
**MITSUBISHI**
PROGRAMMABLE CONTROLLERS
MELSEC-F

Changes for the Better

FX3U-4HSX-ADP

INSTALLATION MANUAL



Manual Number	JY997D16301
Revision	C
Date	September 2010

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 September 2010

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:

⚠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 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.
FX3G/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. JY997D18801)**

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

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

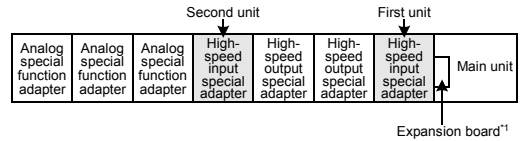
Check if the following product and items are included in the package:

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

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.

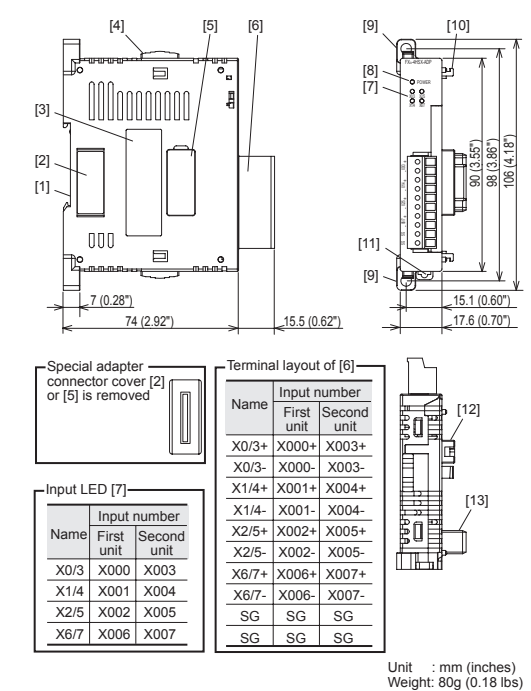
^{*3} Use the terminal of the main unit for start input and reset input if the second high-speed input special adapter is not connected.

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



- 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

⚠DANGER

- 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

DANGER

• 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:
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 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.

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

2) Applicable cable

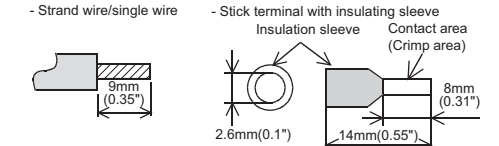
Type	Wire size
Single-wire	0.3mm ² to 0.5mm ² (AWG22 to 20)
2-wire	2 pieces of 0.3mm ² (AWG22)

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 stick terminal 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 0.25N·m. Do not tighten terminal screws with a torque exceeding the regulation torque.
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 any impacts.
Failure to do so may cause failures in the product. After transportation, verify the operations of the product.

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	Between input terminal of high-speed input special adapter and ground terminal of PLC main unit
Insulation resistance	5MΩ or more by 500V DC megger	

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	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 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

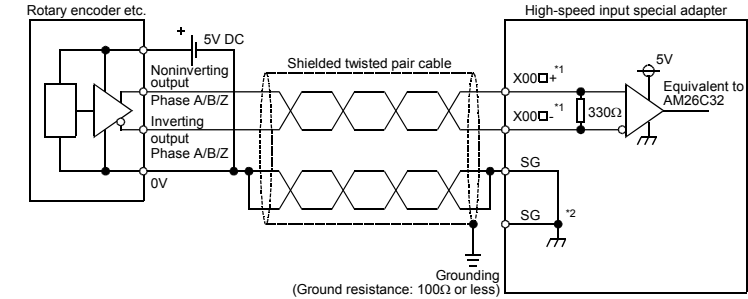
The rotary encoder^{*1} connected to the input terminal of FX3U-4HSX-ADP has to fulfill all of the following conditions;

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.

