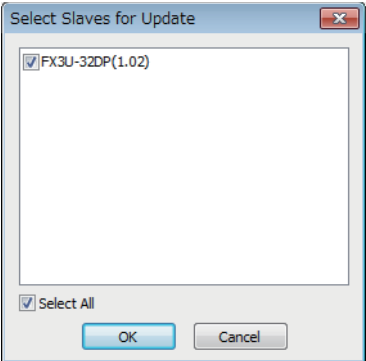


Item	Description
Insert Element before	Adds a new DUT element to the row above the selected DUT element. If the new DUT element is added after the second element, the initial settings are copied from the above DUT element and a serial number is added to the name.
Insert Element behind	Adds a new DUT element to the row below the selected DUT element. The initial settings are copied from the above DUT element and a serial number is added to the name.
Remove Element	Deletes the selected DUT element.


Options

Set the GSD file to be prioritized.

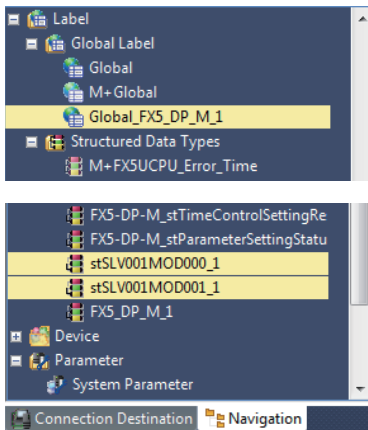


Item	Description	Setting range
GSD database has priority	<p>Select the GSD file to be prioritized if the same GSD file exists in both the project and the GSD database.</p> <ul style="list-style-type: none"> • No: Prioritizes the GSD file in the project. • Yes: Prioritizes the GSD file in the database. <p>If "Yes" is selected, the following window is displayed when opening the project.</p>  <ul style="list-style-type: none"> • OK: Information on the checked DP-Slaves is acquired from the GSD files in the GSD database. • Cancel: Information on all DP-Slaves is acquired from the GSD files in the project. <p>If a GSD file exists in the project or GSD database, the DP-Slave is not displayed in the above window. The GSD file in one of these locations is used.</p>	<ul style="list-style-type: none"> • No • Yes <p>(Default: No)</p>

Point

- If neither the project file nor the GSD database contains DP-Slave information, the project is not opened. Add the DP-Slave used in the project to the GSD database.
- If the GSD file in the project file is more recent than the GSD file in the GSD database, set "No" for "GSD database has priority".
- When the project is opened in GX Configurator-DP Version 6 or earlier, the GSD database is prioritized. If there is no DP-Slave information in the GSD database, the DP-Slave information is read from the GSD extraction file (*.ext). ( Page 58 Import GSD Database)

5. The following global labels and structures are created and displayed.



Precautions

- Do not change names of the created global labels and structures. If the names are changed, delete corresponding global labels and structures then update PROFIBUS label again.
- The number (_1,_2...) is added automatically to the ending for names of the created global labels and some structures. These numbers cannot change to any numbers since these numbers are used for identification in PROFIBUS Configuration Tool.

Do not register global labels and structures with the following names since they are used when PROFIBUS labels are updated.

If they are registered, PROFIBUS labels cannot be updated.

- Global labels with a name starting with "Global_FX5-DP-M..."
- Structures with a name starting with "FX5-DP-M..."
- Structures with a name starting with "stSLV..."

Restriction

The structures can be created up to 800. If the structures exceed 800, update of PROFIBUS labels have completed with an error.

In this case, delete the created structures (start with "FX5-DP-M...") manually. Uncheck the "Use label for slaves" in the "CPU Device Access" window then update PROFIBUS labels again. (➔ Page 84 CPU Device Access)

■ Creating an Unregistered Program

The program is created to change the data from byte arrays to word arrays by updating PROFIBUS labels.

Ex.

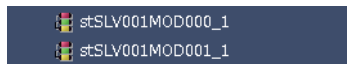
In the following system configurations, two bytes of data from slot 1 MT-Y16T are assigned to the top byte of the first word and the bottom byte of the second word in the buffer memory and separated as a word data.



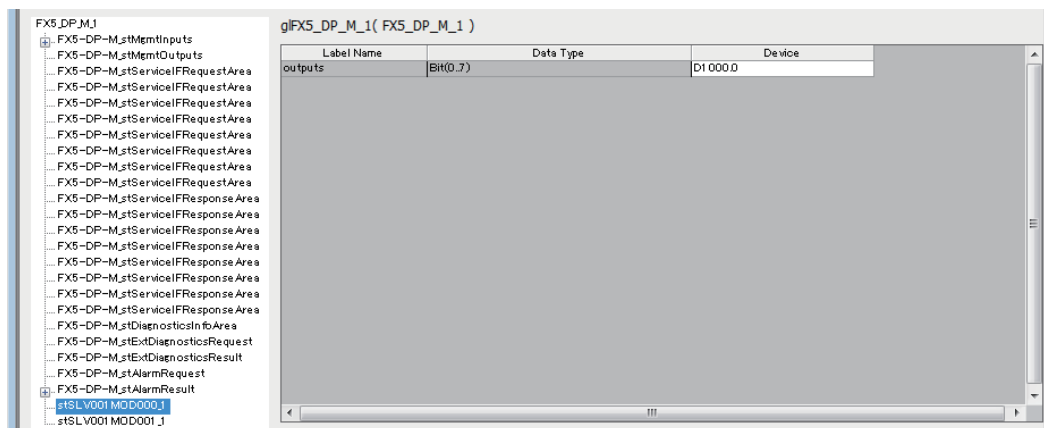
"Unregistered Program" that are auto generated when the PROFIBUS labels are updated are registered as "Scan". Create a program with the structures of these programs to enable I/O data to be assigned regardless of whether the data consists of a byte array or word array.

Operating procedure

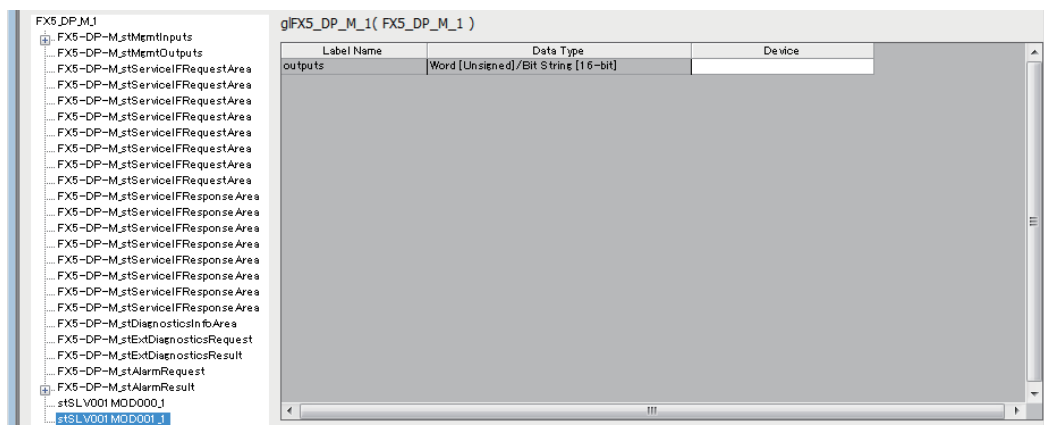
1. Update the PROFIBUS labels and check that the structures have been created and assigned.



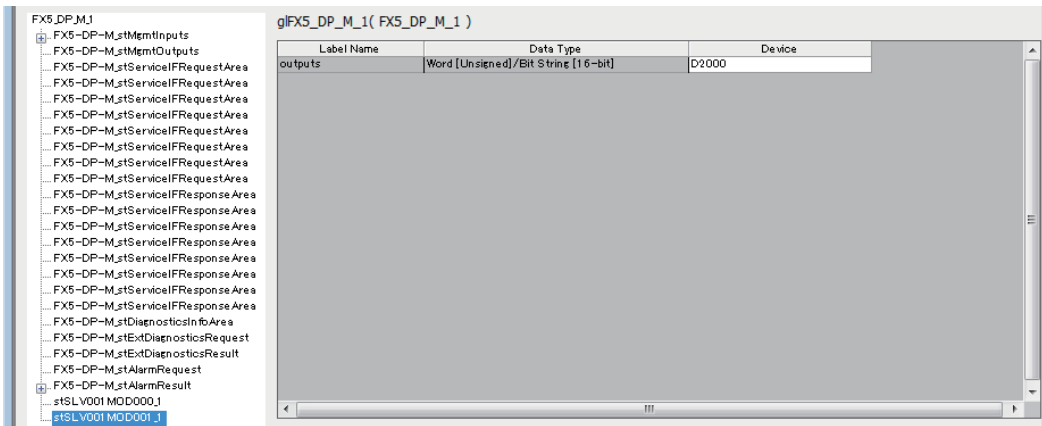
D1000.0 to D1000.7 are assigned to stSLV001_MOD000_1 for one byte of slot 0 MT-Y8T.



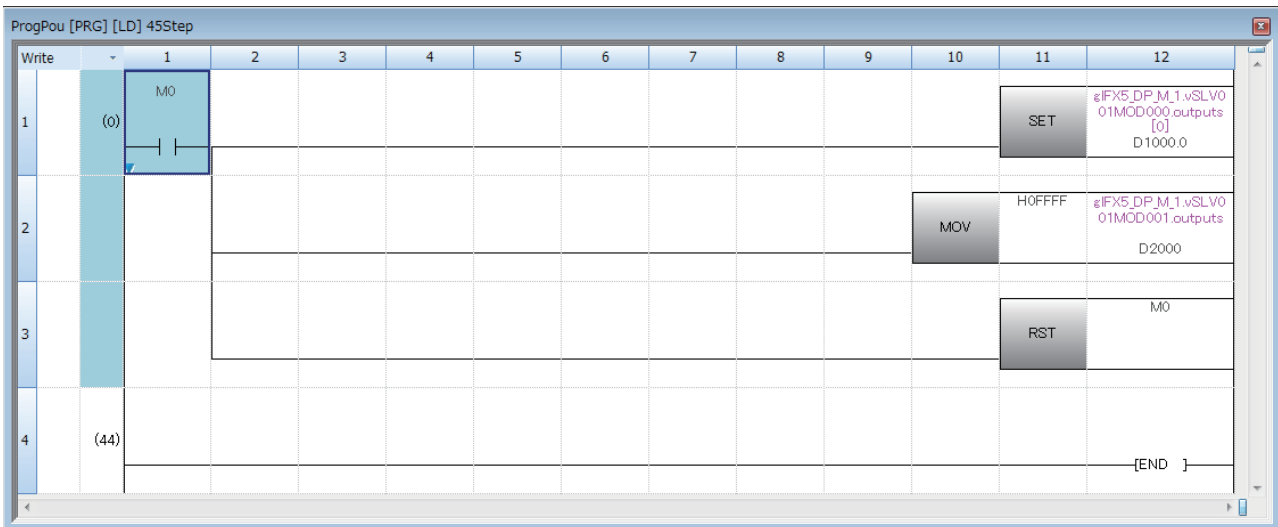
stSLV001_MOD001_1 is not assigned to the device but for two bytes of slot 1 MT-Y16T.



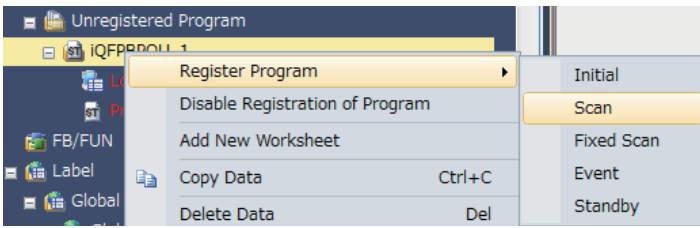
2. D2000 is assigned to stSLV001_MOD001_1.



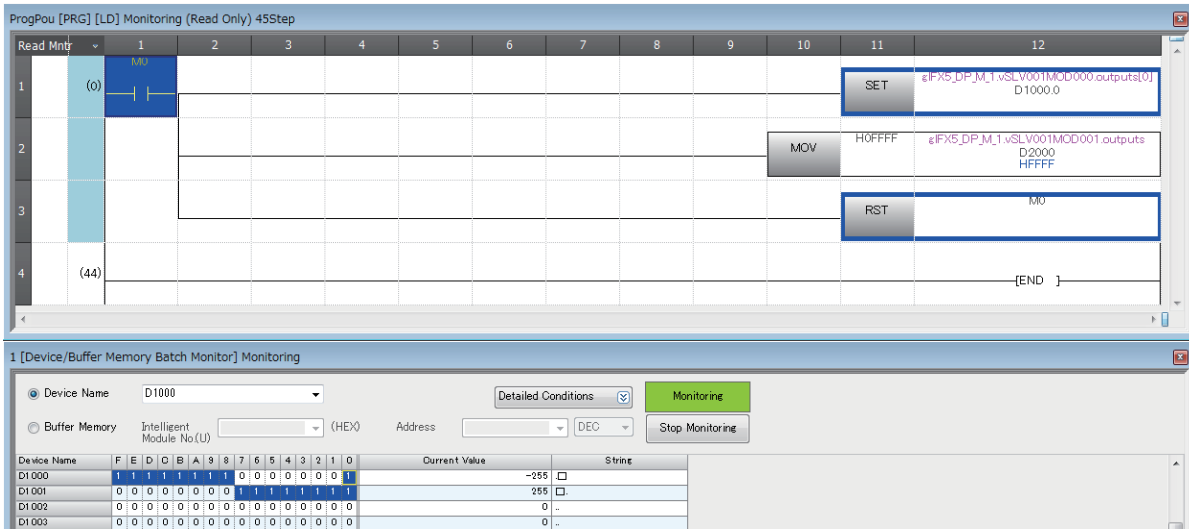
3. Create a program for output.



4. Right-click iQFPBPOU_1 in "Unregistered Program" and select "Scan" to register it.



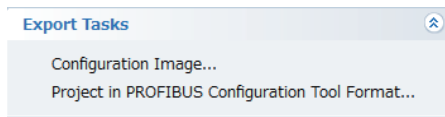
5. Check the operation.



The data of Slot 1 MT-Y16T which have been divided in bit arrays are combined and stored as word arrays by iQFPBPOU_1.

Export Tasks

This section describes the items for "Export Tasks".



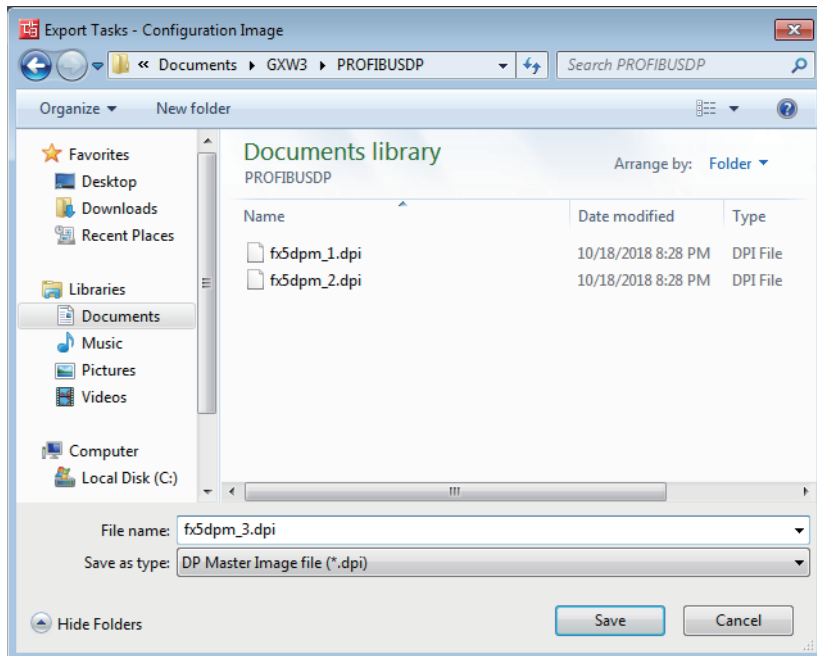
Item	Description
Configuration Image	Creates a configuration image, and saves it to a file.
Project in PROFIBUS Configuration Tool Format	Exports a project file in PROFIBUS Configuration Tool format.

Configuration Image

Creates a configuration image, and saves it to a file.

Clicking "Configuration Image" displays a window to select the save destination of the configuration image file created from the current project.

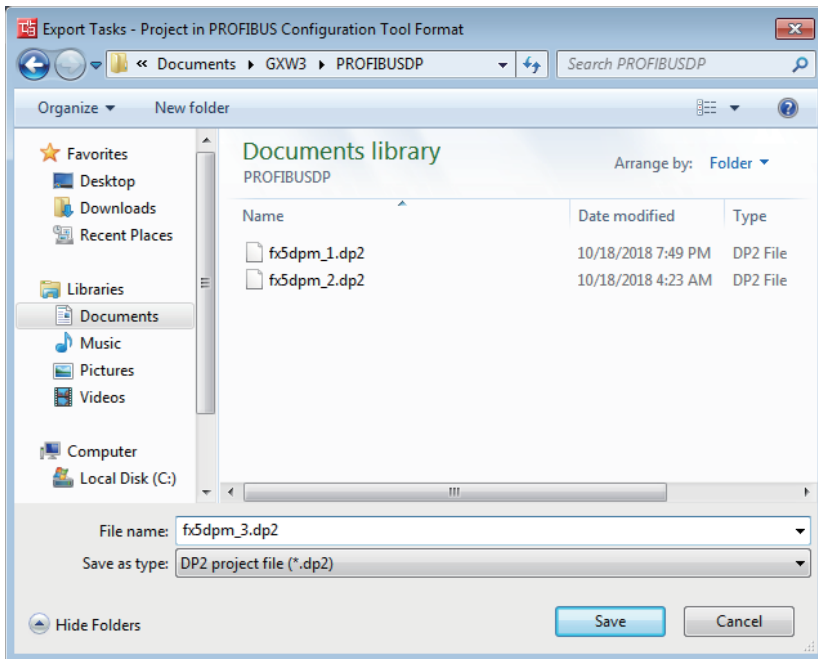
The content of the configuration image file is unique to each type of the DP-Master.



Project in PROFIBUS Configuration Tool Format

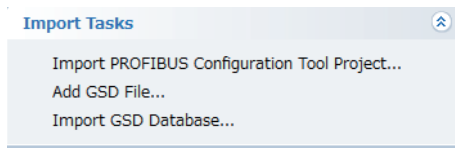
Exports a project file in PROFIBUS Configuration Tool format.

Clicking "Project in PROFIBUS Configuration Tool Format" displays a window to select the save destination of the current project.



Import Tasks

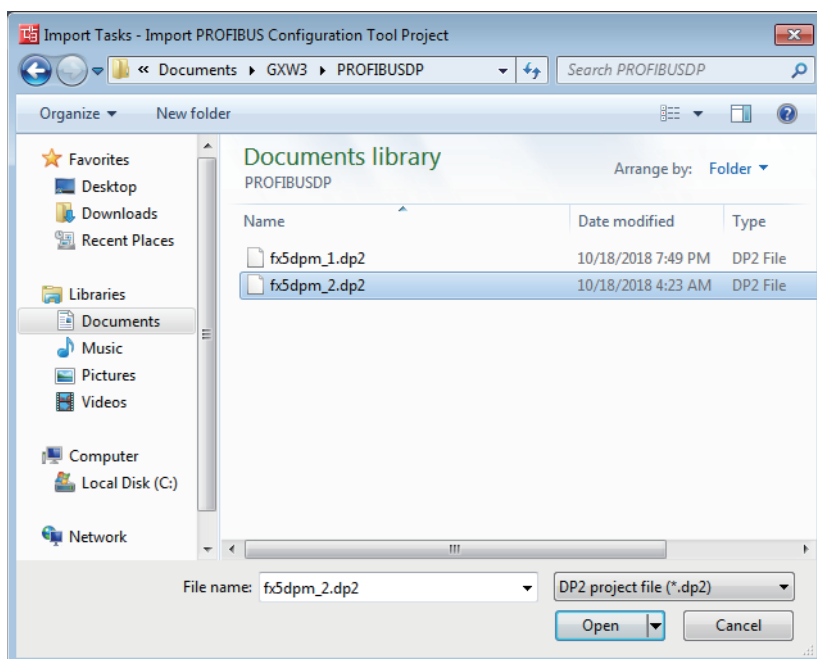
This section describes the items for "Import Tasks".



Item	Description
Import PROFIBUS Configuration Tool Project	Imports a PROFIBUS Configuration Tool project file.
Add GSD File	Adds the content of a GSD file to the device database.
Import GSD Database	Imports device types from the GSD database or the project file.

Import PROFIBUS Configuration Tool Project

Imports a PROFIBUS Configuration Tool project file.



Point

- The module number of the FX5-DP-M saved in the PROFIBUS Configuration Tool project is not imported. The module number set in GX Works3 takes priority.
- A project of the FX3U-64DP-M created in GX Configurator-DP can be imported. Before importing the project of the PROFIBUS master module other than the FX3U-64DP-M, convert it to the project of the FX3U-64DP-M using GX Configurator-DP.

Add GSD File

For "Add GSD File", refer to the following.

☞ Page 57 Add GSD File

Import GSD Database

For "Import GSD Database", refer to the following.

☞ Page 58 Import GSD Database

Documentation

This section describes the items for "Documentation".

Documentation ⤴

- Project Documentation
- Documentation of I/O-Mapping

Item	Description
Project Documentation	Displays the setting details of the project on the Web browser.
Documentation of I/O-Mapping	Displays the setting details of I/O Mapping on the Web browser.

Project Documentation

This item is used to display the setting details of the project on the Web browser.

The setting details can be printed or saved in HTML files using the corresponding function of the Web browser.

Module: 1[U1]:FX5-DP-M

Master: FX5-DP-M	
FDL address	0
Ident number	0x67C0
Module	FX5-DP-M
Vendor	MITSUBISHI ELECTRIC CORPORATION
Name	PROFIBUS Master
Baudrate in bps	1,500,000
Module slot	1
Goto 'Clear' state	no
Min. slave interval in ms	6.5
Polling timeout in ms	50
Maximum total input size in bytes	2048
Maximum total output size in bytes	2048
Slave Watchdog time	40 ms

CPU Device Access	
Block Transfer Input	D1000
Block Transfer Output	D1000
Data Transfer	AutoRefresh
PLC code options	All SDTs

Bus Parameter	
Baudrate (bps)	1,500,000
Slot Time (T_sl)	300
min T_sdr	11
max T_sdr	150
Quiet Time (T_qui)	0
Setup Time (T_set)	1
Target Rot. Time (T_tr)	8,250
GAP factor	10

Point

"Project Documentation" lists the modules selected on each DP-Slave.

"Slot index" shows the serial numbered index of the module.

The "Slot index" is displayed in the configuration tool of the DP-Slave as an example, so it may be different from the mounting slot number.

The "Slot index" is explained at the bottom of "Project Documentation".

Slot index	Module name	User parameter	Configuration data
0	16word_input-whole consistency		df
1	16word_output-whole consistency		ef

Slot index	The 'Slot index' is the sequential index of the module. It is not necessarily identical with its physical slot, as it is displayed for example by the configuration tool of the slave.
-------------------	--

Documentation of I/O-Mapping

This item is used to display the setting details of I/O Mapping on the Web browser.

The setting details can be printed or saved in HTML files using the corresponding function of the Web browser.

Module: 1[U1]:FX5-DP-M					
FDL Addr.	Name	Model	Modules		
			Slot	Model	
1	Slave_Nr_001	FX3U-32DP	0	16word_input-whole consistency	vSLV001MOD000
			1	16word_output-whole consistency	vSLV001MOD001

Global Labels	
Identifier	Element Type
glFX5-DP-M_1	FX5-DP-M_1

Struct Elements

Slave_Nr_001.Module Slot 0 : vSLV001MOD000

Element Identifier	Element Type	Class	Buffer MIT-Address
inputs	ARRAY [0..15] OF WORD	Input	D1000 (%MW0.1000)

Slave_Nr_001.Module Slot 1 : vSLV001MOD001

Element Identifier	Element Type	Class	Buffer MIT-Address
outputs	ARRAY [0..15] OF WORD	Output	D1016 (%MW0.1016)

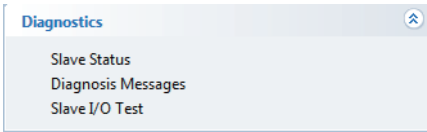


"Buffer MIT-Address" displays the CPU module device for the transfer source and transfer destination assigned to "CPU Device Access" in the "Master settings" window. (Page 84 CPU Device Access)

- When a bit device is assigned to the transfer buffer, the "Buffer MIT-Address" column for the bit device is left blank because I/O Mapping does not support the bit device.
- The "Buffer MIT-Address" column of the bit device is blank even when the refresh settings are disabled. Check that the buffer memory areas are assigned as 'Address information area' (Un\G22528 to Un\G22655), 'Input data start address area' (Un\G22784 to Un\G22847), and 'Output data start address area' (Un\G22912 to Un\G22975).

Diagnostics

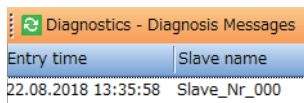
This section describes the items for "Diagnostics".



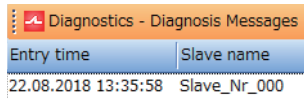
Item	Description
Slave Status	Checks the communication status of the PROFIBUS-DP network.
Diagnosis Messages	Check the diagnostic information from each DP-Slave.
Slave I/O Test	Tests the input/output of the DP-Slave by reading/writing the I/O data of the DP-Slave assigned to the buffer memory of the master module.

The current communication status is displayed via the window name icon for the windows opened by clicking each item.

- Online



- Offline



The "Diagnostics" function can be executed only during data exchange and when the structure is matched between the parameter settings of the DP-Master and the project.

Slave Status

Checks the communication status of the PROFIBUS-DP network.

All the device addresses in the PROFIBUS-DP network are displayed, and the DP-Slave statuses are indicated by corresponding colors.

Diagnostics - Slave Status

0	1	2	3	4	5	6	7	8	9
10					15	16	17	18	19
20					25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125				

Slave is inactive
 Slave has diag. messages
 Slave has link
 Slave has no link

Cycle time (in ms)
 Now 7
 Min 3
 Max 48

Item	Description
0 to 125	Displays the DP-Slave status. Number shown in each cell is an FDL address. <ul style="list-style-type: none"> • Light gray: This FDL address is unused. • Dark gray: This DP-Slave is set as a reserved station. • Yellow: This DP-Slave has diagnostic information. • Green: Data exchange is in progress. • Red: Data exchange with the slave station has failed. Diagnostic information may be displayed in the "PROFIBUS Diagnosis" window. By double-clicking a colored rectangle, the detailed information is displayed in a tooltip.
Cycle time	Displays the bus cycle time. (Unit: ms) <ul style="list-style-type: none"> • Now: Current bus cycle time value • Min: Minimum bus cycle time value • Max: Maximum bus cycle time value
Start	Starts refresh of the window.
Stop	Stops refresh of the window.

Diagnosis Messages

Check the diagnostic information from each DP-Slave.

Entry time	Slave name	FDL address	Status	Message
22.08.2018 11:20:17	Slave_Nr_000	1	!	Exchange with the slave can

Item	Description
Entry time	Displays the occurrence date and time of the diagnostic information.
Slave name	Displays the name specified for "Name" in the "Slave Settings" window.
FDL address	Displays the FDL address of the DP-Master or DP-Slave that has the diagnostic information or the extended diagnostic information.
Status	Displays "!" when the diagnostic information is issued.
Message	Displays the details of the diagnostic information.
Start	Starts refresh of the window.
Stop	Stops refresh of the window.
Clear	Deletes all diagnostic information.
Export	Exports the diagnostic information as a CSV file.

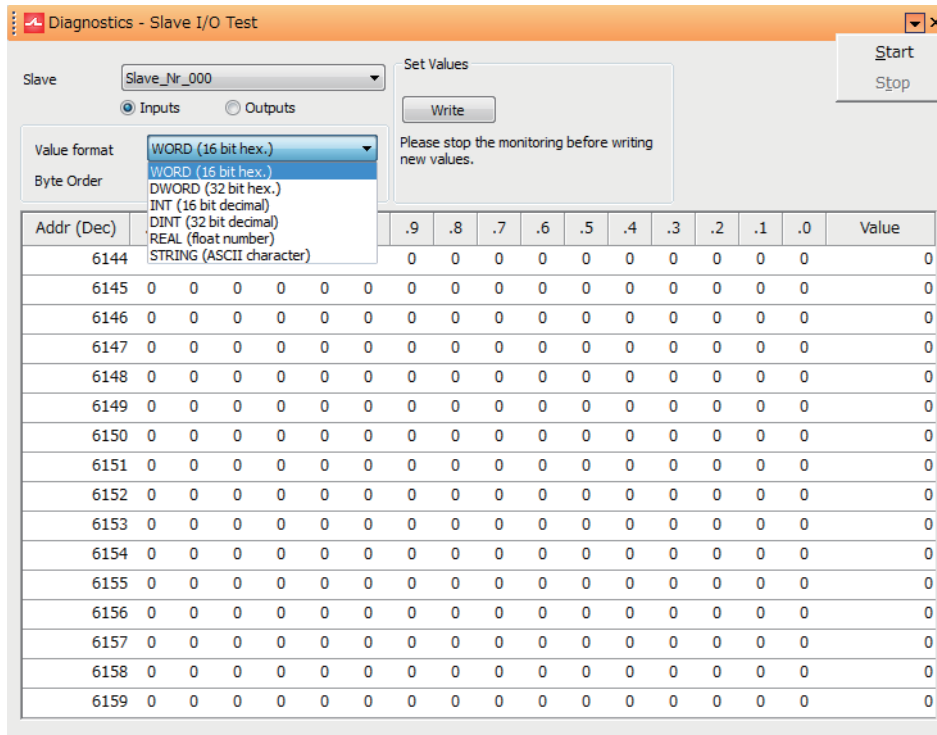
Point

Up to 1000 messages can be displayed in the "Diagnosis Messages" window.

- It is possible that a diagnostic message from a slave generates more than one entry in the message list.
- When the number of messages exceeds 1000, the oldest message is deleted and a new message is added.

Slave I/O Test

Monitor and edit the I/O data of the DP-Slave assigned to the buffer memory of the master module.



