




Programmable Controller  
MELSEC-F



FX INPUT AND OUTPUT TERMINAL BLOCKS

USER’S GUIDE

JY992D50401J 

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.

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

1. INTRODUCTION

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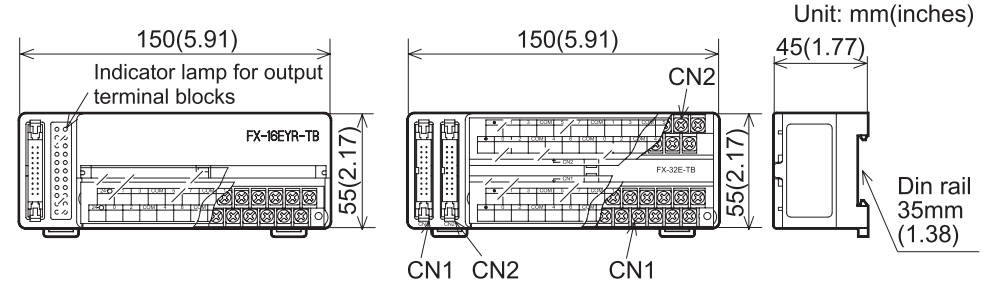
| MODEL  | INPUT                                   | OUTPUT                    | APPLICABLE PLC   | CURRENT CONSUMPTION |
|---|---|---------------------------|--|---------------------|
| FX-16E-TB/UL  | 16 pt (Direct input/output)             |                           | FX2C-□□MT-ESS/UL<br>FX2NC-□□MT-DSS<br>FX2NC-□□EX-DS<br>FX2NC-□□EYT-DSS<br>FX2C-□□MT-E/UL | —                   |
| FX-32E-TB/UL  | 32 pt or 16/16 pt (Direct input/output) |                           |  |                     |
| FX-16EYR-ES-TB/UL   | —                                       | 16 pt (Relay)             | FX2C-□□MT-ESS/UL<br>FX2NC-□□MT-DSS<br>FX2NC-□□EYT-DSS                                    | 80mA (5mA/1pt)      |
| FX-16EYS-ES-TB/UL   | —                                       | 16 pt (Triac)             |  | 112mA (7mA/1pt)     |
| FX-16EYT-ESS-TB/UL  | —                                       | 16 pt (Transistor source) |  |                     |
| FX-16EYT-ES-TB/UL   | —                                       | 16 pt (Transistor sink)   |  |                     |
| FX-16EX-A1-TB/UL  | 16 pt (100V AC)                         | —                         | FX2C-□□MT-E/UL   | 48mA (3mA/1pt)      |

| MODEL  | INPUT                       | OUTPUT                  | APPLICABLE PLC                      | CURRENT CONSUMPTION |
|---|-----------------------------|-------------------------|-------------------------------------|---------------------|
| FX-16E-TB   | 16 pt (Direct input/output) | 16 pt (Relay)           | FX2NC-□□MT-D/UL                     | —                   |
| FX-32E-TB   |                             |                         | FX2NC-□□EX-D/UL<br>FX2NC-□□EYT-D/UL |                     |
| FX-16EYR-TB   | —                           | 16 pt (Relay)           | FX2NC-□□MT-D/UL                     | 80mA (5mA/1pt)      |
| FX-16EYT-TB   | —                           | 16 pt (Transistor sink) | FX2NC-□□EYT-D/UL                    | 112mA (7mA/1pt)     |
| FX-16EX-A1-TB   | 16 pt (100V AC)             | —                       | FX2NC-□□MT-D/UL<br>FX2NC-□□EX-D/UL  | 48mA (3mA/1pt)      |

