This manual classifies the safety precautions into two categories:

- **Personal Safety Precautions**
- **Equipment Safety Precautions**

It is important to follow all precautions for personal safety. Doing so may cause severe injury.

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 disassemble or modify the PLC. Doing so may cause electric shock, equipment failures, or malfunctions.

**CAUTION**

- Do not disconnect the battery. Doing so may cause fire, equipment failures, or malfunctions.
- Turn off the power to the PLC before connecting or disconnecting any extension cable. Failure to do so may cause equipment failures or malfunctions.
- Do not use the battery when the temperature is below -20°C or above 50°C. Failure to do so may cause malfunctions or failures of facilities and other equipment.

### DISPOSAL PRECAUTIONS

**CAUTION**

- 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 FX3GC Series User’s Manual - Hardware Edition.)

### TRANSPORTATION AND STORAGE PRECAUTIONS

**CAUTION**

- 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.

### STARTUP AND MAINTENANCE PRECAUTIONS

**WARNING**

- Use the battery only for the specified purpose.
- Connect the battery correctly. Do not charge, disassemble, heat, put in fire, short-circuit, connect reversely, weld, swallow or burn the battery, or apply excessive forces (vibration, impact, drop, etc.) to the battery.
- Do not store or use the battery at high temperatures or expose to direct sunlight.
- Do not expose to water, bring near fire or touch liquid leakage or other contents directly.
- Incorrect handling of the battery may cause heat excessive generation, burning, ignition, liquid leakage or deformation, and lead to injury. Fire or failures and malfunctions of facilities and other equipment.
- 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.

### MAINTENANCE PRECAUTIONS

**WARNING**

- The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Effective May 2018

Specifications are subject to change without notice.

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MITSUBISHI ELECTRIC

Programmable Controller

FX3GC Series Programmable Controller

HARDWARE MANUAL

**FX3GC**

Manual Number: JY997D45201

Revision: E

Date: May 2018

This manual describes the part names, dimensions, mounting, cabling and specifications for the product. This manual is extracted from FX3GC Series User’s Manual - Hardware Edition. Refer to FX3GC 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 keep 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.

**Models : MELSEC FX2N series manufactured**

- From July 1st, 1997: FX2N-16EX-ES/UL FX2N-16EYR-ES/UL FX2N-16ET-ES/UL FX2N-16ETZ-ES/UL
- From August 1st, 2005: FX2N-16EX-ES/UL FX2N-16EYR-ES/UL FX2N-16ET-ES/UL FX2N-16ETZ-ES/UL
- From September 1st, 2010: FX2N-8EYR-S-ES/UL

Models : MELSEC FX2NC series manufactured

- From August 1st, 1999: FX2NC-16EYR-T-DS FX2NC-16EYR-T
- From October 1st, 2007: FX2NC-16EYR-T

### 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.

**Models : MELSEC FX2NC series manufactured**

- From July 1st, 1997: FX2N-16EX-ES/UL FX2N-16EYR-ES/UL
- From August 1st, 2005: FX2N-16EX-ES/UL FX2N-16EYR-ES/UL
- From September 1st, 2010: FX2N-16ET-ES/UL FX2N-16ETZ-ES/UL

### Caution for Analog Products in use

The analog products have been found to be compliant to the European standards in the aforementioned manual and directive. However, for the very best performance from what are in fact delicate measuring and controlled output device Mitsubishi Electric would like to make the following points:

- Analog devices are sensitive by nature, their use should be considered carefully. For users of proprietary cables (integral with sensors or actuators), these users should follow the manufacturers’ installation requirements.
- Mitsubishi Electric recommends that shielded cables be used. If no other EMC protection is provided, then users may experience temporary loss of accuracy between +10%–10% in very high industrial areas.
- However, Mitsubishi Electric suggests that when adequate EMC precations are followed with general good EMC practice for the users complete control system:
  - Sensitive analog cables should not be laid next to or bound with high voltage cabling. Where possible, users should run analog cables separately.
  - Good cable shielding should be used. When grounding the shield - ensure that no loops are accidentally created.
  - When reading analog values, EMC induced errors can be smoothed out by averaging the readings. This can be achieved either through functions on the analog products or through the user’s program in the FX3G Series PLC main unit.


### Requirement for Compliance with EC 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 Directives for Electromagnetic Compatibility and Low Voltage and Low Voltage 3rd edition (2014/35/EU) when used as directed by the appropriate documentation.

