



Programmable Controller

MELSEC-F

FX3U-ENET

INSTALLATION MANUAL



Manual Number	JY997D15901
Revision	G
Date	May 2018

This manual describes the part names, dimensions, mounting, and specifications of the product. Before use, read this manual and the manuals of all relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and precautions. Store this manual in a safe place so that it can be taken out and read whenever necessary. Always forward it to the end user.

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Effective May 2018

Specifications are subject to change without notice.

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Safety Precaution (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 medium or slight personal injury or physical damage.

Depending on circumstances, procedures indicated by **CAUTION** may also cause severe injury. It is important to follow all precautions for personal safety.

Associated Manuals

Manual name	Manual No.	Description
FX3U-ENET INSTALLATION MANUAL	JY997D15901	This manual
FX3U-ENET User's Manual	JY997D18101 MODEL CODE: 09R716	Describes the specifications, wiring, installation, maintenance, and operations of the FX3U-ENET.
FX3U Series HARDWARE MANUAL	JY997D50301	Briefly describes the I/O specifications, wiring, and installation of the FX3U Series PLC.
FX3U Series User's Manual - Hardware Edition	JY997D16501 MODEL CODE: 09R516	Describes the I/O specifications, wiring, installation, and maintenance of the FX3U Series PLC in detail.
FX3S/FX3G/FX3GC/FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming for basic/applied instructions and devices.
FX3UC(D, DS, DSS) Series HARDWARE MANUAL	JY997D50501	Briefly describes the I/O specifications, wiring, and installation of the FX3UC Series PLC.
FX3UC-32MT-LT-2 HARDWARE MANUAL	JY997D31601	Briefly describes the I/O specifications, wiring, and installation of the FX3U-32MT-LT-2.
FX3UC Series User's Manual - Hardware Edition	JY997D28701 MODEL CODE: 09R519	Describes the I/O specifications, wiring, installation, and maintenance of the FX3UC Series PLC in detail.

Manual name	Manual No.	Description
FX Configurator-EN Operation Manual	JY997D20501 MODEL CODE: 09R919	Describes the operation method of FX Configurator-EN.

Only this INSTALLATION MANUAL is supplied with the FX3U-ENET. For more details regarding the FX3U/FX3UC Series hardware, PLC programming commands, and special function blocks/units, refer to the appropriate manuals.

How to obtain manuals

For the necessary product manuals or documents, consult with the Mitsubishi Electric dealer from who you purchased this product.

How to obtain FX Configurator-EN

The parameter setting software, FX Configurator-EN is not supplied with this product. Consult with the Mitsubishi Electric dealer from who you purchased this product

DESIGN PRECAUTION **CAUTION**

- Configure an interlock circuit in the sequence program so that the system operates safely and uses the communication information in case of a communication error.
- Do not bundle the communication cable or the 24V power supply together with the main circuit or power line. Lay them at least 100mm (3.94") apart from each other. Failure to do so may result in noise and malfunctions.
- Ensure that the unit and cable are not subjected to excessive force. Failure to do so may result in wire damage/breakage or PLC failure.

Certification of UL, cUL standards

The following product has UL and cUL certification.

UL, cUL File Number: E95239

Models: MELSEC FX3U series manufactured FX3U-ENET

Compliance with EC directive (CE Marking)

This note does not guarantee that an entire mechanical module produced in accordance with the contents of this note will comply with the following standards. Compliance to EMC directive and LVD directive for the entire mechanical module should be checked by the user / manufacturer. For more details please contact the local Mitsubishi Electric sales site.

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.

Type: Programmable Controller (Open Type Equipment)

Models: MELSEC FX3U series manufactured

from August 1st, 2005 FX3U-ENET

Standard	Remark
EN61131-2:2007 Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspects of the standard.
EMC	<ul style="list-style-type: none"> Radiated Emission Conducted Emission
EMS	<ul style="list-style-type: none"> Radiated electromagnetic field Fast transient burst Electrostatic discharge High-energy surge Voltage drops and interruptions Conducted RF Power frequency magnetic fields

Notes for compliance to EMC regulation.

The (FX3U-ENET) must be installed in a shielded metal control panel. For more details please contact your local Mitsubishi Electric sales site.

Notes for compliance with EN61131-2:2007

General notes on the use of the power supply cable.