Item	Description																																															
Slave	Selects the monitor target DP-Slave.																																															
Inputs/Outputs	Selects the monitor target data. <ul style="list-style-type: none"> Inputs: Input data Outputs: Output data 																																															
Value format	Selects the data type of the "Value". <ul style="list-style-type: none"> WORD (16 bit hex.): One word unsigned hexadecimal DWORD (32 bit hex.): Two word unsigned hexadecimal INT (16 bit decimal): One word signed decimal DINT (32 bit decimal): Two word signed decimal REAL (float number): Two words STRING (ASCII character): ASCII character 																																															
Byte Order	Selects the byte order (big-endian or little-endian) of the "Value". <ul style="list-style-type: none"> Low byte first ('Little Endean'/Intel): The lower byte consists of the lower address High byte first ('Big Endean'/Motorola): The upper byte consists of the lower address 																																															
[Write] button	Writes the values changed using ".F to .0" or "Value" to the buffer memory of the master module. This button can be used while monitoring is stopped.																																															
Addr	Displays the decimal buffer memory address of the master module of the monitor target data.																																															
Start	Starts refresh of the window.																																															
Stop	Stops refresh of the window.																																															
.F to .0	Displays each bit of the monitor target data. When the buffer memory value is changed during monitoring, the changed value is displayed in red bold font. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Addr (Dec)</th> <th>.F</th> <th>.E</th> <th>.D</th> <th>.C</th> <th>.B</th> <th>.A</th> <th>.9</th> <th>.8</th> <th>.7</th> <th>.6</th> <th>.5</th> <th>.4</th> <th>.3</th> <th>.2</th> <th>.1</th> <th>.0</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>14336</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1 0</td> <td>2</td> </tr> </tbody> </table> </div> <p>To apply the changes to the buffer memory, double-click the changed value while monitoring is stopped, and click the [Write] button. Upon applying the changes to the buffer memory of the master module, the bold font returns to the regular font. To check the buffer memory address and the bit position, move the mouse pointer to the cell.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>.6</th> <th>.5</th> <th>.4</th> <th>.3</th> <th>.2</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p>Word 14336.Bit 6</p> </div>	Addr (Dec)	.F	.E	.D	.C	.B	.A	.9	.8	.7	.6	.5	.4	.3	.2	.1	.0	Value	14336	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 0	2	.6	.5	.4	.3	.2	0	1	0	0	0
Addr (Dec)	.F	.E	.D	.C	.B	.A	.9	.8	.7	.6	.5	.4	.3	.2	.1	.0	Value																															
14336	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 0	2																														
.6	.5	.4	.3	.2																																												
0	1	0	0	0																																												

Item	Description																																				
Value	<p>Displays the value of the monitor target data in the data type selected for "Value format".</p> <p>When the buffer memory value is changed during monitoring, the value is displayed in red bold font.</p> <table border="1"> <thead> <tr> <th>.4</th> <th>.3</th> <th>.2</th> <th>.1</th> <th>.0</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1F</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>8</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> </tbody> </table> <p>To enter a value, double-click a cell while the monitoring is stopped.</p> <table border="1"> <thead> <tr> <th>.0</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> </tr> </tbody> </table> <p>To apply the changes to the buffer memory, click the [Write] button.</p> <p>Upon applying the changes to the buffer memory of the master module, the bold font returns to the regular font.</p>	.4	.3	.2	.1	.0	Value	1	1	1	1	1	1F	0	0	0	0	1	1	0	1	0	0	0	8	0	0	0	0	1	1	.0	Value	0	0	0	0
.4	.3	.2	.1	.0	Value																																
1	1	1	1	1	1F																																
0	0	0	0	1	1																																
0	1	0	0	0	8																																
0	0	0	0	1	1																																
.0	Value																																				
0	0																																				
0	0																																				

During monitoring, values that have been changed since the first update are displayed in red bold font.

When the monitoring is stopped, values remain highlighted until the monitoring is resumed or the buffer is edited.

.4	.3	.2	.1	.0	Value
0	1	0	1	0	B000A
0	1	0	1	1	
0	1	1	0	0	D000C
0	1	1	0	1	

When the communication between the personal computer and the CPU module is disconnected during monitoring, the background of the table turns light red to show that the content of the table is not updated.

.2	.1	.0	Value
0	0	0	0
0	0	0	0
0	0	0	0

Changed values during editing are displayed in black bold font.

Upon successfully completing the writing of values to the PROFIBUS-DP module, all the highlight displays are cleared.

.5	.4	.3	.2	.1	.0	Value
0	1	0	0	0	0	10
0	0	0	1	0	1	5
0	0	0	0	1	1	3
0	0	0	0	0	0	0

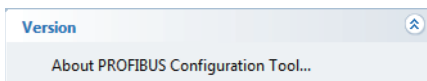
Point

When the data exchange is started, the slave input in the buffer memory is overwritten. Therefore, the table may not indicate the actual buffer content.

In addition, when the CPU module is not stopped, the output may be overwritten by the program or the refresh.

Version

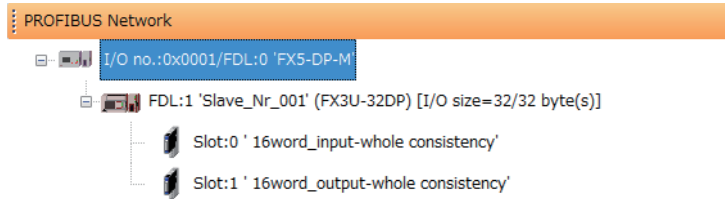
This section describes the items for "Version".



Item	Description
About PROFIBUS Configuration Tool	Displays the version of PROFIBUS Configuration Tool. (Page 91 Checking the Software Version)

8.3 "PROFIBUS Network" window

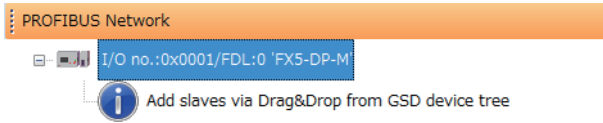
This section describes the tree display of modules comprising the PROFIBUS-DP network.



Type	Icon	Description
DP-Master	Icon for the FX5-DP-M	I/O: <module number>/FDL:<FDL address> '<model name>' • Display example I/O: no.:0x0001//FDL:0 'FX5-DP-M'
DP-Slave	Icon unique to the slave type acquired from the device database	FDL: <FDL address> '<slave name>' (<model name>) [I/O size=<input byte size>/<output byte size> byte(s)] • Display example FDL: 1 'Slave_Nr_001' (FX3U-32DP) [I/O size=32/32 byte(s)]
Module	Fixed icon common to all the module types	Slot: <slot number (serial numbered index)> '<model name>' • Display example Slot: 0 '16word_input-whole consistency'

Point

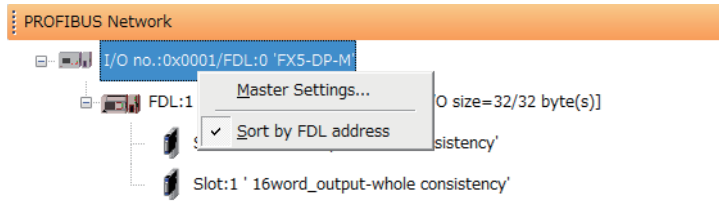
- The tree for a newly created project contains a master module. DP-Slaves are not contained. To add DP-Slaves to the project, refer to an information icon that appears under the master module. This information icon is automatically deleted when the DP-Slave is added to the project.



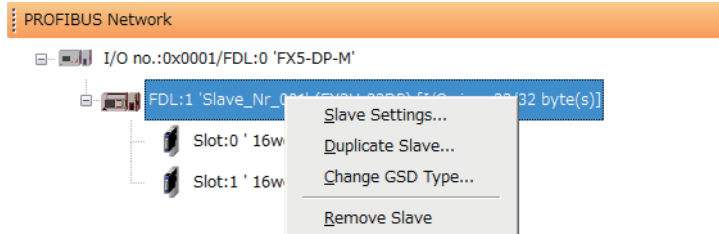
- When multiple DP-Slaves are added to the project, they are set in order of their FDL address.

The following describes the functions that can be operated by right-clicking the "PROFIBUS Network" window.

- For the DP-Master



- For the DP-Slave



Item	Description	Reference
Master Settings	Displays the "Master Settings" window. The "Master Settings" window is also displayed by double-clicking the DP-Master.	<ul style="list-style-type: none"> • Page 81 Master Settings • Page 83 Bus Parameter Settings • Page 84 CPU Device Access
Sort by FDL address	Sets the display order of DP-Slaves. <ul style="list-style-type: none"> • Checked: Displays DP-Slaves in ascending order of the FDL address. • Not checked: Displays DP-Slaves in alphabetical order of the station name. 	—
Slave Settings	Displays the "Slave Settings" window. The "Slave Settings" window is also displayed by double-clicking the DP-Slave or dragging and dropping to the "PROFIBUS Network" window in [Global GSD Database] tab of DP-Slave.	Page 85 Slave Settings
Duplicate Slave	Duplicates the DP-Slave.	—
Change GSD Type	Changes the GSD type of the DP-Slave.	—
Remove Slave	Deletes the DP-Slave.	—

Precautions

Set the master parameter, bus parameter and slave parameter values so that the following conditions are met.

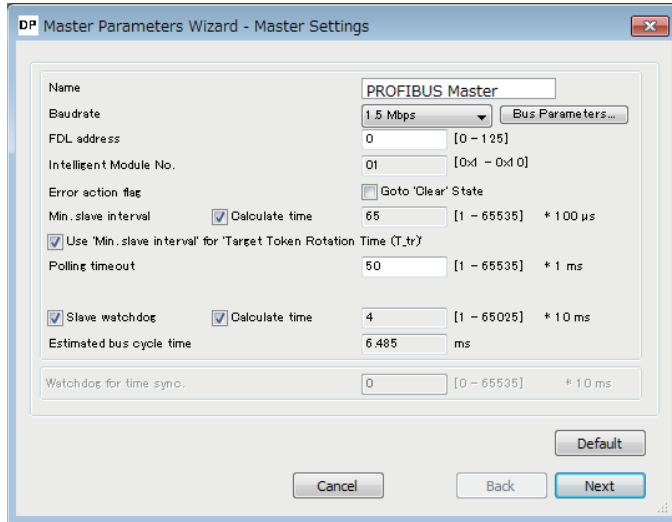
They can be set for PROFIBUS Configuration Tool when these conditions are met.


- "Min. slave interval" in the master parameters < "Slave watchdog" in each slave parameter
- "Min. slave interval" in the master parameters < upper limit of DP-Master GSD file
- "min T_sdr" in the bus parameters < "max T_sdr" in the bus parameters
- "Quiet Time (T_qui)" in the bus parameters < "min T_sdr" in the bus parameters
- "max T_sdr" in the bus parameters < "T_sl" in the bus parameters
- "T_sl" in the bus parameters < "Target Rot. Time (T_tr)"
- "Target Rot. Time (T_tr)" in the bus parameters < "Slave watchdog" in each slave parameter


Master Settings

Set the master parameters (transmission speed, FDL address, or other items of the DP-Master).

 [PROFIBUS Network] ⇒ Right-click the master module ⇒ [Master Settings]




Item	Description	Setting range	
Name	Sets the master module name.	1 to 16 alphanumeric characters	
Baudrate	Sets the transmission speed of the PROFIBUS-DP network. All the DP-Slaves should support the transmission speed to be set. Turn off the power of the DP-Slave when changing the transmission speed. When the power is turned off, the DP-Slave synchronize to the new transmission speed.	9.6kbps to 12Mbps (Default: 1.5Mbps)	
[Bus Parameters] button	Sets the bus parameters. For the bus parameters, refer to the following.  Page 83 Bus Parameter Settings	—	
FDL address	Sets the FDL address.	0 to 125 (Default: 0)	
Intelligent Module No.	Displays the mounting position of this module.	—	
Error action flag/Goto 'Clear' State	Checks this box to send the clear request to all the DP-Slaves from the DP-Master. When a communication error has occurred even on one DP-Slave, the clear request is sent to all the DP-Slaves. • Not checked: Not send the clear request to all the DP-Slaves. • Checked: Sends The clear request to all the DP-Slaves.	• Checked • Not checked (Default: Not checked)	
Min. slave interval	—	Sets the minimum time required from the slave polling cycle to the next slave polling cycle. (Unit: 100µs) This setting value is effective against all the DP-Slaves connected.	1 to 65535
	Calculate time	Checks this box to automatically set "Min. slave interval" based on the predicted bus cycle time.	• Checked • Not checked (Default: Not checked)
Use 'Min. slave interval' for 'Target Token Rotation Time (T_tr)'	Checks this box to automatically set "Min. slave interval" to the value set for "Target Rot. Time (T_tr)" of the bus parameter. When multiple DP-Masters exist in the PROFIBUS-DP network, checking this box is not necessary. T_tr is set to the sum of "Min. slave interval" of all the DP-Masters.	• Checked • Not checked (Default: Checked)	
Polling timeout	Sets the maximum time required for the requester to receive the response during communications between DP-Masters. (Unit: 1 ms)	1 to 65535 (Default: 50)	
Slave watchdog	—	Check this box to collectively set the watchdog timer for all the DP-Slaves.	• Checked • Not checked (Default: Checked)
	Calculate time	• Checked: Sets automatically an optimal value for "Slave watchdog". • Not checked: Sets an any value for "Slave watchdog". (Unit: 10ms, default: 3) The automatically set value is five times of estimated bus cycle time or "Min.slave interval".	• Checked • Not checked (1 to 65025) (Default: Checked)

Item	Description	Setting range
Estimated bus cycle time	<p>Displays the predicted minimum interval of the bus cycle time. (Unit: ms) ( Page 162 Bus cycle time)</p> <p>The bus cycle time becomes longer than the time displayed when communication or acyclic communication with other master module is performed.</p> <p>When "Min. slave interval" or "Slave watchdog" uses the value displayed in this item, set sufficient time in consideration of time required for communication or acyclic communication with other master module.</p>	—
Watchdog for time sync.	Sets the time for monitoring the transmission interval of the clock data from the time master. (Not support)	—

Bus Parameter Settings

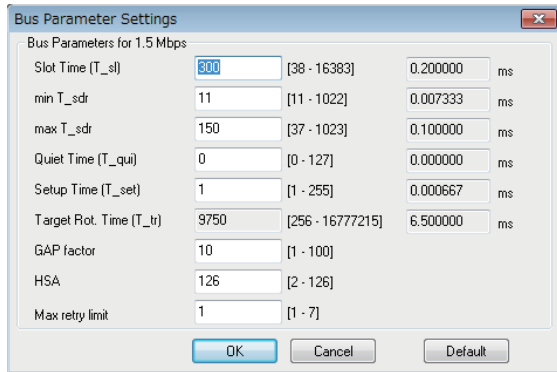
Sets the bus parameters of the PROFIBUS-DP network.


 [Master Settings] ⇒ [Bus Parameters] button

Point


Normally, use the default bus parameters.

To change the bus parameters, knowledge about the PROFIBUS-DP standards is required.



Item	Description	Setting range
Slot Time (T_sl)	Sets the slot time (ms) (the maximum time for waiting responses). (Unit: TBit) ^{*1} When the time set for this item is exceeded, an error is resulted.	38 to 16383 (Default: 300)
min T_sdr	Sets the minimum response time (ms) of the DP-Slave. (Unit: TBit) ^{*1}	11 to 1022 (Default: 11)
max T_sdr	Sets the maximum response time (ms) of the DP-Slave. (Unit: TBit) ^{*1}	37 to 1023 (Default: 150)
Quiet Time (T_qui)	Sets the time required for switching the send direction of the repeater. (Unit: TBit) ^{*1} Set this item to 0 when the repeater is not used.	0 to 127 (Default: 0)
Setup Time (T_set)	Sets the setup time. (Unit: TBit) ^{*1}	1 to 255 (Default: 1)
Target Rot. Time (T_tr)	Sets the target token rotation time. (Unit: TBit) ^{*1} Sets automatically the time when checked "Use 'Min. slave interval' for 'Target Token Rotation Time (T_tr)'" in the "Master Settings" window (default setting). When the box is unchecked, set the time manually. ( Page 81 Master Settings)	256 to 16777215 (Default: The "Min. slave interval" value of TBit) ^{*2}
GAP factor	Sets the constant for controlling the GAP update time (T_gud).	1 to 100 (Default: 10)
HSA	Sets the maximum FDL address of DP-Slaves in the line.	2 to 126 (Default: 126)
Max retry limit	Sets the maximum number of retries for each send data.	1 to 7 (Default: 1)

*1 TBit is a unit in which 1 indicates the time it takes to send one bit of data. When a TBit value is input for each item, it is automatically converted to ms and the converted value is displayed by "ms" on the right side. For the conversion method, refer to the following.

 Page 162 Bus cycle time

*2 For the "Min. slave interval" setting, refer to the following.

 Page 81 Master Settings

Precautions

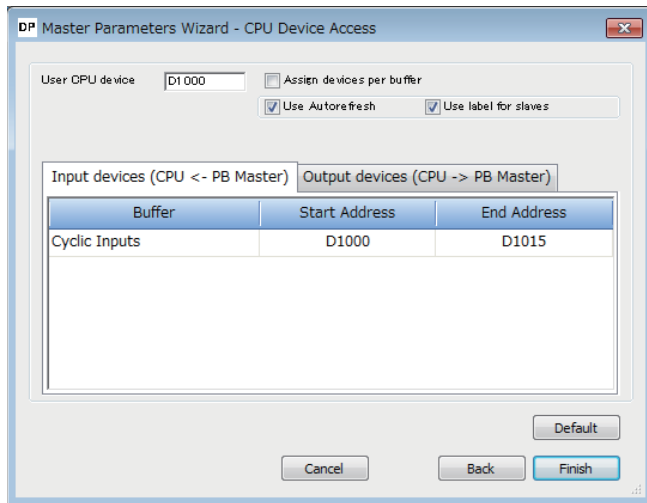
The max T_sdr, Quiet Time (T_qui) and Setup Time (T_set) settings in the bus parameters must match the maximum values of devices connected to the PROFIBUS-DP network, including the DP-Master. The default values are as follows.

Item	Transmission speed					
	9.6kbps, 19.2kbps, 93.75kbps, 187.5kbps	500kbps	1.5Mbps	3Mbps	6Mbps	12Mbps
max T_sdr	60	100	150	250	450	800
Quiet Time (T_qui)	0	0	0	3	6	9
Setup Time (T_set)	1	1	1	4	8	16

CPU Device Access

This item is used to make the refresh settings.
 Check the "Use Autorefresh" to enable this item.

 [Master Settings] ⇨ [Next] button




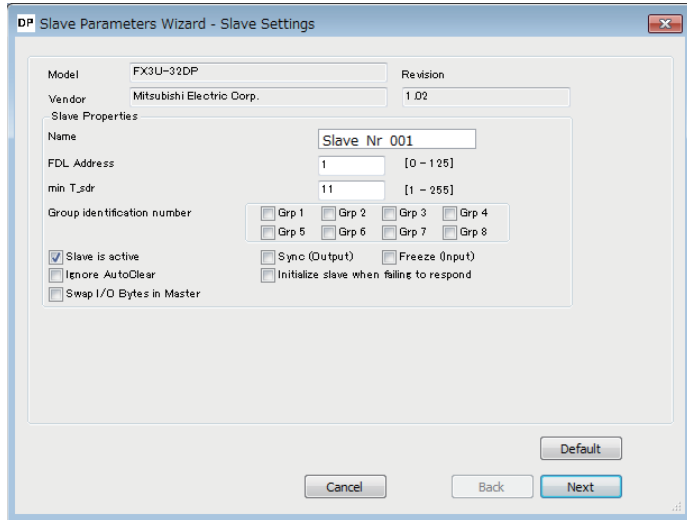
Item	Description	Setting range	
User CPU device	Sets the start address of the CPU module acting as the transfer source device or the transfer destination device. With the device set as the start device, the range of each buffer memory area is automatically assigned. The set devices will be disabled when "Assign devices per buffer" is checked.	The following devices can be set.*1 • D • W • R (Default: D1000)	
Assign devices per buffer	Selects a method for assigning refresh settings. • Not checked: Batch assignment Assigns devices to each buffer memory area in a batch. • Checked: Individual assignment Individually assigns devices to each buffer memory area.	• Checked • Not checked (Default: Not checked)	
Use Autorefresh	Selects enabling/disabling of the refresh settings. • Not checked: The refresh settings are disabled. • Checked: The refresh settings are enabled.	• Checked • Not checked (Default: Checked)	
Use label for slaves	Selects whether the DP-Slave structures are created or not. • Checked: Creates the DP-Slave structures. • Not checked: Not create DP-Slave structures. This item can be selected only when the "Use Autorefresh" is checked. If not, "Use Autorefresh" is fixed to unchecked.	• Checked • Not checked (Default: Checked)	
[Input devices (CPU <- PB Master)] tab, [Output devices (CPU -> PB Master)] tab	Buffer	Displays the buffer memory area of the FX5-DP-M acting as the transfer source device or the transfer destination device. • Cyclic Inputs: Configured by the device number to which the input data of the DP-Slave is copied from 'Input data area' (UnG6144 to UnG7167). • Cyclic Outputs: Configured by the device number from which the output data of the DP-Slave is copied to 'Input data area' (UnG14336 to UnG15359).	—
	Start Address	Sets the start address of the CPU module acting as the transfer source device or the transfer destination device. The set values will be disabled when "Assign devices per buffer" is not checked.	The following devices can be set.*1 • D0 to D7999 • W0 to W1FF • R0 to R32767 (Default: Refer to the following.) • Input devices (CPU <- PB Master) tab: D1000 • Output devices (CPU -> PB Master) tab: D1000 + input word size
	End Address	Displays the last address of the CPU module acting as the transfer source device or the transfer destination device.	—

*1 Note that the setting range does not exceed each device range of the CPU module.
 When "Use label for slaves" is unchecked, any number can be entered as the device range with PROFIBUS Configuration Tool even the number is out of range. However, if the number is out of device range, an error code 2221H: parameter error appears.

Slave Settings

Set the slave parameters.

 [PROFIBUS Network] ⇒ Right-click the DP-Slave ⇒ [Slave Settings]



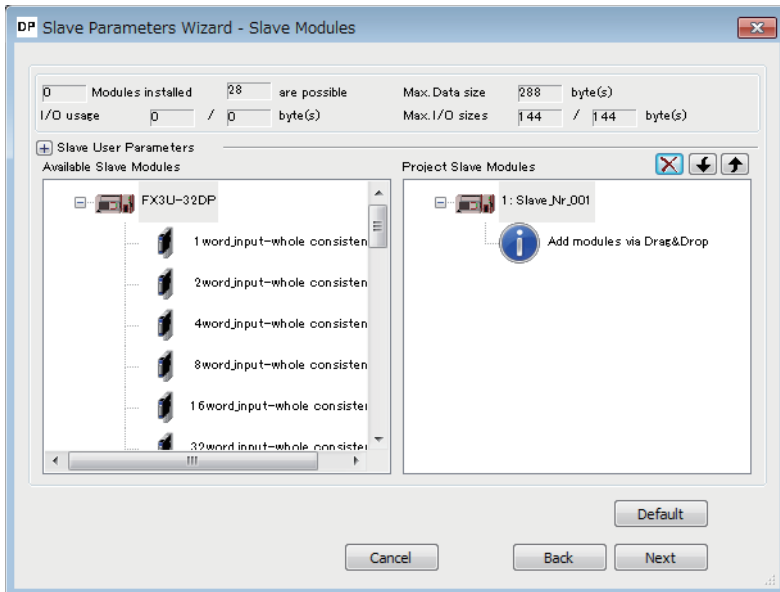
Item	Description	Setting range
Model	Displays the model name of the DP-Slave.	—
Vendor	Displays the manufacturer of the DP-Slave.	—
Revision	Displays the version of the GSD file or that of the device.	—
Name	Sets the name of the DP-Slave.	Up to 16 alphanumeric characters
FDL Address	Sets the FDL address.	0 to 125
min T_sdr	Sets the minimum response time for sending the response frame from the DP-Slave to the master module. Do not change this setting.	1 to 255
Group identification number	Sets the group number (Grp 1 to Grp 8) of the DP-Slave. Multiple group numbers can be set. The group number set in this item is used for the global control function service (SYNC, UNSYNC, FREEZE, and UNFREEZE). • Not checked: Not belong to the relevant group number. • Checked: Belongs to the relevant group number.	<ul style="list-style-type: none"> • Not checked • Checked (Default: Not checked)
Slave is active	Unchecks this box to set the DP-Slave as a reserved station. • Not checked: Sets the DP-Slave as a reserved station. • Checked: Sets the DP-Slave as the station that performs data exchange.	<ul style="list-style-type: none"> • Not checked • Checked (Default: Checked)
Sync (Output)	Checks this box to check whether the DP-Slave supports the SYNC function during initialization communications. When the DP-Slave does not support the SYNC function, the diagnostic information is stored in 'Diagnostic information area' (Un\G23072 to Un\G23199) of the master module. This item can be set when the DP-Slave supports this function. • Not checked: Not perform the function check. • Checked: Perform the function check.	<ul style="list-style-type: none"> • Not checked • Checked (Default: Not checked)
Freeze (Input)	Checks this box to check whether the DP-Slave supports the FREEZE function during initialization communications. When the DP-Slave does not support the FREEZE function, the diagnostic information is stored in 'Diagnostic information area' (Un\G23072 to Un\G23199) of the master module. This item can be set when the DP-Slave supports this function. • Not checked: Not perform the function check. • Checked: Perform the function check.	<ul style="list-style-type: none"> • Not checked • Checked (Default: Not checked)
Ignore AutoClear	Checks this box when a clear request is not sent by a communication error detect of the DP-Slave since the setting in the "Error action flag" of the master parameter is to send it to all DP-Slaves in a communication error occurrence. (Page 81 Master Settings) • Not checked: Enables the "Error action flag" setting. • Checked: Disables the "Error action flag" setting.	<ul style="list-style-type: none"> • Not checked • Checked (Default: Not checked)

Item	Description	Setting range
Initialize slave when failing to respond	Checks this box to resend the parameters from the DP-Master to the DP-Slave upon recovery of the DP-Slave from a communication error. <ul style="list-style-type: none"> • Not checked: Not resend the parameters to the DP-Slave. • Checked: Resends the parameters to the DP-Slave. 	<ul style="list-style-type: none"> • Not checked • Checked (Default: Not checked)
Swap I/O Bytes in Master	Checks this box to swap the I/O data of the DP-Slave in the buffer memory of the FX5-DP-M. (☞ Page 32 Data Swap Function) <ul style="list-style-type: none"> • Not checked: Not swap the I/O data. • Checked: Swaps the I/O data. 	<ul style="list-style-type: none"> • Not checked • Checked (Default: Not checked)


Slave Modules

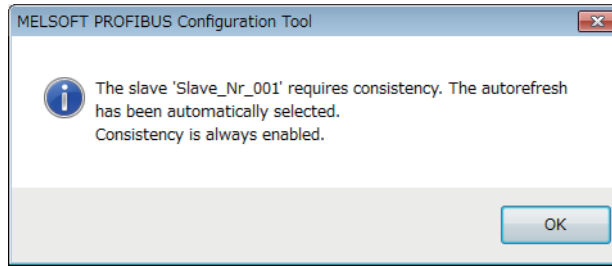
Sets the configuration of the module mounted on the DP-Slave.

☞ [Slave Settings] ⇒ [Next]





Item	Description
Modules installed	Displays the number of modules added to "Project Slave Modules".
are possible	Displays the maximum number of modules that can be added to "Project Slave Modules".
Max. Data size	Displays the maximum data capacity of the DP-Slave (in bytes).
I/O usage	Displays the total number of I/O points of modules added to "Project Slave Modules" (in bytes). The number of input points is displayed on the left, and the number of output points is displayed on the right.
Max. I/O sizes	Displays the maximum number of I/O points of the DP-Slave (in bytes). The number of input points is displayed on the left, and the number of output points is displayed on the right.
Slave User Parameters	Switches display/hidden for "User_Prm_Data usage" and "Max. User_Prm_Data size" by clicking [+/-] button.
User_Prm_Data usage	Displays the buffer memory occupying size for the user parameter of the DP-Slave in bytes.
Max. User_Prm_Data size	Displays the maximum value for the user parameter of the DP-Slave.
Available Slave Modules	Displays the list of modules that can be added. When the module is not described in the GSD file, "Universal" is displayed. In this case, refer to the following. ☞ Page 88 Universal modules
Project Slave Modules	Lists the nodes and the module names of the added modules. When the module is not described in the GSD file, "Universal" is displayed. In this case, refer to the following. ☞ Page 88 Universal modules

If the following window is displayed when the settings are completed, set "Data consistency" in the module parameters to "Enable (Use Autorefresh)". If not, the I/O data may be separated. ( Page 33 Data Consistency Function)



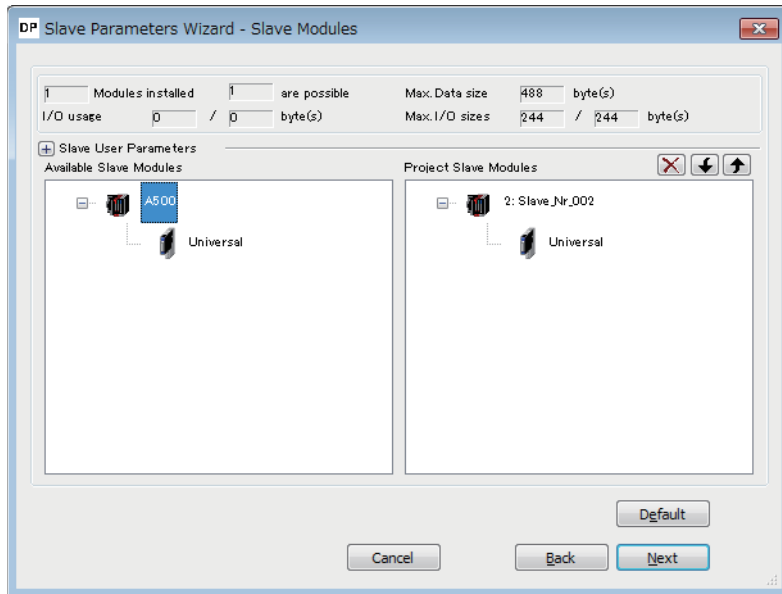
The methods to change the module configuration are listed below.

Item	Description
To add a module to the DP-Slave	<p>Performs any of the following operations.</p> <ul style="list-style-type: none"> • Drag and drop the module to be added to the DP-Slave from "Available Slave Modules" to "Project Slave Modules". • Double-click the module to be added in "Available Slave Modules". • Right-click the module to be added in "Available Slave Modules", and select [Add Module to Slave].
To delete a module from the DP-Slave	<p>Performs any of the following operations.</p> <ul style="list-style-type: none"> • Select the module to be deleted in "Project Slave Modules", and click the [×] button. • Select the module to be deleted in "Project Slave Modules", and press the [Delete] key on the keyboard.
To change the configuration order of the module	<p>Performs any of the following operations.</p> <ul style="list-style-type: none"> • Drag and drop the module of which configuration order is changed in "Project Slave Modules". • In "Project Slave Modules", select the module of which configuration order is changed, and click the [↓] button or the [↑] button.

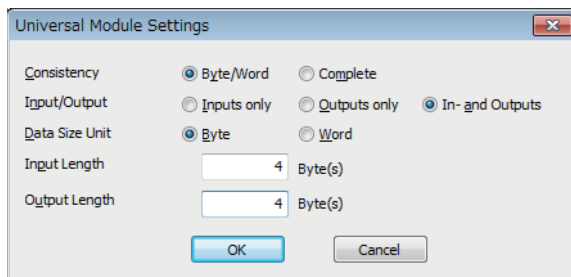
- Adding or deleting a slave module changes the buffer memory address of the I/O data of the master module.
- When the parameter is changed, review the program and the refresh settings. ( Page 84 CPU Device Access)
 - If the refresh settings are enabled, update the PROFIBUS labels again. ( Page 64 Update PROFIBUS Label)

■ Universal modules

When the module is not described in the GSD file, the module name is displayed as "Universal".



The following items can be set when the module displayed as "Universal" is double-clicked in "Project Slave Modules".



Item	Description	Setting range
Consistency	Selects the I/O data unit used for the data consistency function. The data consistency function can be enabled in the "Master Settings" window. For the "Master Settings" window, refer to the following. 📖 Page 81 Master Settings <ul style="list-style-type: none"> • Byte/Word: The data consistency is maintained in bytes or words. • Complete: The data consistency of the entire I/O data of this module is maintained. 	—
Input/Output	Selects the I/O data type handled by the module. <ul style="list-style-type: none"> • Inputs only: Handles input data. • Outputs only: Handles output data. • In- and Outputs: Handles input and output data. 	—
Data Size Unit	Selects the I/O data unit that is set with "Input Length" or "Output Length".	—
Input Length	Sets the input data size. This item can be set when "Inputs only" or "In- and Outputs" is selected in "Input/Output".	0 to 16 (Unit varies depending on the "Data Size Unit" setting.)
Output Length	Sets the output data size. This item can be set when "Outputs only" or "In- and Outputs" is selected in "Input/Output".	0 to 16 (Unit varies depending on the "Data Size Unit" setting.)


