



Side A JAPANESE
Side B ENGLISH

FX3U-4HSX-ADP

INSTALLATION MANUAL



Manual Number	JY997D16301
Revision	F
Date	July 2018

This manual describes the part names, dimensions, mounting, 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 name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Effective July 2018
Specifications are subject to change without notice.
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Safety Precaution (Read these precautions before use.)

This manual classify 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 be linked to serious results. In any case, it is important to follow the directions for usage.

Associated Manuals

Manual name	Manual No.	Description
FX3U Series User's Manual - Hardware Edition	JY997D16501 MODEL CODE: 09R516	Explains FX3U Series PLC specification details for I/O, wiring, installation, and maintenance.
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.

How to obtain manuals
For the necessary product manuals or documents, consult with the Mitsubishi Electric dealer from where you purchase your product.

Applicable Standard
FX3U-4HSX-ADP complies with EC directive (EMC Directive) and UL standards (UL, cUL). Further information can be found in the following manual.
→ FX3U Series Hardware Manual (Manual No. JY997D50301)

Attention
This product is designed for use in industrial applications.

1. Outline

FX3U-4HSX-ADP high-speed input special adapter (hereinafter called high-speed input special adapter) is a special adapter dedicated to FX3U Series PLC. It retrieves pulse signals from a rotary encoder of which the output type is a differential line driver to a high-speed counter or SPD instruction (FNC 56). Up to two units of this high-speed special adapter can be connected to the main unit per system. For details on system configuration, refer to the following manual.
→ FX3U Series User's Manual - Hardware Edition

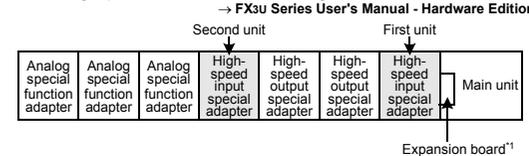
1.1 Incorporated Items

Check if the following product and items are included in the package:

Product	FX3U-4HSX-ADP high-speed input special adapter
Accessories	Installation manual (This manual)

1.2 Input Allocation and Usable High-Speed Counter Number

When the power is turned on, input numbers of the high-speed input special adapters are allocated as shown in the table below in the order of unit position to the main unit. See the table below for usable device number of associated high-speed counter. For details on high-speed counters, refer to the following manual.
→ FX3U Series User's Manual - Hardware Edition



*1 An expansion board is required to use any special adapters other than high-speed I/O special adapters. For system configuration, refer to the following manual.
→ FX3U Series User's Manual - Hardware Edition

	Input number	Associated high-speed counters
First unit	X000 to X002, X006	C235, C236, C237, C241, C242 ² , C244, C244(OP), C245 ³ , C246, C247, C249, C251, C252, C254
Second unit	X003 to X005, X007	C238, C239, C240, C243, C245(OP), C248, C248(OP), C250, C253, C253(OP), C255

*2 Use the terminal of the main unit for reset input if the second high-speed input special adapter is not connected.

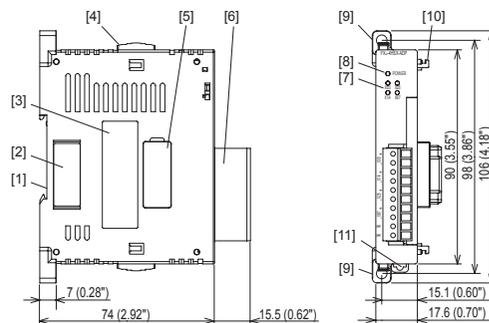
*3 Use the terminal of the main unit for start input and reset input if the second high-speed input special adapter is not connected.

Caution

When connecting a high-speed input special adapter, same input numbers are allocated to the main unit and this special adapter. Must use either one of the input terminals. If both input terminals are used, assumed action may not be executed because inputs of the high-speed input special adapter and main unit are operated in an OR relationship to each other.

- Do not use (wire) the input terminal in main unit corresponding to the input number used in the high-speed input special adapter.
- Do not use (wire) the input terminal in high-speed input special adapter corresponding to the input number used in the main unit.