## 2. EXTERNAL DIMENSION

FX-16E-TB/UL, FX-16E-TB  
FX-16EY□(□: R/T/S)-TB/UL  
FX-16EY□(□: R/T)-TB  
FX-16EX-A1-TB/UL, FX-16EX-A1-TB

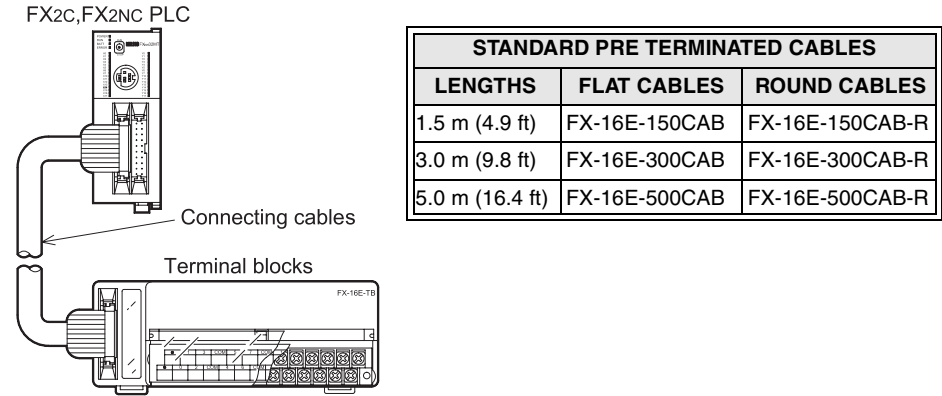
FX-32E-TB/UL  
FX-32E-TB



### Accessories

- Input / output extension block labels
- Terminal layout cards

## 3. CONFIGURATION AND OPTIONS





## 4. CONNECTOR CABLE PIN CONFIGURATION

| PLC           |             | TERMINAL BLOCKS |             |
|---------------|-------------|-----------------|-------------|
| ( ) : Pin No. |             | ( ) : Pin No.   |             |
| X/Y000 (1)    | X/Y010 (11) | (1) X/Y000      | (11) X/Y010 |
| X/Y001 (2)    | X/Y011 (12) | (2) X/Y001      | (12) X/Y011 |
| X/Y002 (3)    | X/Y012 (13) | (3) X/Y002      | (13) X/Y012 |
| X/Y003 (4)    | X/Y013 (14) | (4) X/Y003      | (14) X/Y013 |
| X/Y004 (5)    | X/Y014 (15) | (5) X/Y004      | (15) X/Y014 |
| X/Y005 (6)    | X/Y015 (16) | (6) X/Y005      | (16) X/Y015 |
| X/Y006 (7)    | X/Y016 (17) | (7) X/Y006      | (17) X/Y016 |
| X/Y007 (8)    | X/Y017 (18) | (8) X/Y007      | (18) X/Y017 |
| COM (9)       | COM (19)    | (9) COM         | (19) COM    |
| ● (10)        | ● (20)      | (10) ●          | (20) ●      |

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 X017 and outputs Y000 to Y017.

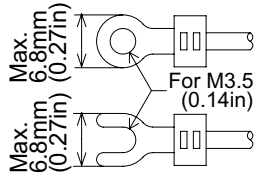
The I/O connector should be the 20-pin type and should conform to MIL C 83503 of Military Standard.

