Side B | Side A JAPANESE / Side B ENGLISH

JY997D48301F

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# MITSUBISHI ELECTRIC

PROGRAMMABLE CONTROLLERS
MELSEC-F

# FX3S SERIES PROGRAMMABLE CONTROLLERS

# HARDWARE MANUAL

FX3S

| | |
|---|---|
| Manual Number | JY997D48301 |
| Revision | F |
| Date | September 2016 |

This manual describes the part names, dimensions, mounting, cabling and specifications for the product. This manual is extracted from FX3S Series User's Manual - Hardware Edition. Refer to FX3S Series User's Manual - Hardware Edition for more details. Before use, read this manual and manuals of relevant products fully to acquire proficiency in the 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: Phillips is a registered trademark of Phillips Screw Company.
The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Effective September 2016
Specifications are subject to change without notice.


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

This manual classifies 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 the circumstances, procedures indicated by ⚠CAUTION may also cause severe injury.
It is important to follow all precautions for personal safety.

**STARTUP AND MAINTENANCE PRECAUTIONS** ⚠WARNING

- Do not touch any terminal while the PLC's power is on.
  Doing so may cause electric shock or malfunctions.
- Before cleaning or retightening terminals, cut off all phases of the power supply externally.
  Failure to do so may cause electric shock.
- Before modifying or disrupting the program in operation or running the PLC, carefully read through this manual and the associated manuals and ensure the safety of the operation.
  An operation error may damage the machinery or cause accidents.

**STARTUP AND MAINTENANCE PRECAUTIONS** ⚠CAUTION

- Turn off the power to the PLC before attaching or detaching the memory cassette. If the memory cassette is attached or detached while the PLC's power is on, the data in the memory may be destroyed, or the memory cassette may be damaged.
- Do not disassemble or modify the PLC.
  Doing so may cause fire, equipment failures, or malfunctions.
  For repair, contact your local Mitsubishi Electric representative.
- Turn off the power to the PLC before connecting or disconnecting any connection cable.
  Failure to do so may cause equipment failures or malfunctions.
- Turn off the power to the PLC before attaching or detaching the following devices.
  Failure to do so may cause equipment failures or malfunctions.
  - Peripheral devices, display module, expansion boards, special adapters and memory cassette

**DISPOSAL PRECAUTIONS** ⚠CAUTION

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

**TRANSPORTATION AND STORAGE PRECAUTIONS** ⚠CAUTION

- The PLC is a precision instrument. During transportation, avoid impacts larger than those specified in section 2.1 by using dedicated packaging boxes and shock-absorbing palettes. Failure to do so may cause failures in the PLC. After transportation, verify operation of the PLC and check for damage of the mounting part, etc.

## Associated manuals

| How to obtain manuals |
|---|
| For the necessary product manuals or documents, consult with your local Mitsubishi Electric representative. |

**Associated manuals**
FX3S Series PLC (main unit) comes with this document (hardware manual).
For a detailed explanation of the FX3S Series hardware and information on instructions for PLC programming, refer to the relevant documents.

| Manual name | Manual No. | Description |
|---|---|---|
| FX3S Series User's Manual - Hardware Edition | JY997D48601 MODEL CODE: 09R535 | Explains FX3S 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 STL/ SFC programming and devices. |
| MELSEC-Q/L/F Structured Programming Manual (Fundamentals) | SH-080782 MODEL CODE: 13JW06 | Programming methods, specifications, functions, etc. required to create structured programs. |
| FXCPU Structured Programming Manual [Device & Common] | JY997D26001 MODEL CODE: 09R925 | Devices, parameters, etc. provided in structured projects of GX Works2. |
| FXCPU Structured Programming Manual [Basic & Applied Instruction] | JY997D34701 MODEL CODE: 09R926 | Sequence instructions provided in structured projects of GX Works2. |
| FXCPU Structured Programming Manual [Application Functions] | JY997D34801 MODEL CODE: 09R927 | Application functions provided in structured projects of GX Works2. |

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| Manual name | Manual No. | Description |
|---|---|---|
| FX Series User's Manual - Data Communication Edition | JY997D16901 MODEL CODE: 09R715 | Explains N:N link, parallel link, computer link, no protocol communication by RS instructions/FX2N-232IF. |
| FX3S/FX3G/FX3GC/ FX3U/FX3UC Series User's Manual - Analog Control Edition | JY997D16701 MODEL CODE: 09R619 | Describes specifications for analog control and programming methods for FX3S/FX3G/FX3GC/ FX3U/FX3UC Series PLC. |
| FX3S/FX3G/FX3GC/ FX3U/FX3UC Series User's Manual - Positioning Control Edition | JY997D16801 MODEL CODE: 09R620 | Explains the specifications for positioning control of FX3S/FX3G/ FX3GC/FX3U/FX3UC Series and programming procedures. |

## Certification of UL, cUL standards

Please consult with Mitsubishi Electric for information on UL, cUL standard practices and the corresponding types of equipment.