1.3 External Dimensions, Part Names, and Terminal Layout



Special adapter connector cover [2] or [5] is removed		
Terminal layout of [6]		
Name	First unit	Second unit
X0/3+	X000+	X003+
X0/3-	X000-	X003-
X1/4+	X001+	X004+
X1/4-	X001-	X004-
X2/5+	X002+	X005+
X2/5-	X002-	X005-
X6/7+	X006+	X007+
X6/7-	X006-	X007-
SG	SG	SG
SG	SG	SG

Unit : mm (inches)
Weight: Approx. 80g (0.18 lbs)

- DIN rail mounting groove (DIN rail: DIN46277)
- High-speed I/O special adapter connector cover: Remove this cover for connecting high-speed I/O special adapter on the left side.
- Name plate
- Special adapter slide lock: Used to connect special adapter on left side of this special adapter.
- Special adapter connector cover: Remove this cover for connecting special adapter on the left side.
- Terminal block for inputs (European type): Connects output signals of differential line driver type.
- Input LED (red): Lit when input turns ON (if input turns ON and OFF alternately at high speed, the LED flickers fast).
- POWER LED (green): Lit while power is properly supplied from main unit.
- Direct mounting hole: 2 holes of $\phi 4.5$ (0.18") (mounting screw: M4 screw)
- Special adapter fixing hook
- DIN rail mounting hook
- Special adapter connector: Used to connect the communication special adapter or analog special adapter to this adapter on left side.
- High-speed I/O special adapter connector: Used to connect the high-speed I/O special adapter to this adapter on left side.

2. Installation

The product can be mounted on DIN rail (DIN46227) or mounted directly using screws. For installation/uninstallation and safety precautions, refer to the following manual:
→ FX3U Series User's Manual - Hardware Edition

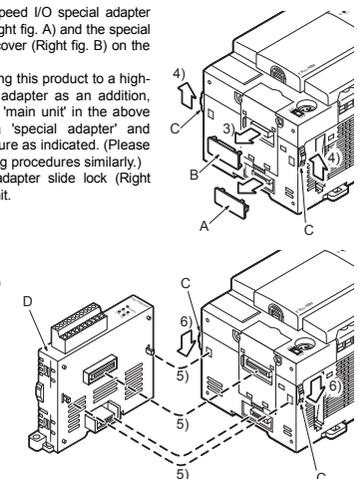
INSTALLATION PRECAUTIONS	⚠WARNING
<ul style="list-style-type: none"> Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product. 	
INSTALLATION PRECAUTIONS	⚠CAUTION
<ul style="list-style-type: none"> Use the product within the generic environment specifications described in PLC main 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, 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. When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions. Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions. Connect the special adapter securely to their designated connectors. Loose connections may cause malfunctions. 	

2.1 Connection to the FX3U Series PLC

- Refer to the procedure 2) for configuring a new system.
- Refer to the procedure 1) for adding product to an existing system.

Procedure

- Turn off the power. Disconnect all the cables connected to the PLC main unit and special adapter. Dismount the main unit and special adapter mounted on DIN rail or mounted directly using screws.
- Install an expansion board to the main unit. For installation of expansion board, refer to the following manual:
→ FX3U Series User's Manual - Hardware Edition
- Remove the high-speed I/O special adapter connector cover (Right fig. A) and the special adapter connector cover (Right fig. B) on the main unit. In case of connecting this product to a high-speed I/O special adapter as an addition, please replace the 'main unit' in the above description with a 'special adapter' and perform the procedure as indicated. (Please replace the following procedures similarly.)
4) Slide the special adapter side lock (Right fig. C) of the main unit.
- Connect the high-speed I/O special adapter (Right fig. D) to the main unit as shown on the right.
- Slide back the special adapter slide lock (Right fig. C) of the main unit to fix the high-speed I/O special adapter (Right fig. C).



Connection precautions

- Install the expansion board to be used before connecting a special adapter.
- Install an expansion board when using a special adapter other than a high-speed I/O special adapter in combination with a high-speed I/O special adapter.
- Connect all the high-speed I/O special adapters before connecting other special adapters when they are used in combination. Do not connect a high-speed I/O special adapter on the left side of any special adapters other than other high-speed I/O special adapters.

3. Used cables and Tightening Torque on Terminal

For connection example and wiring, refer to the following manual.

→ FX3u Series User's Manual - Hardware Edition

CAUTION
WIRING PRECAUTIONS
<ul style="list-style-type: none"> 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.

