

JY997D16401 Manual Number Revision Date December 2005

This manual describes the part names, dimensions, mounting, and specifications of the product Before use read this manual and manuals of elevant 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

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Effective Dec. 2005

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## Safety Precaution (Read these precautions before use.)

This manual classify the safety precautions into two categories:

DANGER and A CAUTION

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on circumstances, procedures indicated by ACAUTION may also be linked to carious 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.	
FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming for basic/applied instructions and devices.	
FX3U/FX3UC Series User's Manual - Positioning Control Edition	JY997D16801 MODEL CODE: 09R620	Describes positioning control and programming using FX3U/ FX3UC Series PLC	

### 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-2HSY-ADP complies with EC directive (EMC Directive) and UL standards (UL, cUL). Further information can be found in the following manual. → Refer to FX3U Series Hardware Manual (Manual No. JY997D18801)

#### 1 Outline

The FX3U-2HSY-ADP high-speed output special adapter (hereinafter called high-speed output special adapter) is a special adapter dedicated to FX3U Series PLC. It outputs pulse signals of a differential line driver system for applicable Servo Amplifiers (or Drive Unit) of an AC servomotor or stepper motor.

Up to two units of this special adapter can be connected to the main unit per system. → For system configuration, refer to the FX3U Series Ilser's Manual - Hardware Edition

## 1.1 Incorporated Items

#### Check if the following product and items are included in the package Manua



#### 1.2 Output Number and Signal

When power is turned on, the output numbers and signals of the high-speed output special adapters are allocated as shown in the table below in the order of it near the main unit

			Se	econd unit	First uni ↓	t		
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

\*1 A function extension board is required to use the high-speed I/O special adapter

#### Expansion board\*

together with a communication/analog special adapter → For system configuration, refer to the FX3U Series

User's Manual - Hardware Edition.

Status of		Output number				
output form setting	Signal name	Firs	t unit	Second unit		
switch		1st axis	2nd axis	1st axis	2nd axis	
	Forward pulse train (FP)	Y000	Y001	Y002	Y003	
FP•RP side	Reverse pulse train (RP)	Y004	Y005	Y006	Y007	
	SG	SG1	SG2	SG3	SG4	
	Pulse train	Y000	Y001	Y002	Y003	
LS•DIR side	Direction	Y004	Y005	Y006	Y007	
	SG	SG1	SG2	SG3	SG4	

#### Caution

1) When a high-speed output adapter is connected, the same output number is allocated to both the main unit and this adapter. Use either output terminal and do not wire to the unused output terminal.

The outputs from the high-speed output special adapter and main unit are operated as below

	Output operation					
instructions	High-speed	Main unit				
	output special adapter	Transistor- output type	Relay-output type			
LSY,PLSR,DSZR, WIT,TBL,ZRN, LSV,DRVI,DRVA	Operated	Operated <sup>*1</sup>	While instruction is activated, relevant output is ON. (LED is also ON.)			
WM	Operated	Operated	Do not apply PWM instruction for relay-output type main unit. <sup>*2</sup>			
Other	Operated	Operated	Operated			

\*1 The output frequency of transistor outputs in the main unit is a maximum of 100kHz. If the load is operated using pulses at a frequency more than 100kHz, PLC may be damaged

\*2 PWM instruction has not supported the relay output for the reasons of the response delay of the output, chattering of contact, the contact life, etc.

2) During STOP or PLC power off modes, set the output form operation. Do not set the output form operation during pulse train output.

