for a greener tomorrow

MITSUBISHI ELECTRIC
Changes for the Better

FACTORY AUTOMATION

MELSEC iQ-F Series iQ Platform-compatible PLC

FX5-20PG-D, FX5-DP-M, FX5-ENET, FX5-ENET/IP

MELSEC iQ-F series

Expanding the lineup of intelligent function modules

2-axis pulse train positioning module

FX5-20PG-D

PROFIBUS-DP master module

FX5-DP-M

Ethernet module

FX5-ENET

EtherNet/IP module

FX5-ENET/IP

Strengthening the functions of CPU modules

Differential driver type is newly released for 2-axis pulse train positioning module

2-axis pulse train positioning module FX5-20PG-D

Number of control axes	2-axis	
Interpolation function	2-axis linear interpolation	2-axis circular interpolation
Pulse output form	Differential driver	
Number of modules installable to a CPU module	16 modules	
Applicable engineering tool	GX Works3 (Ver. 1.050C or later)	
Applicable CPU modules	FX5U/FX5UC*1 (Ver. 1.050 or later)	

For details, refer to the manual.

Differential driver type is newly released for positioning modules.

In addition to the transistor output type, a differential driver type is newly added to the lineup.

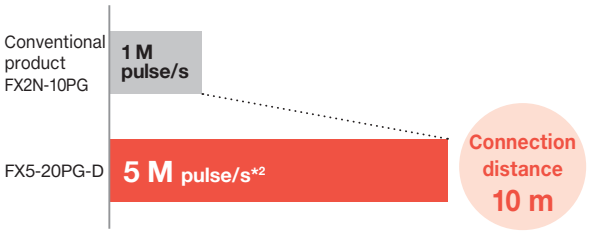
Transistor output type
FX5-20PG-P

NEW

Differential driver type
FX5-20PG-D

The maximum output pulse is 5 M pulse/s, and the connection distance is 10 m.

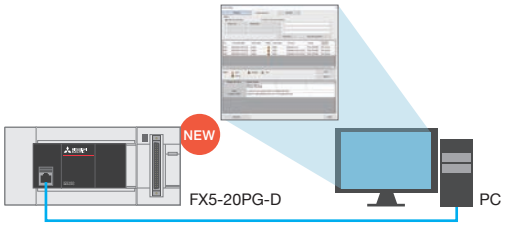
Since the maximum output pulse is 5 M pulse/s, devices which have higher resolution than the conventional products can be controlled. The maximum connection distance between servos is 10 m.



What should I do in this kind of situation?

I'd like to reduce the downtime caused by trouble. Is it possible to identify the trouble caused by work mistakes at an early stage?

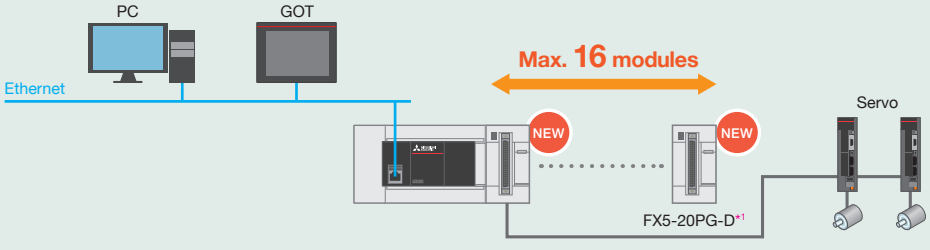
By using the event history function*3, errors occurred in the positioning module can be stored in the data memory of the CPU module or the SD memory card as the event information. The history can be displayed as a list in time series, and the user can identify the trouble part at an early stage.



The event information that occurred in the positioning module is collected in batch and saved by the CPU module.

The PC displays the event information stored in CPU module on GX Works3.

System configuration example



*1: FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-20PG-D to the FX5UC CPU module.
*2: For FX5-20PG-P, the maximum pulse output is 200 k pulse/s, and the maximum connection distance is 2 m.
*3: For the firmware version of FX5-20PG-P and FX5-20PG-D, Ver. 1.010 or later is supported.

