

MITSUBISHI *Changes for the Better*
PROGRAMMABLE CONTROLLERS
MELSEC-F

FX3U-ENET-L

INSTALLATION MANUAL

Manual Number	JY997D37801
Revision	B
Date	June 2010

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. Registration: The company and product name described in this manual are registered trademarks or the trademarks of their respective companies. Effective June 2010. Specifications are subject to change without notice. © 2009 Mitsubishi Electric Corporation

Safety Precaution (Read these precautions before use.)

This manual classifies the safety precautions into two categories:

⚠ DANGER and **⚠ CAUTION**.

⚠ DANGER	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 the 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-L INSTALLATION MANUAL	JY997D37801	This manual
FX3U-ENET-L User's Manual	JY997D38001 MODEL CODE: 09R722	Describes the specifications, wiring, installation, maintenance, and operations of the FX3U-ENET-L.
FX3U Series HARDWARE MANUAL	JY997D18801	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	Explains the FX3U Series PLC specifications for I/O, wiring, installation, and maintenance.
FX3G/FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming for basic/applied instructions and devices.
FX3U(D, DSS) Series HARDWARE MANUAL	JY997D28601	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 FX3UC-32MT-LT-2 PLC.

Manual name	Manual No.	Description
FX3UC Series User's Manual - Hardware Edition	JY997D28701 MODEL CODE: 09R519	Explains the FX3UC Series PLC specifications for I/O, wiring, installation, and maintenance.
FX Configurator-EN-L operation Manual	JY997D38401 MODEL CODE: 09R929	Describes the operation method of FX Configurator-EN-L.

Only this INSTALLATION MANUAL is supplied with the FX3U-ENET-L. 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 product manuals or documents, consult with the Mitsubishi Electric dealer from who you purchased your product.

How to obtain FX Configurator-EN-L

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

Certification of UL, cUL standards

FX3U-ENET-L units comply with the UL standards (UL, cUL). UL, cUL File Number: E95239

Regarding the standards that comply with the main unit, please refer to either the FX series product catalog or consult with your nearest Mitsubishi product provider.

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 information please consult with your nearest Mitsubishi product provider.

Regarding the standards that comply with the main unit, please refer to either the FX series product catalog or consult with your nearest Mitsubishi product provider.

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 (2004/108/EC) when used as directed by the appropriate documentation.

Attention

• This product is designed for use in industrial applications.

Note

- Manufactured by: Mitsubishi Electric Corporation 2-7-3 Marunouchi, Chiyoda-ku, Tokyo, 100-8310 Japan
- Manufactured at: Mitsubishi Electric Corporation Himeji Works 840 Chiyoda-machi, Himeji, Hyogo, 670-8677 Japan
- Authorized Representative in the European Community: Mitsubishi Electric Europe B.V. Gothaer Str. 8, 40880 Ratingen, Germany

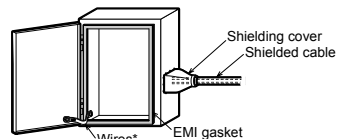
Type: Programmable Controller (Open Type Equipment)
 Models: MELSEC FX3U series manufactured from October 1st, 2009 FX3U-ENET-L

Standard	Remark
EN61131-2:2007 Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspects of the standard. EMI • Radiated Emissions • Conducted Emissions EMS • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • High-energy surge • Voltage drops and interruptions • Conducted RF • Power frequency magnetic field

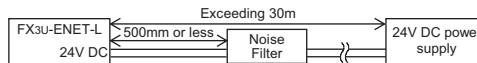
Caution for EC Directive

- Installation in Enclosure
 Programmable logic controllers are open-type devices that must be installed and used within conductive control cabinets. Please use the programmable logic controller while installed within a conductive shielded control cabinet. Please secure the cabinet door to the control cabinet (for conduction). Installation within a control cabinet greatly affects the safety of the system and aids in shielding noise from the programmable logic controller.