### 1.3 External Dimensions, Part Names, and Terminal Layout



-Special	adapte	r <u></u>	11	Output	LED [8]	-		1 [5]	
or [5] is removed					Output	t nur	nber		
				Name	First unit	Sec	cond nit		
				Y0/2	Y000	Y	002		
			ן נ	Y1/3	Y001	Y	003		
- Termina	al layout	of [6]	1	Y4/6	Y004	Y	006		
	Output	number		Y5/7	Y005	Y	007		
Name	First unit	Second unit	'			_		╵┋┇┋═╾┥	
Y0/2+	Y000+	Y002+							
Y0/2-	Y000-	Y002-							
Y4/6+	Y004+	Y006+	L	-[7] Out	put mod	le se	tting s	witch	
Y4/6-	Y004-	Y006-			Nam	e		Setting	
SGA	SGA	SGA				-	Fwd	pulse train (FP)	
Y1/3+	Y001+	Y003+		Upper	FP•RP	side	Rev p	pulse train (RP)	
Y1/3-	Y001-	Y003-		Lower PLS-DIR Pulse train + di			e train + direction		
Y5/7+	Y005+	Y007+	1						
Y5/7-	Y005-	Y007-						Link and the share	
SGB	SGB	SGB						Unit : mm (inches) Weight: 80 g (0.18 lb	) is)

[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
- Special adapter slide lock: [4]
- Used to connect special adapter on left side of this special adapter. Special adapter connector cover [5]
- Remove this cover for connecting special adapter on the left side.
- Output terminal block (European type):
- Connected to Servo Amplifier (or Drive Unit) to which pulse signal of differential line driver system can be input.
- Either "Forward pulse train (FP)/Reverse pulse train (RP)" or "pulse train + direction" is selected. For setting, refer to the following manual → Refer to FX3U / FX3UC Series User's Manual - Positioning Control Edition.
- [8] Output LED (red):
- Lit when output turns ON (if output turns ON and OFF alternately at high speed. LED flickers fast).
- [9] POWER LED (green):
  - Lit while power is properly supplied from main unit.
- [10] Direct mounting hole:2 holes of 64.5 (0.18") (mounting screw: M4 screw)
- [11] Special adapter fixing hook
- [12] DIN rail mounting hook
- [13] Special adapter connector:
  - Used to connect communication special adapter or analog special adapter to this
- adapter on left side.
- [14] High-speed I/O special adapter connector: Used to connect high-speed I/O special adapter to this adapter on left side.

# installation or wiring work, thus avoiding electric shock or damages to the INSTALLATION

The product can be mounted on DIN rail (DIN46277) or mounted directly using

For installation/uninstallation and safety precautions, refer to the following manual

Cut off all phases of the power source externally before starting the

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

#### PRECAUTIONS

- Use the product in the environment within the general specification described in PLC main unit manual (Hardware Edition)
- Never use the product in areas with dust, oily smoke, conductive dusts corrosive gas (salt air, Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, or NO<sub>2</sub>), flammable gas vibrations or impacts, or expose it to high temperature, condensation, or wind and rain
- If the product is used in such a place described above electrical shock fire malfunction, damage, or deterioration may be caused.
- When drilling screw holes or wiring, cutting chips or wire chips should no enter ventilation slits.
- Such an accident may cause fire, failure or malfunction.
- Do not touch the conductive parts of the product directly, thus avoiding failure or malfunction
- Fix the special adapter securely to the specified connector. Incorrect connection may cause malfunction

#### 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 1) Turn off the power.

5) Connect the high

adapter (Right

fia.C).

2 Installation

INSTALLATION

PRECAUTIONS

product

screws

too

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

2) Install an expansion board to the main unit.

#### For installation of expansion board, refer to the following manual: → Refer to the FX3U Series User's Manual - Hardware Edition

3) 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 highspeed 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 slide lock (Right fig.C) of the main unit.

### 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 highspeed 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 a communication or analog special adapter.

- sneed I/O snecial adapter (Right fig.D) to the main unit as shown on the right. 6) Slide back the special adapter slide lock (Right fig.C) of the main unit to fix the highspeed I/O special



- [6] [7] Output form setting switch

3. Used cables and Tightening Torque on Terminal For connection example and wiring, refer to the following manual.

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

WIRING PRECAUTIONS	
Cut off all phases work in order to avo	of power source externally, before installation or wirin id electric shock or damage of product.
WIRING PRECAUTIONS	
<ul> <li>Never let cutting chi</li> </ul>	ps and wire chips enter the ventilation slits of this produc

- recording only and whe chips enter the vehillation sits of this p or PLC when performing wiring.
   Otherwise, fire, failure or malfunction may occur.
- Make sure to observe the precautions below in order to prevent any damage to a machine or any accident which might be caused by abnormal data written in the PLC due to the influence of noise:

1)Do not lay close or bundle with the main circuit, high-voltage power line, or load line.

