

MELSEC iQ-F FX5-CCLGN-MS

Hardware Manual

FX5

Manual number	IB(NA)-0800645
Revision	E
Date	October 2022

Thank you for purchasing the Mitsubishi Electric programmable controllers.

This manual describes the part names, external dimensions, installation, and specifications of the product. Before use, read this manual and manuals of relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and precautions.

And, store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

Trademarks:
The company names, system names and product names mentioned in this manual are either registered trademarks or trademarks of their respective companies.

In some cases, trademark symbols such as [™] or [®] are not specified in this manual.

Published in October 2022 Specifications are subject to change without notice.
© 2020 MITSUBISHI ELECTRIC CORPORATION

When Using a Switching Hub with CC-LINK IE TSN

To connect modules on CC-Link IE TSN, a dedicated TSN switching hub may be required depending on parameter settings or the network topology used. For details, refer to the following.
→MELSEC iQ-F FX5 User's Manual (CC-Link IE TSN)

Safety Precautions (Read these precautions before use.)

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.

Relevant Manuals

Manual name	Manual number	Description
MELSEC iQ-F FX5 User's Manual (CC-Link IE TSN)	SH-082215ENG	Functions of the CC-Link IE TSN module
MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware)	SH-082452ENG	Details of hardware of the FX5 CPU module, including performance specifications, wiring, installation, and maintenance
MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)	JY997D55801	Specifications of the instructions and functions that can be used in programs

Standards

The FX5-CCLGN-MS is compliant with the EC Directive (EMC Directive), UL Standards (UL, cUL), and UKCA marking. For details, refer to the following.

→MELSEC iQ-F FX5 User's Manual (CC-Link IE TSN)

For the standards that relate to the CPU modules, refer to the product catalog or consult your local Mitsubishi representative.

Attention

This product is designed for use in industrial applications.

1. Overview

The FX5-CCLGN-MS master/local module for CC-Link IE TSN (hereinafter referred to as FX5-CCLGN-MS) is an intelligent function module for connecting to CC-Link IE TSN as a master or local station.

1.1 Packing list

Check that the following module and accessories are included in the package:

Module	FX5-CCLGN-MS master/local module for CC-Link IE TSN
Accessories	FX2NC-100MPCB power cable (3-wire cable, 1m) Dust proof sheet (1 sheet) Hardware Manual [Japanese/English] (This manual) Hardware Manual [Chinese]

3. Wiring

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.

WIRING PRECAUTIONS ⚠ CAUTION

- Securely connect the connector to the module. Poor contact may cause malfunction.
- 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 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 communication cables at least 100mm away from the main circuit, high-voltage line, load line or power line.
- For Ethernet cables to be used in the system, select the ones that meet the specifications in the user's manual for the module used. If not, normal data transmission is not guaranteed.

3.1 Connector and cable to be used

3.1.1 Pin layout

The pin layout of the RJ45 connectors (modular jacks for P1 and P2) is as follows:

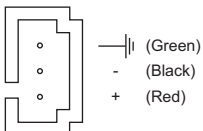
Pin No.	Signal name	Description
1	TP0+	Sending and receiving data 0 (+ side)
2	TP0-	Sending and receiving data 0 (- side)
3	TP1+	Sending and receiving data 1 (+ side)
4	TP2+	Sending and receiving data 2 (+ side)
5	TP2-	Sending and receiving data 2 (- side)
6	TP1-	Sending and receiving data 1 (- side)
7	TP3+	Sending and receiving data 3 (+ side)
8	TP3-	Sending and receiving data 3 (- side)

3.1.2 Cable

For wiring, use Ethernet cables that meet the following standards.