## Compliance with EC directive (CE Marking)

This document does not guarantee that a mechanical system including this product will comply with the following standards.
Compliance to EMC directive and LVD directive of the entire mechanical system should be checked by the user/manufacturer. For more details please contact the local Mitsubishi Electric sales site.

**Requirement for Compliance with EMC directive**

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2014/30/EU) when used as directed by the appropriate documentation.

**Attention**
This product is designed for use in industrial applications.

**Type: Programmable Controller (Open Type Equipment)**
**Models: MELSEC FX3S series, FX3G series, FX3U series manufactured**

| | | |
|---|---|---|
| from June 1st, 2005 | FX3U-232ADP | FX3U-485ADP |
| | FX3U-4AD-ADP | FX3U-4DA-ADP |
| | FX3U-4AD-PT-ADP | FX3U-4AD-TC-ADP |
| from April 1st, 2007 | FX3U-232ADP-MB | FX3U-485ADP-MB |
| from December 1st, 2007 | FX3U-4AD-PTW-ADP | FX3U-4AD-PNK-ADP |
| from November 1st, 2008 | FX3G-232-BD | FX3G-422-BD |
| | FX3G-485-BD | FX3G-EEPROM-32L |
| | FX3G-2AD-BD | FX3G-1DA-BD |
| | FX3G-8AV-BD | |
| from June 1st, 2009 | FX3U-3A-ADP | |
| from February 1st, 2012 | FX3U-ENET-ADP | |
| from March 1st, 2013 | FX3S-★★MR/ES | FX3S-★★MT/ES |
| | FX3S-★★MT/ESS | |
| | Where ★★ indicates: 10,14,20,30 | |
| | FX3S-CNV-ADP | |
| from September 1st, 2013 | FX3S-★★MR/DS | FX3S-★★MT/DS |
| | FX3S-★★MT/DSS | |
| | Where ★★ indicates: 10,14,20,30 | |
| | FX3G-4EX-BD | FX3G-2EYT-BD |
| | FX3G-485-BD-RJ | |
| from September 1st, 2014 | FX3S-5DM | |

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

**Requirement for Compliance with LVD directive**

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Low Voltage (2014/35/EU) when used as directed by the appropriate documentation.

**Type: Programmable Controller (Open Type Equipment)**
**Models: MELSEC FX3S series manufactured**

| | | |
|---|---|---|
| from March 1st, 2013 | FX3S-★★MR/ES | FX3S-★★MT/ES |
| | FX3S-★★MT/ESS | |
| | Where ★★ indicates: 10,14,20,30 | |
| from September 1st, 2013 | FX3S-★★MR/DS | |
| | Where ★★ indicates: 10,14,20,30 | |

| Standard | Remark |
|---|---|
| EN61131-2: 2007 Programmable controllers - Equipment requirements and tests | The equipment has been assessed as a component for fitting in a suitable enclosure which meets the requirements of EN61131-2: 2007 |

**Caution for compliance with EC Directive**

**Installation in Enclosure**
Programmable logic controllers are open-type devices that must be installed and used within conductive control boxes. Please use the FX3S Series programmable logic controllers while installed in conductive shielded control boxes. Please secure the control box lid to the control box (for conduction). Installation within a control box greatly affects the safety of the system and aids in shielding noise from the programmable logic controller.