- The FX3U-ENET unit requires that the cable used for power supply is 30m or less.
- When the cable used for power supply exceeds 30m, a noise filter (Ex. TDK-Lambda MBS1205-22 or similar) should be placed on the 24V DC power cabling as close (within 500mm) to the FX3U-ENET termination points as possible, refer to following figure.



1. Outline

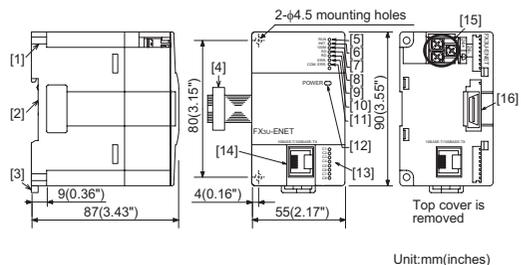
FX3U-ENET is an Ethernet unit for the FX3U/FX3UC Series (Ver.2.21 or later) PLC that is compliant with 100BASE-TX/10BASE-T and has the features as follows.

- Data and programs within the PLC can be sent and received via Ethernet by using GX Developer Ver.8.25B or later.
- Communication between PLCs or with a general Ethernet device is possible by fixed buffer communication. (TCP/IP or UDP/IP)
- Users can develop custom software to communicate with the PLC by using MC (MELSEC Communication) protocol (A-compatible 1E frame subset, for details, refer to user's manual). (TCP/IP or UDP/IP)
- E-mail can be sent and received. (SMTP or POP3 protocol)
- The FX3U-ENET parameters can be set easily using FX Configurator-EN.
- The diagnostic functions of FX Configurator-EN enables easy diagnostics and troubleshooting of the FX3U-ENET.

1.1 Incorporated Items

Product	Ethernet unit for the FX3U/FX3UC Series PLC
Included items	Installation Manual (this manual) Dust sheet Label for indication of special function unit/block number

1.2 External Dimensions and Part Names



MASS(Weight): Approx. 0.3kg(0.66lbs)

- Direct mounting hole: 2 holes of $\phi 4.5$ Used when ENET is directly mounted. Not used when DIN rail is mounted.
- DIN rail mounting groove
- DIN rail mounting hook
- Extension cable
- RUN LED
- INIT. LED
- 100M LED
- SD LED
- RD LED
- ERR. LED
- COM.ERR. LED
- C1 to C8 LEDs
- POWER LED
- RJ45 modular jack
- Terminal block for power supply (24V DC) (M3 terminal block screw)
- Extension connector

Indications of LEDs

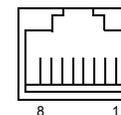
LED	Indication (○: Off, ●: On)
RUN	●: Normal operation ○: Abnormal operation
INIT.	●: Initial processing normal completion ○: Initial processing not performed
100M	●: 100Mbps ○: 10Mbps / When not connected
SD	●: Data being sent ○: Data not being sent
RD	●: Data being received ○: Data not being received
ERR.	●: Abnormal setting display* ○: Normal setting display
COM. ERR.	●: Abnormal communication display ○: Normal communication display
POWER	●: Power on ○: Power off
C1 to C8	●: TCP/IP - Connection established UDP - Open ○: TCP/IP - Connection not established UDP - Closed

*The ERR LED illuminates in the following cases:

- When a parameter setting error occurs in the Ethernet unit
- When an operational error occurs in the PLC CPU
- When an error is found in the Ethernet unit (H/W error)

Pin Configuration

The pin configuration of ENET RJ45 type modular jack (for category 5 or category 3) is as follows:



Pin No.	Signal	Direction	Contents
1	TD+	Out	+ side of sending data
2	TD-	Out	- side of sending data
3	RD+	In	+ side of receiving data
4	Not used	-	
5	Not used	-	
6	RD-	In	- side of receiving data
7	Not used	-	
8	Not used	-	

Cables to be used

For 10BASE-T	Category 5e, shielded twisted-pair cable Category 5, shielded twisted-pair cable Category 3, shielded twisted-pair cable
For 100BASE-TX	Category 5e, shielded twisted-pair cable Category 5, shielded twisted-pair cable

2. Installation

INSTALLATION PRECAUTIONS **WARNING**

- Make sure to cut off all phases of the power supply externally before attempting installation work. Failure to do so may cause electric shock.
- Before attaching or replacing the main unit or extension unit, externally cut off all phases of the power supply. If not, it may cause malfunctions or misoperations.

