This manual describes the part names, dimensions, mounting, cabling and specifications for the product. This manual is extracted from FX3G Series User’s Manual - Hardware Edition. Refer to FX3G Series User’s Manual - Hardware Edition for 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. 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.

Precautions

Manufacturer, the protection provided by the equipment may be impaired.

- Incorrect handling of the battery may cause heat excessive generation, burning, ignition, liquid leakage or deformation, and lead to fire, fire failures and malfunctions of facilities and other equipment.
- When replacing the battery, make sure to use the specified product (FX3G-32B). If the battery error occurs ("ALM" LED is lit in red), follow the description in FX3G Series User’s Manual - Hardware Edition.
- 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

- Turn off the power to the PLC before attaching or detaching the terminals externally cut off all phases of the power supply. Failure to do so may cause electric shock.
- Do not touch any terminal while the PLC’s power is on. Doing so may cause electric shock or malfunctions.
- Before cleaning or tightening terminals externally cut off all phases of the power supply. Failure to do so may cause electric shock.
- Turn off the power to the PLC before connecting or disconnecting any extension cable.

Associated manuals

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

STARTUP AND MAINTENANCE PRECAUTIONS

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device. When disposing of batteries, separate them from other waste according to local regulations. (For details of the Battery Directive in EU countries, refer to FX3G Series User’s Manual - Hardware Edition.)
- Do not touch any terminal while the PLC’s power is on. Doing so may cause electric shock or malfunctions.
- Before cleaning or tightening terminals externally cut off all phases of the power supply. Failure to do so may cause electric shock.

Caution for compliance with EC Directive

- Please use the FX3G Series programmable controllers while installed in conductive shielded control panels under a general industrial environment.
- Programmable controllers are open-type devices that must be installed and used within conductive control panels. 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 controller.
- For the control panel, use the product having sufficient strength, fire proofness and shielding property to an installation environment.
- 24 V DC of the power supply must be supplied from the circuit double/reinforced insulated from the main power supply (MAINS). For more details please contact the local Mitsubishi Electric sales site.

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 product complies with EC directive, however, this document does not guarantee that a mechanical system including this product will comply with EC directive.

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.

Careful for compliance with EC Directive

- Please use the FX3G Series programmable controllers while installed in conductive shielded control panels under a general industrial environment.
- Programmable controllers are open-type devices that must be installed and used within conductive control panels. 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 controller.
- For the control panel, use the product having sufficient strength, fire proofness and shielding property to an installation environment.
- 24 V DC of the power supply must be supplied from the circuit double/reinforced insulated from the main power supply (MAINS).

Careful for compliance with the LVD directive (EN61010-2-01:2013)(*)

- To an external connection port other than AC power supply terminal and AC input/output terminal, connect the circuit separated from a dangerous voltage by a double/reinforced insulation.
- Between the converter and the adjacent relay output terminals if an external power supply is higher than 120 V AC, the insulation is basic. Therefore, when using 120 V AC or higher external power supply and 30 V DC/AC or lower external power supply between the adjacent commons, do not handle 30 V DC/AC or lower external power supply as a touchable part. (When handling 30 V DC/AC or lower external power supply as a touchable part, add a basic insulation.)
1. Outline

For the input/output extension units/blocks, refer to the following manual.