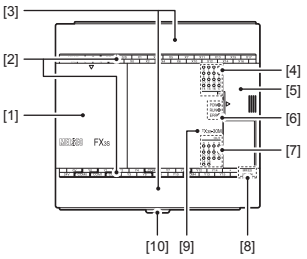
## Incorporated Items

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

| | Included Items | |
|---|---|---|
| FX3S-10M□<br>FX3S-14M□<br>FX3S-20M□<br>FX3S-30M□ | Product | 1 unit |
| | Dust proof protection sheet | 1 sheet |
| | Manuals [Japanese/English] | 1 manual |

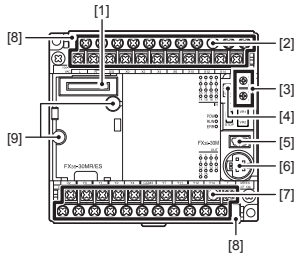
## 1. Outline

### 1.1 Part names



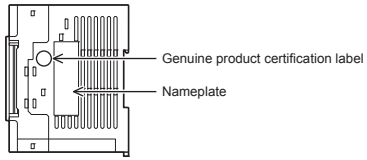
| No. | Name | | |
|---|---|---|---|
| [1] | Top cover | | |
| [2] | Terminal names | | |
| [3] | Terminal block covers | | |
| [4] | Input display LEDs (red) | | |
| [5] | Peripheral device connecting connector cover | | |
| [6] | Operation status display LEDs | | |
| | POW | Green | On while power is on the PLC. |
| | RUN | Green | On while the PLC is running. |
| | ERR | Red | Flashing when a program error occurs. |
| | | Red | Lights when a CPU error occurs. |
| [7] | Output display LEDs (red) | | |
| [8] | The year and month of production | | |
| [9] | Model name (abbreviation) | | |
| [10] | DIN rail mounting hooks | | |

**When the top covers are open**



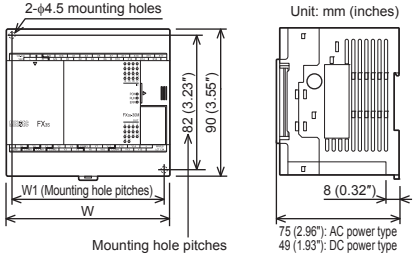

| No. | Name |
|---|---|
| [1] | Optional equipment connector |
| [2] | Power supply terminal, Input (X) terminals |
| [3] | Variable analog potentiometers<br>Upper side: VR1, Lower side: VR2 |
| [4] | RUN/STOP switch |
| [5] | Peripheral device connecting connector (USB) |
| [6] | Peripheral device connecting connector (RS-422) |
| [7] | Service power supply terminal (AC power type only),<br>Output (Y) terminals |
| [8] | Terminal cover |
| [9] | Optional equipment connecting screw holes |

**Right side**




The authentication label for authorized products is affixed to the right side of the product to avoid to be forged.
Products that do not have the genuine product certification label or nameplate are not covered by the warranty.

### 1.2 External dimensions and weight




| Model name | W: mm (inches) | W1: mm (inches) Direct mounting hole pitches | MASS (Weight): kg (lbs) | |
|---|---|---|---|---|
| | | | AC power type | DC power type |
| FX3S-10M□ | 60 (2.37") | 52 (2.05") | Approx. 0.30 (0.66 lbs) | Approx. 0.22 (0.48 lbs) |
| FX3S-14M□ | 60 (2.37") | 52 (2.05") | Approx. 0.30 (0.66 lbs) | Approx. 0.22 (0.48 lbs) |
| FX3S-20M□ | 75 (2.96") | 67 (2.64") | Approx. 0.40 (0.88 lbs) | Approx. 0.30 (0.66 lbs) |
| FX3S-30M□ | 100 (3.94") | 92 (3.63") | Approx. 0.45 (0.99 lbs) | Approx. 0.35 (0.77 lbs) |

**Installation**

- 35-mm-wide DIN rail or Direct (screw) mounting (M4×2)

## 2. Installation (general specifications)

As for installation of the special adapters and expansion boards, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

**INSTALLATION PRECAUTIONS** ⚠**CAUTION**

- Use the product within the generic environment specifications described in section 2.1 of this manual.
  Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, $Cl_2$, $H_2S$, $SO_2$ or $NO_2$), 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.
- Do not touch the conductive parts of the product directly.
  Doing so may cause device failure or malfunctions.
- Install the product securely using a DIN rail or mounting screws.
- Install the product on a flat surface.
  If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.
- When drilling screw holes or wiring, make sure cutting or wire debris do not enter the ventilation slits.
  Failure to do so may cause fire, equipment failures or malfunctions.
- Be sure to remove the dust proof sheet from the PLC's ventilation port when installation work is completed. Failure to do so may cause fire, equipment failures or malfunctions.
- Connect the peripheral device cables securely to their designated connectors. Loose connections may cause malfunctions.
- Turn off the power to the PLC before attaching or detaching the following devices.
  Failure to do so may cause device failures or malfunctions.
  - Peripheral devices, display module, expansion boards, special adapters and memory cassette



**Notes**

- When a dust proof sheet is supplied with units, keep the sheet applied to the ventilation slits during installation and wiring work.
- To prevent temperature rise, do not install the PLC on a floor, a ceiling or a vertical surface.
  Install it horizontally on a wall as shown in section 2.2.
- Keep a space of 50 mm (1.97") or more between the unit main body and another device or structure (part A). Install the unit as far away as possible from high-voltage lines, high-voltage devices and power equipment.