INSTALLATION PRECAUTIONS **CAUTION**

- Use this product within the generic environment specifications described in this manual. 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, fire, malfunctions, deterioration or damage may occur.
- When tightening the terminal screws, stay within the specified torque range. When tightened insufficiently, short-circuit or failure may occur. When tightened too much, the screws or the unit may be damaged, causing the unit disposal, short-circuit, or failure.
- Do not touch the conductive part or electric parts of this unit directly. Doing so may cause device failure or malfunctions.

INSTALLATION PRECAUTIONS **CAUTION**

- Install the unit on a flat surface. If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.

2.1 Mounting

The FX3U-ENET can be mounted directly using screws or on a DIN rail (DIN46227).

2.1.1 Direct Mounting

The FX3U-ENET can be mounted with M4 screws by using the direct mounting holes.

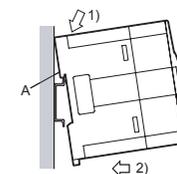
A space of 1 to 2 mm (0.04" to 0.08") between each unit is necessary.

→ For the mounting hole pitch information, refer to Section 1.2

2.1.2 DIN Rail Mounting

The FX3U-ENET can be mounted on a DIN rail (DIN46227, 35mm width).

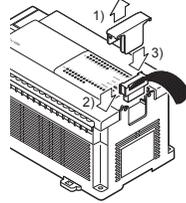
- Fit the upper edge of the DIN rail mounting groove (fig. A) onto the DIN rail.
- Push the unit onto the DIN rail.



2.1.3 Procedure for connecting with the FX3U Series PLC

When connecting to an FX3U:
Before connections, turn off the power to the PLC.

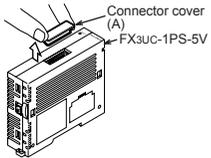
- 1) Remove the extension device connector cover of the main unit.
- 2) Fold and insert the extension cable in the corresponding connector as shown to the right.
- 3) Reattach the extension device connector cover on the main unit.



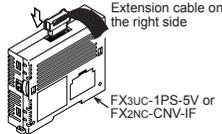
When connecting to an FX3UC:

When connecting the FX3U-ENET, either the FX3UC-1PS-5V or FX2NC-CNV-IF is required.

- 1) The connector cover (A) of the FX3UC-1PS-5V is removed as shown in the figure to the right. The FX2NC-CNV-IF does not have a connector cover.



- 2) Connect the extension cable as shown to the right.



2.2 Wire end treatment

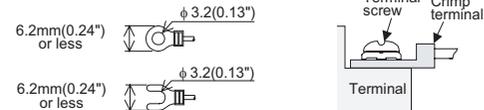
The solderless terminal size depends on the terminal screw size and wiring method.

- Use solderless terminals of the following size.
- Tighten the terminals to a torque of 0.5 N·m to 0.8 N·m. Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

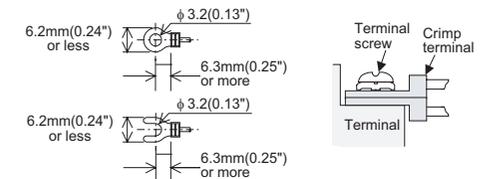
When using M3 terminal screw

For the main unit, input/output powered extension unit/block and special function unit/block

- When one wire is connected to one terminal



- When two wires are connected to one terminal



3. Specification

STARTUP AND MAINTENANCE PRECAUTIONS



- Do not touch any terminals or connector while the PLC'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. Failure to do so may cause malfunction or failure of this unit. When the screws are tightened insufficiently, they may fall out and cause a short-circuit or malfunction. When tightened too much, the screws or the unit may be damaged, resulting in short-circuit, or malfunction.
- When controlling the PLC (especially when changing data, the program or changing the operating conditions) during operation, ensure that it is safe to do so.

STARTUP AND MAINTENANCE PRECAUTIONS



- Do not disassemble or modify the unit. Doing so may cause fire, equipment failures, or malfunctions.
- The unit case is made of resin. Do not drop the product or exert strong impact to it. Doing so may cause damage.
- When this unit is installed or removed from the panel, make sure to externally cut off all phases of the power supply. Failure to do so may cause malfunction or failure of this unit.

DISPOSAL PRECAUTIONS



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

TRANSPORTATION AND STORAGE PRECAUTIONS



- 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.

For the general specifications, refer to the manual of FX Series PLC.