Connectable to PROFIBUS-DP network

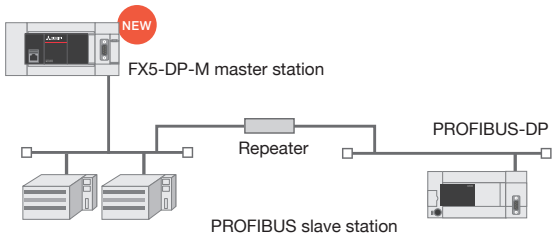
PROFIBUS-DP master module FX5-DP-M

Applicable network	PROFIBUS-DP network
Number of connectable slave station modules	65 per network (including master stations and slave stations) 32 per segment (including repeaters) Maximum 64 of slave stations
Applicable engineering tool	GX Works3 (Ver. 1.050C or later) PROFIBUS Configuration Tool (Ver. 1.02C or later)
Applicable CPU modules	FX5U/FX5UC* (Ver. 1.110 or later)

For details, refer to the manual.

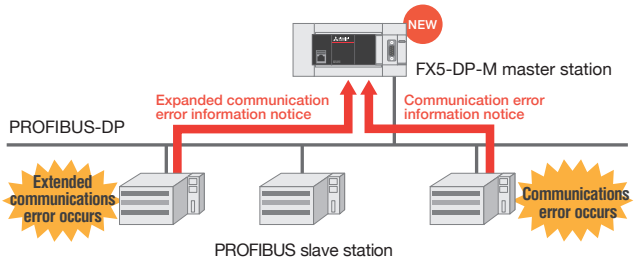
Connectable to a PROFIBUS-DP network

PROFIBUS is industrial field bus widely spread in Europe. MELSEQ iQ-F series can be connected as a master station of the PROFIBUS-DP network.



Capable of acquiring communication error information from the slave station

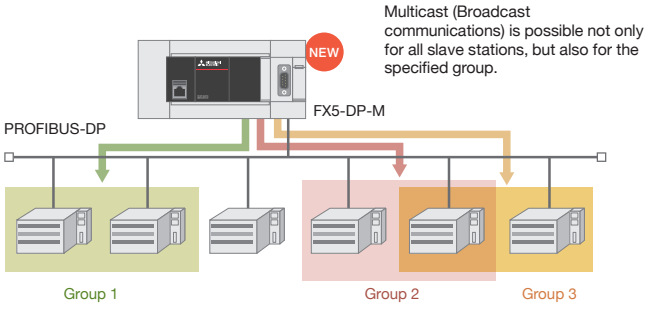
This function enables acquisition of diagnostic information and extended diagnostic information generated at DP-Slaves during data exchange by using the buffer memory.



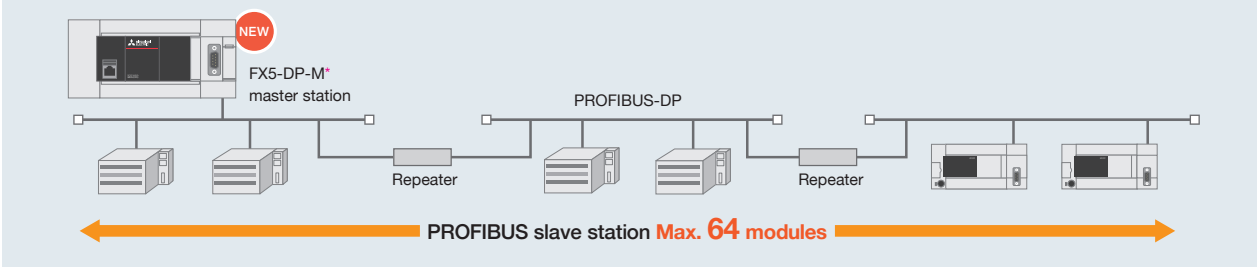
What should I do in this kind of situation?

Communication with each slave station is performed. Is there any good solution for more efficient data communication?

By using global control function, the synchronous communication of I/O data for each group with multicast (Broadcast communications) becomes possible.



System configuration example



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

With extension of Ethernet port, a wide variety of communication is possible

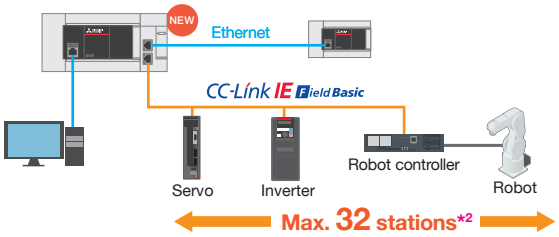
Ethernet module FX5-ENET

Applicable network	CC-Link IE Field Network Basic (master) General purpose Ethernet communication (Socket communication)
Number of connectable slave station modules	32 modules
Applicable engineering tool	GX Works3 (Ver. 1.050C or later)
Applicable CPU modules	FX5U/FX5UC*1 (Ver. 1.110 or later)

For details, refer to the manual.