**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.

### 2.1 Generic specifications

| Item | Specification | | | | |
|---|---|---|---|---|---|
| Ambient temperature | 0 to 55 °C (32 to 131 °F) when operating and<br>-25 to 75 °C (-13 to 167 °F) when stored | | | | |
| Ambient humidity | 5 to 95 %RH (no condensation) when operating | | | | |
| Vibration resistance*1 | | Frequency (Hz) | Acceleration ($m/s^2$) | Half amplitude (mm) | Sweep Count for X, Y, Z: 10 times (80 min in each direction) |
| | When installed on DIN rail | 10 to 57 | - | 0.035 | |
| | | 57 to 150 | 4.9 | - | |
| | When installed directly | 10 to 57 | - | 0.075 | |
| | | 57 to 150 | 9.8 | - | |
| Shock resistance*1 | 147 $m/s^2$ Acceleration, Action time: 11 ms, 3 times by half-sine pulse in each direction X, Y, and Z | | | | |
| Noise resistance | By noise simulator at noise voltage of 1,000 Vp-p, noise width of 1 μs, rise time of 1 ns and period of 30 to 100 Hz | | | | |
| Dielectric withstand voltage | 1.5 kV AC for 1 min | Between each terminals and ground terminal*2 | | | |
| | 500 V AC for 1 min | | | | |
| Insulation resistance | 5 MΩ or higher by 500 V DC insulation resistance tester | | | | |
| Grounding | Class D grounding (grounding resistance: 100 Ω or less)<br><Common grounding with a heavy electrical system is not allowed.>*3 | | | | |
| Working atmosphere | Free from corrosive or flammable gas and excessive conductive dusts | | | | |
| Working altitude | <2000 m*4 | | | | |

*1 The criterion is shown in IEC61131-2.
*2 Dielectric withstand voltage and insulation resistance are shown in the following table.

| Terminal | Dielectric strength | Insulation resistance |
|---|---|---|
| ■ Terminals of main units | | |
| Between power supply terminal (AC power) and ground terminal | 1.5 kV AC for 1 min | 5 MΩ or higher by 500 V DC insulation resistance tester |
| Between power supply terminal (DC power) and ground terminal | 500 V AC for 1 min | |
| Between input terminal (24 V DC) and ground terminal | | |
| Between output terminal (relay) and ground terminal | 1.5 kV AC for 1 min | |
| Between output terminal (transistor) and ground terminal | 500 V AC for 1 min | |
| ■ Terminals of expansion boards, special adapters | | |
| Between terminal of expansion board (except FX3G-4EX-BD and FX3G-2EYT-BD) and ground terminal | Not allowed | Not allowed |
| Between FX3G-4EX-BD input terminal (24 V DC) and ground terminal | 500 V AC for 1 min | 5 MΩ or higher by 500 V DC insulation resistance tester |
| Between FX3G-2EYT-BD output terminal (transistor) and ground terminal | | |
| Between terminal of special adapter and ground terminal | | |

For dielectric with stand voltage test and insulation resistance test of each product, refer to the following manual.

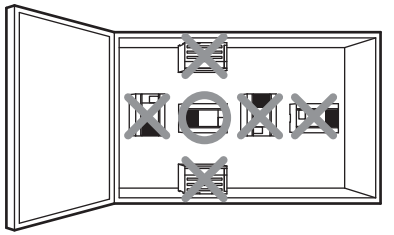
**→ Refer to FX3S Series User's Manual - Hardware Edition.**

*3 For common grounding, refer to section 3.3.
*4 The PLC cannot be used at a pressure higher than the atmospheric pressure to avoid damage.

### 2.2 Installation location

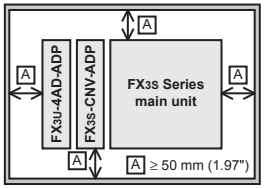
Install the PLC in an environment conforming to the generic specifications (section 2.1), installation precautions and notes.