Point

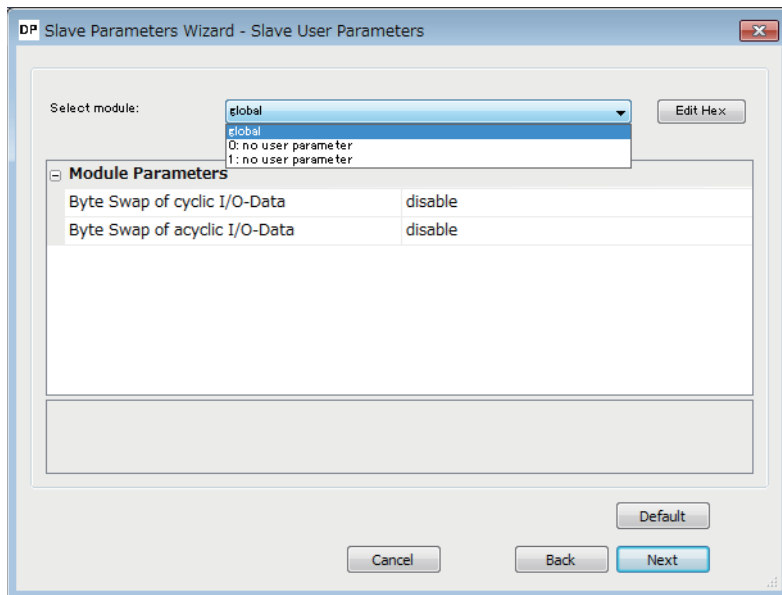
When the number of I/O points of the module displayed as "Universal" is set, check that the settings are made properly referring to the following. If the settings are incorrect, the module may not operate properly.


Manual for the DP-Slave

Slave User Parameters

Set the user parameters of the DP-Slave.

 [Slave Modules] ⇒ [Next]

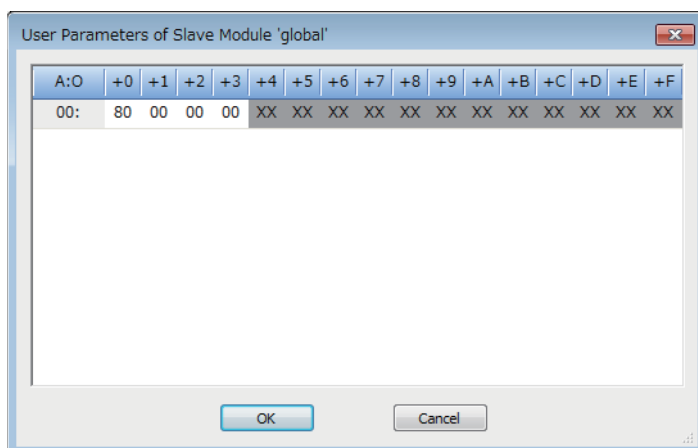


Item	Description
Select module	Selects the module of which user parameters are set.
[Edit Hex] button	By inputting numbers, directly edits the user parameters of the module selected for "Select module". ( Page 89 User Parameters of Slave Module)
Module Parameters	Sets the user parameters.

User Parameters of Slave Module

Directly edit the user parameters of the DP-Slave by inputting numbers.

 [Slave User Parameters] ⇒ [Edit Hex] button



Point

Note that knowledge about the user parameters is required for editing the user parameters in the "User Parameters of Slave Module" window.

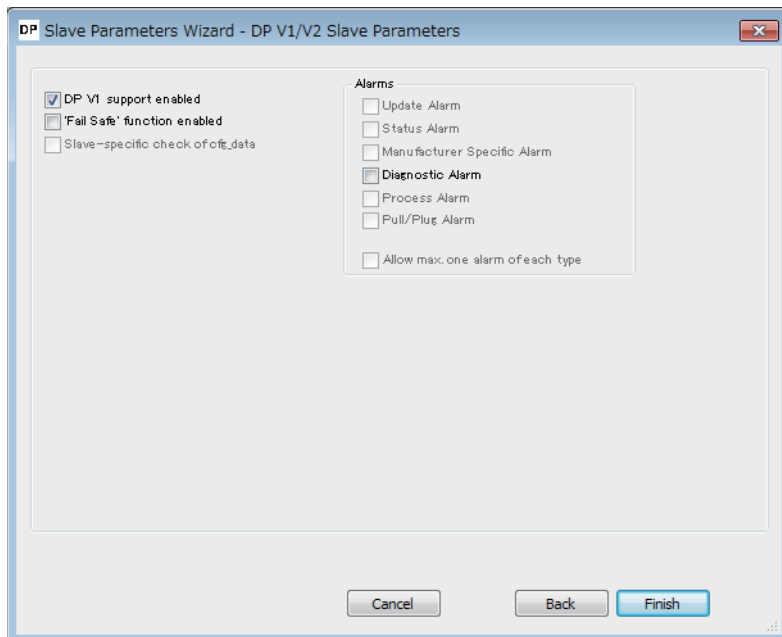
Improper edit may not operate the module.

For details on the user parameter configuration, contact the manufacturer of the DP-Slave.

DP V1/V2 Slave Parameters

Set the slave parameters for the PROFIBUS-DPV1 functions.

 [Slave User Parameters] ⇨ [Next]



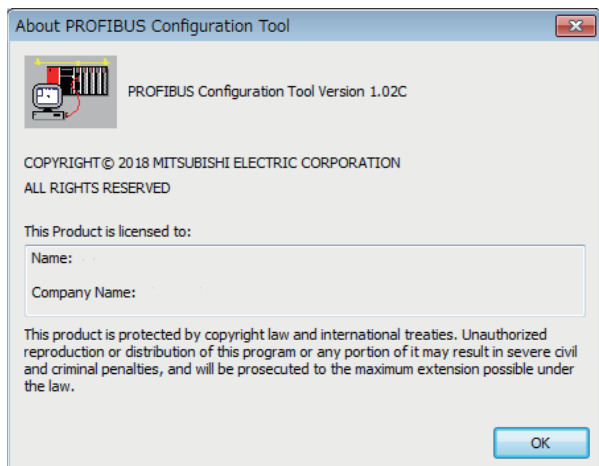
Item	Description
DP V1 support enabled	Checks this box to use the PROFIBUS-DPV1 function. <ul style="list-style-type: none"> • Not checked: The PROFIBUS-DPV1 function is disabled. • Checked: The PROFIBUS-DPV1 function is enabled.
'Fail Safe' function enable	Checks this box to turn the DP-Slave into the 'Fail Safe' state when the clear request is sent from the DP-Master. This item can be set when the DP-Slave supports this function. This item is fixed to "Checked" depending on the DP-Slave used. For the 'Fail Safe' state setting, refer to the following. Manual for the DP-Slave <ul style="list-style-type: none"> • Not checked: Not turn into the 'Fail Safe' state. • Checked: Turns into the 'Fail Safe' state.
Slave-specific check of cfg_data	Check this box when the parameter check method of the DP-Slave is different from that of the standard function of the PROFIBUS. This item can be set when the DP-Slave supports this function. For the parameter check method, refer to the following. Manual for the DP-Slave <ul style="list-style-type: none"> • Not checked: Performs the PROFIBUS standard parameter check. • Checked: Performs the parameter check specific to the DP-Slave.
Update Alarm	Check this box to allow Update Alarm to be sent. This item can be set when the DP-Slave supports this function. This item is fixed to "Checked" depending on the DP-Slave used. <ul style="list-style-type: none"> • Not checked: Prohibits sending of Update Alarm. • Checked: Allows sending of Update Alarm.
Status Alarm	Check this box to allow Status Alarm to be sent. This item can be set when the DP-Slave supports this function. This item is fixed to "Checked" depending on the DP-Slave used. <ul style="list-style-type: none"> • Not checked: Prohibits sending of Status Alarm. • Checked: Allows sending of Status Alarm.
Manufacturer Specific Alarm	Check this box to allow Manufacturer Specific Alarm to be sent. This item can be set when the DP-Slave supports this function. This item is fixed to "Checked" depending on the DP-Slave used. <ul style="list-style-type: none"> • Not checked: Prohibits sending of Manufacturer Specific Alarm. • Checked: Allows sending of Manufacturer Specific Alarm.
Diagnostic Alarm	Check this box to allow Diagnostic Alarm to be sent. This item can be set when the DP-Slave supports this function. This item is fixed to "Checked" depending on the DP-Slave used. <ul style="list-style-type: none"> • Not checked: Prohibits sending of Diagnostic Alarm. • Checked: Allows sending of Diagnostic Alarm.

Item	Description
Process Alarm	<p>Check this box to allow Process Alarm to be sent.</p> <p>This item can be set when the DP-Slave supports this function.</p> <p>This item is fixed to "Checked" depending on the DP-Slave used.</p> <ul style="list-style-type: none"> • Not checked: Prohibits sending of Process Alarm. • Checked: Allows sending of Process Alarm.
Pull/Plug Alarm	<p>Check this box to allow Pull/Plug Alarm to be sent.</p> <p>This item can be set when the DP-Slave supports this function.</p> <p>This item is fixed to "Checked" depending on the DP-Slave used.</p> <ul style="list-style-type: none"> • Not checked: Prohibits sending of Pull/Plug Alarm. • Checked: Allows sending of Pull/Plug Alarm.
Allow max. one alarm of each type	<p>Check this box to acquire alarms of each type one by one when the DP-Slave detects multiple types of alarms.</p> <p>This item can be set when the DP-Slave supports this function.</p> <p>This item is fixed to "Checked" depending on the DP-Slave used.</p> <ul style="list-style-type: none"> • Not checked: Acquires alarms in chronological order (maximum eight alarms). • Checked: Acquires alarms of each type one by one (maximum six alarms).

8.4 Checking the Software Version

Check the software version of PROFIBUS Configuration Tool in the following window of PROFIBUS Configuration Tool.

 [Version] ⇒ [About PROFIBUS Configuration Tool]



9 PROGRAMMING

This chapter describes the programming for the PROFIBUS-DP network.

- ☞ Page 100 Program Example of Data Exchange Function
- ☞ Page 101 Program Example of the Diagnostic Information Acquisition Function
- ☞ Page 102 Program Example of the Acquisition Function of Extended Diagnostic Information
- ☞ Page 103 Program Example of the Global Control Function
- ☞ Page 107 Program Example of Acyclic Communication (Acyclic Communication)
- ☞ Page 109 Program Example of the Alarm Acquisition Function

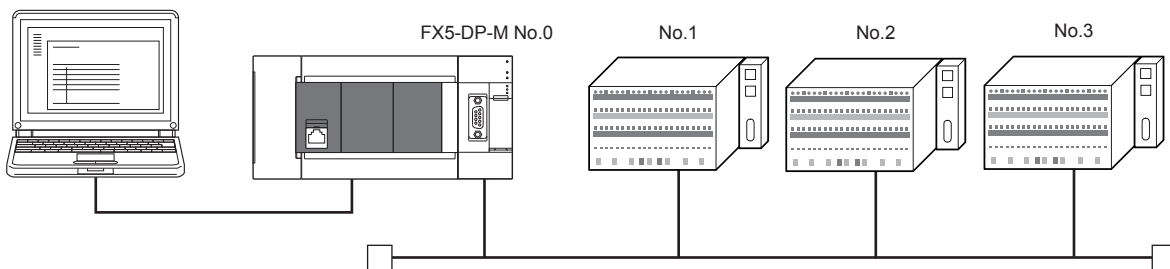
Point

The Acyclic communication function cannot execute with global control function. When used in conjunction with these functions, configure an interlock circuit in the program.

9.1 System Configuration Example

This section describes a program example for the PROFIBUS-DP network using the following system configuration.

System configuration



FDL address	Station types
No.0	DP-Master (FX5 CPU module + FX5-DP-M)
No.1	DP-Slave
No.2	DP-Slave
No.3	DP-Slave

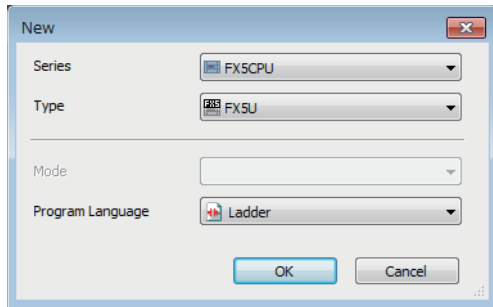
9.2 DP-Master settings

Connect the GX Works3 to the CPU module of the DP-Master, and set the parameters.

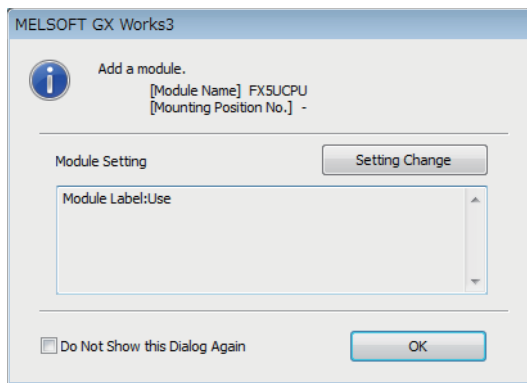
Create a new project

1. Set the CPU module as follows.


 [Project] ⇒ [New]

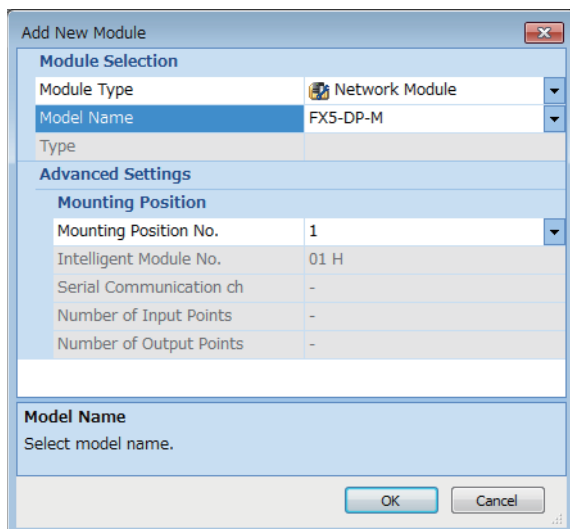


2. Click the [OK] button to add the module label of the CPU module.




3. Set the FX5-DP-M as follows.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Right-click ⇒ [Add New Module]



4. To enable the data consistency function, set the items in "Basic Setting" as follows.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [Module Parameter] ⇒ [Basic Setting]

Item	Setting Value
<input checked="" type="checkbox"/> Data Exchange Setting <i>Consistency</i>	Enable (Use Autorefresh)

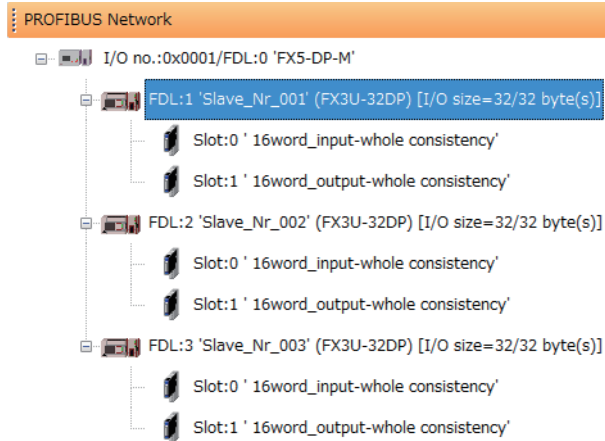
PROFIBUS module setting

1. Start PROFIBUS Configuration Tool from the GX Works3.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [PROFIBUS Module Setting]

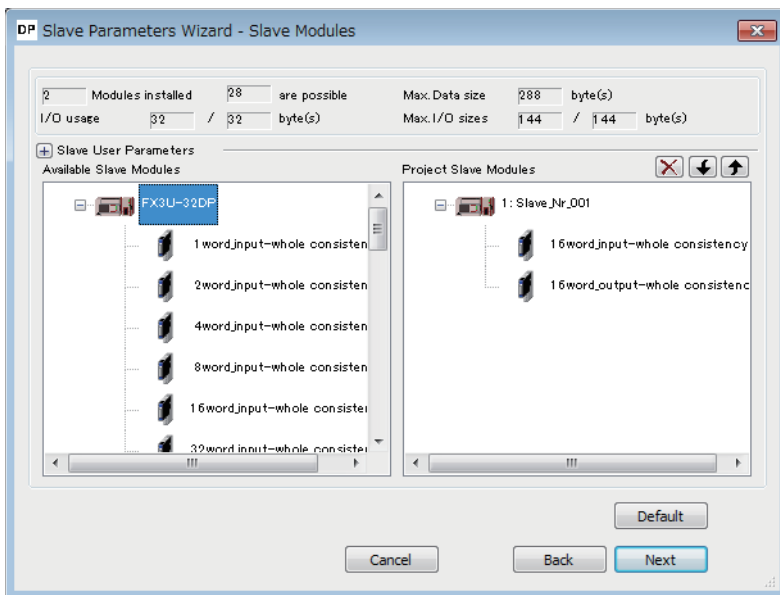
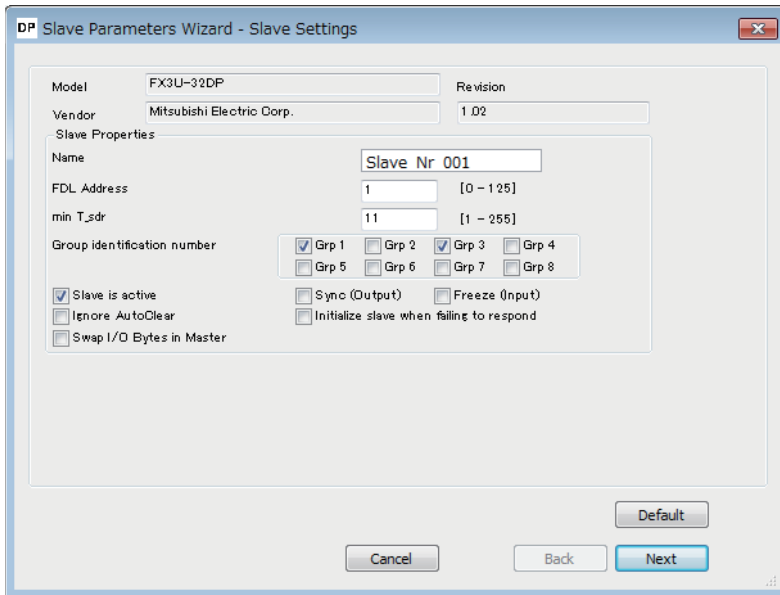
2. Add DP-Slaves to the project. When the DP-Slave to be added is not in [Global GSD Database] tab, add GSD file of DP-Slave to GSD database.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [PROFIBUS Module Setting] ⇒ [Global GSD Database] tab ⇒ Target DP-Slave ⇒ Right-click ⇒ [Add Slave to Project]

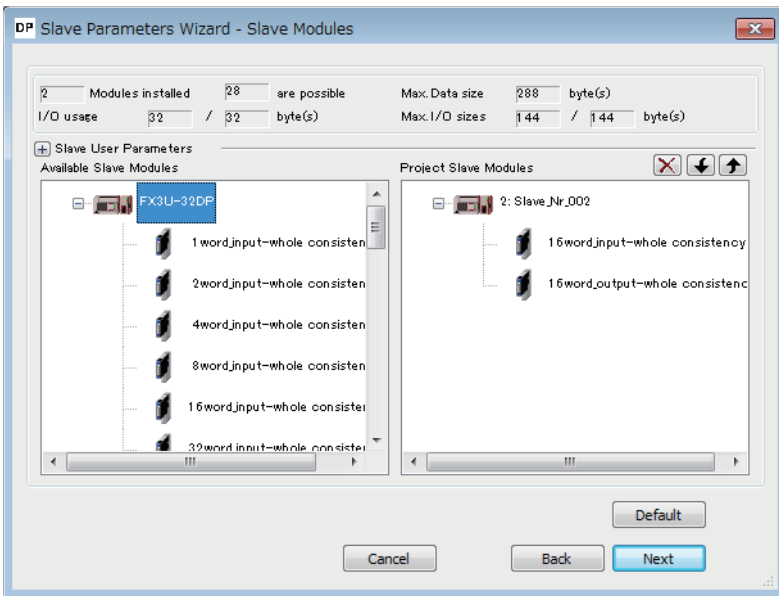
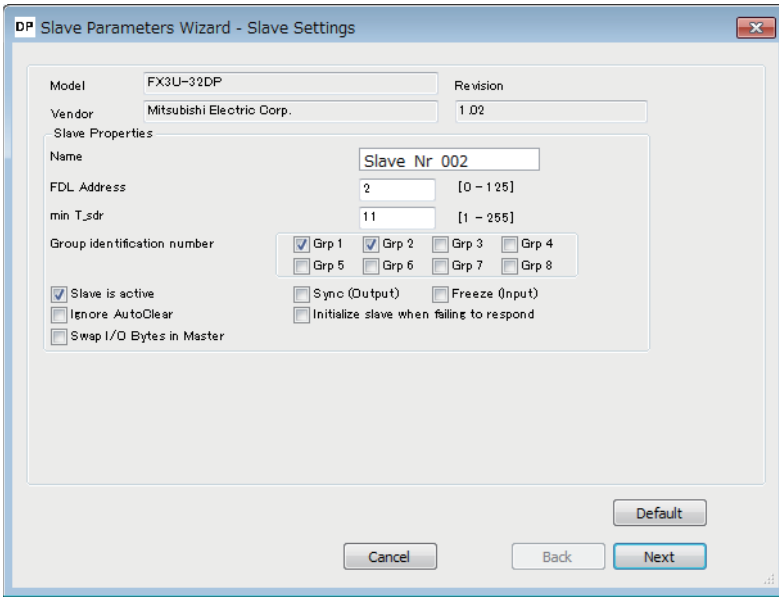


3. Set the items in the "Slave Settings" window as follows.

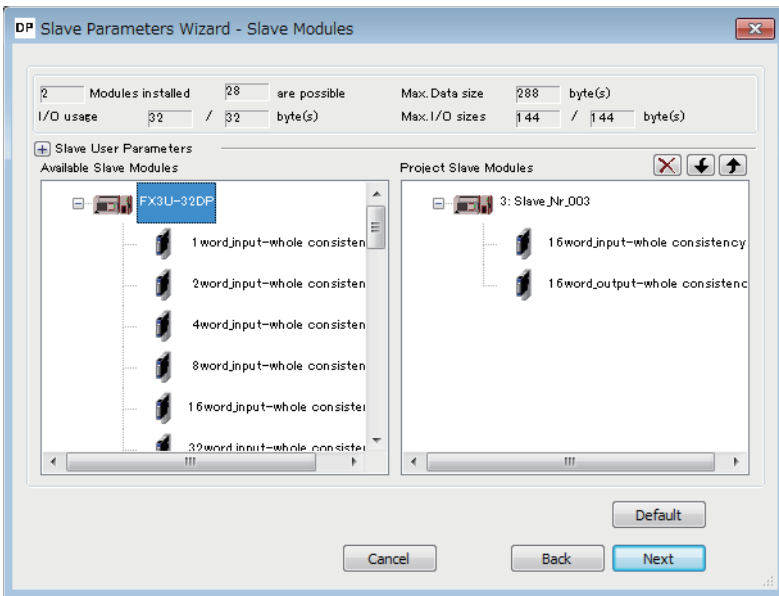
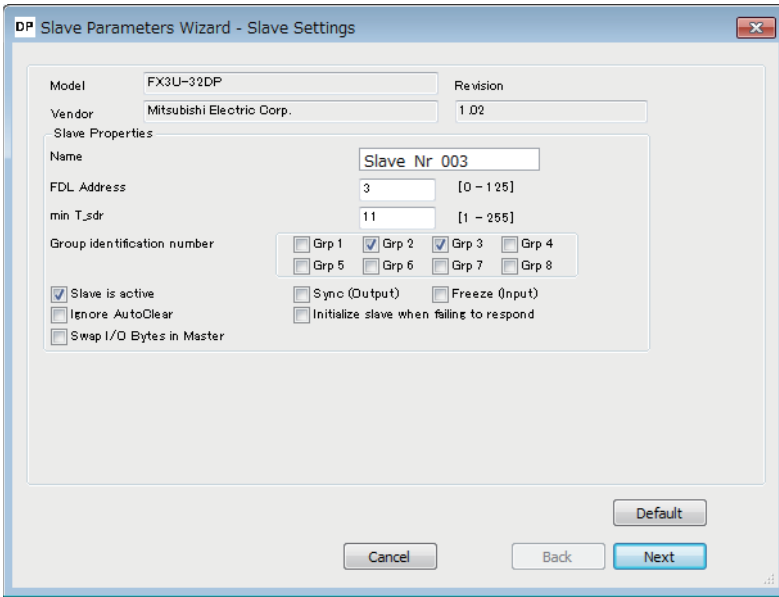
- DP-Slave (FDL address 1)



• DP-Slave (FDL address 2)



• DP-Slave (FDL address 3)



4. Set the items of "Master Settings" as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [PROFIBUS Module Setting] ⇒ [I/O no.:0x0001/FDL:0 'FX5-DP-M'] ⇒ Right-click ⇒ [Master Settings]

5. Click the [Next] button in the "Master Settings" window, and set the items of "CPU Device Access" as follows.

Buffer	Start Address	End Address
Cyclic Inputs	D1000	D1047


Buffer	Start Address	End Address
Cyclic Outputs	D2000	D2047

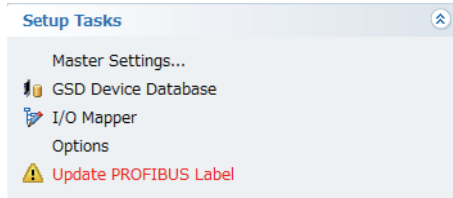
6. Click the [Finish] button to close the "Master Settings" window.

Update PROFIBUS Labels

This enables refresh settings and creates/updates structures to be used for the global labels and module function block.

1. Click "Update PROFIBUS Label" below.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [FX5-DP-M] ⇒ [PROFIBUS Module Setting]⇒[PROFIBUS Configurator Tasks]




2. Convert some program codes or all program codes.

 [Convert] ⇒ [Convert] or [Rebuild All]

3. Write the set parameters to the CPU module or the SD memory card of the CPU module. Then reset the CPU module or power off and on the system.

 [Online] ⇒ [Write to PLC]

Point

In this example, default values were used for parameters that are not shown above. ( Page 49 PROFIBUS Configuration Tool)

9.3 Settings for DP-Slaves

Set for DP-Slaves that configure the PROFIBUS-DP network. (Refer to the manual for each DP-Slave)

9.4 Checking the Network Status

Communications are being performed properly when the LEDs and bits corresponding to the buffer memory areas are in the following status after execution of the program.

- LED on the FX5-DP-M

LED	Status
RUN	On
ERROR	Off
BF	Off

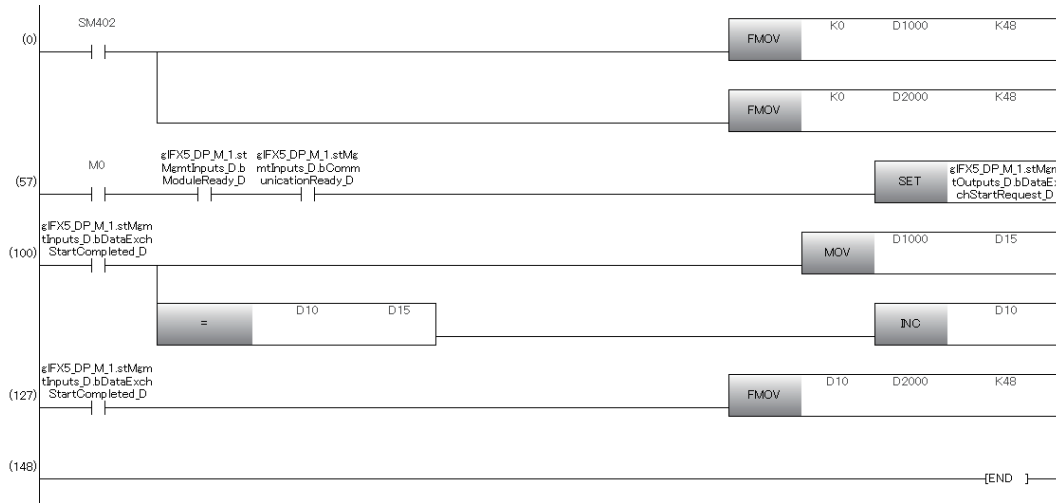
- Bit corresponding to buffer memory area

Name	Status
'Slave status area (Normal communication detection)' (Un\G23040.b0 to Un\G23040.b2)	ON
'Slave status area (Diagnostic information detection)' (Un\G23057.b0 to Un\G23057.b2)	OFF

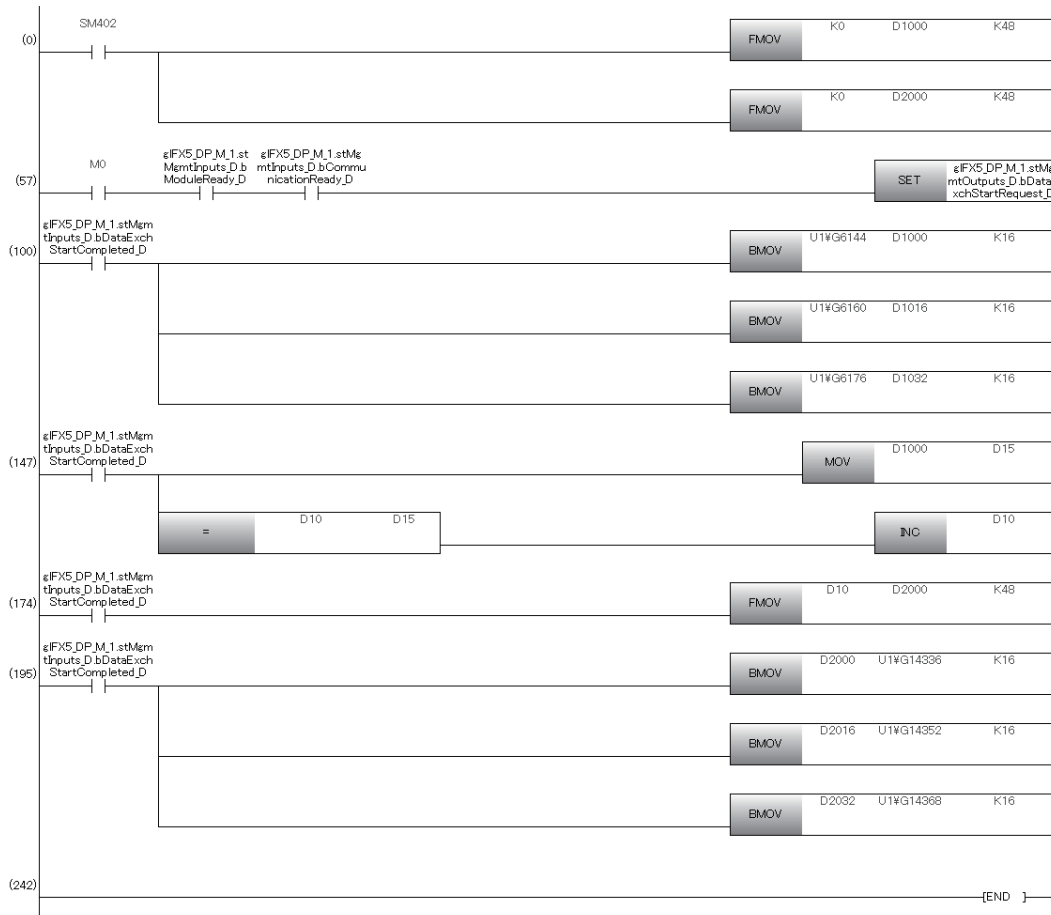
9.5 Program Example of Data Exchange Function

The following shows a program example of communication between the FX5-DP-M and the DP-Slave.

