This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the FX TERMINAL BLOCKS. It should be read and understood before attempting to install or use the unit. Further information can be found in the FX series PLC hardware manuals.

If in doubt at any stage during the installation of the FX TERMINAL BLOCKS always consult a professional electrical engineer who is qualified and trained to the local and national standards.

All terminal blocks described in this manual conform to the UL/UL Standard.

Note's on the symbology used in this manual

At various times through out this manual certain symbols will be used to highlight points of information which are intended to ensure the users personal safety and protect the integrity of the equipment. Whenever any of the following symbols are encountered, its associated note must be read and understood. Each of the symbols used will now be listed with a brief description of its meaning.

Hardware warnings

1) Indicates that the identified danger WILL cause physical and property damage.

2) Indicates that the identified danger could POSSIBLY cause physical and property damage.

Guidelines for the safety of the user and protection of the FX TERMINAL BLOCKS

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- Tighten terminals at a torque of 0.5 to 0.8 Nm. Do not tighten the terminal block mounting screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

1. INTRODUCTION

Terminal blocks convert I/O terminals of connector type PLC into terminal blocks. Some terminal blocks directly extend inputs and outputs of PLC. Other terminal blocks are equipped with diversified built-in devices, and function only as inputs or only as outputs.

2. EXTERNAL DIMENSION

FX-16EYR-TB/UL, FX-16E-YTB/UL FX-16EYR/ R/T/T-TB/UL FX-16EYD-TB/UL FX-16EYA-TB/UL

FX-32E-TB/UL

FX-32E-TB/UL

FX-32E-TB/UL

FX-32E-TB/UL

FX-32E-TB/UL

FX2C- FB

FX2NC- FB

EX-D/UL

bas

MT-DSS/UL

MT-E/UL

4. CONNECTOR CABLE PIN CONFIGURATION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>INPUT</th>
<th>OUTPUT</th>
<th>APPLICABLE PLC</th>
<th>CURRENT CONSUMPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX-16E-TB/UL</td>
<td>16 pt (Direct input/output)</td>
<td>FX2C-DCOM-D/D/D-U</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>FX-32E-TB/UL</td>
<td>32 pt or 16/16 pt (Direct input/output)</td>
<td>FX2C-DCOM-D/D/D-U</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>FX-16EYR-TB/UL</td>
<td>16 pt (Relay)</td>
<td>FX2C-DCOM-D/D/D-U</td>
<td>80mA (5mA/1pt)</td>
<td></td>
</tr>
<tr>
<td>FX-16EYT-TB/UL</td>
<td>16 pt (Transistor sink)</td>
<td>FX2C-DCOM-D/D/D-U</td>
<td>12mA (7mA/1pt)</td>
<td></td>
</tr>
<tr>
<td>FX-16EX-A1-TB/UL</td>
<td>16 pt (100V AC)</td>
<td>FX2C-DCOM-D/D/D-U</td>
<td>48mA (3mA/1pt)</td>
<td></td>
</tr>
</tbody>
</table>

The connections required between the FX2C, FX2NC main unit and a terminal block are shown in the diagram below with an example for inputs X000 to X107 and outputs Y000 to Y017.

The I/O connector should be the 26-pin type and should conform to MIL C 83503 of Military Standard.
FX INPUT AND OUTPUT TERMINAL BLOCKS

PLC Accessories
- Input/output expansion block labels
- Terminal layout cards

2. EXTERNAL DIMENSION

1. INTRODUCTION

Terminal blocks convert I/O terminals of connector type PLC into terminal blocks. Some terminal blocks directly extend inputs and outputs of PLC. Other terminal blocks are equipped with diversified built-in devices, and function only as inputs or only as outputs.

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3. CONFIGURATION AND OPTIONS

TERMINALS

4. CONNECTOR CABLE PIN CONFIGURATION

The connections required between the FXcc; FXnc main unit and a terminal block are shown in the diagram below with an example for inputs X000 to X017 and outputs Y000 to Y017. The I/O connector should be the 26-pin type and should conform to MIL C 83503 of Military Standard.