**Installation location in enclosure**



**Space in enclosure**

Special adapter can be connected on the left sides of the main unit.
If you intend to add special adapter in the future, keep necessary spaces on the left sides.




#### 2.2.1 Affixing the dust proof sheet

The dust proof sheet should be affixed to the ventilation port before beginning the installation and wiring work.
Be sure to remove the dust proof sheet when the installation and wiring work is completed.

**→ For the affixing procedure, refer to the instructions on the dust proof sheet.**

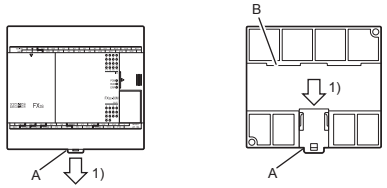
### 2.3 Procedures for installing to DIN rail

The products can be installed on a DIN46277 rail [35 mm (1.38") wide].
This section explains the installations of the main units.
For the special adapters, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

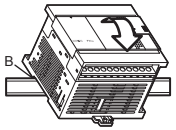
#### 2.3.1 Installation

1) Push out all DIN rail mounting hooks (below fig. A)

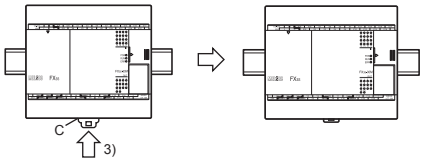



2) Push out all DIN rail mounting hooks (below fig. A).

3) Fit the upper edge of the DIN rail mounting groove (right fig. B) onto the DIN rail.




4) Lock the DIN rail mounting hooks (below fig. C) while pressing the PLC against the DIN rail.




### 2.4 Procedures for installing directly (with M4 screws)

The product can be installed directly on the panel (with screws).
This section explains the installation of the main units.
For the special adapters, refer to the following manual.

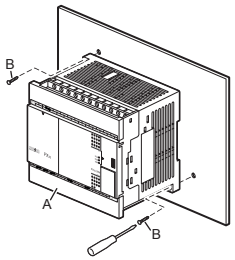
**→ Refer to FX3S Series User's Manual - Hardware Edition.**

#### 2.4.1 Mounting hole pitches

Refer to the External Dimensions (section 1.2) for the product's mounting hole pitch information.

#### 2.4.2 Installation

1) Make mounting holes in the mounting surface referring to the external dimensions diagram.
2) Fit the main unit (A in the right figure) based on the holes, and secure it with M4 screws (B in the right figure).




## 3. Power supply/input/output specifications and examples of external wiring

For the details refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

**DESIGN PRECAUTIONS** ⚠**WARNING**

- Make sure to have the following safety circuits outside of the PLC to ensure safe system operation even during external power supply problems or PLC failure.
  Otherwise, malfunctions may cause serious accidents.
  1) Most importantly, have the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits).
  2) Note that when the PLC CPU detects an error, such as a watchdog timer error, during self-diagnosis, all outputs are turned off. Also, when an error that cannot be detected by the PLC CPU occurs in an input/output control block, output control may be disabled.
  External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
  3) If an overload of the 24 V DC service power supply occurs, the voltage automatically drops, inputs in the PLC are disabled, and all outputs are turned off.
  External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
  4) Note that when an error occurs in a relay or transistor output device, the output could be held either on or off.
  For output signals that may lead to serious accidents, external circuits and mechanisms should be designed to ensure safe machinery operation in such a case.

**DESIGN PRECAUTIONS** ⚠**CAUTION**

- Do not bundle the control line together with or lay it close to the main circuit or power line. As a guideline, lay the control line at least 100 mm (3.94") or more away from the main circuit or power line.
  Noise may cause malfunctions.
- Install module so that excessive force will not be applied to peripheral device connectors.
  Failure to do so may result in wire damage/breakage or PLC failure.

**Notes**

- Even if the AC power supply causes an instantaneous power failure for less than 10 ms, the PLC can continue to operate.
- Even if the DC power supply causes an instantaneous power failure for less than 5 ms, the PLC can continue to operate.
- If a long-time power failure or an abnormal voltage drop occurs, the PLC stops, and output is turned off. When the power supply is restored, it will automatically restart (when the RUN input is on).