1.1 Part names

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[3]</td>
<td>RUN/STOP switch</td>
<td>For controlling the PLC.</td>
</tr>
<tr>
<td>[4]</td>
<td>Variable analog potentiometers</td>
<td>For adjusting the output voltage.</td>
</tr>
<tr>
<td>[5]</td>
<td>Terminal block mounting screws</td>
<td>To secure the terminal block.</td>
</tr>
<tr>
<td>[7]</td>
<td>Terminal cover (FX3G-14M(D)/ES-A is excluded)</td>
<td>To protect the terminal block.</td>
</tr>
<tr>
<td>[8]</td>
<td>Optional equipment connector2</td>
<td>For adding external devices.</td>
</tr>
<tr>
<td>[9]</td>
<td>Power supply terminal, Input (X) terminals</td>
<td>For power supply and input signals.</td>
</tr>
<tr>
<td>[10]</td>
<td>Battery connector</td>
<td>For connecting the battery.</td>
</tr>
<tr>
<td>[11]</td>
<td>Battery holder</td>
<td>To support the battery.</td>
</tr>
<tr>
<td>[12]</td>
<td>Power supply terminal, Output (Y) terminals</td>
<td>For power supply and output signals.</td>
</tr>
<tr>
<td>[14]</td>
<td>Optional equipment connecting screw holes1</td>
<td>For adding external devices.</td>
</tr>
</tbody>
</table>


1.2 External dimensions and weight


- **Model name**: FX3G-14M(D)/ES-A
  - **W**: 90 (3.55”)
  - **H**: 82 (3.23”)
  - **Mass**: Approx. 0.50 (1.09 lbs)
- **Model name**: FX3G-24M(D)/ES-A
  - **W**: 90 (3.55”)
  - **H**: 82 (3.23”)
  - **Mass**: Approx. 1.05 (2.31 lbs)
- **Model name**: FX3G-40M(D)/ES-A
  - **W**: 130 (5.12”)
  - **H**: 122 (4.81”)
  - **Mass**: Approx. 0.70 (1.54 lbs)
- **Model name**: FX3G-60M(D)/ES-A
  - **W**: 175 (6.89”)
  - **H**: 167 (6.58”)
  - **Mass**: Approx. 1.85 (4.07 lbs)

**Installation**

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

**Notes**

- When a dust proof sheet is supplied with an extension unit block, 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 50mm (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.
- Failure to do so may cause fire, equipment failures or malfunctions.

**WIRING PRECAUTIONS**

- Cut off all phases of the power supply externally before installation or wiring work in order to avoid damage to the product or electric shock.
- The temperature rating of the cable should be 80°C or more.

**INSTALLATION PRECAUTIONS**

- 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 extension cables, peripheral device cables, input/output cables and battery connecting cable securely to their designated connectors.
- Unsecured connection may cause malfunctions.
- Failure to do so may cause device failures or malfunctions.
- Peripheral devices, display modules, expansion boards and special adapters
  - Extension units/blocks and the FX Series terminal block
  - Battery and memory cassette

**Installation**

- For the input/output extension units/blocks, refer to the following manual.


- **Model name**: FX3G-14M(D)/ES-A
  - **W**: 90 (3.55”)
  - **H**: 82 (3.23”)
  - **Mass**: Approx. 0.50 (1.09 lbs)
- **Model name**: FX3G-24M(D)/ES-A
  - **W**: 90 (3.55”)
  - **H**: 82 (3.23”)
  - **Mass**: Approx. 1.05 (2.31 lbs)
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  - **W**: 130 (5.12”)
  - **H**: 122 (4.81”)
  - **Mass**: Approx. 0.70 (1.54 lbs)
- **Model name**: FX3G-60M(D)/ES-A
  - **W**: 175 (6.89”)
  - **H**: 167 (6.58”)
  - **Mass**: Approx. 1.85 (4.07 lbs)
2.1 Generic specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>8 to 55°C (32 to 131°F) when operating and -25 to 75°C (13 to 167°F) when stored</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>5 to 95%RH (no condensation) when operating</td>
</tr>
<tr>
<td>Vibration resistance (*1)</td>
<td>Frequency (Hz)</td>
</tr>
<tr>
<td></td>
<td>When installed on DIN rail</td>
</tr>
<tr>
<td></td>
<td>When installed directly</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock resistance (*1)</td>
<td>147m/s² Acceleration, Action time: 11ms, 3 times by half-sine pulse in each direction X, Y, and Z</td>
</tr>
<tr>
<td>Noise resistance</td>
<td>By noise simulator at noise voltage of 1,000Vp-p, noise width of 1us, rise time of 1ns and period of 30 to 100Hz</td>
</tr>
<tr>
<td>Dielectric withstand voltage (*2)</td>
<td>1.5kV AC for one minute</td>
</tr>
<tr>
<td></td>
<td>500V AC for one minute</td>
</tr>
<tr>
<td></td>
<td>1kV for one minute</td>
</tr>
<tr>
<td></td>
<td>5M or higher by 500V DC insulation resistance tester</td>
</tr>
<tr>
<td>Insulation resistance (*2)</td>
<td>9MΩ or higher by 500V DC insulation resistance tester</td>
</tr>
<tr>
<td>Grounding</td>
<td>Class D grounding (grounding resistance: 100Ω or less) Common grounding with a heavy electrical system is not allowed. (*)</td>
</tr>
<tr>
<td>Working atmosphere</td>
<td>Free from corrosive or flammable gas and excessive conductive dusts</td>
</tr>
<tr>
<td>Working altitude</td>
<td>&lt;2000m (*4)</td>
</tr>
<tr>
<td>Installation location</td>
<td>Inside a control panel (*5)</td>
</tr>
<tr>
<td>Over voltage category</td>
<td>50 or less</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>2 or less</td>
</tr>
</tbody>
</table>