Communication speed	Ethernet cable	Standard
1Gbps	Category 5e or higher, straight cables (double shielded, STP)	• IEEE 802.3 (1000BASE-T) • ANSI/TIA/EIA-568-B (Category 5e)

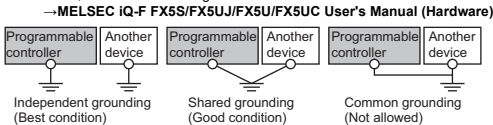
3.1.3 Power connector

For details on power supply wiring and a power cable, refer to the following.
→MELSEC iQ-F FX5 User's Manual (CC-Link IE TSN)

3.2 Grounding

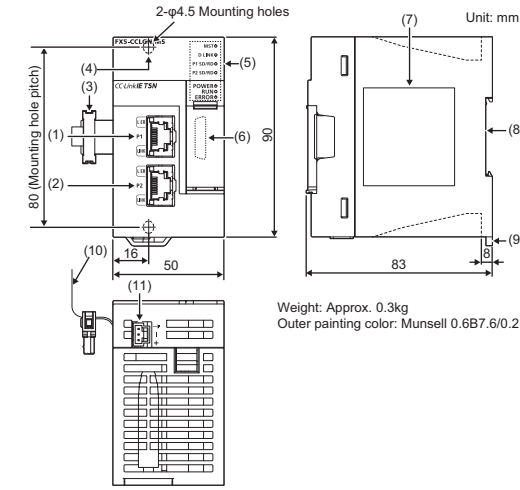
Observe the following:

- Provide grounding with a ground resistance of 100Ω or less.
- Provide independent grounding when possible.
- If independent grounding cannot be provided, provide "shared grounding" as shown below.

For details, refer to the following.
→MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware)

- Bring the grounding point close to the programmable controller as much as possible so that the ground cable can be shortened.

1.2 External dimensions and part names

Weight: Approx. 0.3kg
Outer painting color: Munsell 0.6B7.6/0.2

- [1] Modular jack for P1 (RJ45) (with cap)
- [2] Modular jack for P2 (RJ45) (with cap)
- [3] Extension cable
- [4] Hole for direct installation (2 holes of φ4.5, mounting screw: M4 screw)
- [5] Operation status display LEDs
- [6] Extension connector (for next module)
- [7] Name plate
- [8] DIN rail mounting groove (DIN rail: DIN 46277, 35mm wide)
- [9] DIN rail hook
- [10] Pullout tab
- [11] Power connector

1.3 LED indication

LED	Color	Status	Description
MST	Green	On	Operating as a master station
		Off	Operating as a local station
D LINK ^{*1}	Green	On	Data link (cyclic transmission being performed)
		Flashing	Data link (cyclic transmission stopped)
P1 SD/RD	Green	On	Data ^{*2} being sent or received
		Off	Data ^{*2} neither sent nor received
P2 SD/RD	Green	On	Data ^{*2} being sent or received
		Off	Data ^{*2} neither sent nor received
POWER	Green	On	Power on
		Off	Power off
RUN	Green	On	Normal operation
		Flashing	Module communication test
		Off	Error
ERROR ^{*1}	Red	On	Error, or error detection in progress on all stations
		Flashing	• 500ms interval: Detection of a data link faulty station in progress • 200ms interval: Error
		Off	Normal operation
P1 L ER ^{*1}	Red	On	Abnormal data received
		Off	Normal data received
LINK	Green	On	Link-up
		Off	Link-down

4. Specifications

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 self-diagnosis, 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.
- For the operating status of each station after a communication failure, refer to manuals relevant to the network. Incorrect output or malfunction due to a communication failure 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, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Failure to do so may result in an accident due to an incorrect output or malfunction.

DESIGN PRECAUTIONS ⚠ CAUTION

- Simultaneously turn on and off the power supplies of the CPU module and extension modules.

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 network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

STARTUP AND MAINTENANCE PRECAUTIONS ⚠ CAUTION

- Do not disassemble or modify the programmable controller. Doing so may cause fire, equipment failures, or malfunctions. For repair, please consult your local Mitsubishi Electric representative.
- Do not drop the product or exert strong impact to it. Doing so may cause damage.

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 product is a precision instrument. During transportation, avoid impacts larger than those specified in the general specifications by using dedicated packaging boxes and shock-absorbing pallets. Failure to do so may cause failures in the product. After transportation, verify operation of the product and check for damage of the mounting part, etc.