**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**

- Connect the power supply wiring to the dedicated terminals described in this manual.
  If an AC power supply is connected to a DC input/output terminal or DC power supply terminal, the PLC will burn out.
- Noise resistance may be lower when the L and N wires of an AC power supply are not wired correctly.
  Please wire using the correct polarity.
- Do not wire vacant terminals externally.
  Doing so may damage the product.
- Perform class D grounding (grounding resistance: 100 Ω or less) to the grounding terminal on the main unit with a wire 2 $mm^2$ or thicker.
  Do not use common grounding with heavy electrical systems (refer to section 3.3).
- When drilling screw holes or 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 properly wire to the main unit 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.
  - Make sure to properly wire to the main unit in accordance with the rated voltage, current, and frequency of each terminal.
  - The disposal size of the cable end should follow the dimensions described in the manual.
  - Tightening torque should follow the specifications in the manual.
  - Tighten the screws using a Phillips-head screwdriver No.2 (shaft diameter 6mm (0.24") or less). Make sure that the screwdriver does not touch the partition part of the terminal block.



**Notes**

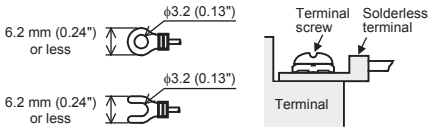
- Input/output wiring 50 to 100 m (164'1" to 328'1") long will cause almost no problems of noise, but, generally, the wiring length should be less than 20 m (65'7") to ensure the safety.

### 3.1 Wiring

#### 3.1.1 Cable end treatment and tightening torque

For the terminals of FX3S series PLC, M3 screws are used.
The electric wire ends should be treated as shown below.
Tighten the screws to a torque of 0.5 to 0.8 N•m.
Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

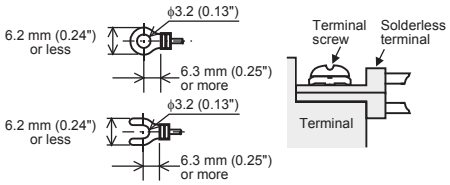
- When one wire is connected to one terminal




<Reference>

| Terminal Manufacturer | Type No. | Certification | Pressure Bonding Tool |
|---|---|---|---|
| J.S.T. Mfg. Co., Ltd. | FV1.25-B3A | UL Listed | YA-1 (JST) |
| | FV2-MS3 | | |

- When two wires are connected to one terminal




<Reference>

| Terminal Manufacturer | Type No. | Certification | Pressure Bonding Tool |
|---|---|---|---|
| J.S.T. Mfg. Co., Ltd. | FV1.25-B3A | UL Listed | YA-1 (JST) |

### 3.2 Power supply specifications and example of external wiring

For details, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

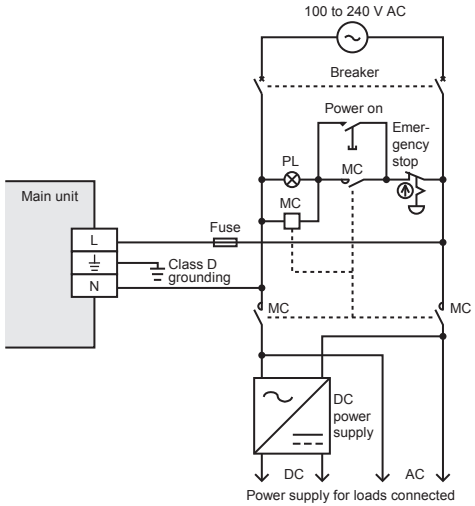
#### 3.2.1 Power supply specifications

| Item | Specification | |
|---|---|---|
| | AC power type | DC power type |
| Supply voltage | 100 to 240 V AC | 24 V DC |
| Allowable supply voltage range | 85 to 264 V AC | 20.4 to 26.4 V DC |
| Rated frequency | 50/60 Hz | - |
| Allowable instantaneous power failure time | Operation can be continued upon occurrence of instantaneous power failure for 10 ms or less. | Operation can be continued upon occurrence of instantaneous power failure for 5 ms or less. |
| Power fuse | 250 V 1 A | 250 V 1.6 A |
| Rush current | 15 A max. 5 ms or less/100 V AC<br>28 A max. 5 ms or less/200 V AC | 20 A max. 1 ms or less/24 V DC |
| Power consumption*1 FX3S-10M□ | 19 W | 6 W |
| Power consumption*1 FX3S-14M□ | 19 W | 6.5 W |
| Power consumption*1 FX3S-20M□ | 20 W | 7 W |
| Power consumption*1 FX3S-30M□ | 21 W | 8.5 W |
| 24 V DC service power supply | 400 mA | - |

*1 This item shows values when all 24 V DC service power supplies are used in the maximum configuration connectable to the main unit, and includes the input current (5 or 7 mA per point). (The DC power type main unit does not have a 24 V DC service power supply.)

