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## MELSEC iQ-F FX5-4DA

### Hardware Manual

IB(NA)-0800577-D



Manual Number	IB(NA)-0800577
Revision	D
Date	April 2022

This manual describes the part names, 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.

Registration:
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 'e' are not specified in this manual.

Effective April 2022

Specifications are subject to change without notice.

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Safety Precautions (Read these precautions before use.) This manual classifies the safety precautions into two categories: **MARNING** and **MCAUTION** 

<b><u></u> <u></u> <u></u> <u></u> <u></u> <u> </u> <u> </u> </b>	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.	
<b>⚠CAUTION</b>	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.	

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

### **Associated Manual**

Manual name	Manual No.	Description
MELSEC iQ-F FX5 User's Manual (Analog Control - Intelligent function module)	SH-081802ENG	Explains analog input module, analog output module, multiple input module.
MELSEC iQ-F FX5S/ FX5UJ/FX5U/FX5UC User's Manual (Hardware)	SH-082452ENG	Describes the details of hardware of the CPU module, including performance specifications, wiring, installation, and maintenance.

For the necessary product manuals or documents, consult with your local Mitsubishi Electric representative.

### Applicable standards

FX5-4DA complies with the EC Directive (EMC Directive), UL standards (UL, cUL) and UKCA marking. Further information can be found in the following manual

manual.

→ MELSEC iQ-F FX5 User's Manual (Analog Control - Intelligent function module)
Regarding the standards that relate to the CPU module, please refer to either the product catalog or consult with your local Mitsubishi Electric representative.

This product is designed for use in industrial applications.

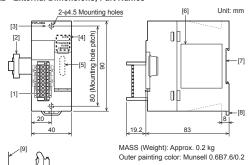
### 1. Outline

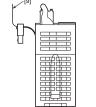
FX5-4DA analog output module (hereinafter called FX5-4DA) can convert 4 points of digital values into analog output values (voltage output and current output).

## Check that the following product and items are included in the package

-		
Product FX5-4DA analog output module		FX5-4DA analog output module
Dust proof protection sheet (1 sheet)  Hardware manual [Japanese /English] (This manual)		Dust proof protection sheet (1 sheet)
		Hardware manual [Japanese /English] (This manual)
		Hardware manual [Chinese]

### 1.2 External Dimensions, Part Names





[1] Terminal block

(Spring clamp terminal block)
[2] Extension cable

Direct mounting hole: 2 holes of \( \phi 4.5 \)
(mounting screw: M4 screw)
Operation status display LEDs
Extension connector (for next module)

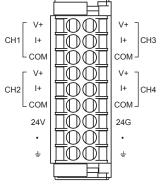
### [6] Name plate [7] DIN rail mounting groove (DIN rail: DIN 46277, 35 mm wide)

### 1.3 Indications of LEDs

Red

LED display	LED color	Status	Indication
POWER	Green	On	Power on
TOWER	Gleen	Off	Power off or module failure
		On	Normal operation
RUN	Green	Flashing	Offset/gain setting mode
		Off	Error
		On	Minor error
ERROR	Red	Flashing	Moderate error or major error
		Off	Normal operation

### 1.4 Terminal Layout



further information on terminal, refer to the following manual. → MELSEC iQ-F FX5 User's Manual (Analog Control - Intelligent function n

### 2. Installation

### **. WARNING** RECAUTIONS

Make sure to cut off all phases of the power supply externally before attempting

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.

## **∴**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 d not enter the ventilation slits of the PLC. Failure to do so may cause fire, equipment failures or malfunctions.