Otherwise effects of noise or surge induction are likely to take place. Keep a safe distance of more than 100 mm (3.94") from the above when wiring.

- 2)Ground the shield wire or shield of a shielded cable at one point on the PLC. However, do not ground at the same point as high voltage lines.
- Observe the following items to wire the lines to the European terminal board. Failing to do so may cause electric shock, short circuit, disconnection, or damage of the product.
- The disposal size of the cable end should follow the dimensions described in this manual.
- Tighten to a torgue should follow the torgue described in this manual.
- Twist the end of strands and make sure there is no loose wires.
- Do not solder-plate the electric wire ends.
- Connect only the electric wires of regulation size
- Fix the electric wires so that the terminal block and connected parts of electric wires are not 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

Туре	Wire size
Single-wire	0.3mm <sup>2</sup> to 0.5mm <sup>2</sup> (AWG22 to 20)
2-wire	2 pieces of 0.3mm <sup>2</sup> (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.

		dang bibbro.
Manufacturer	Model	Caulking tool
Phoenix Contact Co., Ltd.	AI 0.5-8WH	CRIMPFOX UD6

- Strand wire/single wire - St

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.

#### 4. Specification

PRECAUTIONS	ZICAUTION
<ul> <li>Do not disassem Doing so may cau * For repair, conta</li> <li>Do not drop the damage.</li> </ul>	ble or modify the unit. use failure, malfunction or fire. act your local Mitsubishi Electric distributor. product or do not exert strong impact, doing so may cause
DISPOSAL PRECAUTIONS	
Please contact     environmentally s	a company certified in the disposal of electronic waste fo
oo.anontany c	alo roojoning and diopoodi or jour devide.
TRANSPORT AND STORAGE PRECA	
• During transporta Check the operat	UTIONS CAUTION tition avoid any impact as the product is a precision instrument. ion of the product after transportation.
TRANSPORT AND STORAGE PRECAI During transporta Check the operat     .1 Applicable I	UTIONS CAUTION tion avoid any impact as the product is a precision instrument. ion of the product after transportation.
TRANSPORT AND STORAGE PRECAI During transporte Check the operat .1 Applicable I Model name	UTIONS CAUTION tion avoid any impact as the product is a precision instrument. ion of the product after transportation.

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

Note

Cannot be connected to FX3UC-32MT-LT.

#### 4.2 General Specifications

Item	:	Specification		
Dielectric withstand voltage	500V AC for one minute	Conforming to JEM-1021 Between output terminal of high		
Insulation resistance	$5 M \Omega$ or more by 500V DC megger	speed output special adapter an ground terminal of PLC main unit		

### 4.3 Power Supply Specification

Item	Specification
Output circuit driving power supply	60mA 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
Number of controlled axis	Independent two axes
Output points	4 points (Not counted among the total I/O points of the PLC.)
Output system	Differential line driver (Equivalent to AM26C31)
Output form	Forward pulse train, reverse pulse train, or pulse train + direction
Load current	25 mA or less
Maximum output frequency	200 kHz
Insulation	<ul> <li>External cables of output area are insulated from PLC by photo coupler or transformer.</li> <li>SG are insulated from each other by transformer.</li> </ul>
Wiring length	Maximum 10m (32' 9")

#### 4.5 Output Interface Internal Circuit

#### For connection example and wiring, refer to the following manual. → Refer to FXau/FXau/ Series User's Manual - Positioning Control Edition



- \*1 Y00 indicates output number of the high-speed output special adapter.
- 2 'SGA' is insulated from 'SGB'.
   \*3 Ground properly with reference to the Servo Amplifier (or Drive Unit) manual. If not
- indicated, ground as below.