Note
- Do not lay I/O cables next to power cables or allow them to share the same trunking duct.
- Where I/O signals are used over an extended distance consideration must be made for voltage drop and noise interference.
- Use crimp-style terminals of the dimensions shown in the figure below.
- Tighten terminals at a torque of 0.5 to 0.8 N•m. Do not tighten the terminal block mounting screws with a torque outside the above mentioned range. Failure to do so may cause equipment failures or malfunctions.

5. TERMINAL Wiring

1. INTRODUCTION

Terminal blocks convert I/O terminals of connector type PLC into terminal blocks. Some terminal blocks directly extend inputs and outputs of PLC. Other terminal blocks are equipped with diversified built-in devices, and function only as inputs or only as outputs.

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TERMINALS

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All terminal blocks described in this manual conform to UL/UL Standard.

Note on the symbology used in this manual

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- Owing to the very great variety in possible application of this equipment, you must satisfy yourself as to its suitability for your specific application.

5. TERMINAL WIRING

Never perform external wiring to unused terminals. Such wiring may damage the unit.

Note

- Do not lay I/O cables next to power cables or allow them to share the same trunking duct.
- Where I/O signals are used over an extended distance consideration must be made for voltage drop and noise interference.
- Use crimp-style terminals of the dimensions shown in the figure below.
- Tighten terminals at a torque of 0.5 to 0.8 Nm. Do not tighten the terminal block mounting screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

6. DIRECT INPUT BLOCKS AND DIRECT OUTPUT BLOCKS WIRING

Internal circuit

- Inputs

[Diagram showing internal circuit with various components and connections]
7. AC INPUT BLOCK WIRING

**Specifications**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Impedance</th>
<th>Current</th>
<th>Circuit Isolation</th>
<th>Operation indication</th>
<th>Switch Rating</th>
<th>Response time</th>
<th>Signal input supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>85 - 132V AC</td>
<td>50/60Hz</td>
<td>2mA, 15VA, 100V AC</td>
<td>Photocoupler</td>
<td>LED of base unit</td>
<td>ON/OFF</td>
<td>30ms or less</td>
<td>24V DC 3mA/1p²</td>
</tr>
</tbody>
</table>

**Input**

- **Voltage:** 85 - 132V AC, 50/60Hz
- **Impedance:** 1mA, 15VA, 100V AC
- **Current:** 2mA, 15VA, 100V AC
- **Operation indication:** LED of base unit
- **Switch Rating:** ON/OFF
- **Response time:** 30ms or less
- **Signal input supply:** 24V DC 3mA/1p²

**Outputs**

- **Type:** PLC, EYT-DSS
- **Isolation:** Photocoupler
- **Switching:** OFF
- **Load:** 50VA, 100V AC
- **Time:** 10ms

---

**TYPICAL WIRING**

**Relay output blocks FX-16EYR-ES/TB/UL, FX-16EYR-TB wiring**

Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 5 to 10A for every four points.

**Transistor output blocks wiring**

Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 2A for every four points.

**[ ON VOLTAGE ]**

- **The ON voltage of an output transistor is approximately 1.5 V.**
- **When driving a semiconductor device, etc., pay attention to the input voltage characteristics of the used device.**

---

**Digital input blocks wiring**

**[ OUTPUT CURRENT ]**

The current of 0.3 A can flow in each output point. However, in order to restrict temperature rise, flow a 0.8 A to every output points (+0.2 A per point on an average). When turning on and off frequently a load with large rush current, set the square average current to 0.2A or less.
**7. AC INPUT BLOCK WIRING**

- **Specifications**
  - **Input**
    - **Vinages**: 85 - 122V AC 50/60Hz
    - **Impedance**: 50/60Hz
    - **Current**: 0.1A
  - **Circuit isolation**
    - By relay coil
    - Photocoupler
  - **Operation indication**
    - LED of base unit
  - **Switch Rating**
    - ON = OFF
    - 30V 1.7mA
  - **Response time**
    - 30ms or less
  - **Signal input supply**
    - 24V DC 3mA/1pt