When using Autorefresh

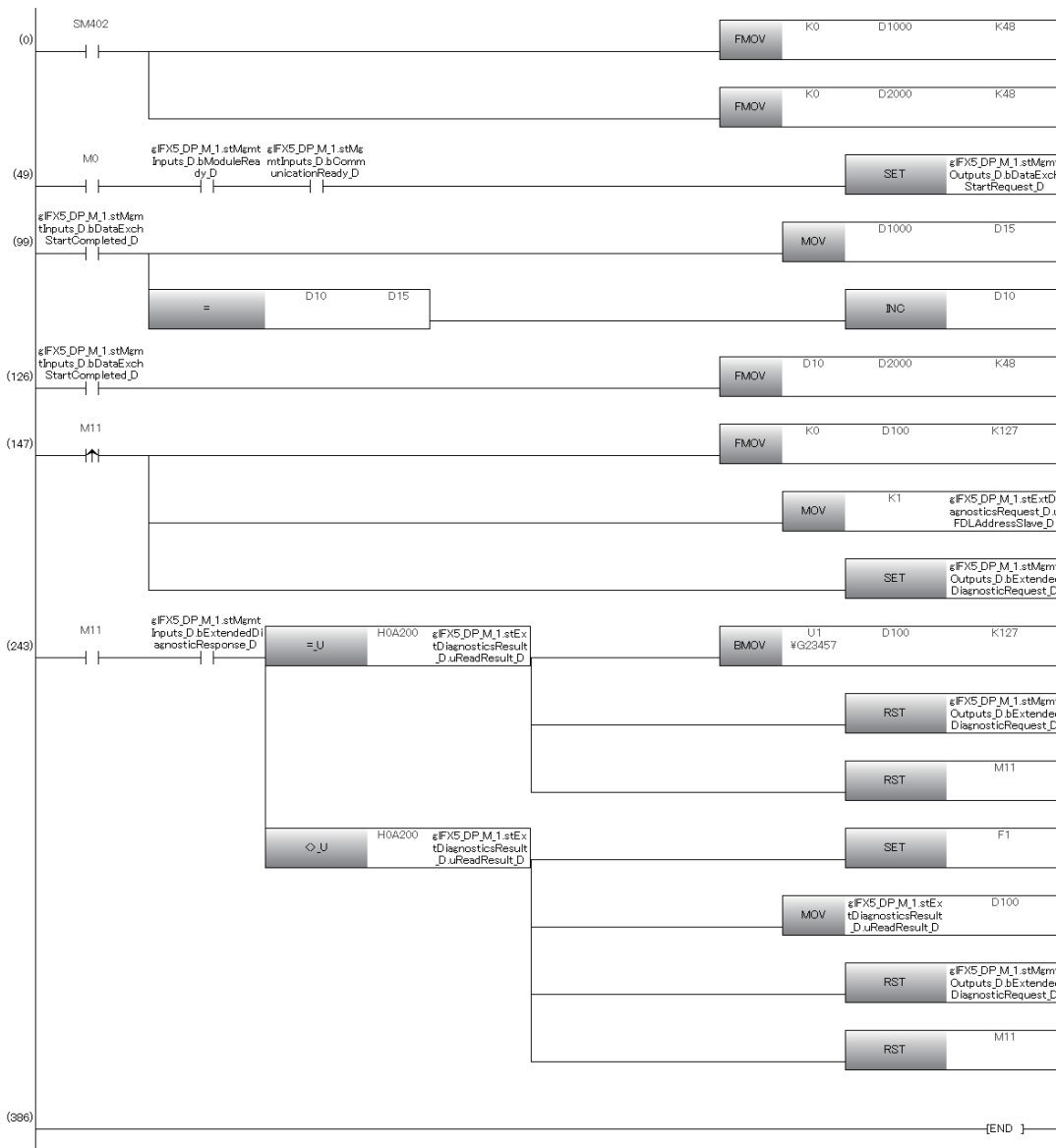


When not using Autorefresh



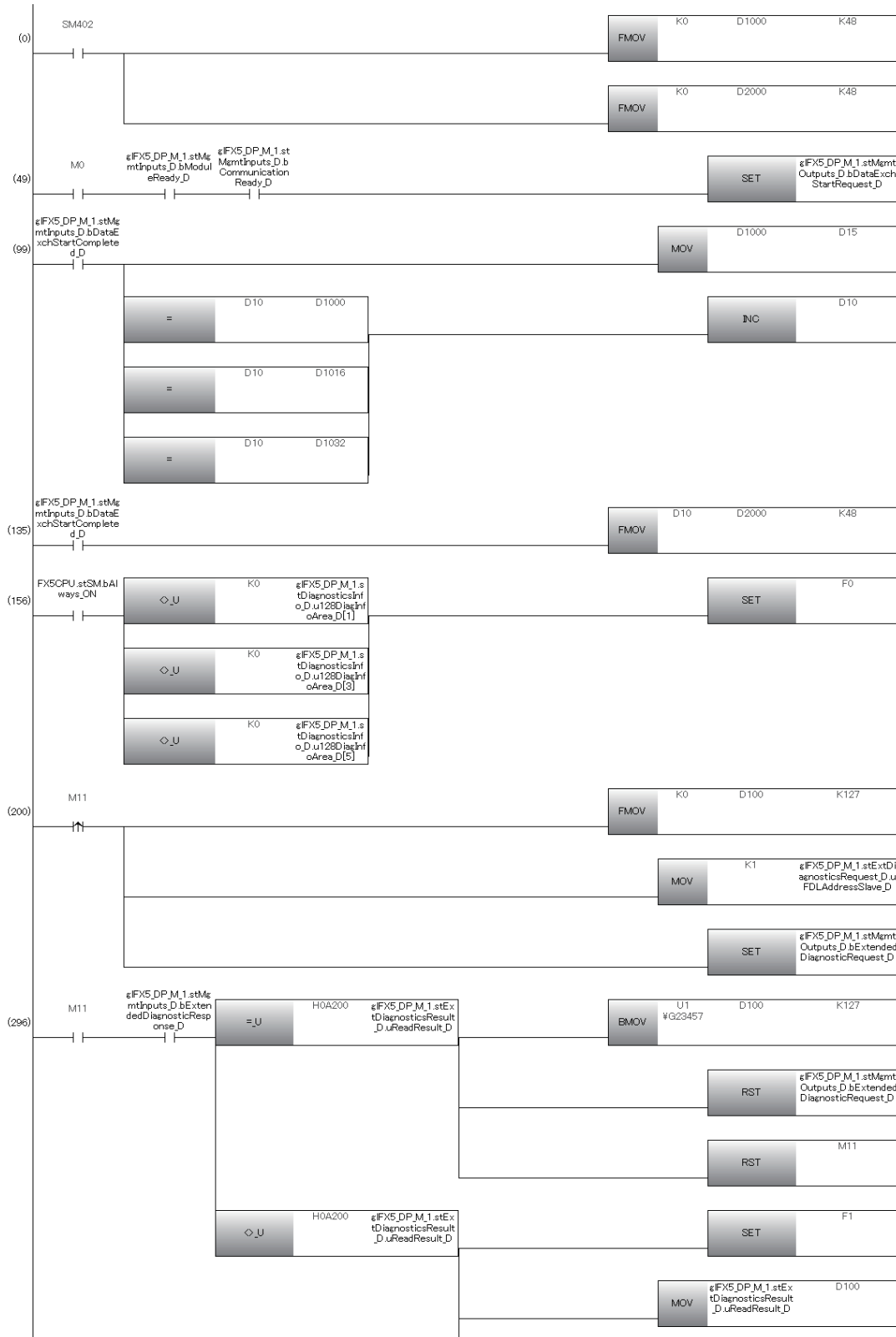
9.7 Program Example of the Acquisition Function of Extended Diagnostic Information

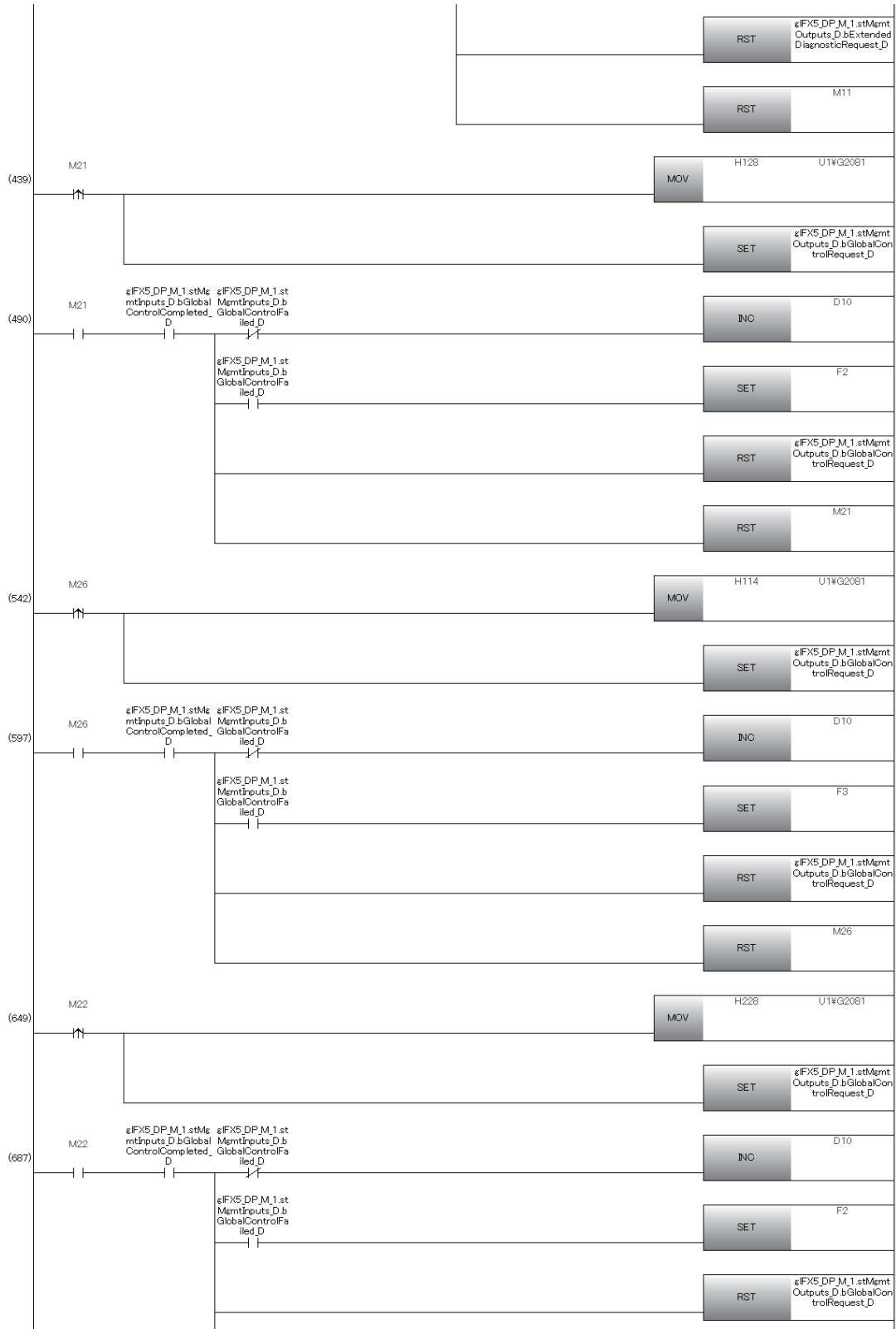
In this program example, the extended diagnostic information of DP-Slaves (FDL address 1) is acquired.

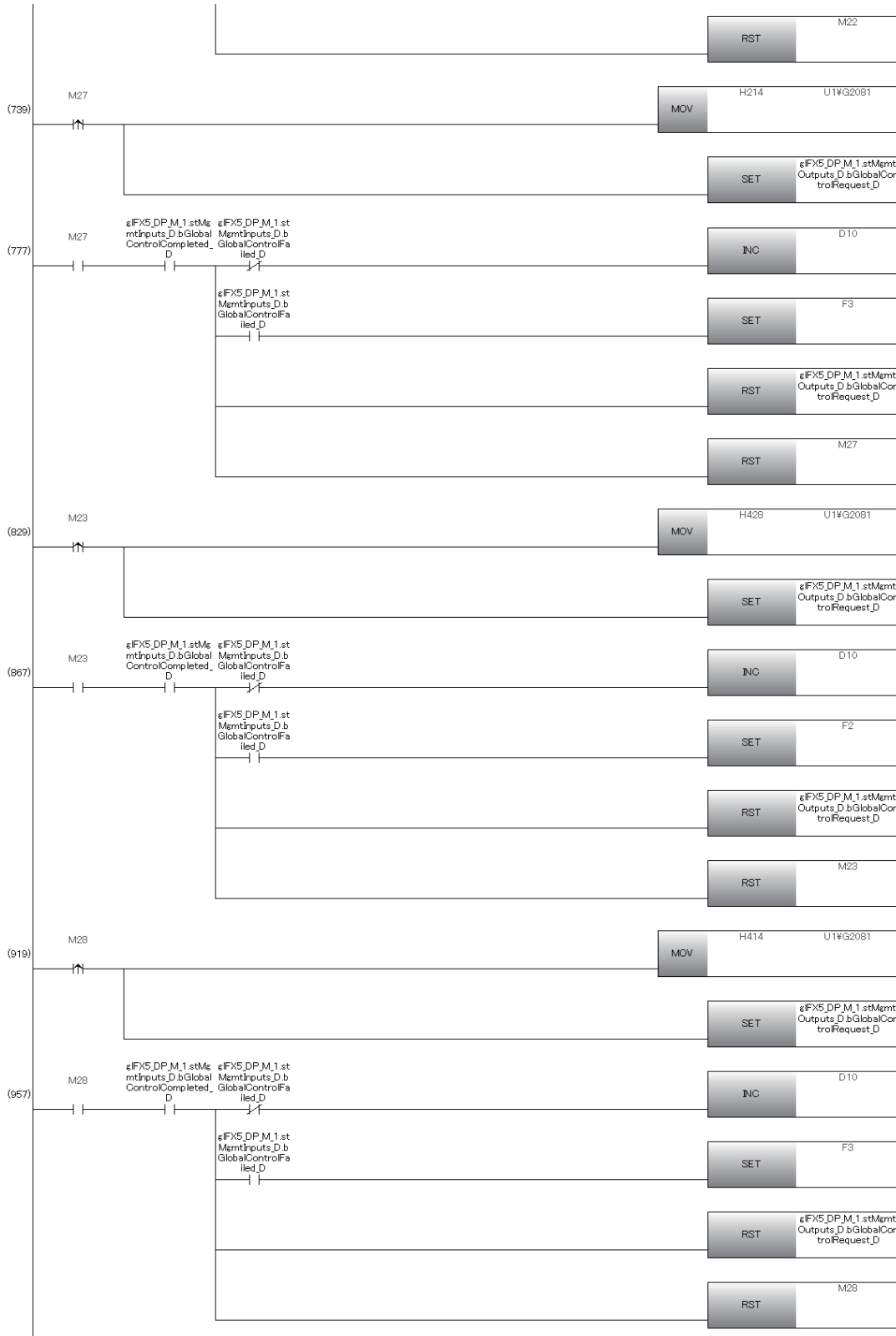


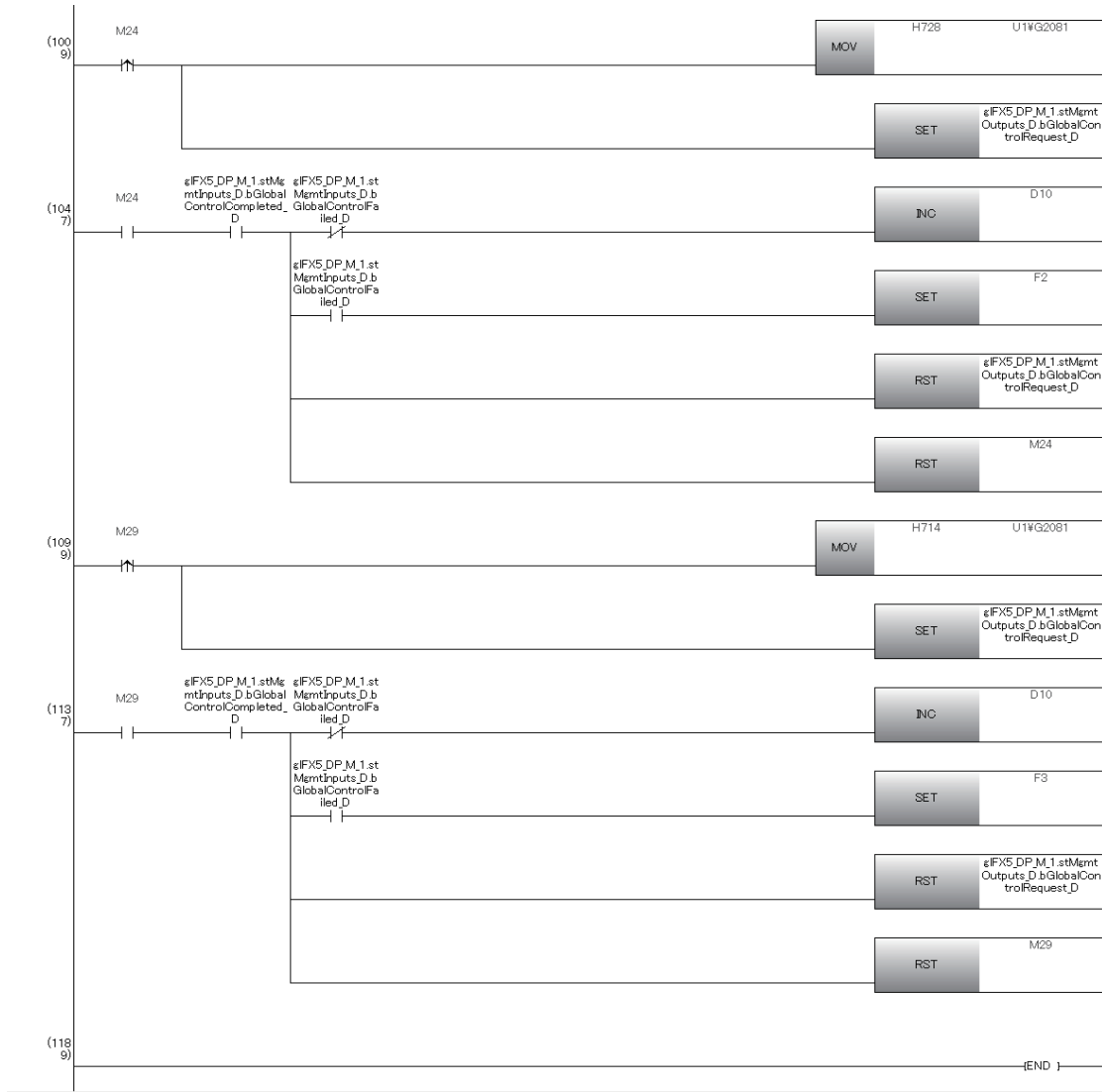
9.8 Program Example of the Global Control Function

In this program example, SYNC and UNSYNC are executed to group 1.



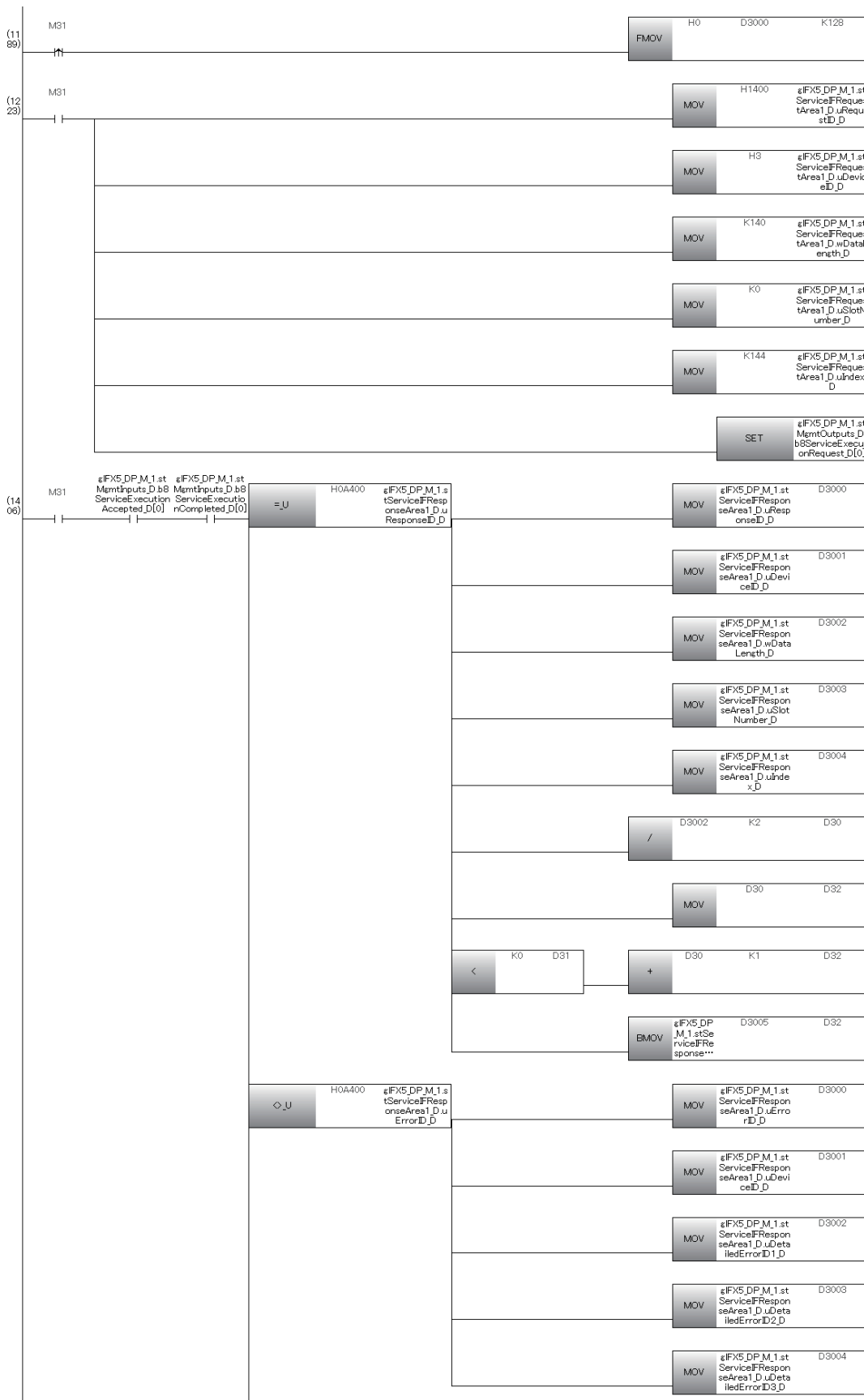


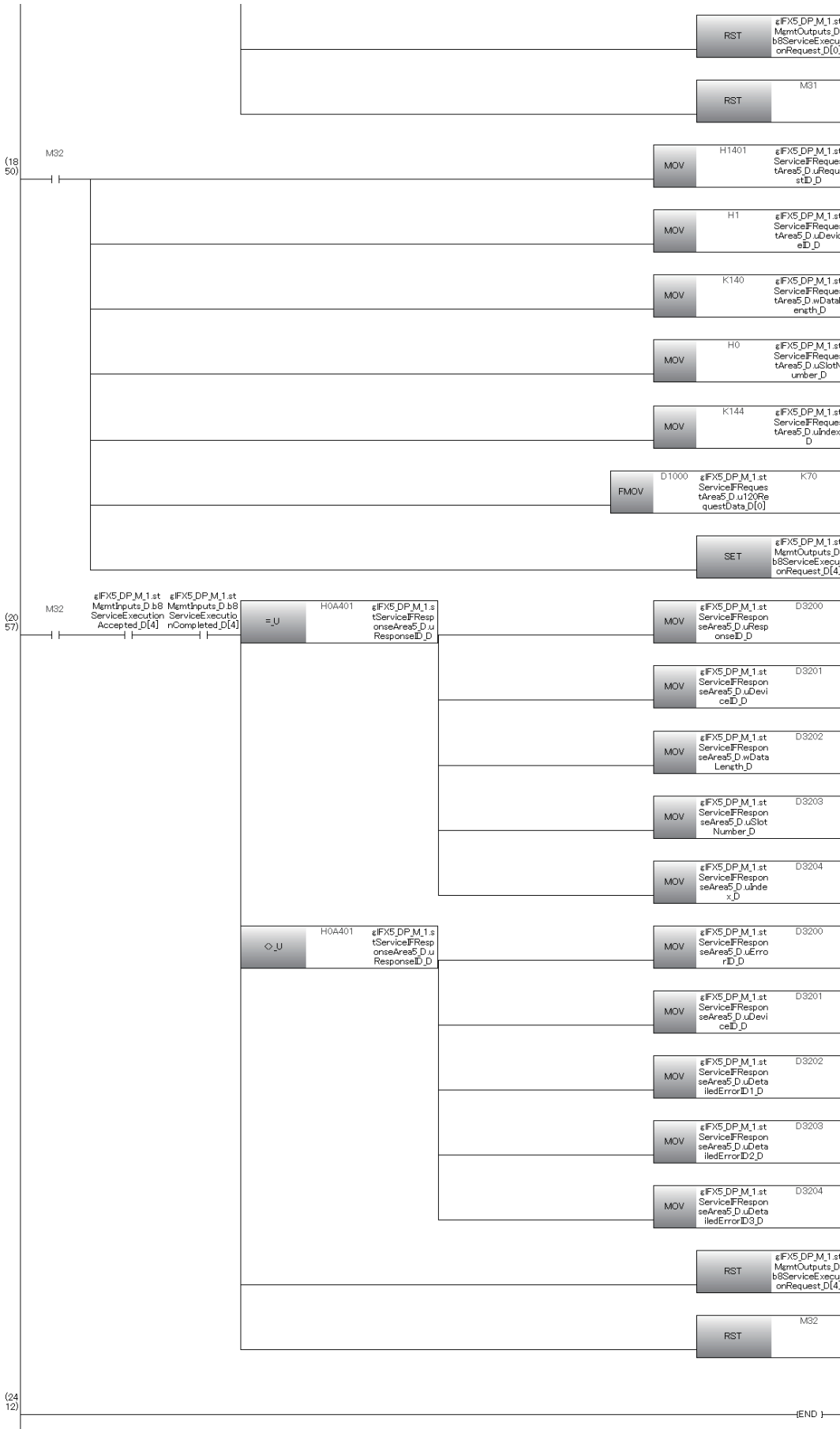




9.9 Program Example of Acyclic Communication (Acyclic Communication)

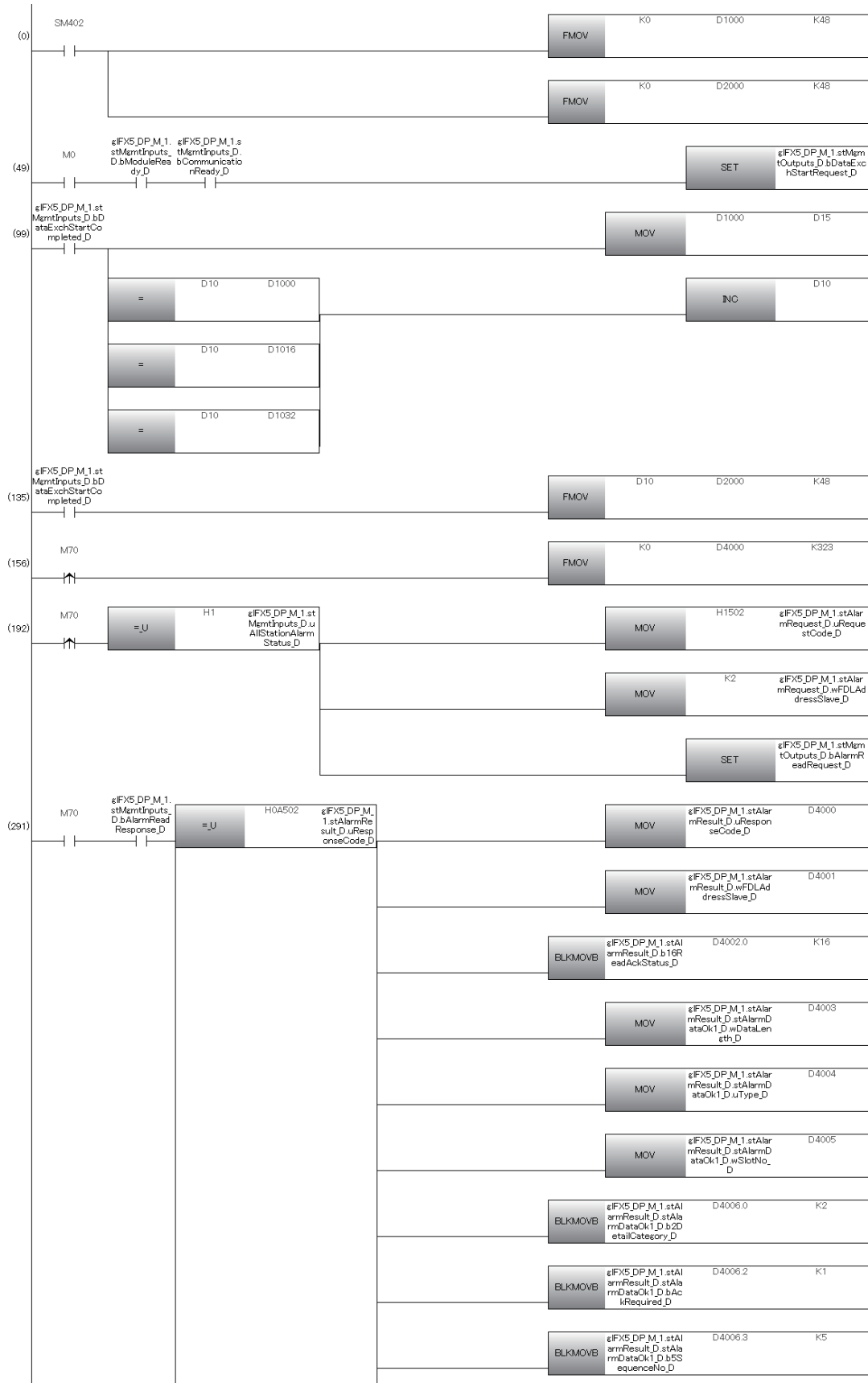
In this program example, the READ command is executed to DP-Slaves (FDL address 3).