#### 3.2.2 Example of external wiring [AC power type]

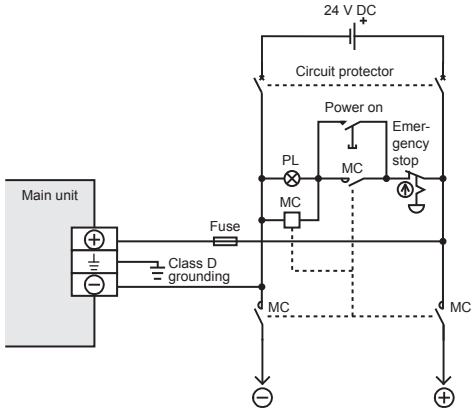
100 to 240 V AC power is supplied to the main unit.




Power supply for loads connected to PLC output terminals

#### 3.2.3 Example of external wiring [DC power type]

24 V DC power is supplied to the main unit.

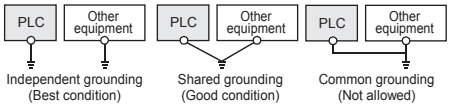



Power supply for loads connected to PLC output terminals

### 3.3 Grounding

Ground the PLC as stated below.

- Perform class D grounding. (Grounding resistance: 100 Ω or less)
- Ground the PLC independently if possible.
  If it cannot be grounded independently, ground it jointly as shown below.




- Use ground wires thicker than AWG14 (2 $mm^2$).
- Position the grounding point as close to the PLC as possible to decrease the length of the ground wire.

### 3.4 Input specifications and external wiring

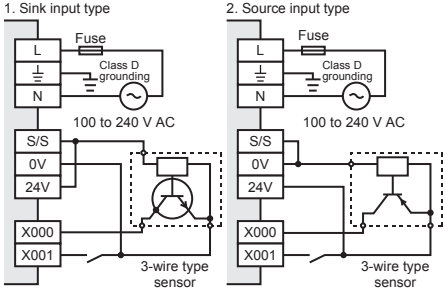
For details, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

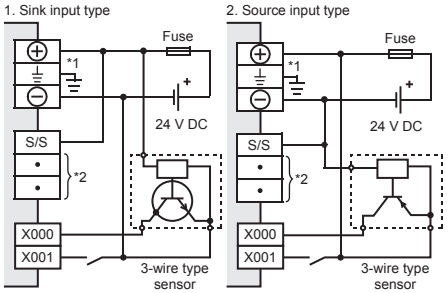
#### 3.4.1 Input specifications

| Item | | Specification |
|---|---|---|
| Number of input points | FX3S-10M□ | 6 points |
| | FX3S-14M□ | 8 points |
| | FX3S-20M□ | 12 points |
| | FX3S-30M□ | 16 points |
| Input connecting type | | Fixed terminal block (M3 screw) |
| Input form | | Sink/Source |
| Input signal voltage | AC power type | 24 V DC +10%, -10% |
| | DC power type | 20.4 to 26.4 V DC |
| Input impedance | X000 to X007 | 3.3 kΩ |
| | X010 to X017 | 4.3 kΩ |
| Input signal current | X000 to X007 | 7 mA/24 V DC |
| | X010 to X017 | 5 mA/24 V DC |
| ON input sensitivity current | X000 to X007 | 4.5 mA or more |
| | X010 to X017 | 3.5 mA or more |
| OFF input sensitivity current | | 1.5 mA or less |
| Input response time | | Approx. 10 ms |
| Input signal form | Sink input | No-voltage contact input<br>NPN open collector transistor |
| | Source input | No-voltage contact input<br>PNP open collector transistor |
| Input circuit insulation | | Photocoupler insulation |
| Input operation display | | LED on panel lights when photocoupler is driven. |

#### 3.4.2 Examples of input wiring [AC power type]




#### 3.4.3 Examples of input wiring [DC power type]




*1 Class D grounding.

*2 Do not connect the [•] terminals with others, since they are not available.