Connectable to CC-Link IE Field Network Basic

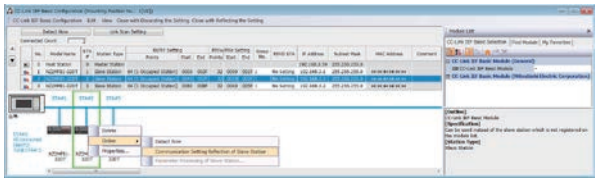
CC-Link IE Field Network Basic is an factory automation network using the standard Ethernet. MELSEC iQ-F series is connectable to CC-Link IE Field Network Basic. Also, the network and general purpose Ethernet can coexist.



Note: IP address of FX5-ENET is shared by 2 ports.

Capable of grouping of slave stations

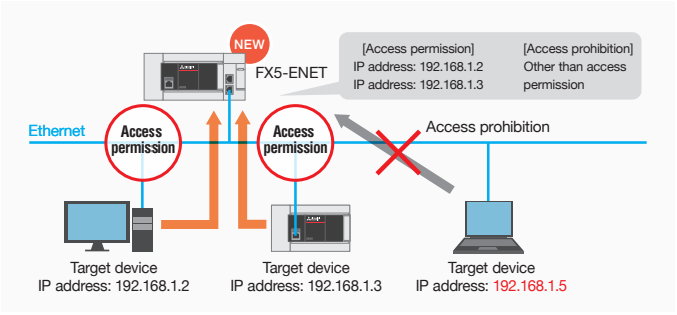
Grouping stations according to the length of response processing time is possible. The cyclic transmission can be performed while suppressing influence by the difference of standard response time of each slave station.



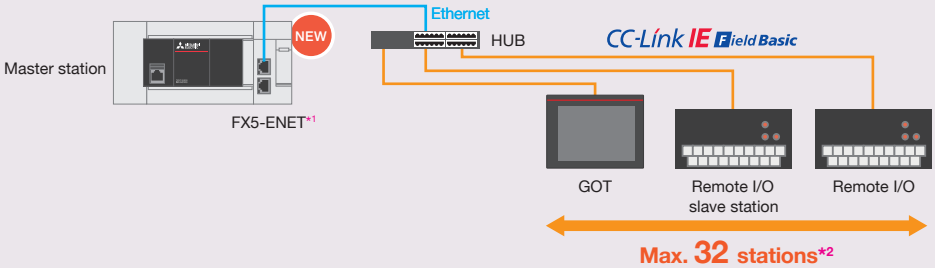
What should I do in this kind of situation?

I'd like to pay close attention to the security. How can I prevent illegal access?

By setting the IP address parameter of the target device to allow or prevent access, access from the target device can be limited. By identifying the IP address of an access source, access from the illegal IP address can be prevented.



System configuration example (Star type)



*1: FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-ENET to the FX5UC CPU module.
*2: The maximum number of connectable modules of slave stations which the FX5-ENET (master station) controls.

Connectable to EtherNet/IP network

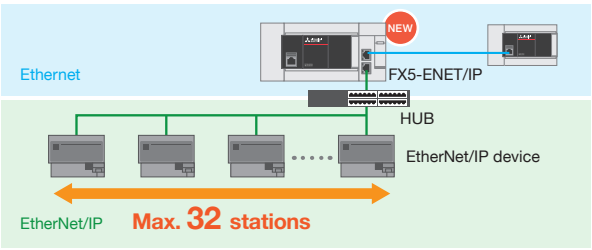
EtherNet/IP module FX5-ENET/IP

Applicable network	EtherNet/IP communication (Class 1 communication, Class 3 communication, and UCMM communication)
	General purpose Ethernet communication (Socket communication)
Number of connectable slave station modules	32 modules
Applicable engineering tool	GX Works3 (Ver. 1.050C or later)
	EtherNet/IP Configuration Tool for FX5-ENET/IP (Ver. 1.00A or later)
Applicable CPU modules	FX5U/FX5UC*1 (Ver. 1.110 or later)

For details, refer to the manual.