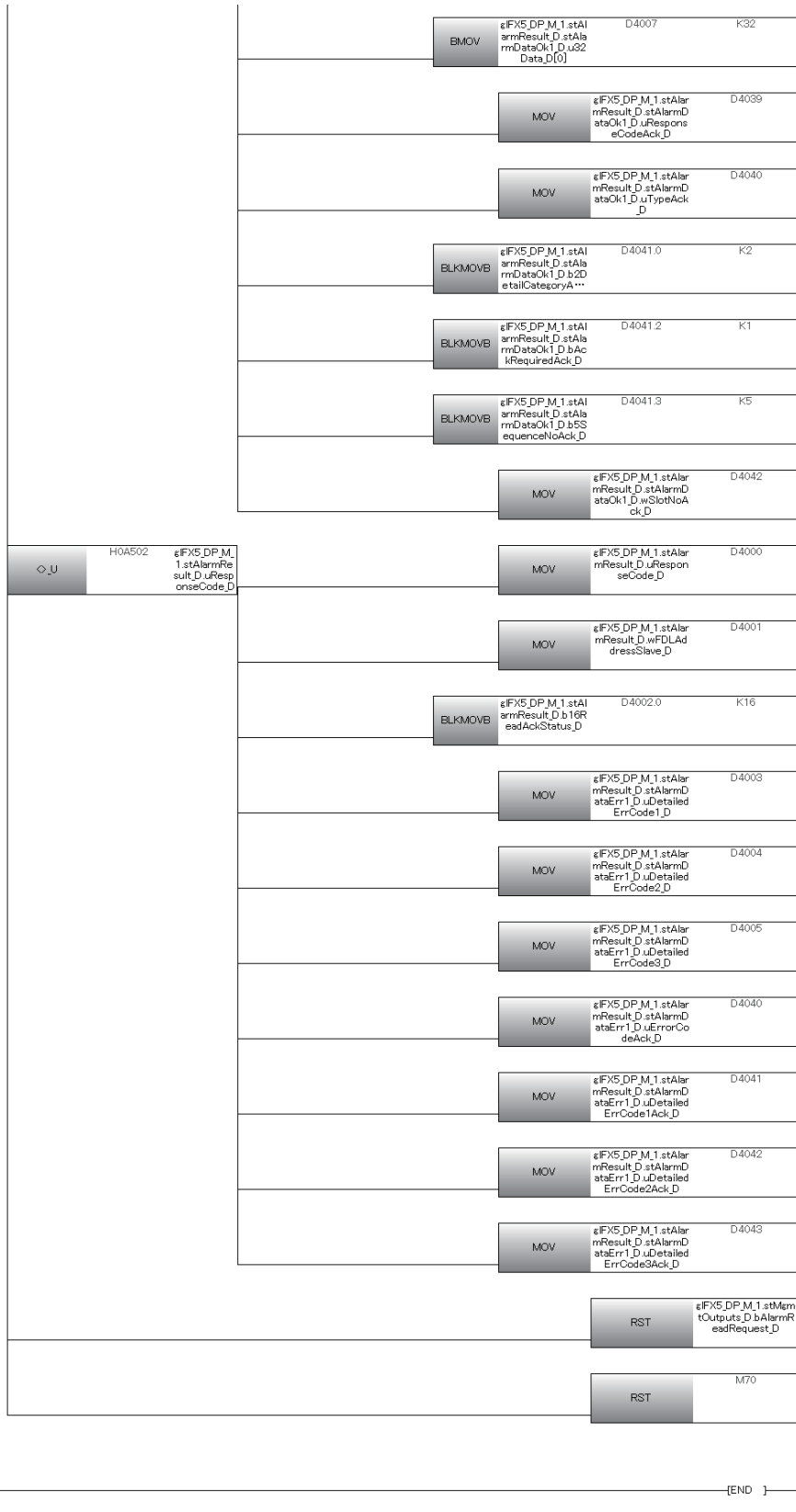




9.10 Program Example of the Alarm Acquisition Function

In this program example, the alarm information generated at DP-Slaves (FDL address 2) is acquired.





(1367)

[END]

10 TROUBLESHOOTING

This chapter describes troubleshooting of the FX5-DP-M.

10.1 Checking with LED

This section describes troubleshooting using the LED.

Error status can be determined by the status of the RUN LED and the ERROR LED.

RUN LED	ERROR LED	Error status ^{*1}	Description
Off	On, flashing	Major error	An error such as hardware failure or memory failure. The module stops operating.
On	Flashing	Moderate error	An error, such as parameter error, which affects module operation. The module stops operating.
On	On	Minor error	An error where the module continues operating.

*1 When multiple errors occur, the error status is displayed in the order of major, moderate, and minor.

When the RUN LED turns off

When the RUN LED turns off after the FX5-DP-M is powered on, check the following.

Check item	Action
Does the error continue after powering off and on?	A hardware failure may have occurred. Replace the module.

When the ERROR LED turns on

When the ERROR LED turns on, check the following item.

Check item	Action
Has the same number been set to the DP-Master and DP-Slave?	Modify the parameter.
Has any error occurred at the parameter of the flash ROM?	Rewrite the parameter. If the error recurs, please consult your local Mitsubishi representative.
Has any error other than the above occurred?	Please consult your local Mitsubishi representative.

When the BF LED turns on

When the BF LED turns on, check the following.

Check item	Action
Has any communications error occurred?	Check 'Diagnostic information area' (Un\G23072 to Un\G23199) and 'Local station error information area' (Un\G23071) for the error cause and follow the instruction.

When the DIA LED turns on

When the DIA LED turns on, check the following.

Check item	Action
Is any alarm or extended diagnostic information generated at the target DP-Slave?	<ul style="list-style-type: none">• Check b11 in 'Diagnostic information area' (Un\G23072 to Un\G23199). When the area is turned on, acquire extended diagnostic information from DP-Slave and take the action. When extended diagnostic is cleared, turn on 'Diagnostic information area clear request signal' (Un\G2.b2). Then DIA. LED is turned off.• Check 'Slave status area (Alarm detection)' (Un\G26416 to Un\G26420). If an alarm has been generated, acquire the alarm by 'Alarm read request' (Un\G3.b8) and take action according to the details.

10.2 Checking the Network Status

The status of the PROFIBUS-DP network can be checked from the PROFIBUS Configuration Tool or buffer memory.

Checking with PROFIBUS Configuration Tool

The PROFIBUS Configuration Tool can be used to check the communication status of the PROFIBUS-DP network and diagnostic information from the DP-Slaves.

Slave Status

This item can be used to check the communication status of the PROFIBUS-DP network. (👉 Page 75 Slave Status)

Diagnosis Messages

Checks diagnostic information from DP-Slaves. (👉 Page 76 Diagnosis Messages)

Checking with the buffer memory

The PROFIBUS-DP network can be diagnosed by checking the following buffer memory areas.

Address	Name	Description
Un\G23040 to Un\G23043	Slave status area (Normal communication detection)	Checks the normal communication detection data on each DP-Slave.
Un\G23056 to Un\G23060	Slave status area (Diagnostic information detection)	Checks the diagnostic information detection data on each DP-Slave.
Un\G23072 to Un\G23199	Diagnostic information area	Checks the diagnostic information on each DP-Slave.
Un\G23328 to Un\G23454	Extended diagnostic information area	Checks the details of the latest extended diagnostic information.
Un\G23457 to Un\G23583	Extended diagnostic information read response area	Checks acquired extended diagnostic information.

10.3 Troubleshooting by Symptom

Communications with DP-Slaves fail

The following lists the actions to be taken if communications with DP-Slaves cannot be performed.

Check item	Action
Are the PROFIBUS cables wired correctly?	Check the wiring status of the PROFIBUS cables. For details on wiring of the PROFIBUS cables, refer to the following. ☞ Page 45 PROFIBUS cable
Is the terminal station of network connected to a bus terminator? Is the bus terminator a specified one?	Check the bus terminator and connect it. For details on bus terminators, refer to the following. ☞ Page 45 Wiring specifications of terminating resistor
Is the PROFIBUS-DP network configuration correct?	Check the PROFIBUS-DP network configuration. For details on the PROFIBUS-DP network configuration, refer to the following. ☞ Page 38 Configuration of PROFIBUS-DP network
Are all DP-Master and DP-Slaves connected to the PROFIBUS-DP network powered on?	Power on all DP-Master and DP-Slaves.
Has an error occurred to the CPU module?	Check the error of the CPU module.
Are the parameter setting details with the configuration of the DP-Slaves?	Modify and rewrite the parameters.
Is 'Data exchange start request signal' (Un\G2.b0) of the DP-Master turned on?	Turn on 'Data exchange start request signal' (Un\G2.b0).
Has an error occurred to a DP-Slave? (Has 'Diagnostic information detection signal' (Un\G0.b1) or the BF LED turned on?)	Check diagnostic information on the DP-Slave where the error is occurring and take action. For DP-Slaves where an error is occurring, check 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060) whether bit relevant to the targets are on or not.
Is any error information stored in 'Diagnostic information area' (Un\G23072 to Un\G23199) of the buffer memory?	Take action according to the error information.
Is any error information stored in 'Extended diagnostic information area' (Un\G23328 to Un\G23454) of the buffer memory?	Take action according to the error information.

Communications are unstable

The following lists the actions to be taken if communications are unstable.

Check item	Action
Are more than three repeaters communicating between the FX5-DP-M and a DP-Slave?	If more than three repeaters are communicating between the FX5-DP-M and a DP-Slave, reduce the number of repeaters to three or less.
Is each segment length within the specified limit?	With any segment exceeding the specified limit, change it to a length within the limit.
Are there two bus terminators installed at both ends?	Install two bus terminators at both ends if the bus terminators are not installed there.
Is the number of connected modules in each segment within the specified limit?	If the number of connected modules in a segment is exceeding the specified limit, reduce it to the limit or less.
Is the number of segments to which devices are connected three or less?	If the number of segments to which devices are connected is exceeding three, reduce the number to three or less.
Do the LED turn on and off normally?	Take action depending on the LED turn on and off states. (☞ Page 111 Checking with LED)
Is any error information stored in 'Diagnostic information area' (Un\G23072 to Un\G23199) of the buffer memory?	Take action according to the error information.
Is any error information stored in 'Extended diagnostic information area' (Un\G23328 to Un\G23454) of the buffer memory?	Take action according to the error information.

10.4 List of Error Codes

This section lists the error codes that result from the processing for data exchange between the FX5-DP-M and DP-Slaves or the processing requests from the CPU module on the own station.

Error codes are classified into major error, moderate error, and minor error.

Error code	LED status	Error details and cause	Action
1800H	ERROR on	A DP-Slave which is duplicated the FDL address with a DP-Master exists in the parameter.	Check the FDL addresses for the DP-Master and DP-Slave and then configure the parameters with the different FDL addresses.
1801H	ERROR on	Even one DP-Slave is not set for data exchange.	Check the following items to perform data exchange at least one DP-Slave. <ul style="list-style-type: none"> • Are "Slave is active" of the slave parameters checked? • Are all the DP-Slaves not switched into reserved stations with the temporarily reserved station specification function?
1806H	ERROR on	The parameters have not been written.	Rewrite the parameters.
180CH	ERROR on	The parameters contain a DP-Slave with the I/O data size set to 0 byte.	Check the slave parameters and set the I/O data sizes of each DP-Slave to 1 byte or more.
1810H	ERROR on	The refresh settings are disabled regardless of the data consistency function is set to "Enable (Use Autorefresh)".	The refresh settings need to be enabled when the data consistency function is set to "Enable (Use Autorefresh)". Reset the refresh settings and data consistency settings and rewrite the parameters.
1811H	ERROR on	A hardware failure has been detected.	Please consult your local Mitsubishi representative.
2250H	ERROR on	An extended parameter error has been detected.	<ul style="list-style-type: none"> • Write the extended parameters to the CPU module. • Check the extended parameter settings and rewrite the extended parameters to the CPU module. • If the error continues to occur after writing the extended parameters to the CPU module, replace the module.
3C00H	ERROR on	A hardware failure has been detected.	Take measures to reduce noise, then power off and on the system or reset the CPU module before running. If the error occurs again, the possible cause is a hardware failure of the module, or extension cable. Please consult your local Mitsubishi representative.
3E07H	ERROR flashing	A hardware failure has been detected.	Rewrite the parameters. If the error recurs, replace the module.
3E08H	ERROR flashing	A hardware failure has been detected.	Rewrite the parameters. If the error recurs, replace the module.
3E0BH	ERROR flashing	A hardware failure has been detected.	Rewrite the parameters. If the error recurs, replace the module.
3E0DH	ERROR flashing	Out of range parameter data are written.	Check and rewrite the parameter. If the error recurs, please consult your local Mitsubishi representative.
3E0EH	ERROR flashing	A hardware failure has been detected.	Please consult your local Mitsubishi representative.
3E0FH	ERROR flashing	A hardware failure has been detected.	Please consult your local Mitsubishi representative.
3E1EH	ERROR flashing	A hardware failure has been detected.	Please consult your local Mitsubishi representative.
3E1FH	ERROR flashing	A hardware failure has been detected.	Please consult your local Mitsubishi representative.
3E61H	ERROR flashing	A hardware failure has been detected.	Please consult your local Mitsubishi representative.

10.5 List of Status Codes

Status codes can be checked using the buffer memory.

The BF LED turns on if a status code is applicable to a DP-Slave error that occurred during data exchange.

Classification of status codes and their storage areas are as follows.

Status code	Classification	Storage area	Reference
E200H to E2FFH	Status codes generated when extended diagnostic information is acquired.	'Extended diagnostic information read response area' (Un\G23457 to Un\G23583)	Page 145 Extended diagnostic information read response area
E400H to E4FFH	Status codes generated when Acyclic communication function is executed	'Acyclic communication response area' (Un\G25121 to Un\G26144)	Page 150 Acyclic communication response area
E500H to E5FFH	Status codes generated when alarms are acquired.	'Alarm response area' (Un\G26446 to Un\G26768)	Page 155 Alarm response area
F100H to FBFFH	Own diagnostic information of the FX5-DP-M	'Local station error information area' (Un\G23071)	Page 141 Local station error information area

Status code	Error details and cause	Action
E200H	Out of range the specified FDL address	Check the specified FDL address and retry.
E201H	The specified FDL address is not set.	Check the specified FDL address and retry.
E202H	The specified FDL address is own station (the DP-Master)	Check the specified FDL address and retry.
E203H	The specified FDL address is for a reserved station or temporarily reserved station.	Check the specified FDL address and retry.
E204H	No extended diagnostic information for the specified FDL address.	Check the specified FDL address and retry.
E400H	Out of range the target FDL address of DP-Slave	Check the specified FDL address and retry.
E401H	The target DP-Slave is own station (the DP-Master)	Check the specified FDL address and retry.
E402H	Invalid read data length	Check the specified read data length and retry.
E403H	Read exception response	Check detailed status codes 1 to 3 and take action.
E404H	Invalid slot number	Check the specified slot number and retry.
E405H	Invalid index	Check the specified index and retry.
E406H	Invalid CommRef number	Check the specified CommRef number are correct and retry.
E407H	A Class 1 service for the Acyclic communication function was executed while data exchange was stopped.	Turn on 'Data exchange start request signal' (Un\G2.b0) and start data exchange. Check 'Slave status area (Normal communication detection)' (Un\G23040 to Un\G23043) for whether the bits relevant to the targets are on and retry.
E410H	A physical execution error was detected.	Check detailed status codes 2 to 3 and take action. Check 'Slave status area (Normal communication detection)' (Un\G23040 to Un\G23043) for whether the bits relevant to the targets are on and retry.
E411H	A protocol related execution error was detected	Check detailed status codes 2 to 3 and take action.
E412H	An application related execution error was detected	Check detailed status codes 2 to 3 and take action.
E420H	The DP-Slave detected a read error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E421H	The DP-Slave detected a write error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E422H	The DP-Slave detected a module error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E423H	The DP-Slave cannot handle the data.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E424H	The DP-Slave detected an application error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E425H	The DP-Slave detected an unsupported request error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)

Status code	Error details and cause	Action
E426H	The DP-Slave detected an invalid index.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E427H	The DP-Slave detected an invalid specified data length.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E428H	The DP-Slave detected an invalid slot number.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E429H	The DP-Slave detected an invalid data type.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E42AH	The DP-Slave attempted to access an inaccessible area.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E42BH	The DP-Slave cannot access data.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E42CH	The DP-Slave rejected access.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E42DH	The DP-Slave detected an invalid access range.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E42EH	The DP-Slave detected an invalid request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E42FH	The DP-Slave detected an invalid data type.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E430H	The DP-Slave detected an invalid parameter in the request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E431H	The DP-Slave detected an abnormal resource during the reading processing.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E432H	The DP-Slave detected an abnormal resource during the writing processing.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E433H	The DP-Slave is already using the resource.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E434H	No resource is available to the DP-Slave.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E435H	A service unavailable for the specified DP-Slave was requested.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E436H	The DP-Slave does not have sufficient memory to process the request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E437H	The DP-Slave invalidated the service.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E438H	The DP-Slave did not respond to the request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E439H	<ul style="list-style-type: none"> The DP-Slave did not respond to the request. Request is executed during other function is operating 	<ul style="list-style-type: none"> Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manuals for each DP-Slave) When the acyclic communication function is executed successively to the same DP-Slave, adjust the execution interval and retry. (Refer to the manuals for each DP-Slave) Check whether the interlock between the global control function and time control of DP-Slaves is correct and retry.
E440H	Out of range the target FDL address of DP-Slave	Check the specified FDL address and retry.
E441H	The target DP-Slave is own station (the DP-Master)	Check the specified FDL address and retry.
E442H	Invalid write data length	Check the specified write data length and retry.
E443H	Write abnormal response	Check detailed status codes 1 to 3 and take action.
E444H	Invalid slot number	Check the specified slot number and retry.
E445H	Invalid index	Check the specified index and retry.
E446H	Invalid CommRef number	Check the specified CommRef number and FDL address are correct and retry.
E447H	A Class 1 service for the Acyclic communication function was executed while data exchange was stopped.	Turn on 'Data exchange start request signal' (Un\G2.b0) and start data exchange. Check 'Slave status area (Normal communication detection)' (Un\G23040 to Un\G23043) for whether the bits relevant to the targets are on and retry.

Status code	Error details and cause	Action
E450H	A physical execution error was detected.	Check detailed status codes 2 to 3 and take action. Check 'Slave status area (Normal communication detection)' (Un\G23040 to Un\G23043) for whether the bits relevant to the targets are on and retry.
E451H	A protocol related execution error was detected	Check detailed status codes 2 to 3 and take action.
E452H	An application related execution error was detected	Check detailed status codes 2 to 3 and take action.
E460H	The DP-Slave detected a read error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E461H	The DP-Slave detected a write error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E462H	The DP-Slave detected a module error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E463H	The DP-Slave cannot handle the data.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E464H	The DP-Slave detected an application error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E465H	The DP-Slave detected an unsupported request error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E466H	The DP-Slave detected an invalid index.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E467H	The DP-Slave detected an invalid specified data length.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E468H	The DP-Slave detected an invalid slot number.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E469H	The DP-Slave detected an invalid data type.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E46AH	The DP-Slave attempted to access an inaccessible area.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E46BH	The DP-Slave cannot access data.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E46CH	The DP-Slave rejected access.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E46DH	The DP-Slave detected an invalid access range.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E46EH	The DP-Slave detected an invalid request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E46FH	The DP-Slave detected an invalid data type.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E470H	The DP-Slave detected an invalid parameter in the request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E471H	The DP-Slave detected an abnormal resource during the reading processing.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E472H	The DP-Slave detected an abnormal resource during the writing processing.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E473H	The DP-Slave is already using the resource.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E474H	No resource is available to the DP-Slave.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E475H	A service unavailable for the specified DP-Slave was requested.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E476H	The DP-Slave does not have sufficient memory to process the request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E477H	The DP-Slave invalidated the service.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E478H	The DP-Slave did not respond to the request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)

Status code	Error details and cause	Action
E479H	<ul style="list-style-type: none"> The DP-Slave did not respond to the request. Request is executed during other function is operating 	<ul style="list-style-type: none"> Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manuals for each DP-Slave) When the acyclic communication function is executed successively to the same DP-Slave, adjust the execution interval and retry. (Refer to the manuals for each DP-Slave) Check whether the interlock between the global control function and time control of DP-Slaves is correct and retry.
E4D0H	The specified request is invalid	Check the request code.
E4D1H to E4DBH	A hardware failure has been detected.	Please consult your local Mitsubishi representative.
E4DCH	The same DP-Slave is the object of another Acyclic communication function or alarm request.	Check that execution of other Acyclic communication function and alarm requests is completed and retry.
E4DDH	No resource is available.	Check that execution of other Acyclic communication function and alarm requests is completed and retry.
E4DEH	Invalid parameter setting	Check the parameters and retry.
E4DFH	The DP-Slave cannot respond.	Check the wiring of PROFIBUS cables and the start completed status of the DP-Slave, and retry. For the start completed status of DP-Slaves, refer to the manual for the DP-Slave.
E4E0H	No response was received from the DP-Slave.	Check the status of the DP-Slave and retry.
E4E1H	<p>The same DP-Master is executing the following functions to the same DP-Slave.</p> <ul style="list-style-type: none"> Acyclic communication function Alarm acquisition function 	<p>Check that the processing of the following functions are completed and retry.</p> <ul style="list-style-type: none"> Acyclic communication function Alarm acquisition function
E4E3H	A hardware failure has been detected.	Please consult your local Mitsubishi representative.
E500H	Out of range the target FDL address of DP-Slave	Check the specified FDL address and retry.
E501H	The target FDL address of DP-Slave is for a not-configured station.	Check the specified FDL address and retry.
E502H	The target DP-Slave is own station (the DP-Master)	Check the specified FDL address and retry.
E503H	The target FDL address is for a reserved station or temporarily reserved station.	Check the specified FDL address and retry.
E504H	Invalid alarm read request code	Check the specified request code and retry.
E505H	Invalid ACK request bit	Check bits specified in Alarm request area (Un\G26434) and retry.
E506H	Alarm read request exception response	Check detailed status codes 1 to 3 and take action.
E507H	Data are not being exchanged.	Turn on 'Data exchange start request signal' (Un\G2.b0) and retry.
E508H	An error response to an ACK request was detected.	Check detailed status codes 1 to 3 and take action.
E510H	A physical execution error was detected	Check detailed status codes 2 to 3 and take action.
E520H	The DP-Slave detected an invalid parameter in the request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E521H	No alarm is available to the DP-Slave.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E530H	The alarm is not available	Check whether the DP-Slave supports the alarm and retry.
E531H	Invalid DP-Slave status	Check whether the DP-Slave is correctly executing the data exchange and retry.
E540H	Out of range the target FDL address of DP-Slave	Check the specified FDL address and retry.
E541H	The target FDL address of DP-Slave is for a not-configured station.	Check the specified FDL address and retry.
E542H	The target DP-Slave is own station (the DP-Master)	Check the specified FDL address and retry.
E543H	The target FDL address is for a reserved station or temporarily reserved station	Check the specified FDL address and retry.

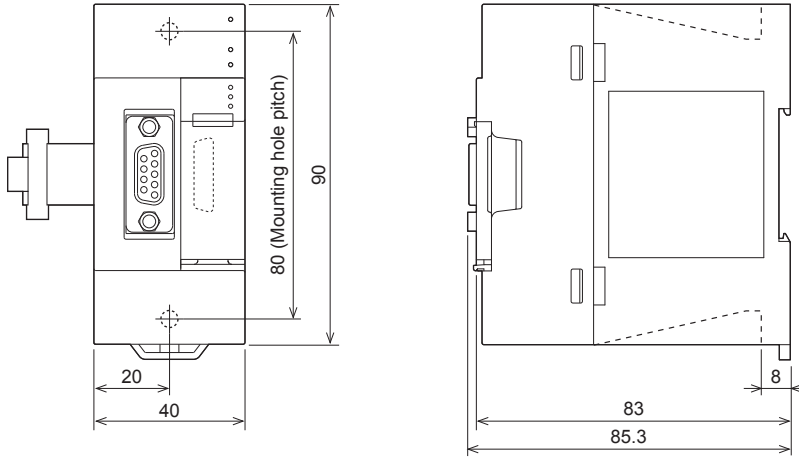
Status code	Error details and cause	Action
E544H	Invalid alarm type	Check that the alarm for which ACK is returned are stored in 'Alarm response area' (Un\G26446 to Un\G26768) and retry.
E545H	Alarm ACK request exception response	Check detailed status codes 1 to 3 and take action.
E546H	Invalid slot number	Check that the alarm for which ACK is returned are stored in 'Alarm response area' (Un\G26446 to Un\G26768) and retry.
E547H	Invalid sequence number	Check that the alarm for which ACK is returned are stored in 'Alarm response area' (Un\G26446 to Un\G26768) and retry.
E550H	A physical execution error was detected	Check detailed status codes 2 to 3 and take action.
E551H	A protocol related execution error was detected	Check detailed status codes 2 to 3 and take action.
E552H	An application related execution error was detected	Check detailed status codes 2 to 3 and take action.
E560H	The DP-Slave detected a read error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E561H	The DP-Slave detected a write error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E562H	The DP-Slave detected a module error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E563H	The DP-Slave cannot handle the data.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E564H	The DP-Slave detected an application error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E565H	The DP-Slave detected an unsupported request error.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E566H	The DP-Slave detected an invalid index.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E567H	The DP-Slave detected an invalid specified data length.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E568H	The DP-Slave detected an invalid slot number.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E569H	The DP-Slave detected an invalid data type.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E56AH	The DP-Slave attempted to access an inaccessible area.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E56BH	The DP-Slave cannot access data.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E56CH	The DP-Slave rejected access.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E56DH	The DP-Slave detected an invalid access range.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E56EH	The DP-Slave detected an invalid request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E56FH	The DP-Slave detected an invalid data type.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E570H	The DP-Slave detected an invalid parameter in the request.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E571H	The DP-Slave detected an abnormal resource during the reading processing.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E572H	The DP-Slave detected an abnormal resource during the writing processing.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E573H	The DP-Slave is already using the resource.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E574H	No resource is available to the DP-Slave.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)
E575H	The ACK request contains an invalid parameter.	Check whether request data supported by the DP-Slave are correctly configured and retry. (Refer to the manual for each DP-Slave)

Status code	Error details and cause	Action
E576H	No alarm is available for the ACK request.	Check the alarm occurrence status of the specified DP-Slave and retry.
E580H	No alarm is available for the ACK request.	Check the alarm occurrence status of the specified DP-Slave and retry.
E581H	The alarm specified in the ACK request is not present.	Check the alarm occurrence status of the specified DP-Slave and retry.
E582H	The alarm function is deactivated for the specified DP-Slave. Therefore no alarm is available for the ACK request.	Check whether the DP-Slave supports the alarm and retry.
E590H to E59AH	A hardware failure has been detected.	Please consult your local Mitsubishi representative.
E59BH	The Acyclic communication function is being executed for the same DP-Slave.	Check that execution of the Acyclic communication function is completed and retry.
E59CH	No resource is available.	Check that execution of the Acyclic communication function is completed and retry.
E59DH	Invalid parameter setting	Check the parameters and retry.
E59EH	The DP-Slave cannot respond.	Check the wiring of PROFIBUS cables and the start completed status of the DP-Slave, and retry. When the Acyclic communication function is executed successively to the same DP-Slave, adjust the execution interval and retry. For the start completed status of DP-Slaves and the intervals of executing the Acyclic communication function, refer to the following. Manual for each DP-Slave
E59FH	No response was received from the DP-Slave.	Check the status of the DP-Slave and retry.
E5A0H	The same DP-Master is executing the following functions to the same DP-Slave. • Acyclic communication function • Alarm acquisition function	Check that the processing of the following functions are completed and retry. • Acyclic communication function • Alarm acquisition function
E5A2H	A hardware failure has been detected.	Please consult your local Mitsubishi representative.
F120H	Diagnostic information was detected in a DP-Slave.	Check Diagnostic information area for the diagnostic information detected in the DP-Slave and take action against the problem.
F121H	A DP-Master or DP-Slave on the same line has the same FDL address.	Check the FDL addresses for the DP-Master and DP-Slave and then configure them with the different FDL addresses.
F122H	An error was detected on the line. Or the master parameters are inappropriate.	Check wiring of bus terminators and PROFIBUS cables. When the bus terminators and PROFIBUS cables are wired correctly, increase setting value "Min. slave interval" of the master parameters.
F123H	An error was detected on the line. Or the master parameters are inappropriate.	Check wiring of bus terminators and PROFIBUS cables. When the bus terminators and PROFIBUS cables are wired correctly, increase setting value "Min. slave interval" of the master parameters.
F124H	An error was detected on the line. Or the master parameters are inappropriate.	Check wiring of bus terminators and PROFIBUS cables. When the bus terminators and PROFIBUS cables are wired correctly, increase setting value "Min. slave interval" of the master parameters.
F125H	The DP-Master is in the clear request sent state.	Since master parameter "Error action flag" is checked, clear requests are being sent to all the DP-Slaves. When clear requests do not need sending, uncheck "Error action flag".
F126H	The line status is unstable. Or the PROFIBUS cable has short-circuited.	Check wiring of bus terminators and PROFIBUS cables. Check whether the PROFIBUS cable has short-circuited.

APPENDIX

Appendix 1 External Dimensions

This chapter describes the external dimensions of the FX5-DP-M.



(Unit: mm)

Appendix 2 Standards

Certification of UL, cUL standards

The FX5-DP-M supports UL (UL, cUL) standards.

UL, cUL file number: E95239

For models that support UL standards, please consult your local Mitsubishi representative.

Compliance with EU Directive (CE marking)

This note does not guarantee that an entire machine produced in accordance with the contents of this note will comply with the following standards.

Compliance to EMC Directive and LVD Directive of the entire mechanical module should be checked by the user/ manufacturer. For more details, please consult your local Mitsubishi representative.

Requirement for compliance with EMC Directive

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2014/30/ EU) when used as directed by the appropriate documentation.

Attention

This product is designed for use in industrial applications.

Product compatibility

Type: Programmable controller (open type equipment)

Models: FX5 manufactured

Electromagnetic compatibility (EMC) directive	Remarks
from October 1st, 2018	FX5-DP-M
EN61131-2:2007 Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspects of the standard. EMI • Radiated emission • Conducted emission EMS • Radiated electromagnetic field • Fast transient burst • Electrostatic discharge • High-energy surge • Voltage drops and interruptions • Conducted RF • Power frequency magnetic field

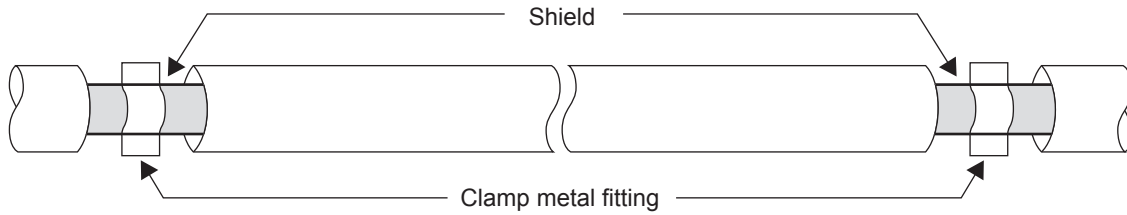
Caution for compliance with EU Directive

Caution for when the FX5-DP-M is used

When the FX5-DP-M is used, attach a ferrite core to the power supplies of the CPU module. Make 2 turns around the ferrite core and attach within approximately 200 mm from the terminal block and connectors of the power cable. (Ferrite core used in Mitsubishi Electric's test: E04SR401938 manufactured by SEIWA ELECTRIC MFG. CO., LTD.)

Caution for when the PROFIBUS cable is used

PROFIBUS cable is a shielded cable, so ground it at both ends. Strip a part of the jacket of the cable as shown below and ground the exposed shield as much as possible.



Requirement for compliance with EMC directive

The requirements for compliance with UKCA marking are the same as that with EU directive (CE marking).

Appendix 3 Buffer Memory

The FX5-DP-M exchanges data with the CPU module through the buffer memory. Data in the buffer memory are reset to the defaults (initial values) when the CPU module is turned off or reset.