**Models : MELSEC FX2NC-16EX-T series manufactured**

- From July 1st, 1997: FX2NC-16EYR-T-DS FX2NC-16EYR-T

### Caution for Analog Products in use

The analog products have been found to be compliant to the European standards in the aforementioned manual and directive. However, for the very best performance from what are in fact delicate measuring and controlled output device Mitsubishi Electric would like to make the following points:

- Analog devices are sensitive by nature, their use should be considered carefully. For users of proprietary cables (integral with sensors or actuators), these users should follow the manufacturers’ installation requirements.
- Mitsubishi Electric recommends that shielded cables be used. If no other EMC protection is provided, then users may experience temporary loss of accuracy between +10%–10% in very high industrial areas.
- However, Mitsubishi Electric suggests that when adequate EMC precations are followed with general good EMC practice for the users complete control system:
  - Sensitive analog cables should not be laid next to or bound with high voltage cabling. Where possible, users should run analog cables separately.
  - Good cable shielding should be used. When grounding the shield - ensure that no loops are accidentally created.
  - When reading analog values, EMC induced errors can be smoothed out by averaging the readings. This can be achieved either through functions on the analog products or through the user’s program in the FX3G Series PLC main unit.

1. Outline

1.1 Part names

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


1.2 External dimensions and weight

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


2. Installation (general specifications)

As for installation of the input/output extension blocks and special adapters, refer to the following manual:


**INSTALLATION PRECAUTIONS**

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

**INSTALLATION PRECAUTIONS**

- Use the product within the general 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 (sulfuric, Cl2, H2S, SO2 or NO2), flammable gas, vibration, or impacts, or expose it to high temperature, condensation, or rain and wind.

- If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.

- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.

- Install the product securely using a DIN rail or mounting screws.

- Install it horizontally on a wall as shown in section 2.2.

- When a dust proof sheet is supplied with an extension block, keep the sheet applied to the ventilation slits during installation and wiring work. 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.

**INSTALLATION PRECAUTIONS**

- When installing on DIN rail or mounting screws, be sure to secure the product vertically to DIN rail or mounting screws. When the optional battery is used, install the extension unit/blocks with the battery unit installed. 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.

- When installing on DIN rail or mounting screws, make sure that cutting and wiring debris do not enter the ventilation slits.

- If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.

- Free from corrosive or flammable gas and excessive conductive dusts

**INSTALLATION PRECAUTIONS**

- Use the product within the general 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 (sulfuric, Cl2, H2S, SO2 or NO2), flammable gas, vibration, or impacts, or expose it to high temperature, condensation, or rain and wind.

- If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.

- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.

- Install the product securely using a DIN rail or mounting screws.

- Install it horizontally on a wall as shown in section 2.2.

- When a dust proof sheet is supplied with an extension block, keep the sheet applied to the ventilation slits during installation and wiring work. 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.

**INSTALLATION PRECAUTIONS**

- When installing on DIN rail or mounting screws, be sure to secure the product vertically to DIN rail or mounting screws. When the optional battery is used, install the extension unit/blocks with the battery unit installed. 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.

- When installing on DIN rail or mounting screws, make sure that cutting and wiring debris do not enter the ventilation slits.

- If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.

- Free from corrosive or flammable gas and excessive conductive dusts

**INSTALLATION PRECAUTIONS**

- Use the product within the general 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 (sulfuric, Cl2, H2S, SO2 or NO2), flammable gas, vibration, or impacts, or expose it to high temperature, condensation, or rain and wind.

- If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.

- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.

- Install the product securely using a DIN rail or mounting screws.

- Install it horizontally on a wall as shown in section 2.2.

- When a dust proof sheet is supplied with an extension block, keep the sheet applied to the ventilation slits during installation and wiring work. 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.

**INSTALLATION PRECAUTIONS**

- When installing on DIN rail or mounting screws, be sure to secure the product vertically to DIN rail or mounting screws. When the optional battery is used, install the extension unit/blocks with the battery unit installed. 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.

- When installing on DIN rail or mounting screws, make sure that cutting and wiring debris do not enter the ventilation slits.

- If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.

- Free from corrosive or flammable gas and excessive conductive dusts

**INSTALLATION PRECAUTIONS**

- Use the product within the general 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 (sulfuric, Cl2, H2S, SO2 or NO2), flammable gas, vibration, or impacts, or expose it to high temperature, condensation, or rain and wind.

- If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.

- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.