CAUTION
WIRING PRECAUTIONS
<ul style="list-style-type: none"> When wiring, make sure cutting or wire debris does not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions. 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: <ol style="list-style-type: none"> 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 the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems. Make sure to properly wire to the European terminal board 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. <ul style="list-style-type: none"> The disposal size of the cable end should follow the dimensions described in the manual. Tightening torque should follow the specifications in the manual. Twist the end of strand wire and make sure that there are no loose wires. 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 connected parts are directly stressed.

4. Specification

CAUTION
STARTUP AND MAINTENANCE PRECAUTIONS
<ul style="list-style-type: none"> Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures, or malfunctions. * For repair, contact your local Mitsubishi Electric distributor. Do not drop the product or exert strong impact to it. Doing so may cause damage.

CAUTION
DISPOSAL PRECAUTIONS
<ul style="list-style-type: none"> Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

CAUTION
TRANSPORT AND STORAGE PRECAUTIONS
<ul style="list-style-type: none"> The product is a precision instrument. During transportation, avoid impacts larger than those specified in the general specifications by using dedicated packaging boxes and shock-absorbing pallets. Failure to do so may cause failures in the product. After transportation, verify operation of the product and check for damage of the mounting part, etc.

4.1 Applicable PLC

Model name	Applicability
FX3u Series PLC	Ver. 2.20 (from the first product) and later

The version number can be checked by monitoring D8001 as the last three digits indicate it.

Note

Cannot be connected to FX3UC Series PLC.

4.2 General Specification

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

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

→ FX3u Series User's Manual - Hardware Edition

Item	Specification
Dielectric withstand voltage	500V AC for one minute
Insulation resistance	5MΩ or higher by 500V DC insulation resistance tester

Between input terminal of high-speed input special adapter and ground terminal of PLC main unit

4.3 Power Supply Specification

Item	Specification
Input circuit driving power supply	30mA for 24V DC Internally supplied from the main unit service power supply.
Adapter driving power supply	30mA for 5V DC 5V DC power is supplied internally from the main unit.

4.4 Performance Specification

Item	Specification							
Input points	4 points (Not counted among the total I/O points of the PLC.)							
Input type	Differential line receiver (Equivalent to AM26C32)							
Maximum input frequency	<table border="1"> <tr> <td>1 phase 1 input</td> <td>200kHz</td> <td rowspan="3">High-speed counter operated as hardware counter¹</td> </tr> <tr> <td>1 phase 2 inputs</td> <td></td> </tr> <tr> <td>2 phase 2 inputs</td> <td>100kHz</td> </tr> </table>	1 phase 1 input	200kHz	High-speed counter operated as hardware counter ¹	1 phase 2 inputs		2 phase 2 inputs	100kHz
1 phase 1 input	200kHz	High-speed counter operated as hardware counter ¹						
1 phase 2 inputs								
2 phase 2 inputs	100kHz							
Insulation	External cables of input area are insulated from PLC by photo coupler and transformer.							
Wiring length	Maximum 10m (32' 9")							

¹ The maximum input frequency for the software counter² will be the same as the maximum input frequency of when the main unit counts pulses via the input terminal. For details on input frequency, refer to the following manual.

→ FX3u Series User's Manual - Hardware Edition

² It also means the hardware counter is operated as a software counter. For conditions of a hardware counter which operates as a software counter, refer to the following manual.

→ FX3u Series User's Manual - Hardware Edition

4.5 Connectable Device Caution

The rotary encoder¹ connected to the input terminal of FX3U-4HSX-ADP has to fulfill all of the following conditions;

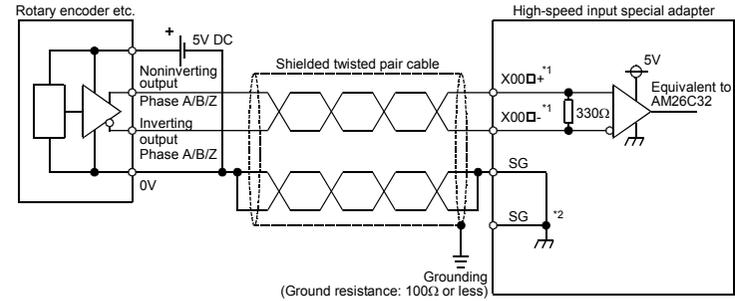
Item	Specifications
Output type	Differential line driver
Output voltage	5V DC or less

¹ If the rotary encoder, which fulfills the above stated conditions, fails to operate, please confirm specifications in advance.