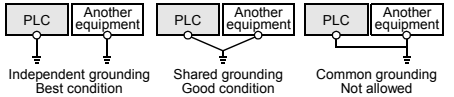
Grounding

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.

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.

MITSUBISHI

PROGRAMMABLE CONTROLLERS

MELSEC-F

Changes for the Better

FX3U-4HSX-ADP

INSTALLATION MANUAL

Manual Number

JY997D16301

Revision

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Date

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

<div>⚠DANGER</div>	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
<div>⚠CAUTION</div>	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.

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.
FX3G/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. JY997D18801)**

- 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

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

⚠DANGER

- 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:
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 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.

- 1) Wire size
To connect to the desired unit, use a shielded twisted pair cable having a conductor(s) of size AWG22-20.
- 2) 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) |

- 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

- Strand wire/single wire

- Stick terminal with insulating sleeve

When using a stick terminal 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 0.25N·m. Do not tighten terminal screws with a torque exceeding the regulation torque.
Failure to do so may cause equipment failures or malfunctions.

- 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 |

- 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

Analog special function adapter

Analog special function adapter

Analog special function adapter

High-speed input special adapter

High-speed output special adapter

High-speed output special adapter

High-speed input special adapter

Main unit

Expansion board^{*1}

^{*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

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

1) DIN rail mounting groove (DIN rail: DIN46277)

2) High-speed I/O special adapter connector cover: Remove this cover for connecting high-speed I/O special adapter on the left side.

3) Name plate

4) Special adapter slide lock: Used to connect special adapter on left side of this special adapter.

5) Special adapter connector cover: Remove this cover for connecting special adapter on the left side.

6) Terminal block for inputs (European type): Connects output signals of differential line driver type.

7) Input LED (red): Lit when input turns ON (if input turns ON and OFF alternately at high speed, the LED flickers fast).

8) POWER LED (green): Lit while power is properly supplied from main unit.

9) Direct mounting hole: 2 holes of φ4.5 (0.18") (mounting screw: M4 screw)

10) Special adapter fixing hook

11) DIN rail mounting hook

12) Special adapter connector: Used to connect the communication special adapter or analog special adapter to this adapter on left side.

13) 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

⚠DANGER

- 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.

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 any impacts.
Failure to do so may cause failures in the product. After transportation, verify the operations of the product.

- 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 | Between input terminal of high-speed input special adapter and ground terminal of PLC main unit
5MΩ or more by 500V DC megger |

- 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. |

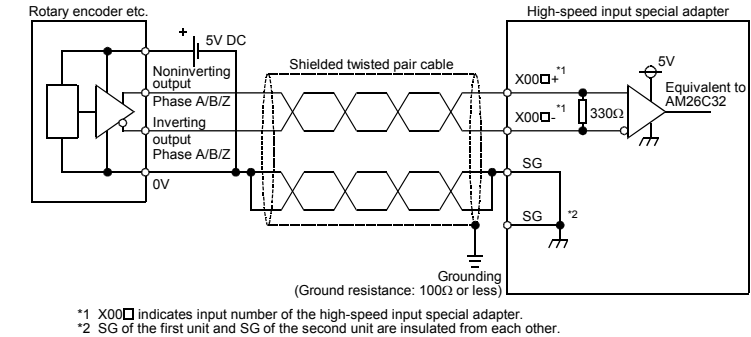
- 4.4 Performance Specification**
- | Item | Specification |
|-------------------------|--|
| Input points | 4 points
(Not counted among the total I/O points of the PLC.) |
| Input type | Differential line receiver (Equivalent to AM26C32) |
| Maximum input frequency | 1 phase 1 input: 200kHz
1 phase 2 inputs: 200kHz
2 phase 2 inputs: 100kHz
High-speed counter operated as hardware counter ^{*1} |
| 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 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**
- PLC

Another equipment

Independent grounding
Best condition
- PLC

Another equipment

Shared grounding
Good condition
- PLC

Another equipment

Common grounding
Not allowed

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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.