5. TERMINAL WIRING

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

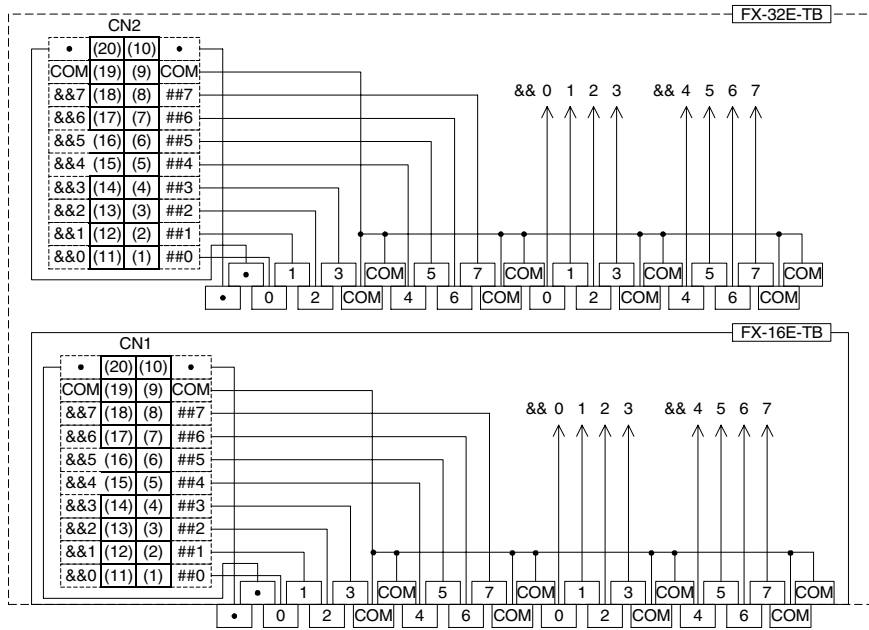
Note

- ☆ 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 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.



6. DIRECT INPUT BLOCKS AND DIRECT OUTPUT BLOCKS WIRING

Internal circuit

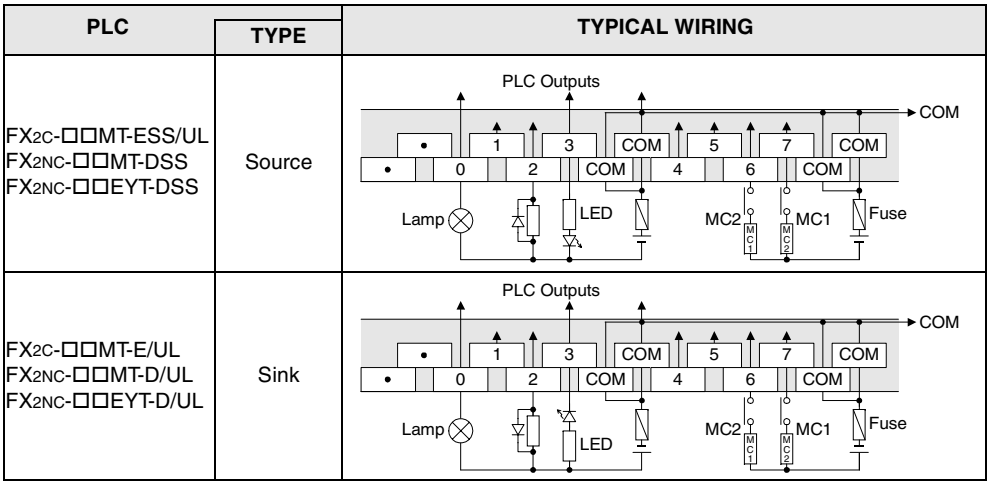


- (9) and (19) of both CN1 and CN2 are short-circuited internally.

Inputs

| PLC   | TYPE                | TYPICAL WIRING |
|---|---------------------|----------------|
| FX2C-□□MT-ESS/UL                                      | Source<br>(-ve S/S) |                |
|   | Sink<br>(+ve S/S)   |                |
| FX2NC-□□MT-E/UL<br>FX2NC-□□MT-D/UL<br>FX2NC-□□EX-D/UL | Sink                |                |
|   | Source              |                |
| FX2NC-□□MT-DSS<br>FX2NC-□□EX-DS                       | Source              |                |
|   | Sink                |                |

■ Outputs



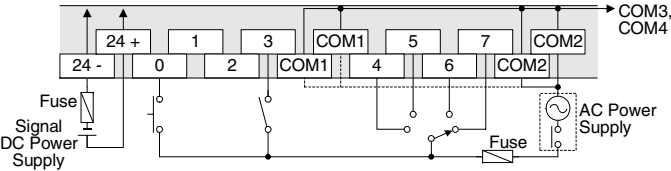
For the I/O specifications and detailed information, refer to the FX2c Hardware Manual or the FX2NC Hardware Manual.