- Control cabinet
 - The control cabinet must be conductive.
 - Ground the control cabinet with the thickest possible grounding cable.
 - To ensure that there is electric contact between the control cabinet and its door, connect the cabinet and its doors with thick wires.
 - In order to suppress the leakage of radio waves, the control cabinet structure must have minimal openings. Also, wrap the cable holes with a shielding cover or other shielding devices.
 - The gap between the control cabinet and its door must be as small as possible by attaching EMI gaskets between them.



- * These wires are used to improve the conductivity between the door and control cabinet.
- Notes for compliance with EN61131-2:2007
 General notes on the use of the power supply cable.
 - The FX3U-ENET-L 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-L termination points as possible, refer to following figure.



1. Outline

FX3U-ENET-L is an Ethernet unit for the FX3U/FX3UC Series PLC that is compliant with 100BASE-TX/10BASE-T and has the features as follows.

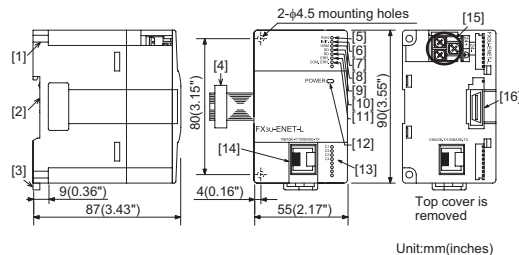
- 1) Data and programs within the PLC can be sent and received via Ethernet by using GX Developer Ver.8.88S or later.*1
- 2) Communication between PLCs or with a general Ethernet device is possible by fixed buffer communication. (TCP/IP or UDP/IP)*1
- 3) Users can develop custom software to communicate 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)*1
- 4) E-mail can be sent. (SMTP protocol)
- 5) The FX3U-ENET-L parameters can be set easily using FX Configurator-EN-L.
- 6) The diagnostic functions of FX Configurator-EN-L enables easy diagnostics and troubleshooting of the FX3U-ENET-L.

*1 It is necessary to set up the open system by configuring open settings in advance.

1.1 Incorporated Items

Included Item	
FX3U-ENET-L	1 unit
Label for indication of special function unit/block number	1 sheet
Dust proof protection sheet	1 sheet
Installation Manual (Japanese version, English version)	1 manual each

1.2 External Dimensions and Part Names



MASS(Weight):0.3kg(0.66lbs) DIN rail width:35mm(1.38")

- [1] Direct mounting hole:2 holes of φ4.5mm(0.18")
 Used when FX3U-ENET-L is directly mounted.
 Not used when DIN rail is mounted.
- [2] DIN rail mounting groove
- [3] DIN rail mounting hook
- [4] Extension cable
- [5] RUN LED
- [6] INIT. LED
- [7] 100M LED
- [8] SD LED
- [9] RD LED
- [10] ERR. LED
- [11] COM.ERR. LED
- [12] POWER LED
- [13] C1 to C4 LEDs
- [14] 10BASE-T/100BASE-TX connector (RJ45)
- [15] External 24VDC terminal (M3 terminal block screw)
- [16] Extension connector

Indications of LEDs

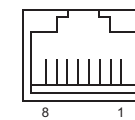
LED	Indication (○ : Off, ● : On)
RUN	● : Normal operation ○ : Abnormal operation
INIT.	● : Initial processing normal completion ○ : Initial processing not performed
100M	● : 100Mbps ○ : 10Mbps/When not connected
SD	● : Data being sent ○ : Data not being sent
RD	● : Data being received ○ : Data not being received
ERR.	● : Abnormal setting display* ○ : Normal setting display
COM. ERR.	● : Abnormal communication display ○ : Normal communication display
POWER	● : Power on ○ : Power off
C1 to C4	● : 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 FX3U-ENET-L 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 **⚠ DANGER**

- Make sure to cut off all phases of the power supply externally before attempting installation work.
 Failure to do so may cause electric shock or damage to the product.
- Before attaching or replacing the main unit or extension unit, externally cut off all phases of the power supply. Failure to do so 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 failure or malfunctions.
- 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.
- Install the product securely using a DIN rail or mounting screws.
- When drilling screw holes or wiring, make sure that cutting or wire debris does not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions.
- Be sure to remove the dust proof sheet from the PLC's ventilation port when installation work is completed. Failure to do so may cause fire, equipment failures or malfunctions.
- Connect extension cables securely to their designated connectors. Loose connections may cause malfunctions.