- Install the product securely using a DIN rail or mounting screws.

- Install it horizontally on a wall as shown in section 2.2.

- When a dust proof sheet is supplied with an extension block, keep the sheet applied to the ventilation slits during installation and wiring work. 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.
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 blocks and special adapters, refer to the following manual.


2.3.1 Installation

1) Turn the power supply OFF.
2) Push the DIN rail mounting hooks (A) of all connected units/ blocks as shown in the figure below. (1)
3) Align the upper side of the DIN rail mounting groove with the DIN rail (2) in the figure on the right.
4) While pressing the main unit onto the DIN rail, lock the DIN rail mounting hooks as shown in the figure below. (3)

2.3.2 Removal methods

1) Turn the power supply OFF.
2) Disconnect all connected cables including the power cable and I/O cable.
3) Insert a flathead screwdriver to the DIN rail mounting hook (1) in the figure on the right.
4) Lever the screwdriver slightly toward direction Q, to pull out the DIN rail mounting hooks, allowing them to come off the DIN rail.
5) Remove the main unit from the DIN rail (2) in the figure on the right.
6) Push the DIN rail mounting hooks as shown in the figure on the right (3).

2.4 Connection of power supply connector

Use the dedicated built-in power connector to supply power to the main unit. The power should be supplied to the main unit, FX2NC Series I/O extension blocks and FX2NC-FX3UC Series special function blocks. Some (FXNC-CC-D3X(T)-T) of FX2NC Series I/O extension blocks require power cable types “A” and “B” shown on the below, while others (FXNC-CC-D3X(T)-DS) do not require them. For details, refer to FX3GC Series User’s Manual - Hardware Edition.

When connecting two or more extension blocks which require power cables “B” and “C” shown on the right, perform crossover wiring between the extension blocks using two (upper and lower) power connectors.

The figure below shows the pin numbers of the power connectors. Extension block 1 (Red) 2 (Black) 3 (Ground) Input extension block 1 (Red) 2 (Black) 3 (Black) (Green)

2) Pinch the power cable connector “a” and disconnect it in the direction of the arrow (see figure on the right).

Power cable types “A” and “B” are supplied with the main unit, while type “C” is supplied with the FXNC-CC-D3X and FXNC-16EX-T.

The crossover cable (type “C”) can skip up to 4 16-point output blocks to connect units. If more blocks should be skipped to supply power to an input block, use cable type “B”.

2.5 Connection to input/output connector

The input/output connectors of the main units conform to MIL-C-83503. Refer to Chapter 4 for the I/O connector pin arrangement.

1) Compliant connectors (commercially available connectors)

Use a 20-pin (1-key) socket connector conforming to MIL-C-83503. Confirm in advance that the connectors do not interfere with other parts including connector covers.

2) Input/output cables (available from Mitsubishi)

Input/output cables with attached connectors are available. For details of the model names, see the following sections.

3) Connectors for user-made input/output cables (available from Mitsubishi)

Users should provide electric wires and a pressure bonding tool.

Users should provide electric wires and a pressure bonding tool.

Model name and composition of input/output connector

<table>
<thead>
<tr>
<th>Model name</th>
<th>Details of part made by DDK Ltd.</th>
<th>Electric wire size</th>
<th>Pressure bonding tool (made by DDK Ltd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX2C-I/O-CON for flat cable</td>
<td>10-piece set</td>
<td>Solderless connector FRC2-A00-30S</td>
<td>AWG24 (0.1mm²) 1.27 pitch, 20-core</td>
</tr>
<tr>
<td>FX2C-I/O-CON-S for bulk wire</td>
<td>5-piece set</td>
<td>Housing HU-200S2-001 Solderless contact H1U-411S</td>
<td>AWG22 (0.3mm²)</td>
</tr>
<tr>
<td>FX2C-I/O-CON-SA for bulk wire</td>
<td>5-piece set</td>
<td>Housing HU-200S2-001 Solderless contact H1U-411A</td>
<td>AWG20 (0.5mm²)</td>
</tr>
</tbody>
</table>

4) Certified connectors (commercially available connectors)

Connectors made by DDK Ltd. shown in item 3.