(*1) The criterion is shown in IEC61131-2.

(*) Dielectric withstand voltage and insulation resistance are shown in the following table.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Dielectric strength</th>
<th>Insulation resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between power supply terminal</td>
<td>1.5kV AC for one minute</td>
<td></td>
</tr>
<tr>
<td>(AC power) and ground terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between power supply terminal</td>
<td>500V AC for one minute</td>
<td></td>
</tr>
<tr>
<td>(DC power) and ground terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between input terminal (24V DC)</td>
<td>1.5kV AC for one minute</td>
<td></td>
</tr>
<tr>
<td>and ground terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between input terminal (100V AC)</td>
<td>5M or higher by 500V DC insulation resistance tester</td>
<td></td>
</tr>
<tr>
<td>and ground terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between output terminal</td>
<td>1.5kV AC for one minute</td>
<td></td>
</tr>
<tr>
<td>(relay) and ground terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between output terminal (transist</td>
<td>500V AC for one minute</td>
<td></td>
</tr>
<tr>
<td>or triac) and ground terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Each manual</td>
<td>Not allowed</td>
<td>Not allowed</td>
</tr>
</tbody>
</table>

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

Extension devices can be connected on the left and right sides of the main unit of the PLC. If you intend to add extension devices in the future, keep necessary spaces on the left and right sides.

Configuration without extension cable

2.3 Procedures for installing to and detaching from 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 input/output extension units/blocks and special adapters, refer to the following manual.


2.3.1 Installation

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

2) Fit the upper edge of the DIN rail mounting groove (right fig. C) onto the DIN rail.

3) Lock the DIN rail mounting hooks (below fig. D) while pressing the PLC against the DIN rail.

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.

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

Be sure to remove the dust proof sheet when the installation and wiring work is completed.
2.4 Procedures for installing directly (with M4 screws)

The product can be installed directly on the panel (with screws).

As for the details of the installation/detaching for input/output extension units/blocks and special adapters, refer to the following manual.


2.4.1 Mounting hole pitches

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

As for the details of the mounting hole pitches for extension unit/block and special adapters, refer to the following manual.


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) block and special adapters, refer to the following manual.

As for the details of the installation/detaching for input/output wiring, refer to the following manual.


2.4.2.1 Mounting hole pitches

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

As for the details of the mounting hole pitches for extension unit/block and special adapters, refer to the following manual.


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

As for the details of the power supply wiring and input/output wiring, refer to the following manual.


3.1 Wiring

This section explains the wiring of the terminal type.

For the connectors types, refer to the following manual.