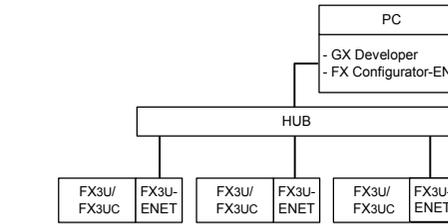
Item	Specifications		
General specification	Ambient temperature	0 to 55°C (32 to 131°F) when operating and -20 to 75°C (-4 to 167°F) when stored	
	Dielectric withstand voltage	500 V AC for one minute	Between all terminals and the ground terminal
	Insulation resistance	5 MΩ or higher by 500 V DC insulation resistance tester	
Transmission specifications	Data transmission speed	100Mbps	10Mbps
	Communication method	Full-duplex/Half-duplex	
Transmission data storage memory	Transmission method	Base band	
	Maximum segment length	100m(328'1") ^{*1}	
	Maximum number of nodes/connection	Cascade connection Maximum 2 stages	Cascade connection Maximum 4 stages
	Number of simultaneously open connections allowed	8 connections (Connections usable by the sequence program)	
Number of I/O occupied points	Fixed buffer	1023 word × 8	
	E-mail	Attached file	2048 word × 1 ²
Power supply specifications	24 V DC external power supply	240 mA, 24 V DC +20%, -15%, ripple (p-p) less than 5%	
	5 V DC internal power supply	5 V DC of PLC is not used. (5 V DC is converted from 24 V DC external power supply.) Make sure to observe the power-on timing and the procedure.	
External dimensions	90(H) × 55(W) × 87(D) [mm] 3.55"(H) × 2.17"(W) × 3.43"(D) [inches]		
MASS (Weight)	Approx. 0.3 kg (0.66 lbs)		
Number of connectable units to the main unit	1		

*1 Length between a hub and a node

*2 Refer to the FX3U-ENET User's Manual of e-mail sending/receiving function specifications.

4. System configuration

System configuration example



PLC	Ethernet unit	LAN cable
FX3U Series PLC		Shielded twisted-pair cable 10BASE-T : Category 5e, 5 or 3 100BASE-T : Category 5e or 5
FX3UC Series PLC + FX2NC-CNV-IF	FX3U-ENET	
FX3UC Series PLC + FX3UC-1PS-5V		

FX Configurator-EN

Ver.1.00 or later

GX Developer applicable version

Ver.8.25B or later

FX3U/FX3UC PLC applicable version

Ver.2.21 or later

5. Wiring

WIRING PRECAUTIONS

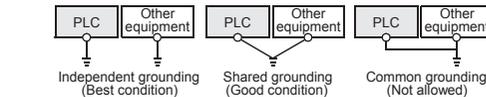


- Make sure to cut off all phases of the power supply externally before attempting wiring work. Failure to do so may cause electric shock or damage to the product.

WIRING PRECAUTIONS

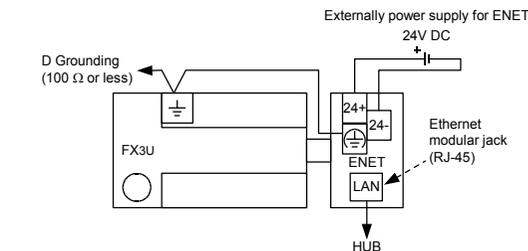


- Before wiring the unit, confirm that the rated voltage and terminal allocation of the unit are correct. An incorrect voltage supply and/or incorrect wiring may cause fire, malfunction, or failure.
- Perform class D grounding (grounding resistance: 100Ω or less) to the grounding terminal on the main unit. Do not use common grounding with heavy electrical systems.
- Prevent cutting or wiring debris from entering the main unit. Failure to do so cause fire, malfunctions, or failures.



Wiring and power supply wiring between PLC and FX3U-ENET

Example usage of FX3U



「电器电子产品有害物质限制使用标识要求」的表示方式



Note: This symbol mark is for China only.

含有有害6物质的名称, 含有量, 含有部品
本产品中所含有的有害6物质的名称, 含有量, 含有部品如下表所示。

产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
可编程控制器	○	○	○	○	○	○
外壳	○	○	○	○	○	○
印刷基板	×	○	○	○	○	○

本表格依据SJ/T 11364的规定编制。

○: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。

×: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。

基于中国标准法的参考规格: GB/T15969. 2

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.

MITSUBISHI ELECTRIC CORPORATION

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