7. AC INPUT BLOCK WIRING

■ Specifications

|                      |           |  |
|----------------------|-----------|--|
| Input                | Voltages  | 85 - 132V AC 50/60Hz                     |
|                      | Impedance | 21kΩ / 50Hz<br>18kΩ / 60Hz               |
|                      | Current   | 6.2mA 110V AC/60Hz<br>4.7mA 100V AC/50Hz |
| Circuit isolation    |           | Photocoupler                             |
| Operation indication |           | LED of base unit                         |
| Switch Rating        | OFF ⇒ ON  | 80V 3.8mA                                |
|                      | ON ⇒ OFF  | 30V 1.7mA                                |
| Response time        |           | 25 - 30ms                                |
| Signal input supply  |           | 24V DC 3mA/1pt                           |

■ Typical wiring

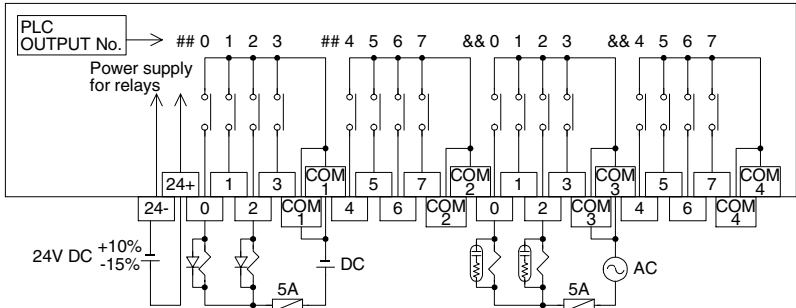


8. OUTPUT BLOCKS WIRING

■ Outputs specification

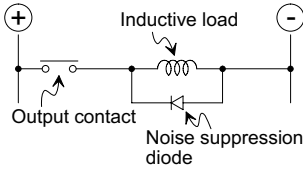
|                        |           | RELAY                           | TRIAC                             | TRANSISTOR                        |
|------------------------|-----------|---------------------------------|-----------------------------------|-----------------------------------|
| Switched voltages      |           | Less than 250V AC 30V DC        | Between 85 - 242V AC              | 5 - 30V DC                        |
| Circuit isolation      |           | By relay coil                   | Photocoupler                      | Photocoupler of base unit         |
| Operation indication   |           | LED is lit when coil is active. | LED is lit when output is active. | LED is lit when output is active. |
| Maximum load           | resistive | 2A/pt 8A/4pts(com)              | 0.3A/pt 0.8A/4pts(com)            | 0.5A/pt 0.8A/4pts(com)            |
|                        | inductive | 80VA                            | 15VA, 100V AC<br>36VA, 240V AC    | 12W 24V DC                        |
|                        | indicator | 100W                            | 30W                               | 1.5W 24V DC                       |
| Leakage current        |           | —                               | 1mA, 100V AC<br>2mA, 200V AC      | 0.1mA 30V DC                      |
| Minimum load           |           | 2mA 5V DC                       | 0.4VA, 100V AC<br>1.6VA, 200V AC  | —                                 |
| Response time          | OFF⇒ON    | Approx. 10ms                    | Less than 2ms                     | Approx. 0.2ms                     |
|                        | ON⇒OFF    |                                 | Less than 12ms                    | Approx. 1.5ms                     |
| Indicator input supply |           | 24V DC 5mA/1pt                  | 24V DC 7mA/1pt                    | 24V DC 7mA/1pt                    |

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



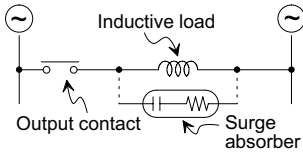
Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 5 to 10 A for every four points.

[ 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. 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.

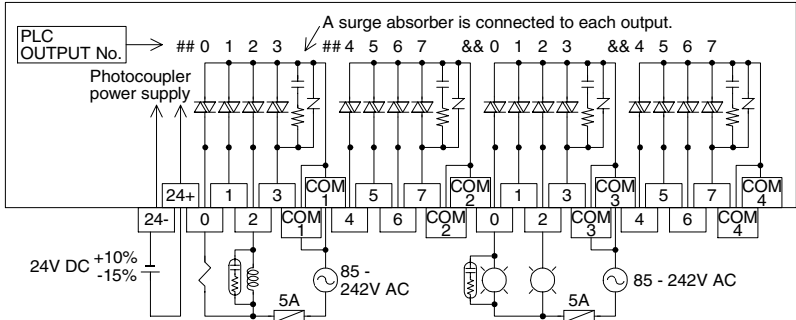
0.1 μF capacitor + 100 to 120 Ω resistor

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.