3.1.1 Cable end treatment and tightening torque

For the terminals of FX3G 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

  6.2 mm (0.24") or less

  6.2 mm (0.24") or less

<Reference>

Terminal manufacturers Type No. Applicable cable Certification Pressure bonding tool


When two wires are connected to one terminal(1)

3.2 (0.13")

<Reference>

Terminal manufacturers Type No. Applicable cable Certification Pressure bonding tool


(1) To adapt the LVD directive (EN61010-2-201:2013) of the EC directive, avoid the wiring with two wires to the built-in terminal, and take an appropriate action such as adding an external terminal.


3.1.2 Removal and installation of quick-release terminal block

Removal

Unscrew the terminal block mounting screw [both right and left screws] evenly, and remove the terminal block.

Installation

Place the terminal block in the specified position, and tighten the terminal block mounting screw evenly [both right and left screws].

Tightening torque 0.4 to 0.5 N·m

Do not tighten the terminal block mounting screws exceeding with a torque outside the above-mentioned range.

Failure to do so may cause equipment failures or malfunctions.

(1) Pay attention so that the center of the terminal block is not lifted.
3.2 Power supply specifications and example of external wiring

As for the details of the power supply specifications and example of external wiring, refer to the following manual.


3.2.1 Power supply specifications

[Main unit, Input/output extension units]

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>100 to 240 V AC 240 V DC</td>
</tr>
<tr>
<td>Voltage fluctuation range</td>
<td>110% +10% -15% +20%</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Allowable instantaneous power failure time</td>
<td>690mA or less</td>
</tr>
</tbody>
</table>

Power fuse

- FX3G-14M 250V 1A 125V 2.5A
- FX3G-24M 250V 1.5A 125V 2.5A
- FX3G-40M 24V 1A 60V 1.5A
- FX3G-60M 24V 1A 60V 1.5A

Power consumption (*1)

- FX3G-14M 31W 15W
- FX3G-24M 32W 21W
- FX3G-40M 37W 25W
- FX3G-60M 40W 29W
- FX3G-80M 46W 30W

24V DC service power supply

- FX3G-14M 250mA
- FX3G-24M 250mA

5V DC built in power supply

- FX3G-14M 690mA or less

3.2.2 Example of external wiring (AC power type)

100 to 240 V AC power is supplied to the main unit and input/output extension units.

→ For the details of wiring work, refer to section 3.1.

3.2.3 Example of external wiring (DC power type)

24 V DC power is supplied to the main unit and input/output extension units.

→ For the details of wiring work, refer to section 3.1.

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.

3.4 Input specifications and external wiring

As for the details of the input specifications and external wiring, refer to the following manual.


3.4.1 Input specifications (24 V DC input type)

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of input points</td>
<td>36 points (40 points)(*1)</td>
</tr>
<tr>
<td>Input connecting type</td>
<td>Refer to FX3G Series User’s Manual - Hardware Edition</td>
</tr>
<tr>
<td>Input form</td>
<td></td>
</tr>
<tr>
<td>Input signal voltage</td>
<td></td>
</tr>
<tr>
<td>Main unit</td>
<td>AC power type 24 V DC ±10%, -10%</td>
</tr>
<tr>
<td>Input/output extension unit</td>
<td>DC power type 20.4-28.8 V DC</td>
</tr>
<tr>
<td>Input impedance</td>
<td>Main unit X100 to X007 3.3kΩ</td>
</tr>
<tr>
<td>Input/output extension unit</td>
<td>X10 or more 4.3kΩ</td>
</tr>
<tr>
<td>Input signal current</td>
<td>Main unit X100 to X007 7mA/24 V DC</td>
</tr>
<tr>
<td>ON input sensitivity current</td>
<td>Main unit X10 or more 5mA/24 V DC</td>
</tr>
<tr>
<td>OFF input sensitivity current</td>
<td>Main unit Input/output extension unit/block 3.5mA/24 V DC</td>
</tr>
</tbody>
</table>

3.4.2 Examples of input wiring (AC power type)

1. Sink input type

- Sink input: No-voltage contact input
- Input signal form (Input sensor form) NPN open collector transistor
- Source input: No-voltage contact input
- Input circuit insulation Photocoupler insulation
- Input operation display LED on panel lights when photocoupler is driven.

