

A JAPANESE B ENGLISH

Programmable Controller MELSEC-F

FX3UC-4AD

INSTALLATION MANUAL



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:

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Effective April 2021 Specifications are subject to change without notice

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Safety Precautions (Read these precautions before use.) al classifies the safety precautions into two categories:

WARNING and CAUTION

Indicates that incorrect handling may cause hazardou conditions, resulting in death or severe injury. ndicates that incorrect handling may cause hazardou onditions, resulting in medium or slight personal injury

Depending on the circumstances, procedures indicated by ACAUTION may also

cause severe injury. It is important to follow all precautions for personal safety.

hysical damage.

Associated Manuals

Manual name	Manual No.	Description
FX3S/FX3G/FX3GC/FX3U/ FX3UC Series User's Manual - Analog Control Edition	JY997D16701 MODEL CODE: 09R619	Describes specifications for analog control and programming method for FX3S/FX3G/FX3GC/ FX3U/FX3UC Series PLC.
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 Series User's Manual - Hardware Edition	JY997D28701 MODEL CODE: 09R519	Explains the FX3UC Series PLC specifications for I/O, wiring, installation, and maintenance.

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

Certification of UL, cUL standards The following product has UL and cUL certification. UL, cUL File Number: E95239 Models: MELSEC FX3UC series manufactured

FX3UC-4AD

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.

WIRIN PRECA		vs		Z	<u>î∖</u> cau	TION	I				
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5.1 W 5.1.1	ire ar Cabl		ermina	l Tigl	htening	Torque	•				

1) Applicable cab

	Wire size		
Single wire	0.3 to 0.5mm ² (AWG22 to 20)		
Double wire	0.3mm ² (AWG22)*2		
Ferrule with insulation sleeve	0.3 to 0.5 mm ² (AWG22 to 20) (Refer to the external view of ferrule shown in the following figure.)		

2) Termination Strip the coating of strand wire and twist the cable core before connecting it, or strip the coating of single wire before connecting it. An alternative connection is to use a ferrule with insulating sleeve.

Manufacturer	Model	Pressure bonding
PHOENIX CONTACT		CRIMPEOX 6*1

GmbH & Co.		(or CRIMPFOX 6 ¹
*1 Old model name	: CRIMPFOX ZA 3	

*2 Old model name : CRIMPFOX UD 6 ed wire/solid wire ith insulation slee Attention This product is designed for use in industrial applications.

JY997D14901

April 2021

Programmable Controller (Open Type Equipment) MELSEC FX3UC series manufactured ber 1st, 2007 FX3UC-4AD Type: Models:

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

tion for EC Directive The FX30C-4AD have been found to be compliant to the European standards in the aforesaid manual and directive. However, for the very best performance from what are in fact delicate measuring and controlled output device Mitsubishi Electric would like to make the following points; As analog devices are sensitive by nature, their use should be considered care-fully. For users of proprietary cables (integral with sensors or actuators), these users should follow those manufacturers installation requirements. Mitsubishi Electric recommend that shielded cables should be used. If NO other EMC protection is provided, then users may experience temporary loss or accuracy between ±10% in very heavy industrial areas. However, Mitsubishi Electric suggest that if adequate EMC precautions are fol-lowed for the users complete control system, users should expect accuracy as specified in this manual.

specified in this manual

Sensitive analog cable should not be laid in the same trunking or cable conduit as high voltage cabling. Where possible users should run analog

concluit as night voltage cabing, where possible users should run analog cables separately.
Good cable shielding should be used. Ground the shield of the twisted shielded cable at one point on the PLC side.
When reading analog values, EMC accuracy can be improved out by averaging the readings. This can be achieved either through functions on the special function block for analog input or through a users program in the FX3UC Series PLC main unit.
Please use FX3UC-4AD while installed in a shielded enclosure. For the details, refer to the FX3UC Series User's Manual - Hardware Edition
→ Refer to the FX3UC Series User's Manual - Hardware Edition

Note for compliance with EN61131-2:2007

General note on the use of the power supply cable.
 The FX3UC-4AD unit requires that the cable used for power supply is 30m or less.

Attach a ferrite core to the power cable and make 2 turns around. (Ferrite core used in Mitsubishi Electric's test E04SR401938 manufactured by SEIWA ELECTRIC MFG. CO., LTD.)

1. Outline

The FX3UC-4AD special function block (hereinafter called 4AD) for analog input converts four analog input values (voltage, current) to digital values and transfers those digital values to the PLC main unit. For the purpose of this manual the FX3UC-4AD will from here be referred to as the 4AD. 2. Incorporated Items

FX3UC Series PLC [Main unit]

Power connector

24- 24+ 🛓

Green

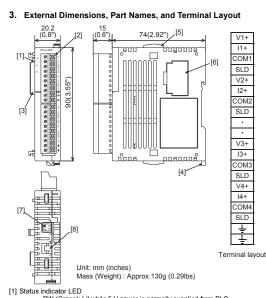
5.4 Wiring of Analog Input

Black Red

24V DC

2) Co

Verify that the following product and items are included in the package:				
Product	FX3UC-4AD special function block for analog input			
Accessories	 Special unit/block No. label FX2NC-10BPCB1 (Power crossover cable) Installation manual (This manual) 			



Status indicator LED
 PW (Green): Lit while 5 V power is normally supplied from PLC.
 24V (Red): Lit while 24V power is normally supplied from power supply
 AD (Red): Flashes during A/D conversion.
 [2] Terminal block (European type)
 Writing of the unit mered and the protection of the unit.