EtherNet/IP communication is possible.

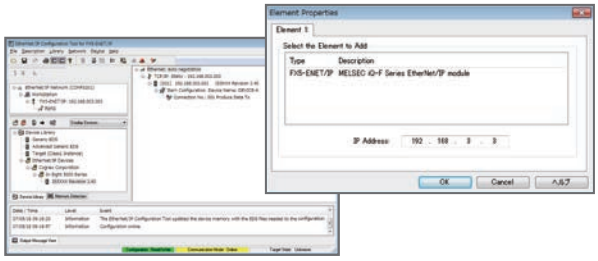
CIP communication protocol achieves a seamless communication with EtherNet/IP Network. EtherNet/IP and general purpose Ethernet can coexist.



Note: IP address of FX5-ENET/IP is shared by 2 ports.

Parameter setting of EtherNet/IP communication by a dedicated setting tool

Not only setting of EtherNet/IP communication, but also detection of EtherNet/IP devices on the network and on-line setting of EtherNet/IP communication is possible.

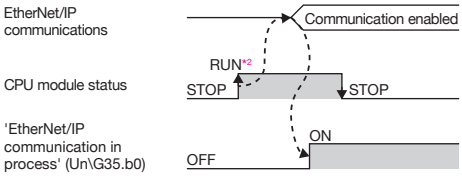


What should I do in this kind of situation?

An error occurs in the CPU module connected with FX5-ENET/IP. Will EtherNet/IP communication stop?

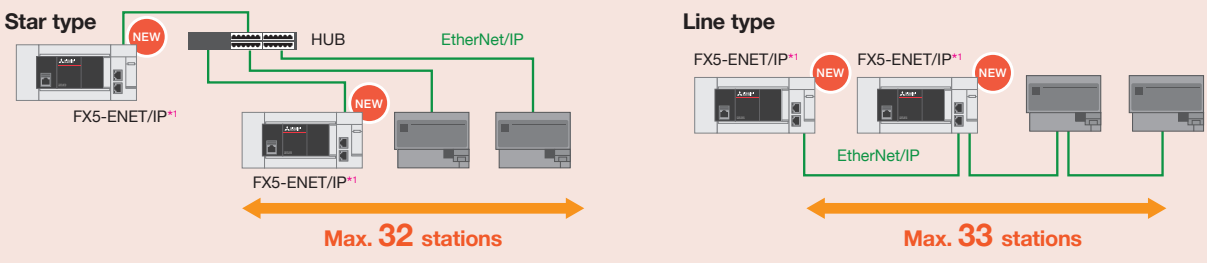
EtherNet/IP communication can be set to stop or to continue. Even if the CPU module becomes STOP status, EtherNet/IP communication can be continued.

When EtherNet/IP communication are continued (Un\G5004 = 16)



Because [Continue] is set, EtherNet/IP communication will continue even if the CPU module stops.

System configuration example



*1: FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-ENET/IP to the FX5UC CPU module.
*2: The EtherNet/IP communication starts when the CPU module performs STOP→RUN.

2-axis pulse train positioning module

FX5-20PG-D

■ Power Supply Specifications

Items		Specifications
External power supply	Power supply voltage	24 V DC +20%, -15%
	Allowable instantaneous power failure time	Operation continues when the instantaneous power failure is shorter than 5 ms.
	Current consumption	165 mA

■ Performance Specifications

Items	Specifications
Number of control axes	2 axes
Pulse output form	Differential driver
Interpolation function	2-axis linear interpolation, 2-axis circular interpolation
Control method	PTP (Point To Point) control, path control (line and arc can be set), speed control, speed-position switching control, position-speed switching control
Control unit	mm, inch, degree, pulse
Positioning data	600 data/axis
Maximum connection distance between servos	10 m
Number of write accesses to flash ROM	100000 times maximum
Number of occupied I/O points	8 points
Applicable CPU module*	FX5U/FX5UC: Ver. 1.050 or later
Applicable engineering tool	GX Works3: Ver. 1.050C or later

★ : FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-20PG-D to the FX5UC CPU module.

■ Input Specifications

・Drive unit READY signal (READY), Stop signal (STOP), Upper limit signal (FLS), Lower limit signal (RLS)

Items	Specifications
Signal voltage	24 V DC
Input current	5 mA
ON current	3.5 mA or more
OFF current	1.7 mA or less
Signal format	No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor
Response time	4 ms or less
Insulation of circuit	Photo-coupler insulation
Indication of operation	None (Operation check via buffer memory is possible.)