#### Grounding

Ground properly with reference to the Servo Amplifier (or Drive Unit) manual. If not indicated, ground as below.

- Grounding (when not indicated)
- 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 FX3U Series User's

Manual - Hardware Edition.

PLC	Another equipment	PLC	Another equipment	PLC	Another equipment
Ţ	Ţ	~	<u> </u>	- Y	Ţ
Independe Best	ent grounding condition	Shared Good	grounding condition	Common Not a	n grounding allowed

- The grounding wire size should be AWG 14 (2 mm<sup>2</sup>) 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; machine damage 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.

## \land 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.
- product fails, install appropriate backup or failsafe functions in the system



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INSTALLATION MANUAL

Revision

his manual describes the part names, dimensions, mounting, ar pecifications of the product. Before use, read this manual and manuals levant products fully to acquire proficiency in handling and operating the roduct. Make sure to learn all the product information, safety information, are event as a set of the set of th

Ind store this manual in a safe place so that you can take it out and read whenever necessary. Always forward it to the end user.

he company name and the product name to be described in this manual a

Depending on circumstances, procedures indicated by ACAUTION may also be linked to serious results. In any case, it is important to follow the directions for usage.

Manual No.

JY997D16501 MODEL CODE

09R516

12997016601

MODEL CODE 09R517

JY997D16801 MODEL CODE:

09R620

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

(UL, CUL). Further information can be found in the following manual. → Refer to FX3U Series Hardware Manual (Manual No. JY997D18801)

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Safety Precaution (Read these precautions before use.)

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Effective Dec. 2005

**ACAUTION** 

Associated Manuals

Manual name

FX3U Series

User's Manual

- Hardware Edition

FX3U/FX3UC Series

Programming Manual - Basic & Applied Instruction Edition

FX3U/FX3UC Series User's Manual

- Positioning Contr Edition

Applicable Standard

DANGER and CAUTION

Manual Number JY997D16401

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Description

Explains FX3U Series PLC specification details for I/O,

viring, installation, and

Describes PLC programming for basic/applied instructions and devices.

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conditions, resulting in medium or slight personal injur or physical damage.

mber 2005

**MITSUBISHI** 

AMMABLE CONTROLLERS

## 1. Outline

Changes for the Better Unit) of an AC servomotor or stepper motor. FX3U-2HSY-ADP

1.1 Incorporated Items Check if the following product and items are included in the package



## 1.2 Output Number and Signal

When power is turned on, the output numbers and signals of the high-speed output special adapters are allocated as shown in the table below in the order of it near the main unit

			Se	econd unit	First uni	t		
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	1	Main unit
							Т	

#### Expansion board

\*1 A function extension board is required to use the high-speed I/O special adapter together with a communication/analog special adapter -> For system configuration, refer to the FX3U Series

User's Manual - Hardware Edition							
Status of		Output number					
output form setting	Signal name	Firs	t unit	Second unit			
switch		1st axis	2nd axis	1st axis	2nd axis		
	Forward pulse train (FP)	Y000	Y001	Y002	Y003		
FP•RP side	Reverse pulse train (RP)	Y004	Y005	Y006	Y007		
	SG	SG1	SG2	SG3	SG4		
	Pulse train	Y000	Y001	Y002	Y003		
PLS•DIR side	Direction	Y004	Y005	Y006	Y007		
	SG	SG1	SG2	SG3	SG4		

4. Specification

STARTUP AND AINTENANCE

damage

RECAUTIONS

1) When a high-speed output adapter is connected, the same output number is allocated to both the main unit and this adapter. Use either output terminal and do not wire to the unused output terminal. The outputs from the high-speed output special adapter and main unit are

erated as below

	Output operation						
instructions	High-speed	Main unit					
	output special adapter	Transistor- output type	Relay-output type				
PLSY,PLSR,DSZR, WIT,TBL,ZRN, PLSV,DRVI,DRVA	Operated	Operated <sup>*1</sup>	While instruction is activated, relevant output is ON. (LED is also ON.)				
WM	Operated	Operated	Do not apply PWM instruction for relay-output type main unit. <sup>*2</sup>				
Other	Operated	Operated	Operated				
1 The output freq	The output frequency of transistor outputs in the main unit is a maximum of						

100kHz. If the load is operated using pulses at a frequency more than 100kHz, PLC may be damaged.