Wiring of the voltage and current input [3] Connector (PLC side)

Used to fix extension block on right side. [4] DIN rail mounting hook

[4] Dividin mounting nook
[5] Silde lock
[6] Connector (Extension side)
Used to connect extension block on right side of this special block.
Remove this cover for connecting.
[7] Power connector (24V DC)
The connector for supplying 24V power supply to 4AD.
[8] Power consector under supply the extension block Used to supply power supply to the extension block.

4. Installation

The 4AD can be installed on a DIN46277 rail (35 mm (1.38") wide)

INSTALLATION PRECAUTIONS	
 Make sure to o installation or v 	ut off all phases of the power supply externally before attempting

Failure to do so may cause electric shock or damage to	the product.

INSTALLATION PRECAUTIONS Use screwdrivers carefully when performing installation work, thus avoiding accide product damage Use the product within the generic environment specifications described in PLC ma unit manual (Hardware Edition)

- 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, o expose it to high temperature, condensation, or rain and wind
- If the product is used in such conditions, electric shock, fire, malfunction deterioration or damage may occur
- When drilling screw holes or wiring, make sure that cutting and wiring debris d not enter the ventilation slits of the PLC. Failure to do so may cause fire, equipment failures or malfunctions Connect FX3UC-4AD securely to their designated connectors. Loose connections may cause malfunctions.

Up to 8 units^{*1} can be connected to the FX3UC Series PLC.

*1 Up to 7 units can be connected to the FX3UC-32MT-LT(-2) PLC

TRANSPORTATION AND TORAGE 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 palettes. 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. 6.1 Applicable PLC FXsuc Series PLC (Ver.1.30 or later) From the production manufactured in August, 2004 with SER No.48**** Applicable PLC 6.2 General Specifications neral specifications are equivalent to the PLC main unit. eneral specifications, refer to the manual of the PLC main unit.) Power Supply Specifications ltem Specifications A/D conversion circuit driving 24V DC $\pm 10\%,\,80mA$ (24V DC power is supplied from the power connector.)

Interface driving (SV DC power is supplied from the internal power supply of main unit, it is not necessary to prepare power supply) power 6.4 Performance Specifications

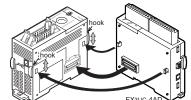
ltem	Specifications			
item	Voltage input	Current input		
Analog input range	-10 to +10V DC (Input resistance: 200 kΩ)	-20 to +20mA, 4 to 20mA DC (Input resistance: 250 Ω)		
Offset*1	-10 to +9V*2	-20 to +17mA*3		
Gain ^{*1}	-9 to +10V*2	-17 to +30mA*3		
Maximum absolute input	±15V	±30mA		
Digital output	Effective numeric value 15bits + Sign 1bit	Effective numeric value 14bits + Sign 1bit		
Resolution*4	0.32mV (20V×1/64000) 2.50mV (20V×1/8000)	1.25mA (40mA×1/32000) 5.00μA (40mA×1/8000)		

4.1 Connection to the PLC

Turn off the power. Disconnect all the cables connected to the PLC, and demount the PLC from the DIN rail.

2) Remove the extension block connector cover on the main unit / extension block.

- Slide the special block slide lock of the main unit / extension block.
 The 4AD connector (PLC side) is connected to the main unit / extension block connector whose cover was previously removed. (see the following figure.) 5) Slide back the slide lock of the main unit / exten
 - sion block to attach the 4AD.



W

4.2 Installation In Enclosure 1) Push out all DIN rail mounting hooks

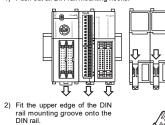
DIN46277 rail (35 mm (1.38")

Lock the DIN rail mounting hooks while pressing the PLC against the DIN rail.

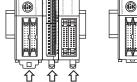
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wide)

Main unit



Û



For installation/uninstallation, Refer to the FX3UC Series User's Manual -Hardware Edition

5. Wiring (Power supply and analog input)

WIRING WARNING RECAUTIONS 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.