・Zero signal (PG05/PG024)
・Manual pulse generator A phase (PULSER A)/ Manual pulse generator B phase (PULSER B)

Items	Specifications		
	Zero signal		Manual pulse generator A phase/ B phase
	PG05	PG024	
Signal voltage	5 V DC	24 V DC	5 V DC
Input current	5 mA		14 mA
ON current	2 mA or more	3 mA or more	2 mA or more
OFF current	0.5 mA or less	0.2 mA or less	0.2 mA or less
Signal format	NPN open collector transistor		
Response time	1 ms or less		-
Response frequency	-		100 kHz
Insulation of circuit	Photo-coupler insulation		
Indication of operation	None (Operation check via buffer memory is possible.)		

・Near-point dog signal (DOG)　・External command signal (CHG)

Items	Specifications	
	Near-point dog signal	External command signal
Signal voltage	24 V DC	
Input current	5 mA	
ON current	3.5 mA or more	2.7 mA or more
OFF current	1.7 mA or less	0.8 mA or less
Signal format	No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor	
Response time	1 ms or less	20 μs
Insulation of circuit	Photo-coupler insulation	
Indication of operation	None (Operation check via buffer memory is possible.)	

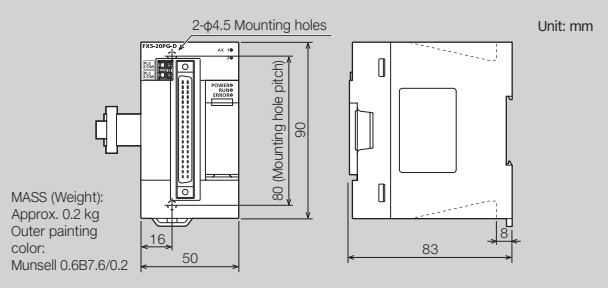
■ Output Specifications

・Deviation counter clear signal (CLEAR)

Items	Specifications
Pulse output form	Transistor
Signal output time	1 to 65535 ms
Rated load voltage	5 to 24 V DC
Max. load current	100 mA
Output ON voltage	1.5 V or less
Indication of operation	None (Operation check via buffer memory is possible.)

・Pulse output (PULSE R+/PULSE F+)
Specification of a differential driver (equivalent to AM26C31).

■ External Dimensions



■ Options

・External device connection connector (40-pin)

Model	Type
A6CON1	Soldered type (straight protrusion)
A6CON2	Crimped type (straight protrusion)
A6CON4	Soldered type (both straight/inclined protrusion type)

PROFIBUS-DP master module

FX5-DP-M

■ Power Supply Specifications

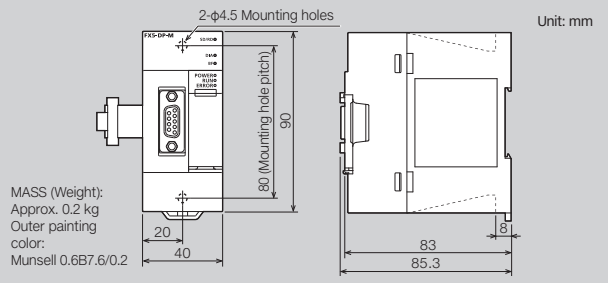
Items		Specifications
Internal power supply	Power supply voltage	24 V DC
	Current consumption	150 mA

■ Performance Specifications

Items		Specifications
PROFIBUS-DP station type		DP-Master (Class 1)
Electrical standard and characteristics		Compliant with EIA-RS485
Medium		Shielded twisted pair cable
Network configuration		Bus topology (or tree topology when repeaters are used)
Data link method		• 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
Max. No. of repeaters (Between DP-Master and DP-Slave)		3 repeaters
No. of connectable modules (per segment)		32 per segment (including repeaters)
No. of connectable modules (per network)		65 per network (including DP-Master and DP-Slaves)
Max. No. of DP-Slaves		64
No. of connectable nodes (No. of repeaters)		32, 62(1), 92(2), 122(3), 126(4)
Transmission 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
No. of connectable units		1 unit
Applicable CPU module*2		FX5U/FX5UC: Ver. 1.110 or later
Applicable engineering tool		GX Works3: Ver. 1.050C or later PROFIBUS Configuration Tool: Ver. 1.02C or late

★1 : Transmission speed accuracy is within ±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.