Have in mind that the life time of a relay contact becomes considerably shorter even in the condition below if the rush current is shut down.

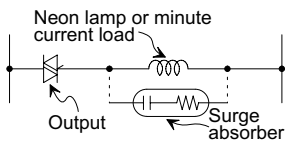
| LOAD CAPACITY<br>(Test condition: ON for 1 second<br>and OFF for 1 second) |                 | LIFE TIME OF<br>CONTACT | EXAMPLE OF APPLICABLE LOAD<br>(Magnetic switch manufactured by<br>our company) |
|--|-----------------|-------------------------|--|
| 35VA   | 0.35A / 100V AC | 3,000,000 times         | S-K10 ~ S-K150<br>S-N10 ~ S-N35  |
|  | 0.17A / 200V AC |                         |  |
| 80VA   | 0.8A / 100V AC  | 1,000,000 times         | S-K180 ~ S-K400  |
|  | 0.4A / 200V AC  |                         |  |
| 120VA  | 1.2 / 100V AC   | 200,000 times           | S-K600, S-K800   |
|  | 0.6A / 200V AC  |                         |  |

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



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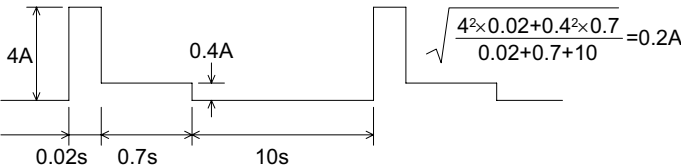
[ MINUTE CURRENT LOAD ]



To a neon lamp or a minute current load of 0.4VA/100V AC, 1.6VA/200V AC or less, connect a surge absorber in parallel.

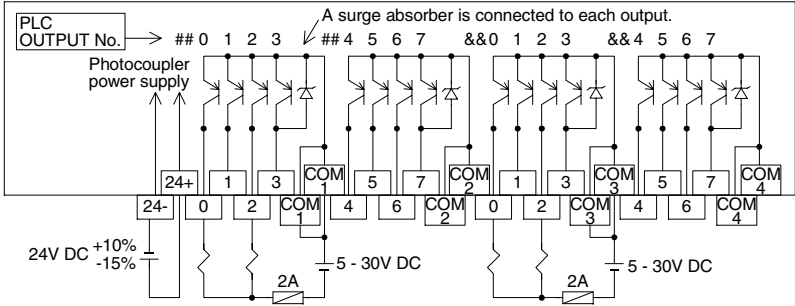
[ OUTPUT CURRENT ]

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 an average). When turning on and off frequently a load with large rush current, set the square average current to 0.2 A or less.

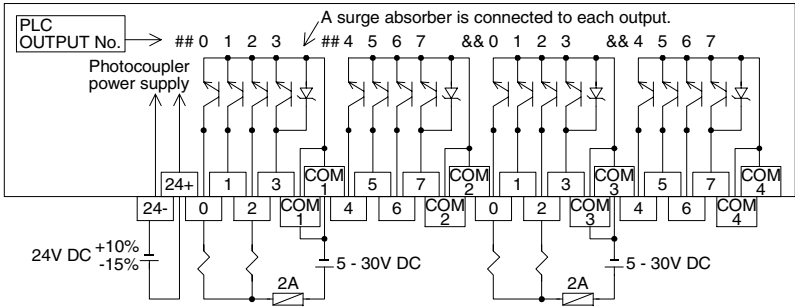


■ Transistor output blocks wiring

FX-16EYT-ESS-TB/UL (source)



FX-16EYT-ES-TB/UL, FX-16EYT-TB (sink)




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.

[ 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.

「电器电子产品有害物质限制使用标识要求」的表示方式

 Note: This symbol mark is for China only.