Input mode Set value	Input mode	Analog input range	Digital output range	Resolu- tion
2	Voltage input mode Analog value direct indication	-10 to +10V	-10000 to +10000	1.00mV
3	Current input mode	4 to 20mA	0 to 16000	1.25µA
4	Current input mode	4 to 20mA	0 to 4000	5.00µA
5	Current input mode Analog value direct indication	4 to 20mA	4000 to 20000	1.25µA
6	Current input mode	-20 to +20mA	-16000 to +16000	1.25µA
7	Current input mode	-20 to +20mA	-4000 to +4000	5.00µA
8 Current input mode Analog value direct indication		-20 to +20mA	-20000 to +20000	1.25µA
9 to E	Not used.			
F	No channels used			

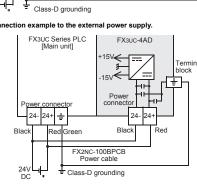
「电器电子产品有害物质限制使用标识要求」的表示方式

Ð 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

年)。 所示。

产品中有害物质的名称及含量						
	有害物质					
部件名称	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴 二苯醚 (PBDE)



1) Connection example with the power supply through crossover wiring to the FX2NC input extension block

Power

crossove

FX2NC Series PLC

24- 24+ 24- 24+

Power

Black Red

FX2NC-100BPCB Power cable

FX3UC-4AD

24- 24

6.3

powe

+15V

-15V

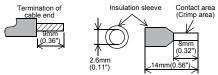
Power

Black

FX2NC-10BPCB1

Power crossover cable

• Ground the " \pm " terminal to the Class-D grounding line (100 Ω or less) together with the ground terminal of the main unit. • Remove the resin cover from the power crossover connector and perform crossover wiring to connect the power line from 4AD to a succeeding extension block.



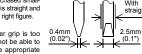
When using a ferrule with insulation sleeve, choose a wire with proper cable sheath referring to the above outside dimensions, otherwise the wire cannot be inserted easily

5.1.2 Tightening Torque

Tightening torque should be between 0.22 and 0.25 N·m. Do not tighten terminal screws with a torque outside the abovemen Failure to do so may cause equipment failures or malfunction entioned range

5.2 Tool

To tighten terminals, use a purchased small sized screwdriver whose head is straight and is not widened as shown in the right figure. Note



If the diameter of screwdriver grip is too

small, tightening torque willen grup is to to be achieved. To achieve the appropriate tightening torque shown in the table above, use the following screwdriver or an appropriate replacement (grip diameter: approximately 25mm (0.98")).

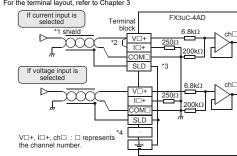
<Reference>

Manufacturer	Model		
PHOENIX CONTACT GmbH & Co. KG	SZS 0.4×2.5		

5.3 Power supply wiring

Supply the 24V DC power to 4AD via the power supply connector

Model	Application			
FX2NC-10BPCB1	Power crossover cable(offered as an accessory for the FX3UC-4AD)			
FX2NC-100BPCB	Power cable(offered as an accessory for the FX3UC Series main unit)			



- *1 Use the 2-core shielded twisted pair cable for the analog input lines, and separate the analog input lines from the other motive power lines or inductive
- *2 To use the current input, be sure to short circuit the line between the V□ + terminal and the l□ + terminal (□: channel number).
- *3 The SLD and " $\stackrel{!}{=}$ " terminals are connected to each other inside *4 Do not connect any lines to the "•" terminal.

6. Specifications

STARTUP AND PRECAUTIONS

- Do not disassemble or modify the PLC. Doing so may cause fire, equipment fai t failures, or malfunctions
- For repair, contact your local Mitsubishi Electric representative
- Do not drop the product or exert strong impact to it.
- Doing so may cause dan

ACAUTION ISPOSAL RECAUTIONS

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

Total accuracy	 ±0.3% (±60mV) for full scale of 20V (when ambient temperature is 25°C±5°C) ±0.5% (±100mV) for full scale of 20V (when ambient temperature is 0°C to 55°C) 	$\begin{array}{llllllllllllllllllllllllllllllllllll$			
A/D conversion time	$500 \mu s \times number$ of selected channels (If channels use the digital filter(s): 5ms \times number of selected channels)				
Insulation method	The photo-coupler insulates the analog input area from the PLC. The DC-DC converter insulates the analog input area from the power supply unit. Channels are not insulated from each other.				
Occupied points	8 point (Count either the input or output points of the PLC.)				

- *1 Change the offset and gain values to change the input characteristics. However, To longe the resolution doesn't change even when the offset and gain values change in the direct indication mode, however, the offset/gain cannot be adjusted.
 The offset and the gain should satisfy the following condition:
 1V ≤ (Gain - Offset) ≤ 7.5V
 The offset and the gain should satisfy the following condition:
 3mA ≤ (Gain - Offset) ≤ 30mA
 4 The resolution depend on the input mode.

6.5 Input characteristics

For the 4AD, the nine kinds of input characteristics are provided for each input mode. For the details of the input character, refer to the following.

Input mode Set value			Digital output range	Resolution	
0	Voltage input mode	-10 to +10V	-32000 to +32000	0.32mV	
1	Voltage input mode	-10 to +10V	-4000 to +4000	2.50mV	

可编程	外壳	0	0	0	0	0	0
控制器	印刷基板	\times	0	0	0	0	0

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

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Warranty

Exclusion of loss in opportunity and secondary loss from warranty liability Regardless of the gratis warranty term, Mitsubishi shall not be liable for compe nsation to (1) Damages caused by any cause found not to be the responsibility of Mitsubishi

Damages caused by any cause found not to be the responsibility of Mitsubishi.
 Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
 Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
 Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

A 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 Mitrolibeit Electric.
- Mitsubishi Electric
- This product has been manufactured under strict quality control. Howeve 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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