(*) Each value inside () indicates the number of occupied points.
4.3 Examples of input wiring (DC power type)

1. Sink input type
2. Source input type

![Diagram of input wiring]

3.4.3 Examples of input wiring [DC power type]

- In the case of 2-wire proximity switch:
- In the case of input device with built-in parallel resistance:
- In the case of input device with built-in series diode:

3.4.4 Instructions for connecting input devices

As for the details of instructions for connecting input devices, refer to the following manual:

1) No-voltage contact:
- In the case of no-voltage contact:
  - The input current of this PLC is 5 to 7mA/24V DC.
  - Use input devices applicable to this minute current.
  - If no-voltage contacts (switches) for large current are used, contact failure may occur.

2) In the case of input device with built-in series diode:
- The voltage drop of the series diode should be approx. 4V or less when the switch is off.
- When lead switches with a series LED are used, up to two switches can be connected in series.
- Also make sure that the input current is over the input-sensing level while the switches are ON.

3) In the case of input device with built-in parallel resistance:
- Use a device with a parallel resistance of 15kΩ or more.
  - When the resistance is less than 15kΩ, connect a bleeder resistance.

4) In the case of 2-wire proximity switch:
- Use a two-wire proximity switch whose leakage current is 1.5mA or less when the switch is off.
  - When the current is larger than 1.5mA, connect a bleeder resistance.

3.4.5 Input specifications (100V AC input type)

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of input points</td>
<td>FX2N-8EYR-UA1/UL, FX2N-48ER-UA1/UL 8 points 24 points</td>
</tr>
<tr>
<td>Input connecting type</td>
<td>Refer to FX3G Series User's Manual - Hardware Edition</td>
</tr>
<tr>
<td>Input form</td>
<td>100 to 120 V AC</td>
</tr>
<tr>
<td>Input impedance</td>
<td>Approx. 21kΩ/50Hz Approx. 18kΩ/50Hz</td>
</tr>
<tr>
<td>Input signal voltage</td>
<td>4.7mA/100V AC 50Hz 6.2mA/110V AC 60Hz</td>
</tr>
<tr>
<td>ON input sensitivity current</td>
<td>3.8mA/80V AC</td>
</tr>
<tr>
<td>OFF input sensitivity current</td>
<td>1.7mA/30V AC</td>
</tr>
<tr>
<td>Input response time</td>
<td>Approx. 25ms to 30ms</td>
</tr>
<tr>
<td>Input signal form</td>
<td>Contact input</td>
</tr>
<tr>
<td>Input circuit insulation</td>
<td>Photo coupler insulation</td>
</tr>
<tr>
<td>Input operation display</td>
<td>LED on panel lights when photo coupler is driven.</td>
</tr>
</tbody>
</table>

3.4.6 Examples of 100V AC input wiring

![Diagram of 100V AC input wiring]

3.5 Relay output specifications and example of external wiring

As for the details of the relay output specifications and external wiring, refer to the following manual:

3.5.1 Relay output specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of output points</td>
<td>FX2N-8ER(1) 4 points(8 points)(*)1</td>
</tr>
<tr>
<td>FX2N-14ER(1) 6 points(8 points)(*)1</td>
<td></td>
</tr>
<tr>
<td>FX2N-4ER(1) 8 points</td>
<td></td>
</tr>
<tr>
<td>FX2N-24ER(1) 10 points(16 points)(*1)</td>
<td></td>
</tr>
<tr>
<td>FX2N-40ER(1) 24 points</td>
<td></td>
</tr>
<tr>
<td>FX2N-60ER(1) FX2N-48ER(1) 16 points</td>
<td></td>
</tr>
<tr>
<td>FX2N-60ER(1) FX2N-48ER(1) 24 points</td>
<td></td>
</tr>
</tbody>
</table>

3.5.2 Life of relay output contact

The product life of relay contacts considerably varies depending on the load type used. Take care that loads generating reverse electromotive force or rush current may cause poor contact or deposition of contacts which may lead to considerable reduction of the contact product life.