Do not disassemble or modify the unit. Doing so may cause failure, malfunction or fire. \* For repair, contact your local Mitsubishi Electric distributor

 During STOP or PLC power off modes, set the output form operation Do not set the output form operation during pulse train output. 1.3 External Dimensions, Part Names, and Terminal Layout

#### [5] [6] [10] [9] \_ [8] \_ 00 [3] . [7] Ũ [2] [1] . 000 [12] [10] \_ 15.1 (0.60") 7 (0.28") 74 (2.92") 15.5 (0.62") 17.6 (0.70") Output LED [8] -Special adapter connector cover [2] or [5] is removed Output number Name NameFirst<br/>unitSecond<br/>unitY0/2Y000Y002 [13] Y1/3 Y001 Y003 Terminal layout of [6] Y4/6 Y004 Y006 Output number Y5/7 Y005 Y007 Na First Second unit unit YO

Y0/2+	Y000+	Y002+	L				
Y0/2-	Y000-	Y002-					
Y4/6+	Y004+	Y006+		-[7] Out	put mode se	tting switch	
Y4/6-	Y004-	Y006-			Name	Setting	
SGA	SGA	SGA				Ewd pulse train (EP)	
Y1/3+	Y001+	Y003+		Upper	FP•RP side	Rev pulse train (RP)	
Y1/3-	Y001-	Y003-		Lower	PLS-DIR	Pulse train + direction	
Y5/7+	Y005+	Y007+	Ľ				
Y5/7-	Y005-	Y007-					
SGB	SGB	SGB				Weight: 80 g (0.18	s) Ibs)

[1] 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. [2]

[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.
- Output terminal block (European type): Connected to Servo Amplifier (or Drive Unit) to which pulse signal of differential line driver system can be input. [6] [7]
  - Output form setting switch Either "Forward pulse train (FP)/Reverse pulse train (RP)" or "pulse train + direction" is selected. For setting, refer to the following manual. → Refer to FX3u / FX3uC Series User's Manual - Positioning Control Edition.
  - Output LED (red): Lit when output turns ON (if output turns ON and OFF alternately at high speed, LED flickers fast).
- [9] POWER LED (green): Lit while power is properly supplied from main unit.

[8]

- [10] Direct mounting hole:2 holes of  $\phi4.5$  (0.18") (mounting screw: M4 screw) [11] Special adapter fixing hook
- [12] DIN rail mounting hook
- [13] Special adapter connector: Used to connect communication special adapter or analog special adapter to this
- adapter on left side. [14] High-speed I/O special adapter connector: Used to connect high-speed I/O special adapter to this adapter on left side

- 2) I
- 3)
- please replace the 'main unit' in the above
- description with a 'special adapter' and perform the procedure as indicated. (Please replace the following procedure as indicated. (Heads replace the following procedures similarly.) Slide the special adapter slide lock (Righ fig.C) of the main unit.





## Connection precautions

- Install the expansion board to be used before connecting a special adapte Install an expansion board when using a special adapter other than a highspeed 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 a communication or analog special adapter.

3. Used cables and Tightening Torque on Terminal For cor ction example and wiring, refer to the following manual. → Refer to FX3U Series User's Manual - Hardware Edition.