List of buffer memory addresses

Address (Decimal)	Address (Hexadecimal)	Name	Description	Initial value	Read, write
0, 1	0H, 1H	Input signal	Stores the Data communication completed signal, the Diagnostic information detection signal, and other signals.	0	Read
2, 3	2H, 3H	Output signal	Sets the reset of the Data communication start signal and Diagnostic information detection signal.	0	Read, write
4 to 2079	4H to 81FH	System area			
2080	820H	Diagnostic information invalid setting area	Sets a value to mask (invalidate) diagnostic information from a DP-Slave.	02B9H	Read, write
2081	821H	Global control area	Specifies a global control function to run.	0	Read, write
2082 to 2083	822H to 823H	System area			
2084	824H	Diagnostic information non-notification time setting area	Specifies the duration after the start of data exchange during which diagnostic information is not notified.	20	Read, write
2085	825H	Current diagnostic information non-notification time area	Stores the duration (remaining time period) after the start of data exchange during which diagnostic information is not notified.	0	Read
2086 to 2256	826H to 8D0H	System area			
2257	8D1H	Local FDL address display area	Stores the FDL address for own station.	*1	Read
2258 to 2271	8D2H to 8DFH	System area			
2272	8E0H	Current bus cycle time	Stores the current bus cycle time.	0	Read
2273	8E1H	Minimum bus cycle time	Stores the minimum bus cycle time.	0	Read
2274	8E2H	Maximum bus cycle time	Stores the maximum bus cycle time.	0	Read
2275 to 6143	8E3H to 17FFH	System area			
6144 to 7167	1800H to 1BFFH	Input data area	Stores input data from DP-Slaves.	0	Read
7168 to 14335	1C00H to 37FFH	System area			
14336 to 15359	3800H to 3BFFH	Output data area	Sets output data to DP-Slaves.	0	Read, write
15360 to 22527	3C00H to 57FFH	System area			
22528 to 22655	5800H to 587FH	Address information area	Stores the FDL address and I/O data length of DP-Slaves.	FFFFH	Read
22656 to 22783	5880H to 58FFH	System area			
22784 to 22847	5900H to 593FH	Input data start address area	Stores the start address (buffer memory address) for input data from DP-Slaves.	0	Read
22848 to 22911	5940H to 597FH	System area			
22912 to 22975	5980H to 59BFH	Output data start address area	Stores the start address (buffer memory address) for output data to DP-Slaves.	0	Read
22976 to 23039	59C0H to 59FFH	System area			
23040 to 23043	5A00H to 5A03H	Slave status area (Normal communication detection)	Stores the communication status of DP-Slaves.	0	Read
23044 to 23047	5A04H to 5A07H	System area			
23048 to 23051	5A08H to 5A0BH	Slave status area (Reserved station setting status)	Stores reserved station settings or temporarily reserved station settings for DP-Slaves.	0	Read
23052 to 23055	5A0CH to 5A0FH	System area			
23056 to 23060	5A10H to 5A14H	Slave status area (Diagnostic information detection)	Stores diagnostic information detection status of DP-Slaves.	0	Read
23061 to 23070	5A15H to 5A1EH	System area			
23071	5A1FH	Local station error information area	Stores the error information on own station (FX5-DP-M).	0	Read
23072 to 23199	5A20H to 5A9FH	Diagnostic information area	Stores diagnostic information on DP-Slaves generated during communications.	0	Read

Address (Decimal)	Address (Hexadecimal)	Name	Description	Initial value	Read, write
23200 to 23327	5AA0H to 5B1FH	System area			
23328 to 23454	5B20H to 5B9EH	Extended diagnostic information area	Stores the latest extended diagnostic information on DP-Slaves generated during communications.	0	Read
23455	5B9FH	System area			
23456	5BA0H	Extended diagnostic information read request area	Sets the FDL address from which extended diagnostic information is acquired.	FFFFH	Read, write
23457 to 23583	5BA1H to 5C1FH	Extended diagnostic information read response area	Stores the result of the extended diagnostic information read request.	0	Read
23584 to 23587	5C20H to 5C23H	Parameter setting status area (Active station)	Stores the DP-Slave set as normal DP-Slaves by slave parameters.	0	Read
23588 to 23591	5C24H to 5C27H	System area			
23592 to 23595	5C28H to 5C2BH	Parameter setting status area (Reserved station)	Stores the DP-Slaves set as reserved stations by the slave parameter.	0	Read
23596 to 23599	5C2CH to 5C2FH	System area			
23600 to 23603	5C30H to 5C33H	Temporarily reserved station specification status area	Stores the DP-Slaves specified as a temporarily reserved station by the temporarily reserved station specification function.	0	Read
23604 to 23607	5C34H to 5C37H	System area			
23608 to 23611	5C38H to 5C3BH	Temporarily reserved station specification request area	Sets which DP-Slaves are to be specified as temporarily reserved stations by the temporarily reserved station specification function.	0	Read, write
23612 to 23807	5C3CH to 5CFFH	System area			
23808	5D00H	Acyclic communication request execution instruction area	Turn on bits of Acyclic communication function that are relevant to the request instruction numbers to execute.	0	Read, write
23809 to 24832	5D01H to 6100H	Acyclic communication request area	Write the request instruction data to be executed by the Acyclic communication function.	0	Read, write
24833 to 25119	6101H to 621FH	System area			
25120	6220H	Acyclic communication request result area	Turns the appropriate bits on for the request acceptance status and the execution completed status of the Acyclic communication.	0	Read
25121 to 26144	6221H to 6620H	Acyclic communication response area	Stores the request execution results of the Acyclic communication function.	0	Read
26145 to 26415	6621H to 672FH	System area			
26416 to 26420	6730H to 6734H	Slave status area (Alarm detection)	Stores the alarm status of DP-Slaves.	0	Read
26421 to 26431	6735H to 673FH	System area			
26432 to 26434	6740H to 6742H	Alarm request area	Sets alarm acquisition request data.	0	Read, write
26435 to 26445	6743H to 674DH	System area			
26446 to 26768	674EH to 6890H	Alarm response area	Stores the result of alarm acquisition.	0	Read
26769 to 65535	6891H to FFFFH	System area			

*1 The initial value changes depending on the CPU module mounting the FX5-DP-M or the relevant parameter(s).



Do not write data to "System area". Doing so may cause malfunction of the programmable controller system.



Details of buffer memory addresses

This section describes the buffer memory areas of the FX5-DP-M.

Input signal (Un\G0, Un\G1), Output signal (Un\G2, Un\G3)

Bit	Signal name
■Input signal (Un\G0)	
b0	Data exchange start completed signal
b1	Diagnostic information detection signal
b2	Diagnostic information area cleared signal
b3	Use prohibited
b4	Global control completed signal
b5	Global control failed signal
b6	Extended diagnostic information read response signal
b7 to bF	Use prohibited
■Input signal (Un\G1)	
b0 to b7	Use prohibited
b8	Alarm read response signal
b9, bA	Use prohibited
bB	Communication READY signal
bC	Use prohibited
bD	Module ready signal
bE	Use prohibited
bF	Watchdog timer error signal
■Output signal (Un\G2)	
b0	Data exchange start request signal
b1	Diagnostic information detection reset request signal
b2	Diagnostic information area clear request signal
b3	Use prohibited
b4	Global control request signal
b5	Use prohibited
b6	Extended diagnostic information read request signal
b7 to bF	Use prohibited
■Output signal (Un\G3)	
b0 to b7	Use prohibited
b8	Alarm read request signal
b9 to bF	Use prohibited

Point

Do not turn on the "Use prohibited" signals. Doing so may cause the programmable controller system to malfunction.

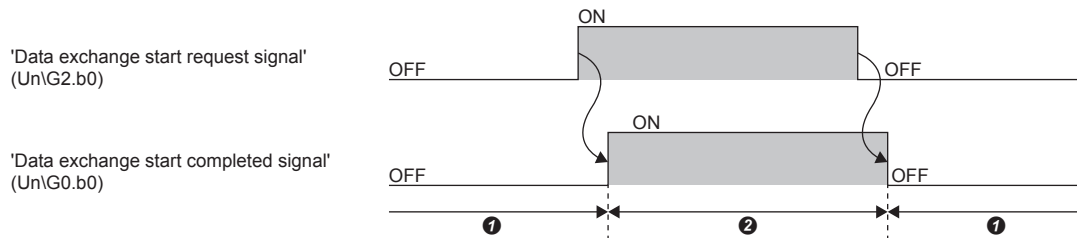
■ Data exchange start signals (Un\G2.b0) and (Un\G0.b0)

'Data exchange start request signal' (Un\G2.b0) is turned on when data exchange is started.

When 'Data exchange start request signal' (Un\G2.b0) is turned on and data exchange begins, 'Data exchange start completed signal' (Un\G0.b0) turns on.

'Data exchange start completed signal' (Un\G0.b0) turns off in one of the following cases.

- 'Data exchange start request signal' (Un\G2.b0) is turned off
- An error causes data exchange to stop
- A communications error occurs to a DP-Slave (When master parameter "Error action flag" is checked)



- ① Data exchange stopped
- ② Data being exchanged

The signals are used as interlock signals when I/O data are read/written.

Initial values of output data are written to the buffer memory before 'Data exchange start request signal' (Un\G2.b0) is turned on.

Turn off 'Data exchange start request signal' (Un\G2.b0) clears the information in the following areas. The other buffer memory areas hold their information.

- 'Slave status area (Normal communication detection)' (Un\G23040 to Un\G23043)
- 'Slave status area (Alarm detection)' (Un\G26416 to Un\G26420)

When 'Data exchange start request signal' (Un\G2.b0) is turned on, the following areas are cleared.

- 'Slave status area (Normal communication detection)' (Un\G23040 to Un\G23043)
- 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060)
- 'Diagnostic information area' (Un\G23072 to Un\G23199)
- 'Extended diagnostic information area' (Un\G23328 to Un\G23454)
- 'Current bus cycle time area' (Un\G2272)
- 'Minimum bus cycle time area' (Un\G2273)
- 'Maximum bus cycle time area' (Un\G2274)

■ Diagnostic information detection signals (Un\G2.b1) and (Un\G0.b1)

[Processing when 'Diagnostic information detection signal' (Un\G0.b1) turns on]

After the time that is specified in 'Diagnostic information non-notification time setting area' (Un\G2084) has elapsed, 'Diagnostic information detection signal' (Un\G0.b1) turns on if a communications error is detected.

Once 'Diagnostic information detection signal' (Un\G0.b1) turns on, the following processing takes place.

- BF LED turns on.
- The diagnostic information is stored in 'Diagnostic information area' (Un\G23072 to Un\G23199).
- The extended diagnostic information is stored in 'Extended diagnostic information area' (Un\G23328 to Un\G23454).
- Bit in 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060) relevant to the station that sent the diagnostic information turns on.
- An error information of FX5-DP-M is stored into 'Local station error information area' (Un\G23071).

[Processing when 'Diagnostic information detection reset request signal' (Un\G2.b1) turns on.]

Turning on 'Diagnostic information detection reset request signal' (Un\G2.b1) causes 'Diagnostic information detection signal' (Un\G0.b1) to turn off.

The following processing takes place when 'Diagnostic information detection signal' (Un\G0.b1) turns off.

- BF LED turns off.
- Bit in 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060) relevant to the station that sent the diagnostic information turns off.

When 'Diagnostic information detection reset request signal' (Un\G2.b1) is on, occurrence of another piece of diagnostic information leads to the following state.

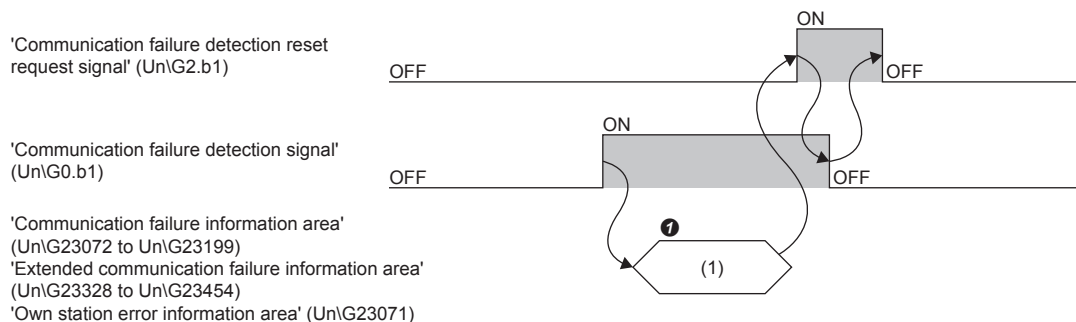
- 'Diagnostic information detection signal' (Un\G0.b1) does not turn on.
- BF LED does not turn on.
- Bit in 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060) relevant to the station that sent the diagnostic information does not turn on.

After 'Diagnostic information detection signal' (Un\G0.b1) turns off, take action against the cause of the error and turn off 'Diagnostic information detection reset request signal' (Un\G2.b1).

[Processing when 'Diagnostic information detection reset request signal' (Un\G2.b1) turns off.]

After 'Diagnostic information detection reset request signal' (Un\G2.b1) is turned off, the FX5-DP-M rechecks diagnostic information.

If diagnostic information has been generated, the bits corresponding to 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060), 'Diagnostic information detection signal' (Un\G0.b1) and BF LED turn on and the following processing takes place.



(1) MOV/FROM instruction

① Read diagnostic information, extended diagnostic information, own station error information from the buffer memory.

Point

Turning on 'Diagnostic information detection reset request signal' (Un\G2.b1) does not clear the following information.

To clear the information, turn on 'Diagnostic information area clear request signal' (Un\G2.b2).

- 'Diagnostic information area' (Un\G23072 to Un\G23199)
- 'Extended diagnostic information area' (Un\G23328 to Un\G23454)
- 'Local station error information area' (Un\G23071)

■ Diagnostic information area clear signals (Un\G2.b2) and (Un\G0.b2)

'Diagnostic information area clear request signal' (Un\G2.b2) is turned on when the following information is cleared.

- 'Diagnostic information area' (Un\G23072 to Un\G23199)
- 'Extended diagnostic information area' (Un\G23328 to Un\G23454)
- 'Local station error information area' (Un\G23071)

After 'Diagnostic information area clear request signal' (Un\G2.b2) is turned on and the processing above is completed, 'Diagnostic information area cleared signal' (Un\G0.b2) turns on.

When 'Diagnostic information area clear request signal' (Un\G2.b2) is on, if another piece of diagnostic information is generated, the following information remains cleared. (Diagnostic information, extended diagnostic information, and own station error information will not be stored.)

- 'Diagnostic information area' (Un\G23072 to Un\G23199)
- 'Extended diagnostic information area' (Un\G23328 to Un\G23454)
- 'Local station error information area' (Un\G23071)

After 'Diagnostic information area cleared signal' (Un\G0.b2) turns on, 'Diagnostic information area clear request signal' (Un\G2.b2) is turned off.

Taking action against the error cause and turning off 'Diagnostic information area clear request signal' (Un\G2.b2) causes 'Diagnostic information area cleared signal' (Un\G0.b2) to turn off.

After 'Diagnostic information area clear request signal' (Un\G2.b2) is turned off, the FX5-DP-M rechecks diagnostic information.

With any piece of diagnostic information generated, diagnostic information, extended diagnostic information, and own station error information are stored in the buffer memory.



■ Global control functions (Un\G2.b4), (Un\G0.b4), and (Un\G0.b5)

[Global control request signal' (Un\G2.b4) and 'Global control completed signal' (Un\G0.b4)]

'Global control request signal' (Un\G2.b4) is turned on when the global control function is executed.

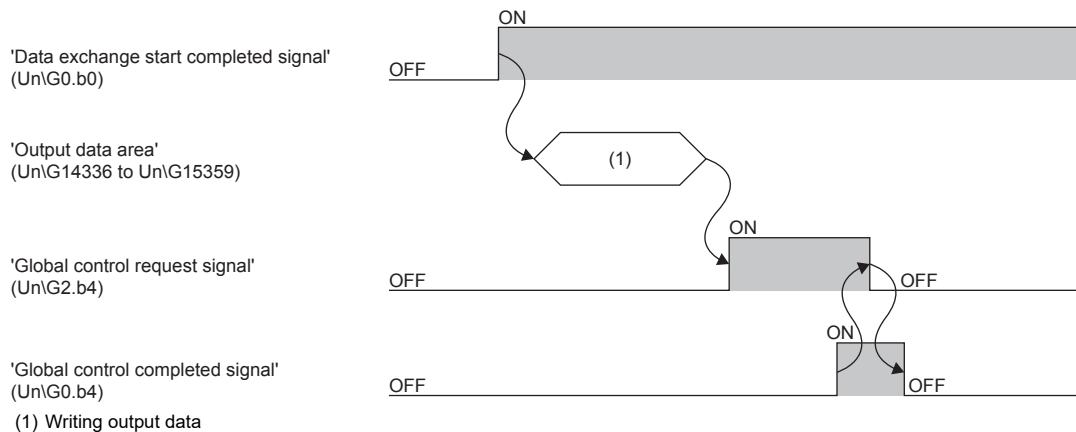
After 'Global control request signal' (Un\G2.b4) is turned on and the global control function processing is completed, 'Global control completed signal' (Un\G0.b4) turns on.

After 'Global control completed signal' (Un\G0.b4) turns on, 'Global control request signal' (Un\G2.b4) is turned off.

Turning off 'Global control request signal' (Un\G2.b4) causes 'Global control completed signal' (Un\G0.b4) to turn off.

'Global control request signal' (Un\G2.b4) is turned on when 'Data exchange start completed signal' (Un\G0.b0) is on.

When 'Data exchange start completed signal' (Un\G0.b0) is off, if 'Global control request signal' (Un\G2.b4) is turned on, both 'Global control completed signal' (Un\G0.b4) and 'Global control failed signal' (Un\G0.b5) turn on.



A

[Global control failed signal' (Un\G0.b5)]

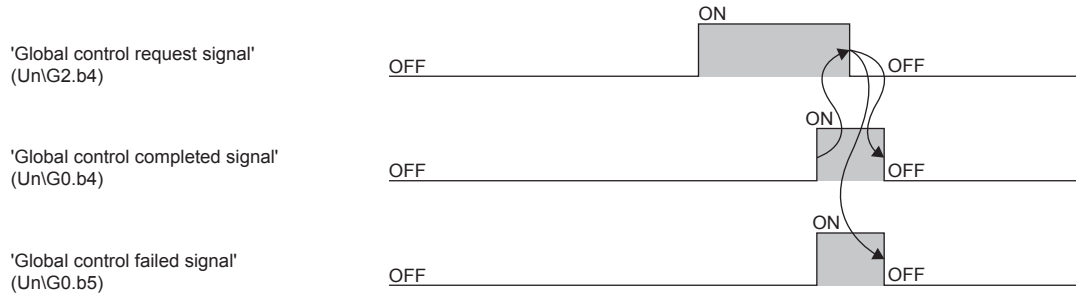
When 'Data exchange start completed signal' (Un\G0.b0) is off, if 'Global control request signal' (Un\G2.b4) is turned on, both 'Global control completed signal' (Un\G0.b4) and 'Global control failed signal' (Un\G0.b5) turn on.

If 'Global control failed signal' (Un\G0.b5) is on, this indicates that execution of the global control function has been completed with an error.

Take action against the cause of the error and retry the global control function.

When 'Global control failed signal' (Un\G0.b5) is on, if DP-Slaves have already I/O data, the DP-Slave holds the data.

Turning off 'Global control request signal' (Un\G2.b4) causes 'Global control failed signal' (Un\G0.b5) to turn off.



Precautions

The global control function cannot be executed with the Acyclic communication function. When used in conjunction with these functions, configure an interlock circuit in the program.

■Extended diagnostic information read signals (Un\G2.b6) and (Un\G0.b6)

'Extended diagnostic information read request signal' (Un\G2.b6) is turned on when extended diagnostic information on a specified FDL address is acquired. The FDL address is specified in 'Extended diagnostic information read request area' (Un\G23456).

Turning on 'Extended diagnostic information read request signal' (Un\G2.b6) causes information in 'Extended diagnostic information read response area' (Un\G23457 to Un\G23583) to be cleared.

After 'Extended diagnostic information read request signal' (Un\G2.b6) is turned on and extended diagnostic information on the specified FDL address is acquired, 'Extended diagnostic information read response signal' (Un\G0.b6) turns on.

After 'Extended diagnostic information read response signal' (Un\G0.b6) turns on, 'Extended diagnostic information read request signal' (Un\G2.b6) is turned off.

Turning off 'Extended diagnostic information read request signal' (Un\G2.b6) causes 'Extended diagnostic information read response signal' (Un\G0.b6) to turn off.



■ Alarm read signals (Un\G3.b8) and (Un\G1.b8)

'Alarm read request signal' (Un\G3.b8) is turned on in accordance with each format settings of the 'Alarm request areas' (Un\G26432 to Un\G26434) when an alarm is acquired in the specified DP-Slave.

Turning on 'Alarm read request signal' (Un\G3.b8) causes information in 'Alarm response area' (Un\G26446 to Un\G26768) to be temporarily cleared, and acquired alarms are stored.

However, the following areas are not cleared when the alarm ACK request is issued.

Buffer memory address	Description
Un\G26449 to Un\G26484	The area where alarm No.1 is stored.
Un\G26489 to Un\G26524	The area where alarm No.2 is stored.
Un\G26529 to Un\G26564	The area where alarm No.3 is stored.
Un\G26569 to Un\G26604	The area where alarm No.4 is stored.
Un\G26609 to Un\G26644	The area where alarm No.5 is stored.
Un\G26649 to Un\G26684	The area where alarm No.6 is stored.
Un\G26689 to Un\G26724	The area where alarm No.7 is stored.
Un\G26729 to Un\G26764	The area where alarm No.8 is stored.

When an alarm is acquired and ACK is returned to the appropriate DP-Slave, the DIA LED turns off when both of the following conditions are met.

- Bits of all DP-Slaves are off in 'Slave status area (Alarm detection)' (Un\G26416 to Un\G26420).
- Bit 11 is off for status 1 in 'Diagnostic information area' (Un\G23072 to Un\G23199).

When an alarm is acquired and ACK is returned to the appropriate DP-Slave, the BF LED turns off when both of the following conditions are met.

- Bits of all DP-Slaves are off in 'Slave status area (Alarm detection)' (Un\G26416 to Un\G26420).
- Bits of all DP-Slaves are off in 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060).

After an alarm is acquired and the result is stored in 'Alarm response area' (Un\G26446 to Un\G26768), 'Alarm read response signal' (Un\G1.b8) turns on.

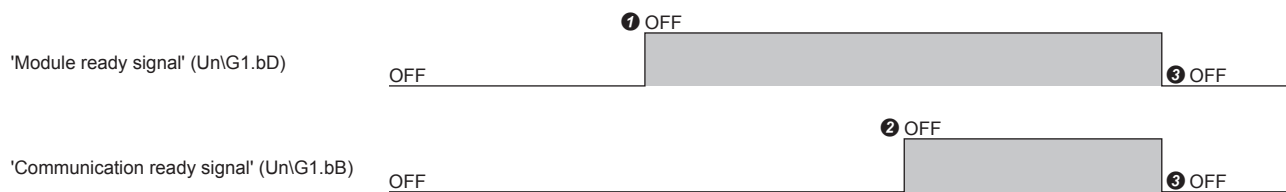
Turning off 'Alarm read request signal' (Un\G3.b8) causes 'Alarm read response signal' (Un\G1.b8) to turn off.

■ Communication READY signal (Un\G1.bB)

'Communication READY signal' (Un\G1.bB) turns on after 'Module READY signal' (Un\G1.bD) turns on and data exchange is ready.

This signal turns off if an error that prevents data exchange occurs to the FX5-DP-M.

The signal is used as an interlock signal when 'Data exchange start request signal' (Un\G2.b0) is turned on.



- ① Module starts
- ② Communications are ready
- ③ When an error that prevents continuation occurs

■ Module ready signal (Un\G1.bD)

This signal turns on when the FX5-DP-M starts.

This signal turns off when the FX5-DP-M is not ready.

■ Watchdog timer error signal (Un\G1.bF)

This signal turns on when a watchdog timer error occurs to the FX5-DP-M.

'Watchdog timer error signal' (Un\G1.bF) does not turn off until the following operation is performed.

- Turning off and on the programmable controller
- Resetting the CPU module

Diagnostic information invalid setting area

■ Diagnostic information invalid setting area (Un\G2080)

This area sets a value to mask (invalidate) pieces of diagnostic information sent from DP-Slaves during communications.

- 0: Validates the diagnostic information.
- 1: Invalidates the diagnostic information.

Address	Bit	Description	Initial value
Un\G2080	b0	Parameter send request from DP-Slaves	1
	b1	A malfunction occurred in the DP-Slave.	0
	b2	Not used (fixed to 0)	0
	b3	A DP-Slave is monitoring their communication watchdog timer.	1
	b4	Not used (fixed to 1)	1
	b5	Not used (fixed to 1)	1
	b6	Not used (fixed to 0)	0
	b7	A parameter setting excluded the station from data exchange.	1
	b8	Data exchange with a DP-Slave failed.	0
	b9	A DP-Slave is not ready for data exchange.	1
	b10	The I/O bytes parameter received from the DP-Master does not match that of a DP-Slave.	0
	b11	Extended diagnostic information exists.	0
	b12	The function requested by the DP-Master is not supported.	0
	b13	An invalid response from a DP-Slave.	0
	b14	An invalid parameter from the DP-Master.	0
	b15	The station is controlled by another DP-Master.	0

The FX5-DP-M does not recognize as diagnostic information the diagnostic information relevant to bits that is generated at a DP-Slave and results in the following status.

- 'Diagnostic information detection signal' (Un\G0.b1) does not turn on.
- BF LED does not turn on.
- The error code and detailed data are not stored in 'Diagnostic information area' (Un\G23072 to Un\G23199) or 'Extended diagnostic information area' (Un\G23328 to Un\G23454).
- Bit in 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060) relevant to the station that sent the diagnostic information does not turn on.



Configure the values of 'Diagnostic information invalid setting area' (Un\G2080) when 'Data exchange start request signal' (Un\G2.b0) is off.

Any value configured while 'Data exchange start request signal' (Un\G2.b0) is on will be ignored.

Global control area

■ Global control area (Un\G2081)

This area sets a global control function to be run. (📄 Page 25 Global control function)

Set the global control function services sent to global control areas b2 to b5, and set the target group numbers at b8 to b15.

- 0: Do not execute the instruction.
- 1: Execute the instruction.

Address	Bit	Description	Initial value
Un\G2081	b0	Not used (fixed to 0)	0
	b1	Not used (fixed to 0)	0
	b2	UNFREEZE (Actual input data are cleared.)	0
	b3	FREEZE (Actual input data are held and read.)	0
	b4	UNSYNC (Actual output data are cleared.)	0
	b5	SYNC (Actual output data are written and held.)	0
	b6	Not used (fixed to 0)	0
	b7	Not used (fixed to 0)	0
	b8	Apply a service(s) to DP-Slaves in group 1.	0
	b9	Apply a service(s) to DP-Slaves in group 2.	0
	b10	Apply a service(s) to DP-Slaves in group 3.	0
	b11	Apply a service(s) to DP-Slaves in group 4.	0
	b12	Apply a service(s) to DP-Slaves in group 5.	0
	b13	Apply a service(s) to DP-Slaves in group 6.	0
	b14	Apply a service(s) to DP-Slaves in group 7.	0
	b15	Apply a service(s) to DP-Slaves in group 8.	0

Point

The following services cannot be executed simultaneously.

- SYNC and UNSYNC (Executing them simultaneously will only activate UNSYNC.)
- FREEZE and UNFREEZE (Executing them simultaneously will only activate UNFREEZE.)

The target group number bits allow configuring multiple group numbers. Setting all bits from b8 to b15 to 0 sends a global control function service to all DP-Slaves (including ones that are not assigned with a group number).

A

Diagnostic information non-notification time setting area

■Diagnostic information non-notification time setting area (Un\G2084)

This area specifies the duration after the start of data exchange (after 'Data exchange start completed signal' (Un\G0.b0) turns on) during which any diagnostic information is not notified.


Address	Setting value	Description
Un\G2084	0 to 65535	Sets the duration during which diagnostic information is not notified. (Unit: second)

This setting allows temporary deactivation of error detection such as a DP-Slave is turned on after the FX5-DP-M is powered on.

Generation of diagnostic information within the specified duration leads to the following state.

- 'Diagnostic information detection signal' (Un\G0.b1) does not turn on.
- BF LED does not turn on.
- The error code and detailed data are not stored in 'Diagnostic information area' (Un\G23072 to Un\G23199) or 'Extended diagnostic information area' (Un\G23328 to Un\G23454).
- Bit in 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060) relevant to the station that sent the diagnostic information does not turn on.

Point

- Configure the value of 'Diagnostic information non-notification time setting area' (Un\G2084) when 'Data exchange start request signal' (Un\G2.b0) is off. Any value configured while 'Data exchange start request signal' (Un\G2.b0) is on will be ignored.
- 'Current diagnostic information non-notification time area' (Un\G2085) allows viewing the duration (remaining time period) after the start of data exchange (after 'Data exchange start completed signal' (Un\G0.b0) turns on) during which diagnostic information is not notified. ( Page 134 Current diagnostic information non-notification time area (Un\G2085))

Current diagnostic information non-notification time area

■Current diagnostic information non-notification time area (Un\G2085)

This area stores the duration (remaining time period) after the start of data exchange (after 'Data exchange start completed signal' (Un\G0.b0) turns on) during which any diagnostic information is not notified.

The duration during which diagnostic information is not notified is configured through 'Diagnostic information non-notification time setting area' (Un\G2084).

Address	Setting value	Description
Un\G2085	0 to 65535	Stores the duration (remaining time period) during which diagnostic information is not notified. The stored value is decremented. (Unit: second) No diagnostic information is notified until it is decremented to 0.

After data exchange starts ('Data exchange start completed signal' (Un\G0.b0) turns on), if time period specified in 'Diagnostic information non-notification time setting area' (Un\G2084) elapses, 'Current diagnostic information non-notification time area' (Un\G2085) is set to 0.

After data exchange stops ('Data exchange start request signal' (Un\G2.b0) is turned off), the remaining time stays unchanged until 'Data exchange start request signal' (Un\G2.b0) is turned on next time.

Local FDL address display area

■Local FDL address display area (Un\G2257)

This area stores the FDL address for own station.

Address	Stored value	Description
Un\G2257	0000H to 007DH	An FDL address for own station (0 to 125)
	FFFFH	The parameter is not configured

Current bus cycle time

■Current bus cycle time (Un\G2272)

This area stores the current bus cycle time. (Unit: × 1ms) (📖 Page 162 Bus cycle time)

Minimum bus cycle time

■Minimum bus cycle time (Un\G2273)

This area stores the minimum bus cycle time. (Unit: × 1ms)

Maximum bus cycle time

■Maximum bus cycle time (Un\G2274)

This area stores the maximum bus cycle time. (Unit: × 1ms)

Input data area

■ Input data area (Un\G6144 to Un\G7167)

This area stores input data from DP-Slaves. (☞ Page 21 Data exchange function)

- Data length settings

Each station is assigned with a variable data length (in byte) according to the slave parameters configured with PROFIBUS Configuration Tool (the "Slave Modules" window).

However, the DP-Slaves with a fixed data length is assigned it regardless of the slave parameters (the "Slave Modules" window) setting.

- Range of data length

Data length can be set 244 bytes maximum per station and to 2048 bytes maximum in total for all the DP-Slaves.

When data length is set to an odd number of bytes, 00H are stored in the last upper byte.

Input data from the next station is assigned from the next buffer memory address.

Ex.

1st station: 23 bytes, 2nd station: 7 bytes

Address	Sorting order of stored data		Stored input data
	b8 to b15	b0 to b7	
Un\G6144	The 2nd byte for the 1st station	The 1st byte for the 1st station	Input data from the 1st station (Input data length: 23 bytes)
Un\G6145	The 4th byte for the 1st station	The 3rd byte for the 1st station	
⋮			
Un\G6154	The 22nd byte for the 1st station	The 21st byte for the 1st station	
Un\G6155	00H	The 23rd byte for the 1st station	
Un\G6156	The 2nd byte for the 2nd station	The 1st byte for the 2nd station	Input data from the 2nd station (Input data length: 7 bytes)
Un\G6157	The 4th byte for the 2nd station	The 3rd byte for the 2nd station	
Un\G6158	The 6th byte for the 2nd station	The 5th byte for the 2nd station	
Un\G6159	00H	The 7th byte for the 2nd station	
⋮			
to Un\G7167			Input data from the nth station

Point

I/O data is assigned in the order of parameters configured with PROFIBUS Configuration Tool (order of FDL address).

Modifying the parameters with PROFIBUS Configuration Tool (adding or deleting a DP-Slave) causes the buffer memory areas to be reassigned. Review the program after modifying the parameters.

When data length is set to an odd number of bytes, upper byte leaves empty and the data from the next station are assigned from the subsequent even address.