含有有害6物质的名称，含有量，含有部品  
本产品中所含有的有害6物质的名称，含有量，含有部品如下表所示。

| 产品中有害物质的名称及含量 |      |           |           |           |                  |               |                 |
|---------------|------|-----------|-----------|-----------|------------------|---------------|-----------------|
| 部件名称          |      | 有害物质      |           |           |                  |               |                 |
|               |      | 铅<br>(Pb) | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(Cr (VI)) | 多溴联苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
| 可编程控制器        | 外壳   | ○         | ○         | ○         | ○                | ○             | ○               |
|               | 印刷基板 | ×         | ○         | ○         | ○                | ○             | ○               |

本表格依据SJ/T 11364的规定编制。

○ :表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。  
× :表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。

基于中国标准法的参考规格：GB/T15969. 2

Manual number : JY992D50401

Manual revision : J

Date : May 2018



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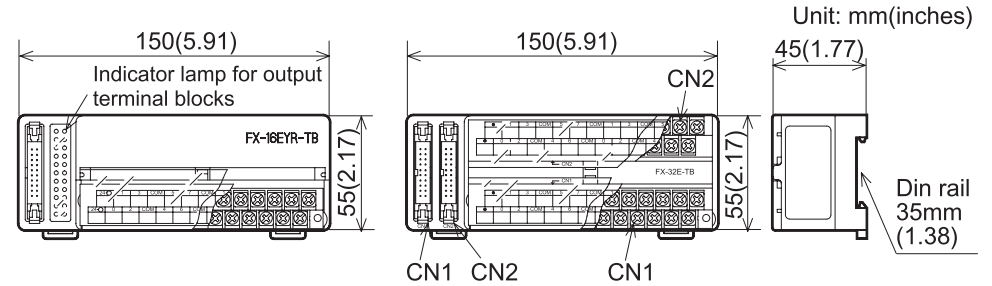
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| FX-32E-TB/UL       | 32 pt or 16/16 pt (Direct input/output) |                           |  |                     |
| FX-16EYR-ES-TB/UL  | —                                       | 16 pt (Relay)             |  | 80mA (5mA/1pt)      |
| FX-16EYS-ES-TB/UL  | —                                       | 16 pt (Triac)             |  |                     |
| FX-16EYT-ESS-TB/UL | —                                       | 16 pt (Transistor source) | FX2C-□□MT-ESS/UL<br>FX2NC-□□MT-DSS<br>FX2NC-□□EYT-DSS                                    | 112mA (7mA/1pt)     |
| FX-16EYT-ES-TB/UL  | —                                       | 16 pt (Transistor sink)   |  |                     |
| FX-16EX-A1-TB/UL   | 16 pt (100V AC)                         | —                         | FX2C-□□MT-E/UL   | 48mA (3mA/1pt)      |

| MODEL         | INPUT                       | OUTPUT                  | APPLICABLE PLC   | CURRENT CONSUMPTION |
|---------------|-----------------------------|-------------------------|--|---------------------|
| FX-16E-TB     | 16 pt (Direct input/output) |                         | FX2NC-□□MT-D/UL<br>FX2NC-□□EX-D/UL<br>FX2NC-□□EYT-D/UL | —                   |
| FX-16EYR-TB   | —                           | 16 pt (Relay)           | FX2NC-□□MT-D/UL<br>FX2NC-□□EYT-D/UL                    | 80mA (5mA/1pt)      |
| FX-16EYT-TB   | —                           | 16 pt (Transistor sink) | FX2NC-□□MT-D/UL<br>FX2NC-□□EYT-D/UL                    | 112mA (7mA/1pt)     |
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2. EXTERNAL DIMENSION