2.1 Mounting

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

2.1.1 Direct Mounting

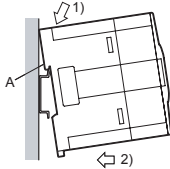
The FX3U-ENET-L can be mounted with M4 screws by using the direct mounting holes.

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

2.1.2 DIN Rail Mounting

The FX3U-ENET-L 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.

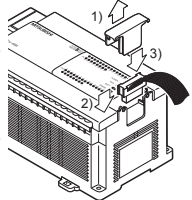


2.1.3 Procedure for connecting with the FX3U Series PLC

When connecting to an FX3U:

Before connecting, turn off the power to the PLC.

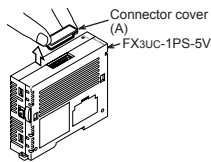
- Remove the extension device connector cover of the main unit.
- Fold and insert the extension cable in the corresponding connector as shown to the right.
- Reattach the extension device connector cover on the main unit.



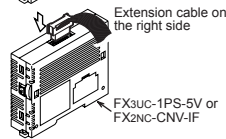
When connecting to an FX3UC:

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

- 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.



- Connect the extension cable as shown to the right.



3. Specification

For details on specifications, refer to the following manual.

→ Refer to the FX3U-ENET-L User's Manual.

DESIGN PRECAUTIONS **DANGER**

- Make sure to include the following safety circuits outside the PLC to ensure safe system operation even during external power supply problems or PLC failure. Otherwise, malfunctions may cause serious accidents.
 - Most importantly, have 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 PLC main unit 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 PLC main unit 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 cases.

DESIGN PRECAUTIONS **CAUTION**

- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
 - Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.
 - Ground the shield wire or shield of a shielded cable. However, do not ground them at the same point as the high-voltage lines.
- Install module so that excessive force will not be applied to the unit or cables. Failure to do so may result in wire damage/breakage or PLC failure.

STARTUP AND MAINTENANCE PRECAUTIONS **DANGER**

- Do not touch any terminals or connector while the PLC's power is on. Doing so may cause electrical shock or malfunctions.
- Before cleaning or retightening screws, externally 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 **CAUTION**

- Do not disassemble or modify the unit. Doing so may cause fire, equipment failures, or malfunctions.
- The unit case is made of resin. If dropped or subjected to strong impact, the unit may be damaged.
- 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 **CAUTION**

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

TRANSPORT AND STORAGE PRECAUTIONS **CAUTION**

- The product is a precision instrument. During transportation, avoid any impacts. Failure to do so may cause failures in the product. After transportation, verify the operations of the product.

Items other than the following are equivalent to those of the PLC main unit.

For general specifications, refer to the manual of the PLC main unit.

→ Refer to the FX3U Series User's Manual - Hardware Edition.

→ Refer to the FX3UC Series User's Manual - Hardware Edition.

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	5MΩ or more by 500V DC	
Transmission specifications	Data transmission speed	100Mbps	10Mbps
	Communication method	Full-duplex/Half-duplex	
	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	Fixed buffer communication	2 connections	
	MELSOFT connection + MC protocol	A total of 2 connections	
Transmission data storage memory	Fixed buffer	1023 word × 2	
	E-mail *2*3	Attached file	2048 word × 1
		Main text	256 word × 1
Number of I/O occupied points		8 points	
Power supply specifications	24V DC external power supply	240mA, 24V DC +20%, -15%, ripple (p-p) less than 5%	
	5V DC internal power supply	Operation can be continued upon occurrence of instantaneous power failure for 1 ms or less.	
	Allowable instantaneous power failure time	5V DC of PLC is not used. (5V DC is converted from 24V 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)	0.3kg(0.66lbs)		
Number of connectable units to the main unit	1		

*1 Length between a hub and a node.

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

*3 It is not possible to send an attached file and main text simultaneously.