'Input data area' (Un\G6144 to Un\G7167) cannot be assigned to the following DP-Slaves. The addresses for them are assigned to the DP-Slaves subsequent to them instead.

- DP-Slaves without an input data length assigned
- DP-Slaves with an input data length of 0 bytes assigned

Output data area

■ Output data area (Un\G14336 to Un\G15359)

This area sets output data sent to DP-Slaves. (☞ Page 21 Data exchange function)

- Data length settings

Each station is assigned with a variable data length (in byte) according to the slave parameters configured with PROFIBUS Configuration Tool (the "Slave Modules" window).

However, the DP-Slaves with a fixed data length is assigned it regardless of the slave parameters (the "Slave Modules" window) setting.

- Range of data length

Data length can be set 244 bytes maximum per station and to 2048 bytes maximum in total for all the DP-Slaves.

When data length is set to an odd number of bytes, the last upper bytes are occupied.

Set to 00H for the last upper bytes.

Output data to the next station is assigned from the next buffer memory address.

Ex.

1st station: 23 bytes, 2nd station: 7 bytes

Address	Sorting order of stored data		Stored output data
	b8 to b15	b0 to b7	
Un\G14336	The 2nd byte for the 1st station	The 1st byte for the 1st station	Output data to the 1st station (Output data length: 23 bytes)
Un\G14337	The 4th byte for the 1st station	The 3rd byte for the 1st station	
⋮			
Un\G14346	The 22nd byte for the 1st station	The 21st byte for the 1st station	
Un\G14347	00H	The 23rd byte for the 1st station	
Un\G14348	The 2nd byte for the 2nd station	The 1st byte for the 2nd station	Output data to the 2nd station (Output data length: 7 bytes)
Un\G14349	The 4th byte for the 2nd station	The 3rd byte for the 2nd station	
Un\G14350	The 6th byte for the 2nd station	The 5th byte for the 2nd station	
Un\G14351	00H	The 7th byte for the 2nd station	
⋮			
to Un\G15359			Input data from the nth station

A



I/O data is assigned in the order of parameters configured with PROFIBUS Configuration Tool (order of FDL address).

Modifying the parameters with PROFIBUS Configuration Tool (adding or deleting a DP-Slave) causes the buffer memory areas to be reassigned. Review the program after modifying the parameters.

When data length is set to an odd number of bytes, upper byte leaves empty and the data from the next station are assigned from the subsequent even address.

'Output data area' (Un\G14336 to Un\G15359) cannot be assigned to the following DP-Slaves. The addresses for them are assigned to the DP-Slaves subsequent to them instead.

- DP-Slaves without an output data length assigned
- DP-Slaves with an output data length of 0 byte assigned

Address information area

■Address information area (Un\G22528 to Un\G22655)

This area stores the FDL address and I/O data length of DP-Slaves.

Address information area stores information on 64 stations in the same sorting order of data.

Information on reserved stations or temporarily reserved stations is stored as well.

Address	Bit	Name	Description	Initial value
Un\G22528	—	FDL address (1st station)	Stores the FDL address for the 1st station. • 0000H to 007DH (0 to 125): FDL address • FFFFH: FDL address is not assigned	FFFFH
Un\G22529	b0 to b7	I/O data length (1st station)	Stores the output data length for the 1st station. • 00H to F4H: Output data length (Unit: byte) ^{*1} • FFH: Output data length is not assigned ^{*1}	FFH
	b8 to b15		Stores the input data length for the 1st station. • 00H to F4H: Input data length (Unit: byte) ^{*1} • FFH: input data length is not assigned ^{*1}	FFH
Un\G22530	—	FDL address (2nd station)	Stores the FDL address for the 2nd station. • 0000H to 007DH (0 to 125): FDL address • FFFFH: FDL address is not assigned	FFFFH
Un\G22531	b0 to b7	I/O data length (2nd station)	Stores the output data length for the 2nd station. • 00H to F4H: Output data length (Unit: byte) ^{*1} • FFH: Output data length is not assigned ^{*1}	FFH
	b8 to b15		Stores the input data length for the 2nd station. • 00H to F4H: Input data length (Unit: byte) ^{*1} • FFH: input data length is not assigned ^{*1}	FFH
⋮				
Un\G22654	—	FDL address (64th station)	Stores the FDL address for the 64th station. • 0000H to 007DH (0 to 125): FDL address • FFFFH: FDL address is not assigned	FFFFH
Un\G22655	b0 to b7	I/O data length (64th station)	Stores the output data length for the 64th station. • 00H to F4H: Output data length (Unit: byte) ^{*1} • FFH: Output data length is not assigned ^{*1}	FFH
	b8 to b15		Stores the input data length for the 64th station. • 00H to F4H: Input data length (Unit: byte) ^{*1} • FFH: input data length is not assigned ^{*1}	FFH

*1 The difference between 00H and FFH is as follows.

00H indicates that input data length or output data length is assigned but that the length is set to 0.

FFH indicates that no input data length or output data length is assigned.

Input data start address area

■Input data start address area (Un\G22784 to Un\G22847)

This area stores the start address (buffer memory address) for input data from DP-Slaves.

Writing a program with 'Input data start address area' (Un\G22784 to Un\G22847) allows specifying addresses in input data area regardless of the number of input points of DP-Slaves.

Input data start address area stores information on 64 stations in the same sorting order of data.

Address	Bit	Name	Description	Initial value
Un\G22784	—	Input data start address (1st station)	Stores the input data start address (buffer memory address) for the 1st station. • 1800H to 1BFFH: Input data start address • FFFFH: Input data address is not assigned	0000H
Un\G22785	—	Input data start address (2nd station)	Stores the input data start address (buffer memory address) for the 2nd station. • 1800H to 1BFFH: Input data start address • FFFFH: Input data address is not assigned	0000H
⋮				
Un\G22847	—	Input data start address (64th station)	Stores the input data start address (buffer memory address) for the 64th station. • 1800H to 1BFFH: Input data start address • FFFFH: Input data address is not assigned	0000H

Output data start address area

■Output data start address area (Un\G22912 to Un\G22975)

This area stores the start address (buffer memory address) for output data to DP-Slaves.

Writing a program with 'Output data start address area' (Un\G22912 to Un\G22975) allows specifying addresses in output data area regardless of the number of output points of DP-Slaves.

Output data start address area stores information on 64 stations in the same sorting order of data.

Address	Bit	Name	Description	Initial value
Un\G22912	—	Output data start address (1st station)	Stores the output data start address (buffer memory address) for the 1st station. • 3800H to 3BFFH: Output data start address • FFFFH: Output data is not assigned	0000H
Un\G22913	—	Output data start address (2nd station)	Stores the output data start address (buffer memory address) for the 2nd station. • 3800H to 3BFFH: Output data start address • FFFFH: Output data is not assigned	0000H
⋮				
Un\G22975	—	Output data start address (64th station)	Stores the output data start address (buffer memory address) for the 64th station. • 3800H to 3BFFH: Output data start address • FFFFH: Output data is not assigned	0000H

A

Slave status area (Normal communication detection)

■ Slave status area (Normal communication detection) (Un\G23040 to Un\G23043)

This area stores the communication status of DP-Slaves.

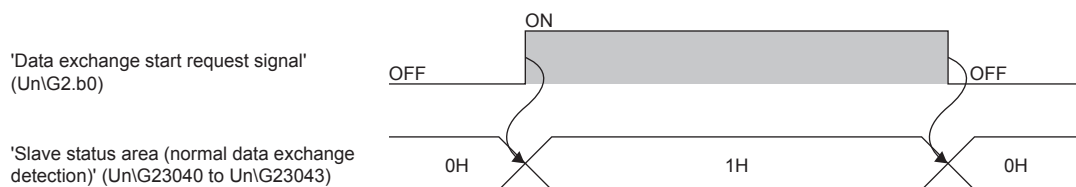
Turning off 'Data exchange start request signal' (Un\G2.b0) causes all the information in 'Slave status area (Normal communication detection)' (Un\G23040 to Un\G23043) to be cleared.

- 0: A data exchange error has occurred or no data have been exchanged (including reserved stations, temporarily reserved stations, and not-configured stations)
- 1: Data are being exchanged

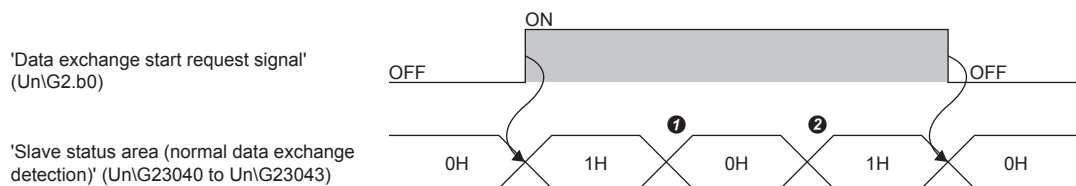
Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G23040	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G23041	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G23042	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G23043	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

The values in the table indicate which number of DP-Slave each bit represents.

Turning on 'Data exchange start request signal' (Un\G2.b0) updates information in 'Slave status area (Normal communication detection)' (Un\G23040 to Un\G23043) and turns on bits for the DP-Slaves that are exchanging data.



Occurrence of data exchange error at a DP-Slave turns off the relevant bit, which is turned on again after the recovery.



- ❶ A data exchange error occurs
- ❷ The data exchange error is recovered

Point

Bits in Slave status area are assigned in the order of parameters configured with PROFIBUS Configuration Tool (order of FDL address).

Modifying the parameters with PROFIBUS Configuration Tool (adding or deleting a DP-Slave) causes the buffer memory areas to be reassigned. Review the program after modifying the parameters.

Slave status area (Reserved station setting status)

■Slave status area (Reserved station setting) (Un\G23048 to Un\G23051)

This area stores reserved station settings or temporarily reserved station settings for DP-Slaves. (☞ Page 37 Temporarily Reserved Station Specification Function)

- 0: Normal DP-Slave or not-configured station
- 1: Reserved station setting or temporarily reserved station setting

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G23048	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G23049	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G23050	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G23051	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

The values in the table indicate which number of DP-Slave each bit represents.

Slave status area (Diagnostic information detection)

■Slave status area (Diagnostic information detection) (Un\G23056 to Un\G23060)

This area stores diagnostic information generation status of DP-Slaves. (☞ Page 23 Acquisition of diagnostic information and extended diagnostic information)

Turning on 'Data exchange start request signal' (Un\G2.b0) clears all the information in 'Slave status area (Diagnostic information detection)' (Un\G23056 to Un\G23060).

Address	Name	Description	Initial value
Un\G23056	All stations' diagnostic status	Stores the diagnostic information detection status of all the DP-Slaves. When a diagnostic information has detected even on one DP-Slave in 'Each station's diagnostic status' (Un\G23057 to Un\G23060), 1 is stored in 'All stations' diagnostic status' (Un\G23056). • 0: All DP-Slaves are operating normally • 1: Diagnostic error information detected	0000H
Un\G23057 to Un\G23060	Each station's diagnostic status	Stores the diagnostic information detection status of each DP-Slave. • 0: Normal (including reserved stations, temporarily reserved stations, and not-configured stations) • 1: Diagnostic error information has been detected	0000H

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G23057	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G23058	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G23059	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G23060	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

The values in the table indicate which number of DP-Slave each bit represents.

Local station error information area

■Local station error information area (Un\G23071)

This area stores the error information on own station (FX5-DP-M).

Address	Stored value	Description
Un\G23071	0000H	Normal
	Other than 0000H	Error (☞ Page 114 List of Error Codes)

Point

The information in 'Local station error information area' (Un\G23071) is not cleared by resolving the problem that occurred to the FX5-DP-M.

To clear the information in 'Local station error information area' (Un\G23071), turn on 'Diagnostic information area clear request signal' (Un\G2.b2).

Diagnostic information area

■ Diagnostic information area (Un\G23072 to Un\G23199)

This area stores diagnostic information on DP-Slaves generated during data exchange. (☞ Page 23 Acquisition of diagnostic information and extended diagnostic information)

Diagnostic information area stores information on 64 stations in the same sorting order of data.

Address	Bit	Name	Description	Initial value
Un\G23072	b8 to b15	Diagnostic information area (1st station)	Stores the status 3 information on the 1st station (whether any piece of diagnostic information other than the one sent this time is stored in the DP-Slave). • 00H: No other diagnostic information is stored. • 80H: Other diagnostic information is stored.	00H
	b0 to b7		Stores the FDL address for the 1st station. • 00H to 7DH (0 to 125): FDL address	00H
Un\G23073	b8 to b15		Stores the status 1 information on the 1st station. • 00H: Normal • Other than 00H: ☞ Page 143 Status 1 and status 2 information	00H
	b0 to b7		Stores the status 2 information on the 1st station. • 00H: Normal • Other than 00H: ☞ Page 143 Status 1 and status 2 information	00H
Un\G23074	b8 to b15	Diagnostic information area (2nd station)	Stores the status 3 information on the 2nd station (whether any piece of diagnostic information other than the one sent this time is stored in the DP-Slave). • 00H: No other diagnostic information is stored. • 80H: Other diagnostic information is stored.	00H
	b0 to b7		Stores the FDL address for the 2nd station. • 00H to 7DH (0 to 125): FDL address	00H
Un\G23075	b8 to b15		Stores the status 2 information on the 1st station. • 00H: Normal • Other than 00H: ☞ Page 143 Status 1 and status 2 information	00H
	b0 to b7		Stores the status 2 information on the 2nd station. • 00H: Normal • Other than 00H: ☞ Page 143 Status 1 and status 2 information	00H
⋮				
Un\G23198	b8 to b15	Diagnostic information area (64th station)	Stores the status 3 information on the 64th station (whether any piece of diagnostic information other than the one sent this time is stored in the DP-Slave). • 00H: No other diagnostic information is stored. • 80H: Other diagnostic information is stored.	00H
	b0 to b7		Stores the FDL address for the 64th station. • 00H to 7DH (0 to 125): FDL address	00H
Un\G23199	b8 to b15		Stores the status 64 information on the 1st station. • 00H: Normal • Other than 00H: ☞ Page 143 Status 1 and status 2 information	00H
	b0 to b7		Stores the status 64 information on the 2nd station. • 00H: Normal • Other than 00H: ☞ Page 143 Status 1 and status 2 information	00H

Point

- 'Diagnostic information area' (Un\G23072 to Un\G23199) is assigned in the order of parameters configured with PROFIBUS Configuration Tool (order of FDL address).
- Modifying the parameters with PROFIBUS Configuration Tool (adding or deleting a DP-Slave) causes the buffer memory areas to be reassigned. Review the program after modifying the parameters.
- The information in 'Diagnostic information area' (Un\G23072 to Un\G23199) is not cleared by resolving the problem that occurred to the relevant DP-Slaves. To clear the information in 'Diagnostic information area' (Un\G23072 to Un\G23199), turn on 'Diagnostic information area clear request signal' (Un\G2.b2).

■ Status 1 and status 2 information

The status 1 and status 2 information is stored diagnostic information generated in a DP-Slave and relevant bits turned on. The following table shows the description of each bit, actions to take, and stations to detect diagnostic information.

Item	Bit	Description	Action	Detected in
Status 1	b8	Data exchange with a DP-Slave failed.	Check the status of the DP-Slave and PROFIBUS line. Check the relevant parameters.	DP-Master
	b9	A DP-Slave is not ready for data exchange.	<ul style="list-style-type: none"> ■When data exchange starts The station is in normal operation. (This bit turns on every time when data exchange starts.) ■When data are being exchanged. Check the status of the DP-Slave and PROFIBUS line. 	DP-Slave
	b10	The I/O bytes parameter received from the DP-Master does not match that of a DP-Slave.	Check the relevant parameters of the DP-Slave.	DP-Slave
	b11	Extended diagnostic information exists.	Check the status of the DP-Slave.	DP-Master
	b12	The function requested by the DP-Master is not supported.	Check that the DP-Slave supports the global control function. Check the specifications of the DP-Slave.	DP-Slave
	b13	An invalid response from a DP-Slave.	Check the status of the DP-Slave or that of the network.	DP-Master
	b14	An invalid parameter from the DP-Master.	Check the relevant parameters.	DP-Slave
	b15	The station is controlled by another DP-Master.	Check that multiple DP-Masters are communicating with the same DP-Slave. Check the relevant parameters.	DP-Master
Status 2	b0	Parameter send request from DP-Slaves	<ul style="list-style-type: none"> ■When data exchange starts The station is in normal operation. (This bit turns on every time when data exchange starts.) ■When data are being exchanged. Check the status of the DP-Slave and PROFIBUS line. 	DP-Slave
	b1	A malfunction occurred in the DP-Slave.	Check the status of the DP-Slave.	DP-Slave
	b2	Not used	—	—
	b3	A DP-Slave is monitoring their watchdog timer.	The station is in normal operation.	DP-Slave
	b4	Not used	—	—
	b5	Not used	—	—
	b6	Not used	—	—
	b7	A parameter setting excluded the station from data exchange.	<ul style="list-style-type: none"> ■When data exchange stops The station is in normal operation. (This bit turns on every time when data exchange stops.) ■When data are being exchanged Check that a Class 2 DP-Master on the network has not changed any relevant parameter. 	DP-Master

Extended diagnostic information area

■Extended diagnostic information area (Un\G23328 to Un\G23454)

This area stores the latest extended diagnostic information generated during data exchange. (☞ Page 23 Acquisition of diagnostic information and extended diagnostic information)

Address	Bit	Name	Description	Initial value
Un\G23328	—	FDL address of DP-Slave	Stores the FDL address of the DP-Slave that sent the latest extended diagnostic information stored in addresses Un\G23329 to Un\G23454. • 0000H to 007DH (0 to 125): FDL address	0000H
Un\G23329	—	Size	Stores the data size of the latest extended diagnostic information stored in addresses Un\G23330 to Un\G23454. • 0006H to 00F4H: Data size of extended diagnostic information (Unit: byte)	0000H
Un\G23330	b8 to b15	Status 1 + status 2	Stores the latest status 1 information. • 00H: Normal • Other than 00H: ☞ Page 143 Status 1 and status 2 information	00H
	b0 to b7		Stores the latest status 2 information. • 00H: Normal • Other than 00H: ☞ Page 143 Status 1 and status 2 information	00H
Un\G23331	b8 to b15	Status 3 + FDL address of DP-Master	Stores the latest status 3 information (whether any piece of extended diagnostic information other than the one sent this time is stored in the DP-Slave). • 00H: No other extended diagnostic information is stored. • 80H: Other extended diagnostic information is stored.	00H
	b0 to b7		Stores the latest FDL address of DP-Master. • 00H to 7DH (0 to 125): FDL address	00H
Un\G23332	—	Ident No.	Stores the latest Ident number for the DP-Slave.	0000H
Un\G23333 to Un\G23454	—	Extended diagnostic information	Stores the latest extended diagnostic information (244 bytes maximum).	0000H

Point

- The information in 'Extended diagnostic information area' (Un\G23328 to Un\G23454) is not cleared by resolving the problem that occurred to the relevant DP-Slaves. To clear the information in 'Extended diagnostic information area' (Un\G23328 to Un\G23454), turn on 'Diagnostic information area clear request signal' (Un\G2.b2).
- If b11 of 'Diagnostic information invalid setting area' (Un\G2080) is turned on, no information is stored in 'Extended diagnostic information area' (Un\G23328 to Un\G23454).

Extended diagnostic information read request area

■Extended diagnostic information read request area (Un\G23456)

This area stores the FDL address of a DP-Slave from which extended diagnostic information is read.

Address	Setting value	Description
Un\G23456	0000H to 007DH (FDL address: 0 to 125)	Stores the FDL address for a DP-Slave.

Setting an FDL address in 'Extended diagnostic information read request area' (Un\G23456) and turning on 'Extended diagnostic information read request signal' (Un\G2.b6) causes extended diagnostic information to be stored in 'Extended diagnostic information read response area' (Un\G23457 to Un\G23583).

Extended diagnostic information read response area

Extended diagnostic information read response area (Un\G23457 to Un\G23583)

This area stores the result of the extended diagnostic information read request.

Completion of operation with an error causes addresses Un\G23458 to Un\G23583 to be set to 0H.

Address	Bit	Name	Description	Initial value
Un\G23457	—	Read results code	Stores the read result • A200H: Completed successfully • Other than A200H: Completed with an error (☞ Page 114 List of Error Codes)	0000H
Un\G23458	—	Size	Stores the data size of the extended diagnostic information stored in addresses Un\G23459 to Un\G23583. • 0006H to 00F4H: Data size of extended diagnostic information (Unit: byte)	0000H
Un\G23459	b8 to b15	Status 1 + status 2	Stores the status 1 information. • 00H: Normal • Other than 00H: ☞ Page 143 Status 1 and status 2 information	00H
	b0 to b7		Stores the status 2 information. • 00H: Normal • Other than 00H: ☞ Page 143 Status 1 and status 2 information	00H
Un\G23460	b8 to b15	Status 3 + FDL address of DP-Master	Stores the status 3 information (whether any piece of extended diagnostic information other than the one sent this time is stored in the DP-Slaves). • 00H: No other extended diagnostic information is stored. • 80H: Other extended diagnostic information is stored.	00H
	b0 to b7		Stores the FDL address of the DP-Master. Stores FFH for a DP-Slave that has not started data exchange. • 00H to 7DH (0 to 125): FDL address	00H
Un\G23461	—	Ident No.	Stores the Ident No. for the DP-Slaves.	0000H
Un\G23462 to Un\G23583	—	Extended diagnostic information	Stores the extended diagnostic information (244 bytes maximum).	0000H

Parameter setting status area (Active station)

Parameter setting status area (Active station) (Un\G23584 to Un\G23587)

This area indicates the DP-Slave set as normal DP-Slaves by slave parameters.

Setting status is stored when 'Communication READY signal' (Un\G1.bB) turns on.

- 0: Reserved station setting or not-configured station setting
- 1: Normal DP-Slave

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G23584	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G23585	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G23586	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G23587	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

The values in the table indicate which number of DP-Slave each bit represents.

Parameter setting status area (Reserved station)

■Parameter setting status area (Reserved station) (Un\G23592 to Un\G23595)

This area indicates the DP-Slaves set as reserved stations by slave parameters.

Setting status is stored when 'Communication READY signal' (Un\G1.bB) turns on.


- 0: Normal DP-Slave or not-configured station
- 1: Reserved station setting

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G23592	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G23593	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G23594	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G23595	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

The values in the table indicate which number of DP-Slave each bit represents.

Temporarily reserved station specification status area

■Temporarily reserved station specification status area (Un\G23600 to Un\G23603)

This area indicates the DP-Slaves set as temporarily reserved stations by the temporarily reserved station specification function. ( Page 37 Temporarily Reserved Station Specification Function)

Setting status is stored when 'Data exchange start completed signal' (Un\G0.b0) turns on.

- 0: Normal DP-Slave, reserved station setting, or not-configured station
- 1: Temporarily reserved station setting

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G23600	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G23601	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G23602	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G23603	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

The values in the table indicate which number of DP-Slave each bit represents.

Temporarily reserved station specification request area

Temporarily reserved station specification request area (Un\G23608 to Un\G23611)

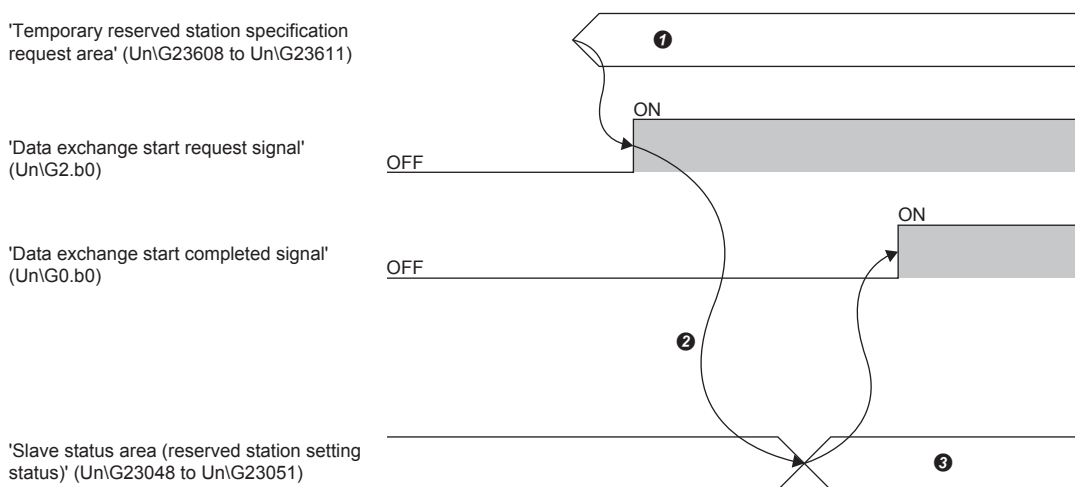
This area sets which DP-Slaves are to be specified as temporarily reserved stations by the temporarily reserved station specification function.

- 0: Not specify the DP-Slave as a temporarily reserved station
- 1: Specifies the DP-Slave as a temporarily reserved station

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G23608	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G23609	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G23610	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G23611	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

The values in the table indicate which number of DP-Slave each bit represents.

Turning on 'Data exchange start request signal' (Un\G2.b0) causes DP-Slaves specified in 'Temporarily reserved station specification request area' (Un\G23608 to Un\G23611) to be specified as temporarily reserved stations.



- ① Specify temporarily reserved stations
- ② The temporarily reserved station specification function is executed
- ③ Stores the logical sum of 'Parameter setting status area (reserved station)' (Un\G23592 to Un\G23595) and 'Temporarily reserved station specification status area' (Un\G23600 to Un\G23603)

Point

- Configure the values of 'Temporarily reserved station specification request area' (Un\G23608 to Un\G23611) when 'Data exchange start request signal' (Un\G2.b0) is off. Any value configured while 'Data exchange start request signal' (Un\G2.b0) is on will be ignored.
- Normal DP-Slaves can be switched into temporarily reserved stations. Reserved stations (DP-Slaves set as reserved stations by slave parameters) cannot be switched into normal DP-Slaves.

For details on the temporarily reserved station specification function, refer to the following.

☞ Page 37 Temporarily Reserved Station Specification Function

A

Acyclic communication request execution instruction area

■Acyclic communication request execution instruction area (Un\G23808)

This area sets the Acyclic communication execution function instructions. (Page 28 Acyclic communication function)

Turning on a bit causes the relevant request instruction to be executed.

- 0: Do not execute the instruction.
- 1: Execute the instruction.

Address	Bit	Description	Initial value
Un\G23808	b0	Execution instruction for request instruction No.1.	0
	b1	Execution instruction for request instruction No.2.	0
	b2	Execution instruction for request instruction No.3.	0
	b3	Execution instruction for request instruction No.4.	0
	b4	Execution instruction for request instruction No.5.	0
	b5	Execution instruction for request instruction No.6.	0
	b6	Execution instruction for request instruction No.7.	0
	b7	Execution instruction for request instruction No.8.	0
	b8 to b15	—	0H (fixed)

Precautions

The Acyclic communication function cannot execute with the global control function. When used in conjunction with these functions, configure an interlock circuit in the program.

Acyclic communication request area

■Acyclic communication request area (Un\G23809 to Un\G24832)

This area specifies the Acyclic communication function request instructions.

A maximum of the eight request instructions can be specified.

Address	Name	Data size
Un\G23809 to Un\G23936	Request instruction No.1 area	128 words
Un\G23937 to Un\G24064	Request instruction No.2 area	128 words
Un\G24065 to Un\G24192	Request instruction No.3 area	128 words
Un\G24193 to Un\G24320	Request instruction No.4 area	128 words
Un\G24321 to Un\G24448	Request instruction No.5 area	128 words
Un\G24449 to Un\G24576	Request instruction No.6 area	128 words
Un\G24577 to Un\G24704	Request instruction No.7 area	128 words
Un\G24705 to Un\G24832	Request instruction No.8 area	128 words

Request format for READ service

Address	Bit	Name	Description	Setting value	
Un\G23809	—	Request instruction No.1 area	READ request code	Sets the code for reading data from the DP-Slave.	1400H
Un\G23810	b8 to b15		CommRef number	Sets the CommRef number.	0H
	b0 to b7		FDL address	Stores the FDL address of the DP-Slave from which data is read.	0 to 125
Un\G23811	—		Data length	Sets the data length of the read data. (Unit: Bytes)	1 to 240
Un\G23812	—		Slot number	Sets the slot number from which data is read.	0 to 254
Un\G23813	—		Index	Sets the index from which data is read.	0 to 255
Un\G23814 to Un\G23936	—		Empty (fixed to 0)		
Un\G23937 to Un\G24064	—	Request instruction No.2 area	Same as the request instruction No.1 area.		
⋮					
Un\G24705 to Un\G24832	—	Request instruction No.8 area	Same as the request instruction No.1 area.		

Request format for WRITE service

Address	Bit	Name	Description	Setting value	
Un\G23809	—	Request instruction No.1 area	WRITE request code	Sets the code that writes data to the DP-Slave.	1401H
Un\G23810	b8 to b15		CommRef number	Sets the CommRef number.	0H
	b0 to b7		FDL address	Sets the FDL address of the DP-Slave to which data is written.	0 to 125
Un\G23811	—		Data length	Sets the data length of the write data. (Unit: Bytes)	1 to 240
Un\G23812	—		Slot number	Sets the slot number to which data is written.	0 to 254
Un\G23813	—		Index	Sets the index to which data is written.	0 to 255
Un\G23814 to Un\G23933	—		Data	Sets the data to be written.	
Un\G23934 to Un\G23936	—	Empty (fixed to 0)			
Un\G23937 to Un\G24064	—	Request instruction No.2 area	Same as the request instruction No.1 area.		
⋮					
Un\G24705 to Un\G24832	—	Request instruction No.8 area	Same as the request instruction No.1 area.		

Acyclic communication request result area

■Acyclic communication request result area (Un\G25120)

This area stores the reception status and the completed status of the Acyclic communication.

Address	Bit	Name	Description	Initial value
Un\G25120	b0	Completed status bit • 0: The request has been unexecuted or is being executed • 1: Execution is completed	Completed status of request instruction No.1.	0
	b1		Completed status of request instruction No.2.	0
	b2		Completed status of request instruction No.3.	0
	b3		Completed status of request instruction No.4.	0
	b4		Completed status of request instruction No.5.	0
	b5		Completed status of request instruction No.6.	0
	b6		Completed status of request instruction No.7.	0
	b7		Completed status of request instruction No.8.	0
	b8	Reception status bit • 0: The request has not been accepted • 1: The request has been accepted	Acceptance status of request instruction No.1.	0
	b9		Acceptance status of request instruction No.2.	0
	b10		Acceptance status of request instruction No.3.	0
	b11		Acceptance status of request instruction No.4.	0
	b12		Acceptance status of request instruction No.5.	0
	b13		Acceptance status of request instruction No.6.	0
	b14		Acceptance status of request instruction No.7.	0
b15	Acceptance status of request instruction No.8.	0		

Acyclic communication response area

■Acyclic communication response area (Un\G25121 to Un\G26144)

This area stores the result of the Acyclic communication.