Model names Length Description Shape

| FX-16E-500CAB-S | 5m (16’4") | General-purpose input/output cable | Single wire (Wire color: red) PLC side: A 20-pin connector |
| FX-16E-150CAB | 1.5m (4’11") | Cables for connecting the FX Series terminal block with input/output connectors. For terminal block connection, refer to FX3GC Series User’s Manual - Hardware Edition. | Flat cables (with tube) A 20-pin connector at both ends |
| FX-16E-300CAB | 3m (9’10") | | Round multicore cables A 20-pin connector at both ends |
| FX-16E-500CAB-R | 5m (16’4") | | |
| FX-16E-500CAB-S | 5m (16’4") | | |
| FX-A32E-150CAB | 1.5m (4’11") | | Flat cables (with tube) PLC side: Two 20-pin connectors in 16-point units. |
| FX-A32E-300CAB | 3m (9’10") | | Terminal block side: A dedicated connector One common terminal covers 32 input/output terminals. |
| FX-A32E-500CAB | 5m (16’4") | | |
2.6 Connection to input/output terminal block

2.6.1 Cable

1) Applicable cable

<table>
<thead>
<tr>
<th>Type</th>
<th>Wire size</th>
<th>Model</th>
<th>Power consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single wire</td>
<td>0.3mm² to 0.5mm² (AWG22 to 20)</td>
<td>Phoenix Contact CRIMPFOX UD 6<em>1 (or CRIMPFOX UD 6T</em>2)</td>
<td>125V 3.15A</td>
</tr>
<tr>
<td>Double wire</td>
<td>0.3mm² (AWG22)*2</td>
<td></td>
<td>24V DC +20% -15%</td>
</tr>
</tbody>
</table>

2) Termination

- 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.
- Use the wire whose head is straight and is not widened as shown in the right figure.
- When using a stick terminal with an insulating sleeve, choose a wire with proper cable sheath referring to the above outside dimensions, otherwise the wire cannot be inserted easily.

2.6.2 Tightening Torque

- Tighten the terminals to a torque of 0.22 to 0.25 Nm. Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

To tighten terminals, use a purchased small-sized screwdriver whose head is straight and is not widened as shown in the right figure.

- If the diameter of screwdriver grip is too small, tightening torque will not be able to be achieved. To achieve the appropriate tightening torque shown in the table above, use the following screwdriver or an appropriate replacement (grip diameter approximately 25 mm (0.98"))
- 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).

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

3.1 Power supply specifications and example of external wiring

- Input/output wiring 50 to 100mm (164" to 328") long will cause almost no problems of noise, but, generally, the wiring length should be less than 20m (65'7") to ensure the safety.
- Extension cables are easily affected by noise. Lay the cables at a distance of at least 30 to 50mm (1.19" to 1.97") away from the PLC output and other power lines.
- Do not solder-plate the electric wire ends.
- Do not connect more than the specified number of wires or electric wires of unspecified size.
- A UL Listed or Recognized fuse rated not higher than 3.47A must be used with FX3GC.

3.2 Grounding

- Ground the PLC as stated below.
- Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

- Prevent class D grounding, (Grounding resistance: 100 ohms or less)
- The specifications for the power supply of the main unit are shown in the following table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>24V DC +20% -15%</td>
</tr>
<tr>
<td>Allowable instantaneous power failure time</td>
<td>Operation can be continued upon occurrence of an instantaneous power failure for 5ms or less.</td>
</tr>
<tr>
<td>Power fuse</td>
<td>125V 3.15A</td>
</tr>
<tr>
<td>Rush current</td>
<td>30A max. 0.5ms/24V DC</td>
</tr>
<tr>
<td>Power consumption 1</td>
<td>8W</td>
</tr>
<tr>
<td>5V DC built-in power supply 2</td>
<td>400mA</td>
</tr>
</tbody>
</table>

4. Wiring precautions

- Connect the DC power supply wiring to the dedicated terminals described in this manual.
- Do not wire vacant terminals externally. Do not allow to damage the product.
- Perform class D grounding (grounding resistance: 100 ohms or less) to the ground terminal on the main unit.

- Make sure to properly wire to the terminal block (European type) 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.