3.1 Applicable PLC

Model name	Applicability
FX3U Series PLC	Ver. 2.21 and later Only one FX3U-ENET-L unit can be connected in a main unit.
FX3UC Series PLC*1	Ver. 2.21 and later Only one FX3U-ENET-L unit can be connected in a main unit.

The version number can be checked by reading the last three digits of device D8001.

*1 An FX2NC-CNV-IF or FX3UC-1PS-5V is necessary to connect the FX3U-ENET-L with the FX3UC PLC.

3.2 Related software

Model name	Applicability
FX Configurator-EN-L*1	Ver. 1.00 and later
GX Developer	Ver. 8.88S and later

*1 To use FX Configurator-EN-L, either of the following software should be installed. - GX Developer (Ver. 8.88S or later)

4. Wiring

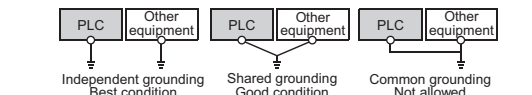
WIRING PRECAUTIONS **DANGER**

- 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 **CAUTION**

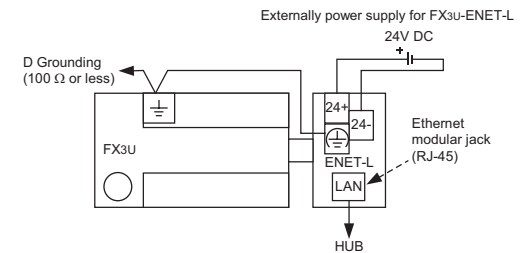
- Before wiring the unit, confirm that the rated voltage and terminal allocation of the unit are correct. An incorrect voltage supply and/or incorrect wiring may cause fire, malfunction, or failure.
- Perform class D grounding (grounding resistance: 100Ω or less) to the grounding terminal on the main unit. Do not use common grounding with heavy electrical systems.
- Prevent cutting or wiring debris from entering the main unit. Failure to do so may cause fire, malfunctions, or failures.
- Place a label that warns of electrical shock (417-IEC-5036) on the enclosure of the final equipment.

4.1 Grounding



Wiring and power supply wiring between PLC and FX3U-ENET-L

Example usage of FX3U



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

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; opportunity loss or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

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.



HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
HIMEJI WORKS : 840, CHIYODA CHO, HIMEJI, JAPAN

MITSUBISHI *Changes for the Better*
 PROGRAMMABLE CONTROLLERS
MELSEC-F

FX3U-ENET-L
INSTALLATION MANUAL

Manual Number	JY997D37801
Revision	B
Date	June 2010

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.
 Registration: The company and product name described in this manual are registered trademarks or the trademarks of their respective companies.
 Effective June 2010
 Specifications are subject to change without notice.
 © 2009 Mitsubishi Electric Corporation

Safety Precaution (Read these precautions before use.)
 This manual classifies the safety precautions into two categories:
 ⚠ **DANGER** and ⚠ **CAUTION**.

DANGER	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 the 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-L INSTALLATION MANUAL	JY997D37801	This manual
FX3U-ENET-L User's Manual	JY997D38001 MODEL CODE: 09R722	Describes the specifications, wiring, installation, maintenance, and operations of the FX3U-ENET-L.
FX3U Series HARDWARE MANUAL	JY997D18801	Briefly describes the I/O specifications, wiring, and installation of the FX3U Series PLC.
FX3U Series User's Manual - Hardware Edition	JY997D18501 MODEL CODE: 09R516	Explains the FX3U Series PLC specifications for I/O, wiring, installation, and maintenance.
FX3G/FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming for basic/applied instructions and devices.
FX3UC(D, DSS) Series HARDWARE MANUAL	JY997D28601	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 FX3UC-32MT-LT-2 PLC.

Manual name	Manual No.	Description
FX3UC Series User's Manual - Hardware Edition	JY997D28701 MODEL CODE: 09R519	Explains the FX3UC Series PLC specifications for I/O, wiring, installation, and maintenance.
FX Configurator-EN-L operation Manual	JY997D38401 MODEL CODE: 09R929	Describes the operation method of FX Configurator-EN-L.