■ External Dimensions



Ethernet module

FX5-ENET

■ Power Supply Specifications

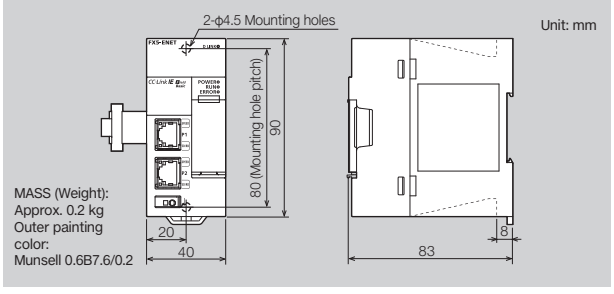
Items		Specifications
Internal power supply	Power supply voltage	24 V DC
	Current consumption	110 mA

■ Performance Specifications

Items			Specifications
CC-Link IE Field Network Basic	Station type		Master station
	Maximum number of connectable stations*1		32
	Number of stations occupied by a slave station		1 to 4
	Maximum number of link points per network	RX	2048
		RY	2048
		RWr	1024
		RWw	1024
	Maximum number of link points per station	Master station: RX	2048
		Master station: RY	2048
		Master station: RWr	1024
		Master station: RWw	1024
		Slave station*2: RX	64/128/192/256
		Slave station*2: RY	64/128/192/256
		Slave station*2: RWr	32/64/96/128
		Slave station*2: RWw	32/64/96/128
	UDP port number used in the cyclic transmission		61450
	UDP port number used in the automatic detection of connected device		Master station: An unused port number is assigned automatically. Slave station: 61451
	Transmission specifications	Data transmission speed	100 Mbps
		Maximum station-tostation distance	100 m
		Overall cable istance	Depends on the system configuration
		Number of cascade connections	✶3
	Network topology		Star topology
	Hub*4		✶5
	Connection cable*6		100BASE-TX
General-purpose Ethernet communication	Transmission specifications	Data transmission speed	100/10 Mbps
		Communication mode	Full-duplex or half-duplex*4
		Transmission method	Base band
		Maximum segment length	100 m*6
		Maximum segment length	100BASE-TX: 2 levels maximum*8 10BASE-T: 4 levels maximum*8
	Protocol type		Socket communication
	Number of connections		Total of 32 connections*9
	Hub*4		✶10
	Connection cable*6		100BASE-TX, 10BASE-T
Number of ports			2*11
Number of occupied I/O points			8 points
Number of connectable units			1 module
Applicable CPU module*12			FX5U/FX5UC: Ver. 1.110 or later
Applicable engineering tool			GX Works3: Ver. 1.050C or later

✶1 : Maximum number of connected slave stations that FX5-ENET (master station) can manage.
✶2 : Value for 1-station occupation, 2-station occupation, 3-station occupation, or 4-station occupation.
✶3 : 100BASE-TX: For the number of the connectable stages when using a switching hub, check with the manufacturer of the switching hub used.
✶4 : IEEE802.3x flow control is not supported.
✶5 : Hubs with 100BASE-TX ports can be used. The ports must comply with the IEEE802.3 100BASE-TX standards.
✶6 : A straight/cross cable can be used.
✶7 : For maximum segment length (length between hubs), consult the manufacturer of the hub used.
✶8 : This number applies when a repeater hub is used. When using a switching hub, check the number of cascaded stages with the manufacturer of the hub to be used.
✶9 : Up to 32 external devices can access one FX5-ENET module at the same time.
✶10 : Hubs with 100BASE-TX or 10BASE-T ports can be used. The ports must comply with the IEEE802.3 100BASE-TX or IEEE802.3 10BASE-T standards.
✶11 : Since the IP address is shared by two ports, only one address can be set.
✶12 : FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-ENET to the FX5UC CPU module.