4.6 Internal Circuit of Input Interface

For connection example and wiring, refer to the following manual.

→ FX3u Series User's Manual - Hardware Edition



^{*1} X00□ indicates input number of the high-speed input special adapter.
^{*2} SG of the first unit and SG of the second unit are insulated from each other.

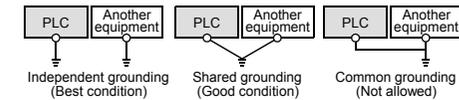
Grounding

Grounding should be performed as stated below.

- The grounding resistance should be 100Ω or less.
- Independent grounding should be performed for best results. When independent grounding is not performed, perform "shared grounding" of the following figure.

For details, refer to the following manual.

→ FX3u Series User's Manual - Hardware Edition



- The grounding wire size should be AWG 14 (2 mm²) or larger.
- The grounding point should be close to the PLC, and all grounding wire should be as short as possible.

1) Wire size
To connect to the desired unit, use a shielded twisted pair cable having a conductor(s) of size AWG22-20.

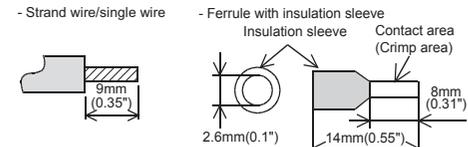
Type	Wire size
Single-wire	0.3mm ² to 0.5mm ² (AWG22 to 20)
2-wire	2 pieces of 0.3mm ² (AWG22)

3) Termination of cable end
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	Caulking tool
Phoenix Contact Co., Ltd.	AI 0.5-8WH	CRIMPFOX 6 ^{*1} (or CRIMPFOX 6T-F ^{*2})

^{*1} Old model name: CRIMPFOX ZA 3

^{*2} Old model name: CRIMPFOX UD 6



When using a ferrule with insulation sleeve, choose a wire with proper cable sheath referring to the above outside dimensions, or otherwise, the wire cannot be inserted easily.
The tightening torque must be 0.22 to 0.25Nm. Do not tighten terminal screws with a torque outside the above-mentioned range.
Failure to do so may cause equipment failures or malfunctions.



Note: This symbol mark is for China only.

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可编程控制器	○	○	○	○	○	○
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.

CAUTION	For safe use
<ul style="list-style-type: none"> 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. 	



Programmable Controller
MELSEC-F

Side A JAPANESE
Side B ENGLISH

FX3U-4HSX-ADP INSTALLATION MANUAL



Manual Number	JY997D16301
Revision	F
Date	July 2018

This manual describes the part names, dimensions, mounting, 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.

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This manual classify the safety precautions into two categories:

WARNING and **CAUTION**.

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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 be linked to serious results.
In any case, it is important to follow the directions for usage.

Associated Manuals

Manual name	Manual No.	Description
FX3U Series User's Manual - Hardware Edition	JY997D16501 MODEL CODE: 09R516	Explains FX3U Series PLC specification details for I/O, wiring, installation, and maintenance.
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.

How to obtain manuals

For the necessary product manuals or documents, consult with the Mitsubishi Electric dealer from where you purchase your product.

Applicable Standard

FX3U-4HSX-ADP complies with EC directive (EMC Directive) and UL standards (UL, cUL). Further information can be found in the following manual.

→ **FX3U Series Hardware Manual (Manual No. JY997D50301)**

Attention

This product is designed for use in industrial applications.

1. Outline

FX3U-4HSX-ADP high-speed input special adapter (hereinafter called high-speed input special adapter) is a special adapter dedicated to FX3U Series PLC. It retrieves pulse signals from a rotary encoder of which the output type is a differential line driver to a high-speed counter or SPD instruction (FNC 56).

Up to two units of this high-speed special adapter can be connected to the main unit per system. For details on system configuration, refer to the following manual.