Only this INSTALLATION MANUAL is supplied with the FX3U-ENET-L. 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 product manuals or documents, consult with the Mitsubishi Electric dealer from who you purchased your product.
How to obtain FX Configurator-EN-L
 The parameter setting software, FX Configurator-EN-L is not supplied with this product. Consult with the Mitsubishi Electric dealer from who you purchased this product.

Certification of UL, cUL standards
 FX3U-ENET-L units comply with the UL standards (UL, cUL).
 UL, cUL File Number: E95239
 Regarding the standards that comply with the main unit, please refer to either the FX series product catalog or consult with your nearest Mitsubishi product provider.

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 information please consult with your nearest Mitsubishi product provider.
 Regarding the standards that comply with the main unit, please refer to either the FX series product catalog or consult with your nearest Mitsubishi product provider.

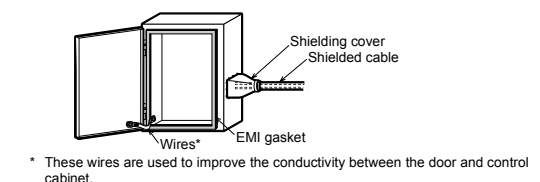
Requirement for Compliance with EMC directive
 The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2004/108/EC) when used as directed by the appropriate documentation.

Attention
 • This product is designed for use in industrial applications.
Note
 • Manufactured by: Mitsubishi Electric Corporation, 2-7-3 Marunouchi, Chiyoda-ku, Tokyo, 100-8310 Japan
 • Manufactured at: Mitsubishi Electric Corporation Himeji Works, 840 Chiyoda-machi, Himeji, Hyogo, 670-8677 Japan
 • Authorized Representative in the European Community: Mitsubishi Electric Europe B.V., Gothaer Str. 8, 40880 Ratingen, Germany
 Type: Programmable Controller (Open Type Equipment)
 Models: MELSEC FX3U series manufactured from October 1st, 2009 FX3U-ENET-L

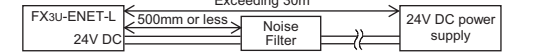
Standard	Remark
EN61131-2:2007 Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspects of the standard. EMI • Radiated Emissions • Conducted Emissions EMS • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • High-energy surge • Voltage drops and interruptions • Conducted RF • Power frequency magnetic field

Caution for EC Directive
 • Installation in Enclosure
 Programmable logic controllers are open-type devices that must be installed and used within conductive control cabinets. Please use the programmable logic controller while installed within a conductive shielded control cabinet. Please secure the cabinet door to the control cabinet (for conduction). Installation within a control cabinet greatly affects the safety of the system and aids in shielding noise from the programmable logic controller.

- Control cabinet
 - The control cabinet must be conductive.
 - Ground the control cabinet with the thickest possible grounding cable.
 - To ensure that there is electric contact between the control cabinet and its door, connect the cabinet and its doors with thick wires.
 - In order to suppress the leakage of radio waves, the control cabinet structure must have minimal openings. Also, wrap the cable holes with a shielding cover or other shielding devices.
 - The gap between the control cabinet and its door must be as small as possible by attaching EMI gaskets between them.



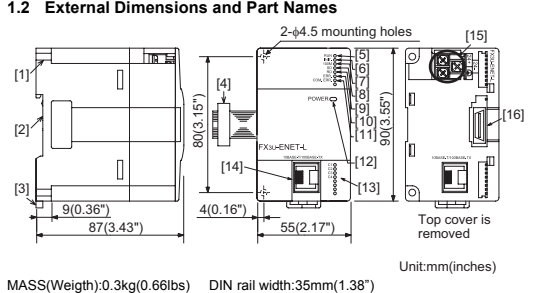
- Notes for compliance with EN61131-2:2007
 General notes on the use of the power supply cable.
 - The FX3U-ENET-L unit requires that the cable used for power supply is 30m or less.
 - When the cable used for power supply exceeds 30m, a noise filter (Ex. TDK-Lambda MBS1205-22 or similar) should be placed on the 24V DC power cabling as close (within 500mm) to the FX3U-ENET-L termination points as possible, refer to following figure.