- Ensure the following safety circuits outside of the PLC to ensure safe system operation even during external power supply problems or PLC failure.
3.3 Input specifications and external wiring

3.3.1 Input specifications

<table>
<thead>
<tr>
<th>Number of input points</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX3GC-32MT(D)(SS)</td>
<td>16 points</td>
</tr>
<tr>
<td>FX3GC-16EX(D)-(SS)</td>
<td>32 points</td>
</tr>
<tr>
<td>FX2NC-16EX(D)-T(DS)</td>
<td>Connector</td>
</tr>
</tbody>
</table>

3.3.2 Handling of input terminal

1) FX3GC-32MT/D, FX2NC-C(C)/E(Y)(T)
   - Sink input
     - Inputs turn ON when the input terminal and COM terminal are connected, and the input and terminal 24V DC terminal are electrically connected with a no-voltage contact or NPN open collector transistor.
   - Source input
     - Inputs turn ON when the 24V DC terminal and COM terminal are electrically connected with a no-voltage contact or PNP open collector transistor. Where \( \Delta \) indicates 0 to 2

2) FX3GC-32MT/DSS, FX2NC-C(C)/E(Y)(T)-DS
   - Sink input
     - Inputs turn ON when the 24V DC \( \bullet \) terminal and COM terminal are connected, and the input and terminal 24V DC \( \bullet \) terminal are electrically connected with a no-voltage contact or NPN open collector transistor.
   - Source input
     - Inputs turn ON when the 24V DC \( \bullet \) terminal and COM terminal are electrically connected with a no-voltage contact or PNP open collector transistor.

3.3.3 Example of input wiring

1. Examples of input wiring (FX3GC-32MT/D)

   - Breaker, Circuit protector, Fuse, etc.
   - Fuse *1
   - Class D grounding *2
   - Three wire sensor
   - NPN

2. Examples of sink input wiring (FX3GC-32MT/DSS)

   - Breaker, Circuit protector, Fuse, etc.
   - Fuse *1
   - Class D grounding *2
   - Three wire sensor
   - NPN

3. Examples of source input wiring (FX3GC-32MT/DSS)

   - Breaker, Circuit protector, Fuse, etc.
   - Fuse *1
   - Class D grounding *2
   - Three wire sensor
   - PNP

*1 UL Listed or Recognized fuse rated not higher than 3.47A must be used with FX3GC.
*2 The grounding resistance should be 100 \( \Omega \) or less.

3.3.3.1 Connector

- X000 to X007: 4.5mA or more
- X010 to X017: 3.5mA or more

3.3.3.2 Terminal block

- X000 to X007: 5mA/24V DC
- X010 to X017: 4.3k \( \Omega \)

3.3.3.3 Sink input

- NPN open collector
- No-voltage contact

3.3.3.4 Source input

- PNP open collector
- No-voltage contact

3.4 Transistor output specifications and example of external wiring

3.4.1 Transistor output specifications

<table>
<thead>
<tr>
<th>Number of output points</th>
<th>Specification (Transistor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX3GC-32MT(D)(SS)</td>
<td>16 points</td>
</tr>
<tr>
<td>FX3NC-16EY(T)(DSS)</td>
<td>32 points</td>
</tr>
<tr>
<td>FX2NC-16EY(T)(DSS)</td>
<td>Connector</td>
</tr>
</tbody>
</table>

Output form

- FX3GC-32MT/DSS
- FX2NC-16EY(T)(DSS)

Connector

- Transistor (Sink)
- Transistor (Source)

External power supply

- 5 to 30V DC

3.4.2 Examples of transistor output wiring

1. Examples of transistor output wiring (FX3GC-32MT/D)

   - Breaker, Circuit protector, Fuse, etc.
   - Fuse *1
   - Class D grounding *2
   - Three wire sensor
   - NPN

2. Examples of sink transistor output wiring (FX3GC-32MT/DSS)

   - Breaker, Circuit protector, Fuse, etc.
   - Fuse *1
   - Class D grounding *2
   - Three wire sensor
   - NPN

*1 A UL Listed or Recognized fuse rated not higher than 3.47A must be used with FX3GC.

*2 The grounding resistance should be 100 \( \Omega \) or less.

Charge input

- 1.5V or less
- 0.1mA or less/30V DC

3.4.3 Examples of source transistor output wiring (FX3GC-32MT/DSS)

1. Examples of source transistor output wiring (FX3GC-32MT/DSS)

   - Breaker, Circuit protector, Fuse, etc.
   - Fuse *1
   - Class D grounding *2
   - Three wire sensor
   - PNP

2. Examples of sink transistor output wiring (FX3GC-32MT/DSS)

   - Breaker, Circuit protector, Fuse, etc.
   - Fuse *1
   - Class D grounding *2
   - Three wire sensor
   - NPN

*1 A UL Listed or Recognized fuse rated not higher than 3.47A must be used with FX3GC.

*2 The grounding resistance should be 100 \( \Omega \) or less.