1) Inductive load
- Inductive loads generate large reverse electromotive force between contacts at shutdown may cause arcing. At a fixed current consumption, as the power factor (phase between current and voltage) gets smaller, the arc energy gets larger.
  - The standard life of the contact used for Inductive loads, such as contactors and solenoid valves, is 500 thousand operations at 20VA.
  - The following table shows the approximate life of the relay based on the results of our operation life test:
  - Load capacity: 20VA | 30VA | 80VA
  - Contact life: 3 million times | 1 million times | 2 hundred thousand times
  - Test condition: 1 sec. ON / 1 sec. OFF

2) Lamp load
- Lamp loads generally generate rush current 5 to 15 times the stationary current at activation. Make sure that the rush current does not exceed the current corresponding to the maximum specified resistance load.
  - For countermeasures while using Inductive loads, refer to Subsection 3.5.4.
  - Some types of Inductive loads generate rush current 5 to 15 times the stationary current. Make sure that the rush current does not exceed the current corresponding to the maximum specified resistance load.
  - Capacitive loads such as capacitors may be present in electronic circuit loads including inverters.

3.5.3 Example of relay output wiring

![Diagram of relay output wiring]
3.6 Transistor output specifications and example of external wiring

As for the details of the transistor output specifications and external wiring, refer to the following manual.

3.6.1 Transistor output specifications

<table>
<thead>
<tr>
<th>Number of output points</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX2N-14MT(T)</td>
<td>6 points (6 points)</td>
</tr>
<tr>
<td>FX2N-8ET(T)</td>
<td>8 points</td>
</tr>
<tr>
<td>FX2N-24MT(T)</td>
<td>10 points (16 points)</td>
</tr>
<tr>
<td>FX2N-40MT(T)</td>
<td>24 points</td>
</tr>
<tr>
<td>FX2N-48MT(T)</td>
<td>16 points</td>
</tr>
<tr>
<td>FX2N-8MT(T), FX2N-48ET(T)</td>
<td>24 points</td>
</tr>
<tr>
<td>FX2N-80MT(T), FX2N-14ET(T)</td>
<td>24 points</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output connecting type</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refer to FX3G Series User's Manual - Hardware Edition</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output form</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX2N-14MT(T), FX2N-8ET(T), FX2N-24MT(T), FX2N-40MT(T), FX2N-48MT(T), FX2N-8MT(T), FX2N-48ET(T), FX2N-80MT(T), FX2N-14ET(T)</td>
<td>Transistor (Sink)</td>
</tr>
<tr>
<td>FX2N-14MT(T), FX2N-8ET(T), FX2N-24MT(T), FX2N-40MT(T), FX2N-48MT(T), FX2N-8MT(T), FX2N-48ET(T), FX2N-80MT(T), FX2N-14ET(T)</td>
<td>Transistor (Source)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External power supply</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-30V DC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resistance load</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX2N-14MT(T), FX2N-8ET(T), FX2N-24MT(T), FX2N-40MT(T), FX2N-48MT(T), FX2N-8MT(T), FX2N-48ET(T), FX2N-80MT(T), FX2N-14ET(T)</td>
<td>0.5A (point)*2</td>
</tr>
<tr>
<td>FX2N-8ETY(T)</td>
<td>1A (point)*3</td>
</tr>
<tr>
<td>FX2N-16ETY(T)</td>
<td>0.3A (point)*2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max. load</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX2N-14MT(T), FX2N-8ET(T), FX2N-24MT(T), FX2N-40MT(T), FX2N-48MT(T), FX2N-8MT(T), FX2N-48ET(T), FX2N-80MT(T), FX2N-14ET(T)</td>
<td>12W/24V DC*4</td>
</tr>
<tr>
<td>FX2N-8ETY(T)</td>
<td>24W/24V DC*3</td>
</tr>
<tr>
<td>FX2N-16ETY(T)</td>
<td>7.2W/24V DC*4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inductive load</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX2N-14MT(T), FX2N-8ET(T), FX2N-24MT(T), FX2N-40MT(T), FX2N-48MT(T), FX2N-8MT(T), FX2N-48ET(T), FX2N-80MT(T), FX2N-14ET(T)</td>
<td>1.5W/24V DC*3</td>
</tr>
<tr>
<td>FX2N-8ETY(T)</td>
<td>24W/24V DC*3</td>
</tr>
<tr>
<td>FX2N-16ETY(T)</td>
<td>7.2W/24V DC*4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Min. load</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1mA or less/30V DC</td>
<td></td>
</tr>
</tbody>
</table>