WIRING PRECAUTIONS						
<ul> <li>Cut off all phases of power source externally, before installation or wirin work in order to avoid electric shock or damage of product.</li> </ul>						
WIRING PRECAUTIONS						
Never let cutting chip or PLC when perforr Otherwise, fire, failur Make sure to observ to a machine or an written in the PLC du 1)Do not lay close or load line. Otherwise effects or Keep a safe distar wiring. 2)Ground the shield PLC. However, do Observe the followin Failing to do so may damage of the prodt. The disposal size in this manual. Tighten to a torqu. Twist the end of s Do not solder-pla Connect only the	s and wire chips enter the ventilation slits of this product ning wiring. e or malfunction may occur. e the precautions below in order to prevent any damage y accident which might be caused by abnormal data ie to the influence of noise: bundle with the main circuit, high-voltage power line, or of noise or surge induction are likely to take place. Ice of more than 100 mm (3.94") from the above when wire or shield of a shielded cable at one point on the not ground at the same point as high voltage lines. Ig items to wire the lines to the European terminal board. y cause electric shock, short circuit, disconnection, or ict. of the cable end should follow the dimensions described ue should follow the torque described in this manual. trands and make sure there is no loose wires. te the electric wire ends. electric wires of regulation size. inse on that the torminal board of					
<ul> <li>Fix the electric wi electric wires are</li> </ul>	res so that the terminal block and connected parts of not 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	
Туре	Wire size
0	

## DISPOSAL PRECAUTIONS Please contact a company certified in the disposal of electronic waste for environmentally safe recycling and disposal of your device. TRANSPORT AND STORAGE PRECAUTIONS During transportation avoid any impact as the product is a precision ins Check the operation of the product after transportation. 4.1 Applicable PLC Model name Applicability EX3U 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-32MT-LT.

4.2 General Specifications For general specifications, refer to the manual of the PLC main unit. The items other than the following are equivalent to those of the PLC main unit. → Refer to FX3∪ Series User's Manual - Hardware Edition.

item	Specification					
Dielectric withstand voltage	500V AC for one minute	Conforming to JEM-1021 Between output terminal of high				
Insulation resistance	$5M\Omega$ or more by 500V DC megger	speed output special adapter and ground terminal of PLC main unit				

For connection example and wiring, refer to the following manual. → Refer to FX3U/FX3UC Series User's Manual - Positioning Control Edition

# 4.5 Output Interface Internal Circuit High-speed output special Y00**□**+<sup>\*1</sup> Equival AM26C31 Do not drop the product or do not exert strong impact, doing so may cause Y00□



- \*1 Y00□ indicates output number of the high-speed output special adapter. \*2 'SGA' is insulated from 'SGB'. \*3 Ground properly with reference to the Servo Amplifier (or Drive Unit) manual. If not indicated, ground as below.

- Grounding Ground properly with reference to the Servo Amplifier (or Drive Unit) manual. If or indicated, ground as below.
   Grounding (when not indicated)

  - The grounding resistance should be  $100\Omega$  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 FX3U Series User's

2. Installation

INSTALLATION PRECAUTIONS

product.

INSTALLATIO

2.1

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1)

PRECAUTIONS

The product can be mounted on DIN rail (DIN46277) or mounted directly using screws. For installation/uninstallation and safety precautions, refer to the following manual