#### 3.4.4 Instructions for connecting input devices

As for the details of Instructions for connecting input devices, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

### 3.5 Relay output specifications and example of external wiring

For details, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

#### 3.5.1 Relay output specifications

| Item | | Specification |
|---|---|---|
| Number of output points | FX3S-10MR□ | 4 points |
| | FX3S-14MR□ | 6 points |
| | FX3S-20MR□ | 8 points |
| | FX3S-30MR□ | 14 points |
| Output connecting type | | Fixed terminal block (M3 screw) |
| Output form | | Relay |
| External power supply | | 30 V DC or less<br>240 V AC or less*1 |
| Max. load | Resistance load | 2 A/point*2 |
| | Inductive load | 80 VA*3 |
| Min. load | | 5 V DC, 2 mA (reference value) |
| Open circuit leakage current | | - |
| Response time | OFF→ON<br>ON→OFF | Approx. 10 ms |
| Output circuit insulation | | Mechanical insulation |
| Output operation display | | LED on panel lights when power is applied to relay coil. |



*1 250 V AC or less when the unit does not comply with CE, UL or cUL standards.

*2 The total load current of resistance loads per common terminal should be the following value.
- 1 output point/common terminal: 2 A or less
- 4 output points/common terminal: 8 A or less

As for the number of outputs per common terminal, refer to "Chapter 4 interpretation of partition" and the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

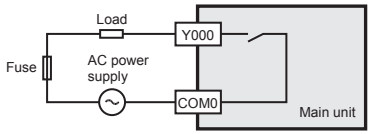
*3 UL and cUL standards approved at 120 and 240 V AC.

#### 3.5.2 Life of relay output contact

As for the details of life of relay output contact, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

#### 3.5.3 Example of relay output wiring




#### 3.5.4 Cautions in external wiring

As for the details of cautions in external wiring, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

### 3.6 Transistor output specifications and example of external wiring

For details, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

#### 3.6.1 Transistor output specifications

| Item | | | Specification |
|---|---|---|---|
| Number of output points | FX3S-10MT□ | | 4 points |
| | FX3S-14MT□ | | 6 points |
| | FX3S-20MT□ | | 8 points |
| | FX3S-30MT□ | | 14 points |
| Output connecting type | | | Fixed terminal block (M3 screw) |
| Output form | FX3S-□MT/□S | | Transistor (Sink) |
| | FX3S-□MT/□SS | | Transistor (Source) |
| External power supply | | | 5 to 30 V DC |
| Max. load | Resistance load | | 0.5 A/point*1 |
| | Inductive load | | 12 W/24 V DC*2 |
| Open circuit leakage current | | | 0.1 mA or less/30 V DC |
| ON voltage | | | 1.5 V or less |
| Response time | OFF→ON<br>ON→OFF | Y000, Y001 | 5 µs or less/10 mA or more (5 to 24 V DC) |
| | | Y002 to Y015 | 0.2 ms or less/200 mA or more (at 24 V DC) |
| Output circuit insulation | | | Photocoupler insulation |
| Output operation display | | | LED on panel lights when photocoupler is driven. |

*1 The total load current of resistance loads per common terminal should be the following value.
- 1 output point/common terminal: 0.5 A or less
- 4 output points/common terminal: 0.8 A or less

As for the number of outputs per common terminal, refer to "Chapter 4 interpretation of partition" and the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

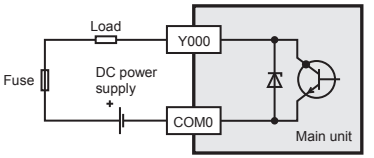
*2 The total of inductive loads per common terminal should be the following value.
- 1 output point/common terminal: 12 W or less/24 V DC
- 4 output points/common terminal: 19.2 W or less/24 V DC

As for the number of outputs per common terminal, refer to "Chapter 4 interpretation of partition" and the following manual.

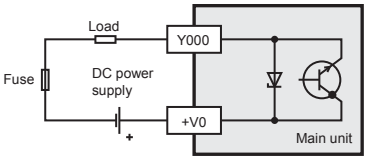
**→ Refer to FX3S Series User's Manual - Hardware Edition.**

#### 3.6.2 External wiring of transistor output

**1. External wiring of sink output type**




**2. External wiring of source output type**




#### 3.6.3 Cautions in external wiring

As for the details of cautions in external wiring, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

## 4. Terminal block layouts

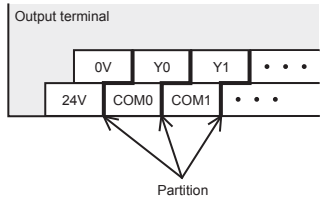
For details on the terminal block layout, refer to the following manual.

**→ Refer to FX3S Series User's Manual - Hardware Edition.**

**Interpretation of partition**

The partition of the output terminals (see following figure) indicates the range of the output connected to the same common.

Example: FX3S-30MT/ES



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