1. Outline
 FX3U-ENET-L is an Ethernet unit for the FX3U/FX3UC Series PLC that is compliant with 100BASE-TX/10BASE-T and has the features as follows.
 1) Data and programs within the PLC can be sent and received via Ethernet by using GX Developer Ver.8.88S or later.*
 2) Communication between PLCs or with a general Ethernet device is possible by fixed buffer communication. (TCP/IP or UDP/IP)*
 3) 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)*
 4) E-mail can be sent. (SMTP protocol)
 5) The FX3U-ENET-L parameters can be set easily using FX Configurator-EN-L.
 6) The diagnostic functions of FX Configurator-EN-L enables easy diagnostics and troubleshooting of the FX3U-ENET-L.
 *1 It is necessary to set up the open system by configuring open settings in advance.

1.1 Incorporated Items

Included item	Quantity
FX3U-ENET-L	1 unit
Label for indication of special function unit/block number	1 sheet
Dust proof protection sheet	1 sheet
Installation Manual (Japanese version, English version)	1 manual each



- [1] Direct mounting hole: 2 holes of $\phi 4.5\text{mm}(0.18")$
 Used when FX3U-ENET-L is directly mounted.
 Not used when DIN rail is mounted.
 [2] DIN rail mounting groove
 [3] DIN rail mounting hook
 [4] Extension cable
 [5] RUN LED
 [6] INIT. LED
 [7] 100M LED
 [8] SD LED
 [9] RD LED
 [10] ERR. LED
 [11] COM.ERR. LED
 [12] POWER LED
 [13] C1 to C4 LEDs
 [14] 10BASE-T/100BASE-TX connector (RJ45)
 [15] External 24VDC terminal (M3 terminal block screw)
 [16] 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 C4	●: 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 FX3U-ENET-L 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

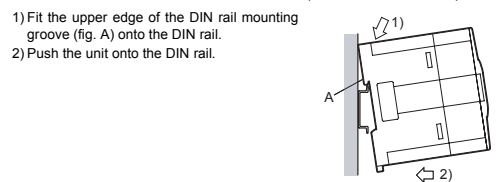
INSTALLATION PRECAUTIONS ⚠ **DANGER**

- Make sure to cut off all phases of the power supply externally before attempting installation work. Failure to do so may cause electric shock or damage to the product.
- Before attaching or replacing the main unit or extension unit, externally cut off all phases of the power supply. Failure to do so may cause malfunctions or misoperations.

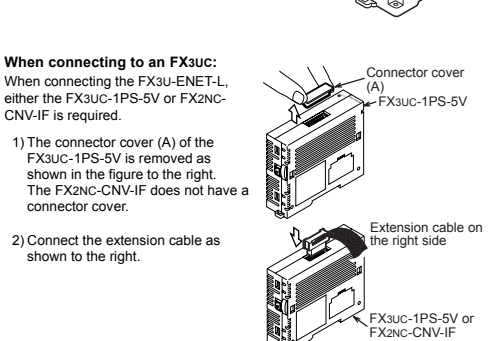
INSTALLATION PRECAUTIONS ⚠ **CAUTION**

- 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 failure or malfunctions.
- 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.
- Install the product securely using a DIN rail or mounting screws.
- When drilling screw holes or wiring, make sure that cutting or wire debris does not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions.
- Be sure to remove the dust proof sheet from the PLC's ventilation port when installation work is completed. Failure to do so may cause fire, equipment failures or malfunctions.
- Connect extension cables securely to their designated connectors. Loose connections may cause malfunctions.

2.1 Mounting
 The FX3U-ENET-L can be mounted directly using screws or on a DIN rail (DIN46227).
2.1.1 Direct Mounting
 The FX3U-ENET-L 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.
2.1.2 DIN Rail Mounting
 The FX3U-ENET-L can be mounted on a DIN rail (DIN46227, 35mm width).
 1) Fit the upper edge of the DIN rail mounting groove (fig. A) onto the DIN rail.
 2) 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.



3. Specification
 For details on specifications, refer to the following manual.
 → Refer to the FX3U-ENET-L User's Manual.