**8. OUTPUT BLOCKS WIRING**

- **Outputs specification**
  - **Relay output blocks FX-16EYR-ES/TB/U, FX-16EYR-TB wiring**
    - Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 2 A for every four points.
  - **[DC LOAD]**
    - Connect a noise suppression diode to a DC inductive load in parallel. If the diode is not connected, the life time of the contact becomes considerably shorter.
    - Select a noise suppression diode whose reverse withstand voltage is 5 to 10 times or more the load voltage and whose current in the forward direction is not less than the load current.
  - **[AC LOAD]**
    - When a surge absorber is connected to an AC inductive load in parallel, noise generation is reduced.
    - The standard lifetime of contactors and solenoid valves against AC inductive load is 500,000 times of 120VA.
    - The current of 0.3 A can flow in each output point. However, in order to restrict temperature rise, flow 0.8 A to every four output points (= 0.2 A per point on average). When turning on and off frequently a load short-circuit, provide a fuse of 5 to 10 A for every four points.

**Examples of applicable load**

<table>
<thead>
<tr>
<th>Input</th>
<th>Output No.</th>
<th>DC Power Supply</th>
<th>AC Power Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.35 A/100 VAC</td>
<td>1</td>
<td>Fuse</td>
<td>Photocoupler</td>
</tr>
<tr>
<td>0.4 A/200 VAC</td>
<td>2</td>
<td>fuse</td>
<td>Photocoupler</td>
</tr>
<tr>
<td>0.8 A/100 VAC</td>
<td>3</td>
<td>12A/100V AC</td>
<td>Photocoupler</td>
</tr>
<tr>
<td>1.6 A/200 VAC</td>
<td>4</td>
<td>20A/100V AC</td>
<td>Photocoupler</td>
</tr>
</tbody>
</table>

**Relay output blocks FX-16EYR-ES/TB/U, FX-16EYR-TB wiring**

- **Relay output blocks**
  - FX-16EYR-ES/TB/U, FX-16EYR-TB
  - Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 2 A for every four points.
  - The ON voltage of an output transistor is approximately 1.5 V.
  - When driving a semiconductor device, etc., pay attention to the input voltage characteristics of the used device.

**Transistor output blocks wiring**

- **FX-16EYT-ES-TB/U, FX-16EYT-TB**
  - Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 2 A for every four points.
  - The ON voltage of an output transistor is approximately 1.5 V.
7. AC INPUT BLOCK WIRING

- Specifications
  - **Input**
    - **Voltages**: 85 - 122V AC 50/60Hz
    - **Impedance**: 21kΩ / 50Hz
    - **Current**: 6.2mA 110V AC/65Hz, 4.7mA 100V AC/50Hz
  - **Circuit isolation**: Photocoupler
  - **Operation indicator**: LED of base unit
  - **Switch Rating**: OFF = ON 80V 3mA, ON = OFF 30V 1.7mA
  - **Response time**: 30ms or less
  - **Signal input supply**: 24V DC 3mA/tp

- **Typical wiring**
  - **Terminals**:
    - 1: COM
    - 2: 24V DC
    - 3: +24V
    - 4: -24V
  - **Components**:
    - Lamp LED
    - Fuse F capacitor
    - Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 2A for every four points.
    - When driving a semiconductor device, etc., pay attention to the input voltage characteristics of the used device.
  - **Contactors**: Magnetic switch manufactured by our company.
  - **Relay life time**: S-K10 ~ S-K150: 3,000,000 times, S-K600, S-K800: 200,000 times

8. OUTPUT BLOCKS WIRING

- **Outputs**
  - **Relay output blocks FX-16EYR-ES-TB, FX-16EYR-ES-TB/UL**
    - **Example of applicable load**
      - **Magnetic switch manufactured by our company**
    - **Output capacity**
      - **Input voltage**: 38V / 100V AC, 0.6A / 200V AC
      - **Output current**: 0.25A / 100V AC, 0.6A / 200V AC
      - **Power consumption**: 0.15W / 200V AC
      - **Output OFF time**: 1 second
      - **Response time**: Approx. 0.2ms
    - **Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 2A for every four points.**
    - **Operating voltage**: 1.5V when driving a semiconductor device, etc.