The dust proof sheet should be affixed to the ventilation slits before installati 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 shee 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 boathereby 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.

ormation on mounting, refer to the following manual. → MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware)

### 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.
- Make sure to properly wire to the spring clamp terminal block in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit wire breakage, malfunctions, or damage to the product.
- The disposal size of the cable end should follow the dimensions describe in the manual.
  - Twist the ends of stranded wires and make sure that there are no loose wire

  - Do not solder-plate the electric wire ends.
  - Do not connect more than the specified number of wires or electric wires of unspecified size.
- Affix the electric wires so that neither the terminal block nor the connecte

### **ACAUTION** WIRING PRECAUTIONS

- Make sure to observe the following precautions in order to prevent an damage to the machinery or accidents due to malfunction of the PLC cause by abnormal data written to the PLC 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 100 mm away from the main circuit, high-voltage line, load line or power line.
- power line.

   Ground the shield of the analog input/output cable in accordance with the manuals of each model. However, do not use common grounding with heavy electrical systems.

  Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.

  To terminal blocks, connect circuits isolated from hazardous voltage by double/reinforced insulation.

### 3.1 Applicable Cable

# 3.1.1 Spring clamp terminal block 1) Suitable wiring

No. of			Temperature	
wire per terminal	Single wire, Strand wire (Material: Copper wire)	Ferrules with insulation sleeve	rating	
One wire	AWG24 to 16 (0.2 to 1.5 mm <sup>2</sup> )	AWG23 to 19 (0.25 to 0.75 mm <sup>2</sup> )	80°C or more	

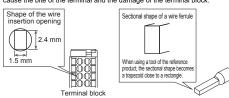
2) Wire end treatment Strip the cable about 10 mm from the tip to connect a wire ferrule at the stripped area. Failure to do so may result in electric shock or short circuit between adjacent terminals because the conductive part. If the wire strip length is too short, it may result in an unstable connection to the spring clamp

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



Insulation sleeve Contact area (Crimp area) 2 to 2.8 mm 16 to 18 mm

Check the shape of the wire insertion opening with the following chart, and use the smaller wire ferrule than the described size. Also, insert the wire with care so that the wire ferrule is in proper orientation. Failure to do so may cause the bite of the terminal and the damage of the terminal block



The following table shows wire ferrules and its associated tools compatible with the terminal block. The shape of the wire ferrule differs depending on the crimp tool to be used, use the reference product. If the product other than referenced products is used, the wire ferrule cannot be removed. Sufficiently confirm that the wire ferrule can be removed before use.

Manufacturer	Model	Wire size	Crimp tool
PHOENIX CONTACT GmbH & Co. KG	AI 0.5-10 WH	0.5 mm <sup>2</sup>	
	AI 0.75-10 GY	0.75 mm <sup>2</sup>	CRIMPFOX 6
	A 1.0-10	1.0 mm <sup>2</sup>	CKIMPFOX
	A 1.5-10	1.5 mm <sup>2</sup>	

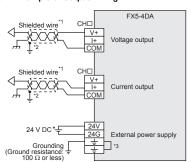
- When ferrules with insulation sleeve are used Insert a wire with the ferrule with insulation sleeve into the wire insertion
- opening and push the wire
- When stranded wires and solid wires are used Push the open/close button of the terminal block with a flathead screwdriver. While pushing the open/close button, insert the wire into the insertion opening until the wire reaches the back, and then release the Then, pull the wire lightly and check that it is clamped securely

Manufacturer	Model name of a flathead screwdriver	
PHOENIX CONTACT GmbH & Co. KG	SZS 0.4×2.5 VDE	

## 4) Disconnecting a cable

Push the open/close button of the wire to be disconnected with a flathead screwdriver. Pull out the wire with the open/close button pushed.

## 3.2 Example of Output Wiring



CH□: represents the channel number.

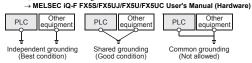
- \*1 Use 2-core shielded twisted pair cable for the analog output lines, and separate the analog output lines from other power lines or inductive lines. \*2 Ground the shielded wire at one point on the signal receiving side.
- \*3 "=" terminals are internally connected. Perform class D grounding by either

## 3.3 Grounding

ALM

- Ground the PLC as stated below. - Perform class D grounding. (Grounding resistance: 100  $\Omega$  or less)
- Ground the PLC independently if possible.