→ **FX3U Series User's Manual - Hardware Edition**

1.1 Incorporated Items

Check if the following product and items are included in the package:

Product	FX3U-4HSX-ADP high-speed input special adapter
Accessories	Installation manual (This manual)

1.2 Input Allocation and Usable High-Speed Counter Number

When the power is turned on, input numbers of the high-speed input special adapters are allocated as shown in the table below in the order of unit position to the main unit. See the table below for usable device number of associated high-speed counter. For details on high-speed counters, refer to the following manual.

→ **FX3U Series User's Manual - Hardware Edition**

Second unit	First unit	Main unit
Analog special function adapter	High-speed input special adapter	High-speed input special adapter
Analog special function adapter	High-speed output special adapter	High-speed output special adapter
Analog special function adapter	High-speed output special adapter	High-speed output special adapter
High-speed input special adapter	High-speed output special adapter	High-speed output special adapter
High-speed output special adapter	High-speed output special adapter	High-speed output special adapter
High-speed output special adapter	High-speed output special adapter	High-speed output special adapter
High-speed output special adapter	High-speed output special adapter	High-speed output special adapter

*1 An expansion board is required to use any special adapters other than high-speed I/O special adapters. For system configuration, refer to the following manual.

→ **FX3U Series User's Manual - Hardware Edition**

Input number	Associated high-speed counters
First unit X000 to X002, X006	C235, C236, C237, C241, C242 ² , C244, C244(OP), C245 ³ , C246, C247, C249, C251, C252, C254
Second unit X003 to X005, X007	C238, C239, C240, C243, C245(OP), C248, C248(OP), C250, C253, C253(OP), C255

*2 Use the terminal of the main unit for reset input if the second high-speed input special adapter is not connected.

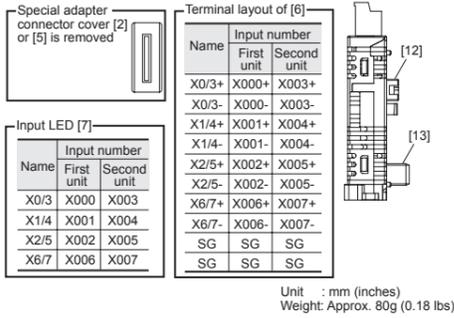
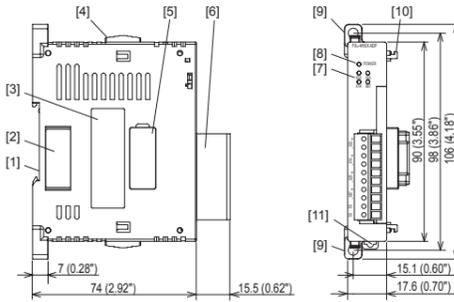
*3 Use the terminal of the main unit for start input and reset input if the second high-speed input special adapter is not connected.

Caution

When connecting a high-speed input special adapter, same input numbers are allocated to the main unit and this special adapter. Must use either one of the input terminals. If both input terminals are used, assumed action may not be executed because inputs of the high-speed input special adapter and main unit are operated in an OR relationship to each other.

- Do not use (wire) the input terminal in main unit corresponding to the input number used in the high-speed input special adapter.
- Do not use (wire) the input terminal in high-speed input special adapter corresponding to the input number used in the main unit.

1.3 External Dimensions, Part Names, and Terminal Layout



- DIN rail mounting groove (DIN rail: DIN46277)
- High-speed I/O special adapter connector cover: Remove this cover for connecting high-speed I/O special adapter on the left side.
- Name plate
- Special adapter slide lock: Used to connect special adapter on left side of this special adapter.
- Special adapter connector cover: Remove this cover for connecting special adapter on the left side.
- Terminal block for inputs (European type): Connects output signals of differential line driver type.
- Input LED (red): Lit when input turns ON (if input turns ON and OFF alternately at high speed, the LED flickers fast).
- POWER LED (green): Lit while power is properly supplied from main unit.
- Direct mounting hole: 2 holes of $\phi 4.5$ (0.18") (mounting screw: M4 screw)
- Special adapter fixing hook
- DIN rail mounting hook
- Special adapter connector: Used to connect the communication special adapter or analog special adapter to this adapter on left side.
- High-speed I/O special adapter connector: Used to connect the high-speed I/O special adapter to this adapter on left side.