ON voltage: 1.5V or less

1. External Wiring of Sink Output Type

2. External Wiring of Source Output Type

3.6.2 External Wiring of Transistor Output

3.6.3 Cautions in external wiring

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

Protection circuit for load short-circuits
A short-circuit at a load connected to an output terminal could cause burnout at the output element or the PCB. To prevent this, a protection fuse should be inserted at the output. Use a load power supply capacity that is at least 2 times larger than the total rated fuse capacity.

Contact protection circuit for inductive loads
When an inductive load is connected, connect a diode (for commutation) in parallel with the load as necessary. The diode (for commutation) must comply with the following specifications.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse voltage</td>
<td>5 to 10 times the load voltage</td>
</tr>
<tr>
<td>Forward current</td>
<td>Load current or more</td>
</tr>
</tbody>
</table>

Interlock
Loads, such as contactors for normal and reverse rotations, that must not be turned on simultaneously should have an interlock in the PLC program and an external interlock.
3.7 Triac output specifications and example of external wiring

As for the details of the triac output specifications and external wiring, refer to the following manual.

3.7.1 Triac output specifications

<table>
<thead>
<tr>
<th>Number of output points</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX2N-16ESYS, FX3N-32ES</td>
<td>16 points</td>
</tr>
</tbody>
</table>

Output connecting type

External power supply
85 to 242V AC

Max. load
Resistance load 0.3A/point (*1)

Inductive load
10VA/100V AC, 30VA/200V AC

Min. load
0.4VA/100V AC, 1.6VA/200V AC

Open circuit leakage current
1mA/100V AC, 2mA/200V AC

Response time
OFF→ON 1ms or less
ON→OFF 10ms or less

Circuit insulation
Photo-thyristor insulation

Display of output operation
LED on panel lights when photo-thyristor is driven.

(*1) The total load current of resistance loads per common terminal should be the following value or less.
- 4 output points/common terminal: 0.8A
- 8 output points/common terminal: 0.8A
As for the number of outputs per common terminal, refer to "Chapter 4 interpretation of partition" and the following manual.

3.7.2 External Wiring of Triac Output

3.7.3 Cautions in external wiring

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

Protection circuit for load short-circuits
A short-circuit at a load connected to an output terminal could cause burnout at the output element or the PCB. To prevent this, a protection fuse should be inserted at the output.

Micro current load
The PLC's internal Triac output circuit is equipped with a turn-off C-R absorber. When connecting a very low current load of "0.4VA/100V AC or less, or 1.6VA/200V AC or less", please connect a surge absorber parallel to the load.

Interlock
Loads, such as contactors for normal and reverse rotations, that must not be turned on simultaneously should have an interlock in the PLC program and an external interlock.

4. Terminal block layouts

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

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

Example: FX3G-40MT/ES

Note: This symbol mark is for China only.

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.