*3 Use a fuse suitable for the system.

Notes

- 16 points
- 32 points

- Resistance load
  - 0.3A/point
  - 0.1A/point

- Maximum load
  - 7.2W/point (24V DC)
  - 2.4W/point (24V DC)

- Open circuit leakage current
  - 0.1mA or less/30V DC

- ON voltage
  - 1.5V or less

- Response time
  - Off: 0.2ms or less/100mA (at 24V DC)
  - On: 0.2ms or less/100mA (at 24V DC)

- Output circuit insulation
  - Photocoupler insulation

- Output operation display
  - LED on panel lights when photocoupler is driven.

*1 When the two COM(+V0) terminals are connected outside the PLC, resistance load is 1.6A or less.
3.4.2 Handling of transistor output circuit

Output terminal:
The main unit and FX2NC input/output extension block have 16 transistor output points per common.
Two COM* or +V△ terminals connected to each other inside the PLC are provided for outputs.
Connect two COM* or +V△ terminals outside the PLC so that the load applied to each COM* or +V△ terminal is smaller.
Where * indicates 1 to 3
Where △ indicates 0 to 2

Output current:
The ON voltage of the output transistor is approx. 1.5V. When driving a semiconductor element, carefully check the input voltage characteristics of the applied element.

3.4.3 External Wiring of Transistor Output

1. External wiring of sink output type

2. External wiring of source output type

3.5 Relay output specifications and example of external wiring


3.5.1 Relay output specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification (Relay)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of output points</td>
<td>FX2NC-16EYR-T(-DS) 16 points</td>
</tr>
<tr>
<td>Output connecting type</td>
<td>Terminal block</td>
</tr>
<tr>
<td>External power supply</td>
<td>20V DC or less or 24V AC or less (250V AC or less when the unit does not comply with CE, UL or cUL standards)</td>
</tr>
</tbody>
</table>

Max. load:

- In the case of transistor output, the load current of 8A or less.
- When using one COM2 terminal, make sure that the total load current of 8 resistance load points is 4 A or less.
- When connecting two COM2 terminals outside the PLC, make sure that the total load current of 8 resistance load points is 8A or less.

3.5.2 Handling of relay output circuit

Output terminal:
Main units, FX2NC input/output extension blocks have 8 relay output points per common.
Two COM* or terminals connected to each other inside the FX2NC-16EYR-T(-DS) are provided for outputs.
Connect two COM* terminals outside the PLC so that the load applied to each COM* terminal is smaller.
Where * indicates 1 or 2

3.5.3 Example of relay output wiring

3.6 Cautions in input and output wiring


3.6.1 Instructions for connecting input devices

1) In the case of no-voltage contact

2) In the case of input device with built-in series diode

3) In the case of input device with built-in parallel resistance

4) In the case of 2-wire proximity switch

3.6.2 Cautions on transistor output wiring

1) Protection circuit for load short-circuits

2) Protection circuit of contact when inductive load is used

3) Interlock

4) Common mode

3.6.3 Cautions on relay output wiring

1) Protection circuit for load short-circuits

2) Protection circuit of contact when inductive load is used

3) Interlock

4) Common mode
Refer to Sections 3.3 and 3.4 for the details.

The I/O wiring is different in the FX3GC-32MT/D. Refer to Sections 3.3 and 3.4 for the details.

### 4.1 Main units

#### 4.1.1 FX3GC-32MT/D

The I/O wiring is different in the FX3GC-32MT/D. Refer to Sections 3.3 and 3.4 for the details.

FX3GC-32MT/D

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<td>X7</td>
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#### 4.1.2 FX3GC-32MT/DSS

The I/O wiring is different in the FX3GC-32MT/DSS. Refer to Sections 3.3 and 3.4 for the details.

FX3GC-32MT/DSS

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### 4.2 Terminal layouts

#### 4.2.1 FX 3GC-32EX

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**FX3NC-16EX**

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**FX3NC-32EX-DS**

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#### 4.2.2 FX3NC-32EYT

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### 4.2.3 FX3NC-16EX-T(�S), FX3NC-16EYR-T(�S)

**FX3NC-16EX-T(�S)**

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**FX3NC-16EYR-T(�S)**

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此产品中所含有的有害物质的名称，含量及部品如下表所示。

<table>
<thead>
<tr>
<th>含有害物质名称</th>
<th>含有量</th>
<th>含有部品</th>
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- **接触**: ○ ○ ○

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