- **Triac output block FX-16EY-ESS-TB/UL**
  - **Outline**: A surge absorber is connected to each output.
  - **Specifications**
    - **Output voltage**: 0.4VA / 100V AC, 1.6VA / 200V AC
    - **Power consumption**: 0.1VA / 200V AC
    - **Output OFF time**: 1 second
    - **Response time**: Approx. 0.2ms
  - **Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 2A for every four points.**

- **Transistor output blocks wiring**
  - **Output voltage**: 0.4VA / 100V AC, 1.6VA / 200V AC
  - **Power consumption**: 0.1VA / 200V AC
  - **Output OFF time**: 1 second
  - **Response time**: Approx. 0.2ms
  - **Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 2A for every four points.**
This manual contains texts, diagrams and explanations which will guide the reader in the correct installation and operation of the FX TERMINAL BLOCKS. It should be read and understood before attempting to install or use the unit. Further information can be found in the FX series PLC hardware manuals.

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All terminal blocks described in this manual conform to the UL/UL Standard.

Note’s on the symbology used in this manual

1. INTRODUCTION
This manual has been written to be used by trained and competent personnel. This is defined as a person who has the knowledge and experience to use the equipment safely.

2. EXTERNAL DIMENSION
Owing to the very great variety in possible application of this equipment, you must satisfy yourself as to its suitability for your specific application.

3. CONFIGURATION AND OPTIONS
Guidelines for the safety of the user and protection of the FX TERMINAL BLOCKS

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4. CONNECTOR CABLE PIN CONFIGURATION
The connections required between the FXnc. FXnc main unit and a terminal block are shown in the diagram below with an example for inputs X000 to X017 and outputs Y000 to Y017. The I/O connector should be the 25-pin type and should conform to MIL C 83503 of Military Standard.
7. AC INPUT BLOCK WIRING

**Specifications**

- **Voltages**: 85 - 125V AC 50/60Hz
- **Impedance**: 21kΩ / 50Hz
- **Current**: 6.2mA / 100V AC 65Hz
- **Operation indication**: Photocoupler
- **Switch Rating**: OFF = ON 80V 3.8mA
- **Response time**: 30ms or less
- **Signal input supply**: 24V DC 3mA/1pt

**Typical wiring**

- **Output**: Supplies DC Power to the PLC
- **Input**: Receives Signal from the PLC

**Relay output blocks FX-16EYR-ES-TB/UL, FX-16EYR-TB wiring**

Terminal blocks are not equipped with built-in fuses. To prevent breakdown of circuits caused by load short-circuit, provide a fuse of 5 to 10 A for every four points.

**[DC LOAD]**

Connect a noise suppression diode to a DC inductive load in parallel. If the diode is not connected, the life time of the contact becomes considerably shorter.

- **Input contact**
- **Output contact**
- **Surge absorber**

**[AC LOAD]**

When a surge absorber is connected to an AC inductive load in parallel, noise generation is reduced.

- **Inductive load**
- **Noise suppression diode**
- **Output contact**

The standard life time of contactors and solenoid valves against AC inductive load is 500,000 times of actuation against 35 VA. The table below shows the guideline of the life time of relays based on the result of the life time test performed in our company.

<table>
<thead>
<tr>
<th>LOAD CAPACITY</th>
<th>LIFE TIME OF CONTACT</th>
<th>EXAMPLE OF APPLICABLE LOAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>35VA</td>
<td>0.35A / 100V AC</td>
<td>S-K10 – S-K100</td>
</tr>
<tr>
<td></td>
<td>0.17A / 200V AC</td>
<td>S-N10 – S-N35</td>
</tr>
<tr>
<td>80VA</td>
<td>0.8A / 100V AC</td>
<td>S-K180 – S-K400</td>
</tr>
<tr>
<td></td>
<td>0.4A / 200V AC</td>
<td></td>
</tr>
<tr>
<td>120VA</td>
<td>1.25A / 200V AC</td>
<td>S-K600 – S-K800</td>
</tr>
</tbody>
</table>

**Triac output block FX-16EYS-ES-TB/UL wiring**

Terminal blocks are not equipped with built-in fuses. To prevent breakdown of circuits caused by load short-circuit, provide a fuse of 2 A for every four points.

**ON VOLTAGE**

The ON voltage of an output transistor is approximately 1.5 V. When driving a semiconductor device, etc., pay attention to the input voltage characteristics of the used device.

Note: This symbol mark is for China only.

- Contains triac devices.
- Contains PLC devices.

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