4.1 Applicable CPU module

Model	Version
FX5UJ CPU module	Ver. 1.040 or later
FX5U CPU module	Ver. 1.210 or later
FX5UC CPU module ^{*1}	Ver. 1.210 or later

^{*1} To connect the FX5-CCLGN-MS to the FX5UC CPU module, the FX5-CNV-IFC and FX5-C1PS-5V are required.

4.2 Applicable software package

Model	Version
GX Works3	Ver. 1.090U or later (for FX5UJ CPU module) Ver. 1.065T or later (for FX5U CPU module) Ver. 1.065T or later (for FX5UC CPU module)

4.3 General specifications

General specifications of the FX5-CCLGN-MS other than the following are same as those of a CPU module to be connected.

For the general specifications of the CPU modules, refer to the following.

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

Item	Specifications
Operating ambient temperature	-20 to 55°C ^{*1}
Withstand voltage	500VAC for 1 minute
Insulation resistance	10MΩ or higher (500VDC insulation resistance tester)
	Between all terminals and ground terminal

^{*1} When using the FX5-CCLGN-MS manufactured in December 2020 or earlier, the operating ambient temperature is -20 to 50°C. The operating ambient temperature of the programmable controller system is the same.

4.4 Power supply specifications

Item	Specifications	
External power supply	Power supply voltage	24VDC +20%/-15%
	Allowable instantaneous power failure time	Operation continues for an instantaneous power failure of 1ms or less.
	Current consumption	220mA

4.5 Performance specifications

Item	Specifications		
Station type	Master or local station		
Station number	• Master station: 0 • Local station: 1 to 120		
Number of connectable modules	One module can be connected to the CPU module for each station type. • Master station: 1 • Local station: 1		
Maximum number of link points per network	RX	16K points (16384 points, 2K bytes)	
	RY	16K points (16384 points, 2K bytes)	
	RWw	8K points (8192 points, 16K bytes)	
	RX	8K points (8192 points, 1K bytes)	
	RY	8K points (8192 points, 1K bytes)	
	RWw	4K points (4096 points, 8K bytes)	
Maximum number of link points per station ^{*1}	Master station	RX	16K points (16384 points, 2K bytes)
		RY	16K points (16384 points, 2K bytes)
		RWw	8K points (8192 points, 16K bytes)
	Local station	RX	16K points (16384 points, 2K bytes)
		RY	16K points (16384 points, 2K bytes)
		RWw	8K points (8192 points, 16K bytes)
Communication speed	• 1Gbps • 100Mbps		
Minimum synchronization cycle	250.00μs		
CC-Link IE TSN Class	B		
CC-Link IE TSN Protocol version	• 2.0 • 1.0		
Maximum number of connectable stations	When used as a master station	61 stations	
	When used as a local station	121 stations	

LED	Color	Status	Description
P2 L ER ^{*1}	Red	On	Abnormal data received
		Off	Normal data received
LINK	Green	On	Link-up
		Off	Link-down

^{*1} The LED is always off in offline mode.

^{*2} Data of cyclic transmission and transient transmission in CC-Link IE TSN are included.

2. Installation

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 to be 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.
- The dust proof sheet should be affixed to the ventilation slits before installation and wiring work to block 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 fire, equipment failures 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.
- Connect the extension cables securely to their designated connectors. Loose connections may cause malfunctions.

For details, refer to the following.

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

Item	Specifications	
Station-based data assurance	When used as a master station	61 stations
	When used as a local station	121 stations
Connection cable	Refer to the following. 3.1.2 Cable	
Overall cable distance	Line topology	12000m (when 121 stations are connected)
	Others	Depends on the system configuration.
Maximum station-to-station distance	100m	
Network number setting range	1 to 239	
Network topology	Line topology, star topology (coexistence of line topology and star topology is also possible)	
Communication method	Time sharing method	
Maximum transient transmission capacity	1920 bytes	
Number of occupied I/O points	8 points	

^{*1} The maximum number of points for all link devices may not be used simultaneously depending on the number of device stations, or the number of points and assignments of the link devices that are set in the "Network Configuration Settings" of the "Basic Settings".

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

Warranty

Exclusion of loss in opportunity and secondary loss from warranty liability
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.

⚠ For safe use

- 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 with 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.