2. Installation

The product can be mounted on DIN rail (DIN46227) or mounted directly using screws.
For installation/uninstallation and safety precautions, refer to the following manual:
→ **FX3U Series User's Manual - Hardware Edition**

INSTALLATION PRECAUTIONS **WARNING**

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

INSTALLATION PRECAUTIONS **CAUTION**

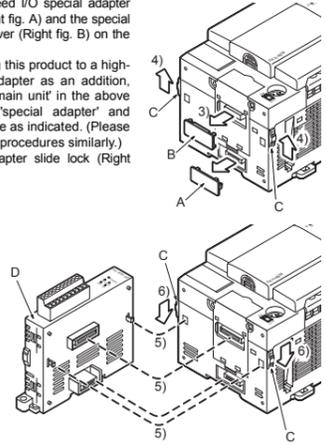
- Use the product within the generic environment specifications described in PLC main unit manual (Hardware Edition). Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl₂, H₂S, SO₂ or NO₂), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind. If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.
- When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions.
- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.
- Connect the special adapter securely to their designated connectors. Loose connections may cause malfunctions.

2.1 Connection to the FX3U Series PLC

- Refer to the procedure 2) for configuring a new system.
- Refer to the procedure 1) for adding product to an existing system.

Procedure

- Turn off the power. Disconnect all the cables connected to the PLC main unit and special adapter. Dismount the main unit and special adapter mounted on DIN rail or mounted directly using screws.
- Install an expansion board to the main unit. For installation of expansion board, refer to the following manual:
→ **FX3U Series User's Manual - Hardware Edition**
- Remove the high-speed I/O special adapter connector cover (Right fig. A) and the special adapter connector cover (Right fig. B) on the main unit. In case of connecting this product to a high-speed I/O special adapter as an addition, please replace the 'main unit' in the above description with a 'special adapter' and perform the procedure as indicated. (Please replace the following procedures similarly.)
- Slide the special adapter slide lock (Right fig. C) of the main unit.
- Connect the high-speed I/O special adapter (Right fig. D) to the main unit as shown on the right.
- Slide back the special adapter slide lock (Right fig. C) of the main unit to fix the high-speed I/O special adapter (Right fig. C).



Connection precautions

- Install the expansion board to be used before connecting a special adapter.
- Install an expansion board when using a special adapter other than a high-speed I/O special adapter in combination with a high-speed I/O special adapter.
- Connect all the high-speed I/O special adapters before connecting other special adapters when they are used in combination. **Do not connect a high-speed I/O special adapter on the left side of any special adapters other than other high-speed I/O special adapters.**

3. Used cables and Tightening Torque on Terminal

For connection example and wiring, refer to the following manual.
→ **FX3U Series User's Manual - Hardware Edition**

WIRING PRECAUTIONS **WARNING**

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

WIRING PRECAUTIONS **CAUTION**

- When wiring, make sure cutting or wire debris does not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions.
- 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 the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.
- Make sure to properly wire to the European terminal board 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 described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Twist the end of strand wire and make sure that there are no loose wires.
 - 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 connected parts are directly stressed.

TRANSPORT AND STORAGE PRECAUTIONS **CAUTION**

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

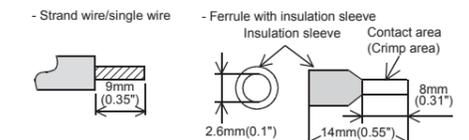
- Wire size
To connect to the desired unit, use a shielded twisted pair cable having a conductor(s) of size AWG22-20.
- Applicable cable

Type	Wire size
Single-wire	0.3mm ² to 0.5mm ² (AWG22 to 20)
2-wire	2 pieces of 0.3mm ² (AWG22)

- Termination of cable end
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	Caulking tool
Phoenix Contact Co., Ltd.	AI 0.5-8WH	CRIMPFOX 6 ¹ (or CRIMPFOX 6T-F ²)

*1 Old model name: CRIMPFOX ZA 3
*2 Old model name: CRIMPFOX UD 6



When using a ferrule with insulating sleeve, choose a wire with proper cable sheath referring to the above outside dimensions, or otherwise, the wire cannot be inserted easily.
The tightening torque must be 0.22 to 0.25Nm. Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

4. Specification

STARTUP AND MAINTENANCE PRECAUTIONS **CAUTION**

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

DISPOSAL PRECAUTIONS **CAUTION**

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

TRANSPORT AND STORAGE PRECAUTIONS **CAUTION**

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

4.1 Applicable PLC

Model name	Applicability
FX3U Series PLC	Ver. 2.20 (from the first product) and later

The version number can be checked by monitoring D801 as the last three digits indicate it.