■ External Dimensions



EtherNet/IP module

FX5-ENET/IP

■ Power Supply Specifications

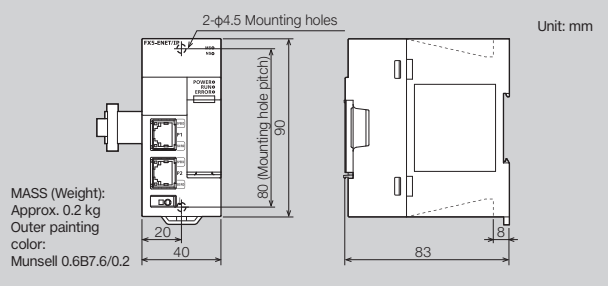
Items		Specifications
Internal power supply	Power supply voltage	24 V DC
	Current consumption	110 mA

■ Performance Specifications

Items			Specifications
EtherNet/IP communications	Class 1 communications	Communication format	Standard EtherNet/IP
		Number of connections	32
		Communication data size	1444 bytes (per connection)
		Connection type	Point-to-point, multicast
		RPI (communication cycle)	2 to 60000 ms
		PPS (communication processing performance)	3000 pps (case of 128 bytes)
	Class 3 communications	Communication format	Standard EtherNet/IP
		Number of connections (number of simultaneous executions)	32*1
		Communication data size	1414 bytes (per onnection)*2
		Connection type	Point-to-point
	UCMM communications	Communication format	Standard EtherNet/IP
		Number of connections (number of simultaneous executions)	32*1
		Communication data size	1414 bytes*2
		Connection type	Point-to-point
	Transmission specifications	Data transmission speed	100 Mbps
		Communication mode	Full-duplex
		Transmission method	Base band
		IP version	IPv4 is supported.
		Maximum segment length	100 m*3
		Number of cascade connections	100BASE-TX: 2 levels maximum*4
	Network topology		Star topology, line pology
	Hub*5		✶6
	Connection cable*7		100BASE-TX
General-purpose Ethernet communication	Transmission specifications	Data transfer speed	100/10 Mbps
		Communication mode	Full-duplex or half-duplex*5
		Transmission method	Base band
		Maximum segment length	100 m*3
		Number of cascade connections	100BASE-TX:2 levels maximum*4 10BASE-T:4 levels maximum*4
	Protocol type		Socket communication
	Number of connections		Total of 32 connections*8
	Hub*5		✶9
	Connection cable*7		100BASE-TX, 10BASE-T
Number of ports			2*10
Number of occupied I/O points			8 points
Number of connectable units			1 module
Applicable CPU module*11			FX5U/FX5UC: Ver. 1.110 or later
Applicable engineering tool			GX Works3: Ver. 1.050C or later EtherNet/IP Configuration Tool for FX5-ENET/IP: Ver. 1.00A or later

✶1 : The total number of connections for Class 3 communications and UCMM communications is 32.
✶2 : This size is the maximum size which can be specified to 'Data length' of Class1 communication input data area of the request command during the client operation. During the sever operation, since the FX5-ENET/IP automatically responds according to the request command received from the client, the maximum size is not prescribed.
✶3 : For maximum segment length (length between hubs), consult the manufacturer of the hub used.
✶4 : This number applies when a repeater hub is used. When using a switching hub, check the number of cascaded stages with the manufacturer of the hub to be used.
✶5 : IEEE802.3x flow control is not supported.
✶6 : Hubs with 100BASE-TX ports can be used. The ports must comply with the IEEE802.3 100BASE-TX standards.
✶7 : A straight/cross cable can be used.
✶8 : Up to 32 external devices can access one FX5-ENET/IP module at the same time.
✶9 : Hubs with 100BASE-TX or 10BASE-T ports can be used. The ports must comply with the IEEE802.3 100BASE-TX or IEEE802.3 10BASE-T standards.
✶10 : Since the IP address is shared by two ports, only one address can be set.
✶11 : FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-ENET/IP to the FX5UC CPU module.