Address	Name	Data size
Un\G25121 to Un\G25248	Request instruction No.1 area	128 words
Un\G25249 to Un\G25376	Request instruction No.2 area	128 words
Un\G25377 to Un\G25504	Request instruction No.3 area	128 words
Un\G25505 to Un\G25632	Request instruction No.4 area	128 words
Un\G25633 to Un\G25760	Request instruction No.5 area	128 words
Un\G25761 to Un\G25888	Request instruction No.6 area	128 words
Un\G25889 to Un\G26016	Request instruction No.7 area	128 words
Un\G26017 to Un\G26144	Request instruction No.8 area	128 words

Normal response format for READ service

Address	Bit	Name	Description	Stored value	
Un\G25121	—	Request instruction No.1 area	READ Normal response code	Stores the response code that occurs when data read from the DP-Slave is completed successfully.	A400H
Un\G25122	b8 to b15		CommRef number	Sets the CommRef number.	0H
	b0 to b7		FDL address	Stores the FDL address of the read DP-Slave.	0 to 125
Un\G25123	—		Data length	Stores the read data length. (Unit: Bytes)	1 to 240
Un\G25124	—		Slot number	Stores the read slot number.	0 to 254
Un\G25125	—		Index	Stores the read index.	0 to 255
Un\G25126 to Un\G25245	—		Data	Stores the read data. • If the index set in the READ request is shorter than the data length, only the read data is stored. • If the index set in the READ request is longer than the data length, only the set data length is stored.	
Un\G25246 to Un\G25248	—			Empty (fixed to 0)	
Un\G25249 to Un\G25376	—	Request instruction No.2 area	Same as the request instruction No.1 area.		
⋮					
Un\G26017 to Un\G26144	—	Request instruction No.8 area	Same as the request instruction No.1 area.		

Abnormal response format for READ service

Address	Bit	Name	Description	Stored value	
Un\G25121	—	Request instruction No.1 area	READ Abnormal response code	Stores the response code that occurs when an error occurs in reading data from the DP-Slave.	☞ Page 115 List of Status Codes
Un\G25122	b8 to b15		CommRef number	Sets the CommRef number.	0H
	b0 to b7		FDL address	Stores the FDL address of the read DP-Slave.	0 to 125
Un\G25123	—		Detailed status code 1	• Other than FFFFH: ☞ Page 115 List of Status Codes • FFFFH: Detailed status code 1 does not exist.	
Un\G25124	—		Detailed status code 2	• Other than FFFFH: ☞ Page 115 List of Status Codes (Refer to the DP-Slave manual if the status code is not in the list.) • FFFFH: Detailed status code 2 does not exist.	
Un\G25125	—		Detailed status code 3	Refer to the manual of the DP-Slave.	
Un\G25126 to Un\G25248	—			Empty (fixed to 0)	
Un\G25249 to Un\G25376	—	Request instruction No.2 area	Same as the request instruction No.1 area.		
⋮					
Un\G26017 to Un\G26144	—	Request instruction No.8 area	Same as the request instruction No.1 area.		

Normal response format for WRITE service

Address	Bit	Name	Description	Stored value	
Un\G25121	—	Request instruction	WRITE Normal response code	Stores the response code that occurs when data written to the DP-Slave is completed successfully.	A401H
Un\G25122	b8 to b15	No.1 area	CommRef number	Sets the CommRef number.	0H
	b0 to b7		FDL address	Stores the FDL address of the written DP-Slave.	0 to 125
Un\G25123	—		Data length	Stores the written data length. (Unit: Bytes)	1 to 240
Un\G25124	—		Slot number	Stores the written slot number.	0 to 254
Un\G25125	—		Index	Stores the written index.	0 to 255
Un\G25126 to Un\G25248	—		Empty (fixed to 0)		
Un\G25249 to Un\G25376	—	Request instruction No.2 area	Same as the request instruction No.1 area.		
⋮					
Un\G26017 to Un\G26144	—	Request instruction No.8 area	Same as the request instruction No.1 area.		

Abnormal response format for WRITE service

Address	Bit	Name	Description	Stored value	
Un\G25121	—	Request instruction	WRITE Abnormal response code	Stores the response code that occurs when an error occurs in writing data from the DP-Slave.	☞ Page 115 List of Status Codes
Un\G25122	b8 to b15	No.1 area	CommRef number	Sets the CommRef number.	0H
	b0 to b7		FDL address	Stores the FDL address of the written DP-Slave.	0 to 125
Un\G25123	—		Detailed status code 1	<ul style="list-style-type: none"> Other than FFFFH: ☞ Page 115 List of Status Codes FFFFH: Detailed status code 1 does not exist. 	
Un\G25124	—		Detailed status code 2	<ul style="list-style-type: none"> Other than FFFFH: ☞ Page 115 List of Status Codes (Refer to the DP-Slave manual if the status code is not in the list.) FFFFH: Detailed status code 2 does not exist. 	
Un\G25125	—		Detailed status code 3	Refer to the manual of the DP-Slave.	
Un\G25249 to Un\G25376	—		Request instruction No.2 area	Same as the request instruction No.1 area.	
⋮					
Un\G26017 to Un\G26144	—	Request instruction No.8 area	Same as the request instruction No.1 area.		

Slave status area (Alarm detection)

■ Slave status area (Alarm detection) (Un\G26416 to Un\G26420)

This area stores alarm occurrence status of DP-Slaves. (☞ Page 30 Alarm acquisition function)

Address	Name	Description	Initial value
Un\G26416	All stations' alarm status	Stores the alarm detection status of all the DP-Slaves. When an alarm has detected even on one DP-Slave in 'Each station's alarm status' (Un\G26417 to Un\G26420), 1 is stored in 'All stations' alarm status' (Un\G26416). • 0: No alarm detected • 1: Alarm detected When 1 is stored as 'All stations' alarm status' (Un\G26416), BF LED and DIA LED turn on.	0000H
Un\G26417 to Un\G26420	Each station's alarm status	The alarm detection status of each DP-Slave is stored by turning the appropriate bit on. • 0: No alarm detected (including reserved stations, temporarily reserved stations, not-configured stations, and alarm-unsupported stations) • 1: Alarm detected in	0000H

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G26417	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G26418	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G26419	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G26420	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

The values in the table indicate which number of DP-Slave each bit represents.

Alarm request area

■Alarm request area (Un\G26432 to Un\G26434)

This area sets request data with the format in two methods for the alarm acquisition function. (☞ Page 30 Alarm acquisition function)

■Request format when the alarm is read (without ACK)

Address	Bit	Name	Description	Setting value
Un\G26432	—	Alarm read (without ACK) request code	Sets the code that acquires the alarm without returning ACK.	1500H
Un\G26433	—	FDL address	Sets the FDL address of the DP-Slave for the alarm acquisition destination.	0 to 125
Un\G26434	—	Empty (Fixed to 0H)		

■Request format for alarm ACK

Address	Bit	Name	Description	Setting value
Un\G26432	—	Alarm ACK request code	Sets the code that returns ACK to cancel the alarm in the DP-Slave that was acquired without returning ACK.	1501H
Un\G26433	—	FDL address	Sets the FDL address of the DP-Slave to the ACK return address.	0 to 125
Un\G26434	b0	Alarm No.	ACK is returned for alarm No.1.	
	b1		ACK is returned for alarm No.2.	
	b2		ACK is returned for alarm No.3.	
	b3		ACK is returned for alarm No.4.	
	b4		ACK is returned for alarm No.5.	
	b5		ACK is returned for alarm No.6.	
	b6		ACK is returned for alarm No.7.	
	b7		ACK is returned for alarm No.8.	
b8 to b15	Empty (Fixed to 0H)			

Restriction

Alarm ACK request is not executed when the results of executing the alarm read (without ACK) request is not stored in 'Alarm response area' (Un\G26446 to Un\G26768).

■Request format when the alarm is read (with ACK)

Address	Bit	Name	Description	Setting value
Un\G26432	—	Alarm read (with ACK) request code	Sets the code that synchronizes the alarm acquisition and ACK return.	1502H
Un\G26433	—	FDL address	Sets the FDL address of the DP-Slave for the alarm acquisition destination.	0 to 125
Un\G26434	—	Empty (Fixed to 0H)		

Alarm response area

■ Alarm response area (Un\G26446 to Un\G26768)

Stores the results of executing each of the alarm read (without ACK) request, alarm ACK request and alarm read (with ACK) request.

■ Normal response format when the alarm is read (without ACK)

Address	Bit	Name	Description	Stored value
Un\G26446	—	Alarm read (without ACK) normal response code	Stores the response code that occurs when an alarm read (without ACK) request is completed successfully.	A500H
Un\G26447	—	FDL address	Stores the FDL address of the DP-Slave that acquires the alarm.	0 to 125
Un\G26448	b8 to b15	Empty (Fixed to 0H)		
	b0 to b7	Completed status	Bit of the alarm No. for which alarm acquisition completed successfully turns on.	
Un\G26449	—	Alarm No.1	Alarm data length	Stores the acquired alarm data length. (Unit: Bytes)
Un\G26450	—		Alarm type	Stores the acquired alarm type. <ul style="list-style-type: none"> • A510H: Diagnosis Alarm • A511H: Process alarm • A512H: Pull Alarm • A513H: Plug Alarm • A514H: Status Alarm • A515H: Update Alarm • A516H: Manufacturer Specific Alarm
Un\G26451	—		Alarm slot number	Stores the slot number that has an alarm notification.
Un\G26452	b0, b1	Details	Status classification is stored. <ul style="list-style-type: none"> • 00: No additional information • 01: Error is received, a malfunction is in the slot. (An error is detected, and an alarm is notified from that slot) • 10: Error is cleared and the slot is normal. (An alarm is notified from the slot, but no subsequent error occurs) • 11: Error is cleared but a malfunction is in the slot. (An alarm is notified from the slot, and the error continues) 	
			ACK return requirement is stored. <ul style="list-style-type: none"> • 0: ACK return not required • 1: ACK return required 	
	Sequence number is stored. <ul style="list-style-type: none"> • 0 to 31 			
	Empty (Fixed to 0H)			
Un\G26453 to Un\G26484	—		Alarm data	Stores the acquired alarm data. (Maximum 64 bytes)
	—		Empty This area is the response area for the Alarm ACK request.	
Un\G26489 to Un\G26528	—	Alarm No.2	Same as alarm No.1.	
⋮				
Un\G26729 to Un\G26768	—	Alarm No.8	Same as alarm No.1.	

■Abnormal response format when the alarm is read (without ACK)

Address	Bit	Name	Description	Stored value	
Un\G26446	—	Alarm read (without ACK) abnormal response code	Stores the response code that occurs when an alarm read (without ACK) request is completed with an error.	☞ Page 115 List of Status Codes	
Un\G26447	—	FDL address	Stores the FDL address of the DP-Slave that acquires the alarm.	0 to 125	
Un\G26448	b8 to b15	Empty (Fixed to 0H)			
	b0 to b7	Completed status	Bit of the alarm No. for which alarm acquisition completed successfully turns on.		
Un\G26449	—	Alarm No.1	Alarm details status code 1	<ul style="list-style-type: none"> • Other than FFFFH: ☞ Page 115 List of Status Codes • FFFFH: Detailed status code 1 does not exist. 	
Un\G26450	—		Alarm details status code 2	<ul style="list-style-type: none"> • Other than FFFFH: ☞ Page 115 List of Status Codes (Refer to the DP-Slave manual if the status code is not in the list.) • FFFFH: Detailed status code 2 does not exist. 	
Un\G26451	—		Alarm details status code 3		
Un\G26452 to Un\G26484	—		Empty (fixed to 0)		
Un\G26485 to Un\G26488	—		Empty This area is the response area for the Alarm ACK request.		
Un\G26489 to Un\G26528	—	Alarm No.2	Same as alarm No.1.		
⋮					
Un\G26729 to Un\G26768	—	Alarm No.8	Same as alarm No.1.		

Normal response format for alarm ACK

Address	Bit	Name	Description	Stored value	
Un\G26446	—	ACK Normal response code	Stores the response code that occurs when an ACK request is completed successfully.	A501H	
Un\G26447	—	FDL address	Stores the FDL address of the DP-Slave for the ACK return address.	0 to 125	
Un\G26448	b8 to b15	Completed status	Bit of an alarm No. for which ACK return completed successfully turns on.		
	b0 to b7		Bit of the alarm No. for which alarm acquisition completed successfully turns on.		
Un\G26449 to Un\G26484	—	Alarm No.1 (stored when the alarm read normal bit is on)	Alarm data	Stores an alarm data acquired for the alarm read normal response. (Page 155 Normal response format when the alarm is read (without ACK))	
Un\G26485	—		ACK Normal response code	Stores the response code that occurs when an Alarm ACK request is completed successfully.	A501H
Un\G26486	—		ACK type	Stores the acquired alarm type. <ul style="list-style-type: none"> • A510H: Diagnosis Alarm • A511H: Process alarm • A512H: Pull Alarm • A513H: Plug Alarm • A514H: Status Alarm • A515H: Update Alarm • A516H: Manufacturer Specific Alarm 	
			ACK details	Status classification is stored. <ul style="list-style-type: none"> • 00: No additional information • 01: Error is received, a malfunction is in the slot. (An error is detected, and an alarm is notified from that slot) • 10: Error is cleared and the slot is normal. (An alarm is notified from the slot, but no subsequent error occurs) • 11: Error is cleared but a malfunction is in the slot. (An alarm is notified from the slot, and the error continues) 	
Un\G26487	b0, b1		ACK return requirement is stored. <ul style="list-style-type: none"> • 0: ACK return not required • 1: ACK return required 		
	b2		Sequence number is stored. <ul style="list-style-type: none"> • 0 to 31 		
	b3 to b7		Empty (Fixed to 0H)		
	b8 to b15				
Un\G26488	—	ACK Slot number	Stores the slot number that has an alarm notification.	0 to 254	
Un\G26489 to Un\G26528	—	Alarm No.2	Same as alarm No.1.		
⋮					
Un\G26729 to Un\G26768	—	Alarm No.8	Same as alarm No.1.		



■Abnormal response format for alarm ACK

Address	Bit	Name	Description	Stored value	
Un\G26446	—	ACK Abnormal response code	Stores the response code that occurs when an ACK request is completed with an error.	☞ Page 115 List of Status Codes	
Un\G26447	—	FDL address	Stores the FDL address of the DP-Slave for the ACK return address.	0 to 125	
Un\G26448	b8 to b15	Completed status	Bit of an alarm No. for which ACK return completed successfully turns on.		
	b0 to b7		Bit of the alarm No. for which alarm acquisition completed successfully turns on.		
Un\G26449 to Un\G26484	—	Alarm No.1 (stored when the alarm read normal bit is off)	Alarm data	Stores an alarm data acquired for the alarm read normal response. (☞ Page 155 Normal response format when the alarm is read (without ACK))	
Un\G26485	—		ACK Abnormal response code	Stores the response code that occurs when an Alarm ACK request is completed with an error.	☞ Page 115 List of Status Codes
Un\G26486	—		ACK Detailed status code 1	<ul style="list-style-type: none"> • Other than FFFFH: ☞ Page 115 List of Status Codes • FFFFH: Detailed status code 1 does not exist. 	
Un\G26487	—		ACK Detailed status code 2	<ul style="list-style-type: none"> • Other than FFFFH: ☞ Page 115 List of Status Codes (Refer to the DP-Slave manual if the status code is not in the list.) • FFFFH: Detailed status code 2 does not exist. 	
Un\G26488	—	ACK Detailed status code 3			
Un\G26489 to Un\G26528	—	Alarm No.2	Same as alarm No.1.		
⋮					
Un\G26729 to Un\G26768	—	Alarm No.8	Same as alarm No.1.		

■Normal response format when the alarm is read (with ACK)

Address	Bit	Name	Description	Stored value	
Un\G26446	—	Alarm read (with ACK) normal response code	Stores the response code that occurs when an alarm read (with ACK) request is completed successfully.	A502H	
Un\G26447	—	FDL address	Stores the FDL address of the DP-Slave for the alarm acquisition and ACK return address.	0 to 125	
Un\G26448	b8 to b15	Completed status	Bit of an alarm No. for which ACK return completed successfully turns on.		
	b0 to b7		Bit of the alarm No. for which alarm acquisition completed successfully turns on.		
Un\G26449	—	Alarm No.1	Alarm data length	Stores the acquired alarm data length. (Unit: Bytes)	1 to 64
Un\G26450	—		Alarm type	Stores the acquired alarm type. <ul style="list-style-type: none"> • A510H: Diagnosis Alarm • A511H: Process alarm • A512H: Pull Alarm • A513H: Plug Alarm • A514H: Status Alarm • A515H: Update Alarm • A516H: Manufacturer Specific Alarm 	
Un\G26451	—		Alarm slot number	Stores the slot number that has an alarm notification.	0 to 254
Un\G26452	b0, b1		Alarm details	Status classification is stored. <ul style="list-style-type: none"> • 00: No additional information • 01: Error is received, a malfunction is in the slot. (An error is detected, and an alarm is notified from that slot) • 10: Error is cleared and the slot is normal. (An alarm is notified from the slot, but no subsequent error occurs) • 11: Error is cleared but a malfunction is in the slot. (An alarm is notified from the slot, and the error continues) 	
		b2		ACK return requirement is stored. <ul style="list-style-type: none"> • 0: ACK return not required • 1: ACK return required 	
	b3 to b7	This number is the sequence number. <ul style="list-style-type: none"> • 0 to 31 			
	b8 to b15	Empty (Fixed to 0H)			
Un\G26453 to Un\G26484	—	Alarm data	Stores the acquired alarm data. (Maximum 64 bytes)		
Un\G26485	—	ACK Normal response code	Stores the response code that occurs when an Alarm ACK request is completed successfully.	A501H	
Un\G26486	—	ACK type	Stores the acquired alarm type. <ul style="list-style-type: none"> • A510H: Diagnosis Alarm • A511H: Process alarm • A512H: Pull Alarm • A513H: Plug Alarm • A514H: Status Alarm • A515H: Update Alarm • A516H: Manufacturer Specific Alarm 		
Un\G26487	b0, b1	ACK details	Status classification is stored. <ul style="list-style-type: none"> • 00: No additional information • 01: Error is received, a malfunction is in the slot. (An error is detected, and an alarm is notified from that slot) • 10: Error is cleared and the slot is normal. (An alarm is notified from the slot, but no subsequent error occurs) • 11: Error is cleared but a malfunction is in the slot. (An alarm is notified from the slot, and the error continues) 		
			b2	ACK return requirement is stored. <ul style="list-style-type: none"> • 0: ACK return not required • 1: ACK return required 	
	b3 to b7		Sequence number is stored. <ul style="list-style-type: none"> • 0 to 31 		
	b8 to b15		Empty (Fixed to 0H)		
Un\G26488	—	ACK Slot number	Stores the slot number that has an alarm notification.	0 to 254	
Un\G26489 to Un\G26528	—	Alarm No.2	Same as alarm No.1.		

Address	Bit	Name	Description	Stored value
Un\G26729 to Un\G26768	—	Alarm No.8	Same as alarm No.1.	

■Abnormal response format when the alarm is read (with ACK)

Address	Bit	Name	Description	Stored value
Un\G26446	—	Alarm read (with ACK) abnormal response code	Stores the response code that occurs when an alarm read (with ACK) request is completed with an error.	☞ Page 115 List of Status Codes
Un\G26447	—	FDL address	Stores the FDL address of the DP-Slave that acquires the alarm.	0 to 125
Un\G26448	b8 to b15	Completed status	Bit of an alarm No. for which ACK return completed successfully turns on.	
	b0 to b7		Bit of the alarm No. for which alarm acquisition completed successfully turns on.	
Un\G26449	—	Alarm No.1	Alarm details status code 1	• Other than FFFFH: ☞ Page 115 List of Status Codes • FFFFH: Detailed status code 1 does not exist.
Un\G26450	—		Alarm details status code 2	• Other than FFFFH: ☞ Page 115 List of Status Codes (Refer to the DP-Slave manual if the status code is not in the list.) • FFFFH: Detailed status code 2 does not exist.
Un\G26451	—		Alarm details status code 3	
Un\G26452 to Un\G26484	—		Empty (fixed to 0)	
Un\G26485	—	ACK Abnormal response code	Stores the response code that occurs when an Alarm ACK request is completed with an error.	☞ Page 115 List of Status Codes
Un\G26486	—	ACK Detailed status code 1	• Other than FFFFH: ☞ Page 115 List of Status Codes • FFFFH: Detailed status code 1 does not exist.	
Un\G26487	—	ACK Detailed status code 2	• Other than FFFFH: ☞ Page 115 List of Status Codes (Refer to the DP-Slave manual if the status code is not in the list.) • FFFFH: Detailed status code 2 does not exist.	
Un\G26488	—	ACK Detailed status code 3		
Un\G26489 to Un\G26528	—	Alarm No.2	Same as alarm No.1.	
Un\G26729 to Un\G26768	—	Alarm No.8	Same as alarm No.1.	

■Clear timing

- At alarm read (with/without ACK) request

Address	Name	When status code E504H or E507H is undetected	When status code E507H is detected
Un\G26446	Response result	Clear	Overwrites the status code
Un\G26447	FDL address	Clear	Overwrites the FDL address
Un\G26448	Completed status	Clear	Clear
Un\G26449 to Un\G26484	Alarm No.1 alarm acquisition results	Clear	Clear
Un\G26485 to Un\G26488	ACK return results to alarm No.1	Clear	Clear
Un\G26489 to Un\G26524	Alarm No.2 alarm acquisition results	Clear	Clear
Un\G26525 to Un\G26528	ACK return results to alarm No.2	Clear	Clear
Un\G26729 to Un\G26764	Alarm No.8 alarm acquisition results	Clear	Clear
Un\G26765 to Un\G26768	ACK return results to alarm No.8	Clear	Clear

• At the time of Alarm ACK request

Address	Name	When status code E504H, E505H or E507H is undetected	When status code E505H is detected	When status code E507H is detected
Un\G26446	Response result	Clear	Overwrites the status code	Overwrites the status code
Un\G26447	FDL address	Clear	Overwrites the FDL address	Overwrites the FDL address
Un\G26448	Completed status	Clear	Clear	Clear
Un\G26449 to Un\G26484	Alarm No.1 alarm acquisition results	Not cleared	Not cleared	Not cleared
Un\G26485 to Un\G26488	ACK return results to alarm No.1	Only the ACK return results of an alarm No. that requested alarm ACK are cleared	Not cleared	Only the ACK return results of an alarm No. that requested alarm ACK are cleared
Un\G26489 to Un\G26524	Alarm No.2 alarm acquisition results	Not cleared	Not cleared	Not cleared
Un\G26525 to Un\G26528	ACK return results to alarm No.2	Only the ACK return results of an alarm No. that requested alarm ACK are cleared	Not cleared	Only the ACK return results of an alarm No. that requested alarm ACK are cleared
⋮				
Un\G26729 to Un\G26764	Alarm No.8 alarm acquisition results	Not cleared	Not cleared	Not cleared
Un\G26765 to Un\G26768	ACK return results to alarm No.8	Only the ACK return results of an alarm No. that requested alarm ACK are cleared	Not cleared	Only the ACK return results of an alarm No. that requested alarm ACK are cleared

• When status code E504H is detected

Address	Name	When status code E504H is detected
Un\G26446	Response result	Overwrites the status code
Un\G26447	FDL address	Overwrites the FDL address
Un\G26448	Completed status	Clear
Un\G26449 to Un\G26484	Alarm No.1 alarm acquisition results	Not cleared
Un\G26485 to Un\G26488	ACK return results to alarm No.1	Not cleared
Un\G26489 to Un\G26524	Alarm No.2 alarm acquisition results	Not cleared
Un\G26525 to Un\G26528	ACK return results to alarm No.2	Not cleared
⋮		
Un\G26729 to Un\G26764	Alarm No.8 alarm acquisition results	Not cleared
Un\G26765 to Un\G26768	ACK return results to alarm No.8	Not cleared



Appendix 4 Processing Time

This section describes bus cycle time and transmission delay time.

Bus cycle time

When only one DP-Master is deployed

■ Calculation formula of bus cycle time (Bc)

The following calculation formula provides bus cycle time (Bc) of the DP-Master.

The symbol in [] indicates the unit.

$$Bc[s] = \text{Max} \left(\text{MSI}, \sum_{i=1}^n (\text{Pt}(i) + \text{Tsd}(M)) + \text{Lr} \right)$$

n = The number of DP-Slaves

Max (A, B) = The larger of A and B

Item	Description
MSI[s]	Minimum required time for polling cycle (Min. slave interval) ^{*1}
Pt(i)[s]	(Polling cycle of ith station) = Treq(i) + max_Tsdr(i) + Tres(i) • Treq(i)[s] = (Request transmission time of ith station) = {(Number of output bytes to ith station) + 9} × 11[bit] ÷ (Transmission speed[bps]) • max_Tsdr(i)[s] = (Response time of ith station[TBit]) ^{*2*3} ÷ (Transmission speed[bps]) • Tres(i)[s] = (Response transmission time of ith station) = {(Number of input bytes from ith station) + 9} × 11[bit] ÷ (Transmission speed[bps])
Tsd(M)[s]	(Request/response processing time of DP-Master (FX5-DP-M)[TBit]) ^{*4} ÷ (Transmission speed[bps])
Lr[s]	(Data refresh time) = 5.50 × 10 ⁻⁶ + Number of DP-Slaves × 150 × 10 ⁻⁶

*1 A value set in "Min. slave interval" of the "Master Settings" window of PROFIBUS Configuration Tool.

*2 The max_Tsdr value specified in the GSD file of DP-Slaves.

*3 The unit TBit (Bit Time) defines "1" as the time it takes to send 1 bit data.
 The actual processing time depends on the transmission speed as follows.

When the transmission speed is 1.5Mbps

$$1[\text{TBit}] = 1 \div (1.5 \times 10^6) = 0.667 \times 10^{-6}[\text{s}]$$

When the transmission speed is 12Mbps

$$1[\text{TBit}] = 1 \div (12 \times 10^6) = 0.083 \times 10^{-6}[\text{s}]$$

*4 The Tsd value specified in the GSD file of the FX5-DP-M.
 The Tsd value depends on the transmission speed as follows.
 For the unit TBit, refer to *3.

Transmission speed	Request/response processing time of DP-Master
9.6kbps	70TBit
19.2kbps	
93.75kbps	
187.5kbps	
500kbps	150TBit
1.5Mbps	200TBit
3Mbps	250TBit
6Mbps	450TBit
12Mbps	800TBit

When multiple DP-Masters are deployed

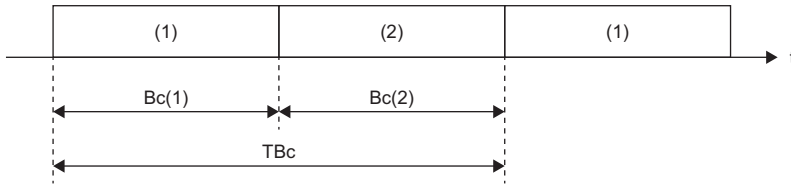
With multiple DP-Masters deployed on the same network, the following calculation formula provides their bus cycle time (TBc).

$$TBc[s] = \sum_{i=1}^n Bc(i)$$

n = The number of DP-Masters

Bc = The bus cycle time of each DP-Master (☞ Page 162 When only one DP-Master is deployed)

The following shows an example with two DP-Masters.



(1) Polling by DP-Master 1

(2) Polling by DP-Master 2

The total bus cycle time TBc can be calculated from $TBc = Bc(1) + Bc(2)$.

Transmission delay time

Transmission delay time is the time needed for transmitting I/O data between the CPU module to which the FX5-DP-M is mounted and the PROFIBUS-DP network during I/O data exchanges.

The transmission delay time of input data and output data differ depending on the data consistency function settings.

Calculation formulas of transmission delay time are shown below.

The calculation formulas are described by using the following abbreviations.

Bc: Bus cycle time^{*1}

Scan: Scan time

*1 When multiple DP-Masters are deployed on the same network, replace it with TBc.

When Data Consistency Function is disabled

The following shows transmission delay times of reading/writing I/O data with the refresh settings enabled and data consistency function disabled, or by the MOV instruction or FROM/TO instructions.

■Transmission delay time of output data

Item	Transmission delay time
Normal value	$Bc \times 1.5$
Maximum value	$Bc \times 2$

■Transmission delay time of input data

Item	Transmission delay time
Normal value	$Scan + Bc$
Maximum value	$Scan + Bc \times 2$

When Data Consistency Function is enabled

The following shows transmission delay times of reading/writing I/O data with the refresh settings enabled and data consistency function enabled.

■Transmission delay time of output data

Item	Condition	Transmission delay time
Normal value	—	$Scan + Bc$
Maximum value	$Scan \times 2 \leq Bc$	$Bc \times 3$
	$Scan \times 2 > Bc$	$Scan \times 2 + Bc \times 2$

■Transmission delay time of input data

Item	Condition	Transmission delay time
Normal value	—	$Scan + Bc$
Maximum value	$Scan \times 2 \leq Bc$	$Scan + Bc$
	$Scan \leq Bc < Scan \times 2$	$Scan + Bc \times 2$
	$Scan > Bc$	$Scan \times 3$

MEMO

A

INDEX

A

Acquisition of diagnostic information and extended diagnostic information	20,23
Acyclic communication function	20
Acyclic communication request area	148
Acyclic communication request execution instruction area	148
Acyclic communication request result area	150
Acyclic communication response area	150
Acyclic communication with DP-Slaves	28
Address information area	138
Alarm acquisition function	20,30
Alarm read request signal	131
Alarm request area	154
Alarm response area	155

B

Buffer memory	124
Bus Parameter Settings	83

C

Communication READY signal	131
CPU Device Access	84
Current bus cycle time	135
Current diagnostic information non-notification time area	134

D

Data consistency function	20,33
Data exchange function	20,21
Data exchange start completed signal	127
Data exchange start request signal	127
Data swap function	20,32
Device	11
Diagnostic information area	142
Diagnostic information area clear request signal	129
Diagnostic information area cleared signal	129
Diagnostic information detection reset request signal	128
Diagnostic information detection signal	128
Diagnostic information invalid setting area	132
Diagnostic information non-notification time setting area	134
DP-Master	12
DP-Master (Class 1)	11
DP-Master (Class 2)	11
DP-Slave	11

E

Extended diagnostic information area	144
Extended diagnostic information read request area	144
Extended diagnostic information read request signal	130
Extended diagnostic information read response area	145

Extended diagnostic information read response signal	130
--	-----

F

FDL address	11
-----------------------	----

G

Global control	11
Global control area	133
Global control completed signal	129
Global control function	20,25
Global control request signal	129

I

Input data area	136
Input data start address area	139

L

Label	11
Local FDL address display area	135
Local station error information area	141

M

Master Settings	81
Maximum bus cycle time	135
Minimum bus cycle time	135
Module label	11
Module ready signal	131

O

Output data area	137
Output data start address area	139
Output setting function for CPU stop error	35
Output status setting function for CPU stop error	20,47

P

Parameter setting status area (Active station)	145
Parameter setting status area (Reserved station)	146
PROFIBUS-DPV0	11,21
PROFIBUS-DPV1	11,28

R

Repeater	11
--------------------	----

S

Slave Settings	85
Slave status area (Alarm detection)	153
Slave status area (Diagnostic information detection)	141

Slave status area (Normal communication detection) 140
Slave status area (Reserved station setting status) 141

T

Temporarily reserved station specification function 20,37
Temporarily reserved station specification request area 147
Temporarily reserved station specification status area 146

W

Watchdog timer error signal 131



REVISIONS

Revision date	Revision	Description
October 2018	A	First Edition
October 2019	B	■Added models FX5UJ CPU module ■Added or modified parts RELEVANT MANUALS, TERMS, Section 2.1, 2.3, Chapter 3, Section 5.2, TRADEMARKS
June 2021	C	■Added or modified parts SAFETY PRECAUTIONS, WARRANTY
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WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company. However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

- (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
 1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
 2. Failure caused by unapproved modifications, etc., to the product by the user.
 3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
 4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
 5. Relay failure or output contact failure caused by usage beyond the specified life of contact (cycles).
 6. Failure caused by external irresistible forces such as fires or abnormal voltages, and failure caused by force majeure such as earthquakes, lightning, wind and water damage.
 7. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
 8. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued.
Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

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Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

- (1) In using the Mitsubishi MELSEC programmable controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
- (2) The Mitsubishi programmable controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for railway companies or public service purposes shall be excluded from the programmable controller applications.
In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications. However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the user's discretion.
- (3) Mitsubishi shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

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