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

Cut off all phases of the power source externally before starting th

installation or wiring work, thus avoiding electric shock or damages to th

<ul> <li>Use the product in the environment within the general specifications described in PLC main unit manual (Hardware Edition).</li> <li>Never use the product in areas with dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, or NO<sub>2</sub>), flammable gas, vibrations or impacts, or expose it to high temperature, condensation, or wind and rain.</li> <li>If the product is used in such a place described above, electrical shock, fire, malfunction, damage, or deterioration may be caused.</li> <li>When drilling screw holes or wiring, cutting chips or wire chips should not enter ventilation slits.</li> </ul>
Such an accident may cause fire, failure or malfunction.
<ul> <li>Do not touch the conductive parts of the product directly, thus avoiding failure or malfunction.</li> </ul>
Fix the special adapter securely to the specified connector.
Incorrect connection may cause malfunction.
1 Connection to the FX3U Series PLC
Defeate the successive () for configuring a new quetom
Refer to the procedure 2) for configuring a new system.
Refer to the procedure 2) for configuring a new system. Refer to the procedure 1) for adding product to an existing system.
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Refer to the procedure 2) for configuring a new system. Refer to the procedure 1) for adding product to an existing system. <b>ocedure</b> 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.
Refer to the procedure 2) for configuring a new system. Refer to the procedure 1) for adding product to an existing system. <b>ocedure</b> 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 installeting of expansion board to the for to the following maximum:
Refer to the procedure 2) for configuring a new system. Refer to the procedure 1) for adding product to an existing system. <b>ocedure</b> 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: — Befer to the FX3U Series User's Manual - Hardware Fdittion
Refer to the procedure 2) for configuring a new system. Refer to the procedure 1) for adding product to an existing system. <b>ocedure</b> 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 mounte directly using screws. Install an expansion board to the main unit. For installation of expansion board, refer to the following manual: → Refer to the FX3U Series User's Manual - Hardware Editio Remove the high-speed U/O special adapter
Refer to the procedure 2) for configuring a new system. Refer to the procedure 1) for adding product to an existing system. <b>ocedure</b> Turn off the power. Disconnect all the cables connected to the PLC main unit and special adapter directly using screws. Install an expansion board to the main unit. For installation of expansion board, refer to the following manual: → Refer to the FX3U Series User's Manual - Hardware Editio Remove the high-speed I/O special adapter connector cover (Right fig. A) and the special
Refer to the procedure 2) for configuring a new system. Refer to the procedure 1) for adding product to an existing system. <b>ocedure</b> 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: → Refer to the FX3U Series User's Manual - Hardware Edition Remove the high-speed I/O special adapter connector cover (Right fig. B) on the
Refer to the procedure 2) for configuring a new system. Refer to the procedure 1) for adding product to an existing system. <b>ocedure</b> 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: → Refer to the FX30 Series User's Manual - Hardware Edition Remove the high-speed I/O special adapter connector cover (Right fig. B) on the main unit. Le case of connecting this product to a bich. 4)

Servo Amplifie (or Drive Unit)

5) Connect the high-

fig.C).







The FX3U-2HSYADP high-speed output special adapter (hereinafter called high-speed output special adapter) is a special adapter dedicated to FX3U Series PLC. It outputs pulse signals of a differential line driver system for applicable Servo Amplifiers (or Drive Up to two units of this special adapter can be connected to the main unit per syster

→ For system configuration, refer to the FX3U Series User's Manual - Hardware Edition.

Products Manual

olligie wire	0.5mm 10 0.5mm (AWG22 10 20)
2-wire	2 pieces of 0.3mm <sup>2</sup> (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 UD6



When using a stick ter eve, choose a wire w ith insulating cable sheath referring to the above outside dimensions, or otherwise, the cannot be inserted easily. The tightening torque must be 0.22 to 0.25N-m

## 4.3 Power Supply Specification

Item	Specification
Dutput circuit	60mA for 24V DC
Iriving power supply	Internally supplied from the main unit service power supply.
Adapter driving	30mA for 5V DC
oower supply	5V DC power is supplied internally from the main unit.

#### 4.4 Performance Specification

Item	Specification
lumber of controlled axis	Independent two axes
Output points	4 points (Not counted among the total I/O points of the PLC.)
Output system	Differential line driver (Equivalent to AM26C31)
Output form	Forward pulse train, reverse pulse train, or pulse train + direction
oad current	25 mA or less
Maximum output requency	200 kHz
nsulation	<ul> <li>External cables of output area are insulated from PLC by photo coupler or transformer.</li> <li>SG are insulated from each other by transformer.</li> </ul>
Viring length	Maximum 10m (32' 9")



- The grounding wire size should be AWG 14 (2 mm<sup>2</sup>) 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 Initiations with rook reaction and the reaction during exclusion of the rook o

# A For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated i brated 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. Ho when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

# A MITSUBISHI ELECTRIC CORPORATION

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<sup>\*2</sup> PWM instruction has not supported the relay output for the reasons of the response delay of the output, chattering of contact, the contact life, etc.