DESIGN PRECAUTIONS ⚠ **DANGER**

- Make sure to include the following safety circuits outside the PLC to ensure safe system operation even during external power supply problems or PLC failure. Otherwise, malfunctions may cause serious accidents.
 1) Most importantly, have 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).
 2) Note that when the PLC main unit 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 PLC main unit occurs in an input/output control block, external control may be disabled.
 External circuits and mechanisms should be designed to ensure safe machinery operation in such cases.

DESIGN PRECAUTIONS ⚠ **CAUTION**

- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
 1) Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.
 2) Ground the shield wire or shield of a shielded cable. However, do not ground them at the same point as the high-voltage lines.
 • Install module so that excessive force will not be applied to the unit or cables. Failure to do so may result in wire damage/breakage or PLC failure.

STARTUP AND MAINTENANCE PRECAUTIONS ⚠ **DANGER**

- 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 screws, externally 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 ⚠ **CAUTION**

- Do not disassemble or modify the unit. Doing so may cause fire, equipment failures, or malfunctions.
- The unit case is made of resin. If dropped or subjected to strong impact, the unit may be damaged.
- 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 ⚠ **CAUTION**

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

TRANSPORT AND STORAGE PRECAUTIONS ⚠ **CAUTION**

- The product is a precision instrument. During transportation, avoid any impacts. Failure to do so may cause failures in the product. After transportation, verify the operations of the product.

Items other than the following are equivalent to those of the PLC main unit. For general specifications, refer to the manual of the PLC main unit.
 → Refer to the FX3U Series User's Manual - Hardware Edition.
 → Refer to the FX3UC Series User's Manual - Hardware Edition.

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
Transmission specifications	Dielectric withstand voltage: 500 V AC for one minute
	Insulation resistance: 5MΩ or more by 500V DC
	Data transmission speed: 100Mbps / 10Mbps
Transmission specifications	Communication method: Full-duplex/Half-duplex
	Transmission method: Base band
Transmission specifications	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	Fixed buffer communication: 2 connections
	MELSOFT connection + MC protocol: A total of 2 connections
Transmission data storage memory	Fixed buffer: 1023 word × 2
	E-mail *23: Attached file: 2048 word × 1 / Main text: 256 word × 1
Number of I/O occupied points	8 points
Power supply specifications	24V DC external power supply: 240mA, 24V DC +20%, -15%, ripple (p-p) less than 5% Allowable instantaneous power failure time: Operation can be continued upon occurrence of instantaneous power failure for 1 ms or less.
	5V DC internal power supply: 5V DC of PLC is not used. (5V DC is converted from 24V 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)	0.3kg(0.66lbs)
Number of connectable units to the main unit	1

*1 Length between a hub and a node.
 *2 Refer to the FX3U-ENET-L User's Manual of e-mail sending function specifications.
 *3 It is not possible to send an attached file and main text simultaneously.

3.1 Applicable PLC

Model name	Applicability
FX3U Series PLC	Ver. 2.21 and later Only one FX3U-ENET-L unit can be connected in a main unit.
FX3UC Series PLC*1	Ver. 2.21 and later Only one FX3U-ENET-L unit can be connected in a main unit.

The version number can be checked by reading the last three digits of device D8001.
 *1 An FX2NC-CNV-IF or FX3UC-1PS-5V is necessary to connect the FX3U-ENET-L with the FX3UC PLC.

3.2 Related software

Model name	Applicability
FX Configurator-EN-L*1	Ver. 1.00 and later
GX Developer	Ver. 8.88S and later

*1 To use FX Configurator-EN-L, either of the following software should be installed.
 - GX Developer (Ver. 8.88S or later)

4. Wiring

WIRING PRECAUTIONS ⚠ **DANGER**

- 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 ⚠ **CAUTION**

- 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 may cause fire, malfunctions, or failures.
- Place a label that warns of electrical shock (417-IEC-5036) on the enclosure of the final equipment.

4.1 Grounding

Wiring and power supply wiring between PLC and FX3U-ENET-L
 Example usage of FX3U

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.