  If the PLC cannot be grounded independently, perform the "Shared grounding"
- For details, refer to the following manual



· Bring the grounding point close to the PLC as much as possible so that the ground cable can be shorte

# 4. Specification

DESIGN PRECAUTIONS	<b><u></u></b> MARNING
. Make sure to set up the following safety circuits outside the PLC to ensure safe	
system operation even du	uring external power supply problems or PLC failure.

- 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.

## **CAUTION**

Otherwise, malfunctions may cause serious accidents.

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

### **ACAUTION** MAINTENANCE RECAUTIONS

- Do not disassemble or modify the PLC. Doing so may cause fire, equipment 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 damage. Before handling the module, touch a conducting object such as a grounded meta to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.

DISPOSAL PRECAUTIONS **ACAUTION** Please contact a certified electronic waste disposal environmentally safe recycling and disposal of your device.

## **CAUTION**

The product is a precision instrument, During transportation, avoid impacts large than those specified in the general specifications by using dedicate an those specimen in the general specimentations by using dedicated pack was and shock-absorbing palettes. illure to do so may cause failures in the product. After transportation, eration of the product and check for damage of the mounting part, etc.

# Applicable CPU module

Model name	Applicability
FX5UJ CPU module	From first production
FX5U CPU module	Ver. 1.050 or later
FX5UC CPU module*1	Ver. 1.050 or later

\*1 FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-4DA to the FX5UC

4.2 General Specifications

The items other than the following are equivalent to those of the CPU module. For the general specification, refer to the following manual.

→ MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hard			IC User's Manual (Hardware	
	Items	Specifications		
	Dielectric withstand voltage	500 V AC for 1 minute	Between all terminals and	
	Insulation resistance	10 MΩ or higher by 500 V DC insulation resistance tester	ground terminal	

4.3 Pow	4.3 Power Supply Specifications		
	Items	Specifications	
	Power supply voltage	24 V DC +20%, -15%	
External power supply	Allowable instantaneous power failure time	Operation continues when the instantaneous power failure is shorter than 5 ms.	
	Current consumption	150 mA	
Internal power supply	Power supply voltage	5 V DC	
	Current consumption	100 mA	

# supply

4.4 Performance Specifications				
Items	Specifications			
Number of analog output points	4 points (4 channels)			
Conversion speed	80 μs/CH			
Isolation method	Between output terminal and PLC: Photocoupler Between output terminal and channels: Non-isolation			

# 4.5 Output specifications

Items	Specifications				
Digital input	16-bit signed binary (-32768 to +32767)				
Analog output voltage	-10 to +10 V DC (external load resistance value 1 k to 1 $\mbox{M}\Omega)$				
Analog output current	0 to 20 mA DC (external load resistance value 0 to 500 $\Omega$ )				
Output characteristics, resolution <sup>*1</sup>	Analog output range		Digital value	Resolution	
	Voltage	0 to 10 V	0 to 32000	312.5 μV	
		0 to 5 V	0 to 32000	156.3 μV	
		1 to 5 V	0 to 32000	125 μV	
		-10 to +10 V	-32000 to +32000	312.5 μV	
		User range setting	-32000 to +32000	312.5 μV	
	Current	0 to 20 mA	0 to 32000	625 nA	
		4 to 20 mA	0 to 32000	500 nA	
		User range setting	-32000 to +32000	500 nA	

Ambient temperature 0 to 35 C. 20.2 % (Voltage ±40 mV, Current ±40  $\mu$ A) Ambient temperature -20 to 0°C: ±0.3 % (Voltage ±60 mV, Current ±60  $\mu$ A) \*1 For the output characteristic, refer to the following.

Accuracy
(accuracy for the full scale of the analog output value)

Ambient temperature 25±5°C: ±0.1 % (Voltage ±20 mV, Current

±20 μA) Ambient temperature 0 to 55°C: ±0.2 % (Voltage ±40 mV,

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