Note

Cannot be connected to FX3UC Series PLC.

4.2 General Specification

For the general specification, refer to the manual of the PLC main unit. The items other than the following are equivalent to those of the PLC main unit.
→ **FX3U Series User's Manual - Hardware Edition**

Item	Specification
Dielectric withstand voltage	500V AC for one minute Between input terminal of high-speed input special adapter and ground terminal of PLC main unit
Insulation resistance	5MΩ or higher by 500V DC insulation resistance tester

4.3 Power Supply Specification

Item	Specification
Input circuit driving power supply	30mA for 24V DC Internally supplied from the main unit service power supply.
Adapter driving power supply	30mA for 5V DC 5V DC power is supplied internally from the main unit.

4.4 Performance Specification

Item	Specification
Input points	4 points (Not counted among the total I/O points of the PLC.)
Input type	Differential line receiver (Equivalent to AM26C32)
Maximum input frequency	1 phase 1 input: 200kHz 1 phase 2 inputs: High-speed counter operated as hardware counter*1 2 phase 2 inputs: 100kHz
Insulation	External cables of input area are insulated from PLC by photo coupler and transformer.
Wiring length	Maximum 10m (32' 9")

*1 The maximum input frequency for the software counter*2 will be the same as the maximum input frequency of when the main unit counts pulses via the input terminal. For details on input frequency, refer to the following manual.
→ **FX3U Series User's Manual - Hardware Edition**

*2 It also means the hardware counter is operated as a software counter. For conditions of a hardware counter which operates as a software counter, refer to the following manual.
→ **FX3U Series User's Manual - Hardware Edition**

4.5 Connectable Device Caution

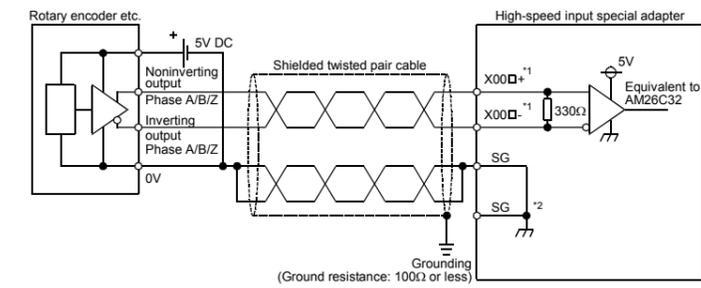
The rotary encoder*1 connected to the input terminal of FX3U-4HSX-ADP has to fulfill all of the following conditions:

Item	Specifications
Output type	Differential line driver
Output voltage	5V DC or less

*1 If the rotary encoder, which fulfills the above stated conditions, fails to operate, please confirm specifications in advance.

4.6 Internal Circuit of Input Interface

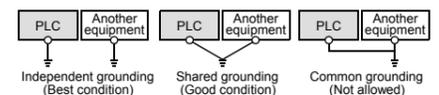
For connection example and wiring, refer to the following manual.
→ **FX3U Series User's Manual - Hardware Edition**



*1 X00□ indicates input number of the high-speed input special adapter.
*2 SG of the first unit and SG of the second unit are insulated from each other.

Grounding

- Grounding should be performed as stated below.
- The grounding resistance should be 100Ω or less.
- Independent grounding should be performed for best results. When independent grounding is not performed, perform "shared grounding" of the following figure. For details, refer to the following manual.
→ **FX3U Series User's Manual - Hardware Edition**



- The grounding wire size should be AWG 14 (2 mm²) or larger.
- The grounding point should be close to the PLC, and all grounding wire should be as short as possible.

「电器电子产品有害物质限制使用标识要求」的表示方式

15 Note: This symbol mark is for China only.

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	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	○	○	○	○	○	○
印刷基板	×	○	○	○	○	○

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基于中国标准法的参考规格: GB/T15969. 2

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(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.