■ External Dimensions



PROGRAMMABLE CONTROLLERS
MELSEC iQ-F Series

Product list

Items		Specifications
FX5-20PG-D		2-axis pulse train positioning module
FX5-DP-M		PROFIBUS-DP master module
FX5-ENET		Ethernet module
FX5-ENET/IP		EtherNet/IP module
Options	A6CON1	External device connection connector (40-pin) Soldered type (straight protrusion)
	A6CON2	External device connection connector (40-pin) Crimped type (straight protrusion)
	A6CON4	External device connection connector (40-pin) Soldered type (both straight/inclined protrusion type)
FX5U-U-HW-E		MELSEC iQ-F FX5U User's Manual (Hardware) Model code: 09R536
FX5UC-U-HW-E		MELSEC iQ-F FX5UC User's Manual (Hardware) Model code: 09R558
FX5-U-POS-I-E		MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) Model code: 09R572
FX5-U-PROFIBUS-E		MELSEC iQ-F FX5 User's Manual (PROFIBUS) Model code: 09R574
FX5-U-ENET-E		MELSEC iQ-F FX5-ENET User's Manual Model code: 09R736
FX5-U-ENETIP-E		MELSEC iQ-F FX5-ENET/IP User's Manual Model code: 09R737
FX5-U-EN-E		MELSEC iQ-F FX5 User's Manual (Ethernet Communication) Model code: 09R543
FX5-P-MF-E		MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/ Function Blocks) Model code: 09R539
CCIEFB-R-E		CC-Link IE Field Network Basic Reference Manual Model code: 13JX62

Coming soon **Spring clamp terminal block relay output type**

The relay output type is newly added to the FX5UC CPU module and I/O module of the spring clamp terminal block type!

CPU module 32 points

FX5UC-32MR/DS-TS DC D2 R

DC DC power supply R Relay output
D2 DC input (sink/source)

I/O module* 16 points

Output module **FX5-C16EYR/D-TS**

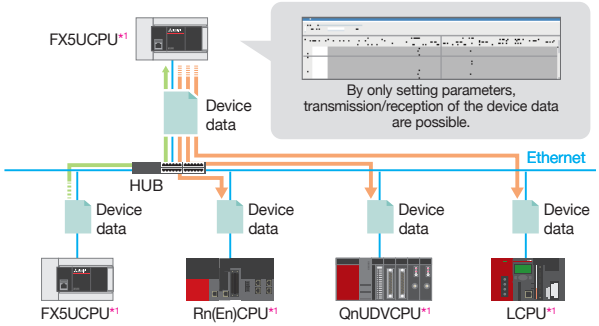
*: FX5-CNV-IF is necessary to connect FX5-C16EYR/D-TS to the FX5U CPU module.

MELSEC iQ-F series Ver. 1.110 × GX Works3 Ver. 1.050C

By upgrading a version, MELSEC iQ-F series becomes easier to use!

Simple CPU communication function NEW

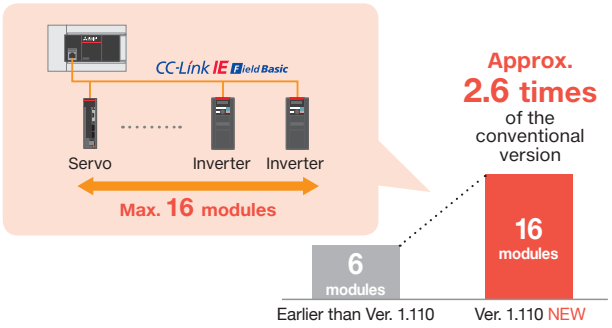
By a simple setting with GX Works3, the device data such as the production data can be transferred without program. The communication with the existing system which uses MELSEC iQ-R series, -Q series, and -L series can be easily performed.
For details, refer to the MELSEC iQ-F FX5 User's manual (Ethernet Communication).



*1: The built-in Ethernet function

For CC-Link IE Field Network Basic, the number of connectable modules is expanded to 16. NEW

By expanding the number of connectable modules from 6 of the conventional version to 16, the usability is improved. Because the remote I/O stations connected by CC-Link IE Field Network Basic are not included in the sum of remote I/O points, the user can expand modules without worrying about the remote I/O points.
For details, refer to the CC-Link IE Field Network Basic Reference manual.



Other new functions are added as follows.

- The setting number of auto refresh are expanded.
- The Intelligent function module supports the event history function.*2
- Compatible modules are added. (FX5-DP-M, FX5-20PG-D, FX5-ENET, and FX5-ENET/IP)
- The Intelligent function module supports the module diagnostic function.*2
- A-compatible 1C frame of the MC protocol is supported.

*2: The supported modules are only FX5-20PG-P, FX5-20PG-D, FX5-ENET, and FX5-ENET/IP. For the firmware version of FX5-20PG-P and FX5-20PG-D, Ver. 1.010 or later is supported.

⚠ Safety Warning

To ensure proper use of the products in this document, please be sure to read the instruction manual prior to use.

Registration

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