FX-16E-TB/UL, FX-16E-TB  
FX-16EY□(□: R/T/S)-TB/UL  
FX-16EY□(□: R/T)-TB  
FX-16EX-A1-TB/UL, FX-16EX-A1-TB

FX-32E-TB/UL  
FX-32E-TB

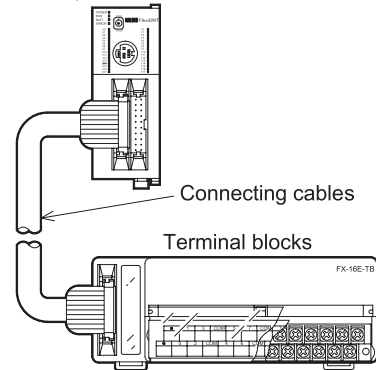


Accessories

- Input / output extension block labels
- Terminal layout cards

3. CONFIGURATION AND OPTIONS

FX2C,FX2NC PLC



| STANDARD PRE TERMINATED CABLES |               |                 |
|--------------------------------|---------------|-----------------|
| LENGTHS                        | FLAT CABLES   | ROUND CABLES    |
| 1.5 m (4.9 ft)                 | FX-16E-150CAB | FX-16E-150CAB-R |
| 3.0 m (9.8 ft)                 | FX-16E-300CAB | FX-16E-300CAB-R |
| 5.0 m (16.4 ft)                | FX-16E-500CAB | FX-16E-500CAB-R |

4. CONNECTOR CABLE PIN CONFIGURATION

| PLC          | TERMINAL BLOCKS        |
|--------------|------------------------|
| ( ): Pin No. | ( ): Pin No.           |
| X/Y000 (1)   | (1) X/Y000 (11) X/Y010 |
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| X/Y002 (3)   | (3) X/Y002 (13) X/Y012 |
| X/Y003 (4)   | (4) X/Y003 (14) X/Y013 |
| X/Y004 (5)   | (5) X/Y004 (15) X/Y014 |
| X/Y005 (6)   | (6) X/Y005 (16) X/Y015 |
| X/Y006 (7)   | (7) X/Y006 (17) X/Y016 |
| X/Y007 (8)   | (8) X/Y007 (18) X/Y017 |
| COM (9)      | (9) COM (19) COM       |
| ● (10)       | (10) ● (20) ●          |

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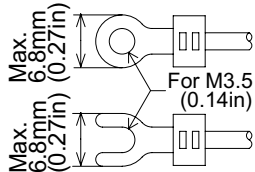
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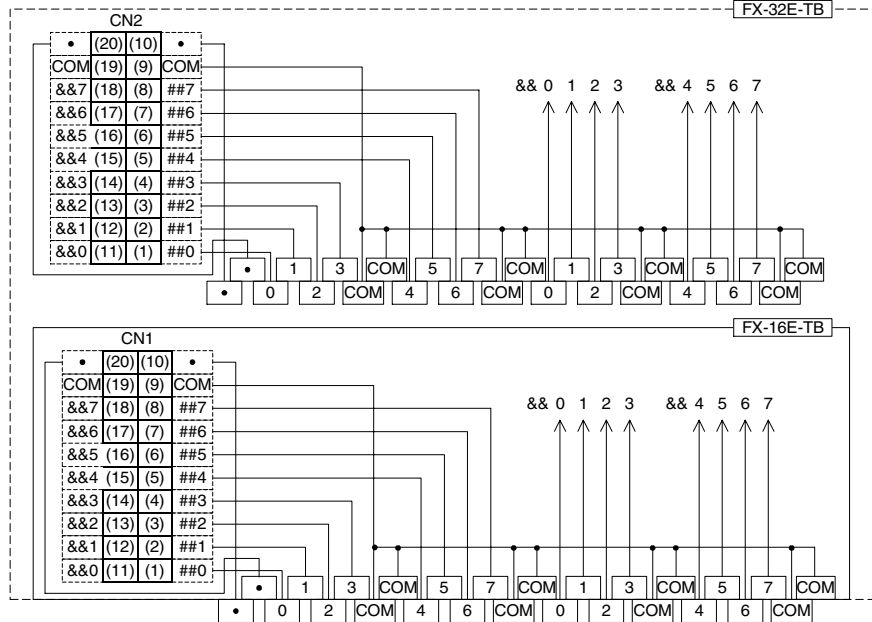
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- ☆ Where I/O signals are used over an extended distance consideration must be made for voltage drop and noise interference.
- ☆ Use crimp-style terminals of the dimensions shown in the figure below.
- ☆ Tighten terminals at a torque of 0.5 to 0.8 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.



6. DIRECT INPUT BLOCKS AND DIRECT OUTPUT BLOCKS WIRING

Internal circuit



- (9) and (19) of both CN1 and CN2 are short-circuited internally.

Inputs

| PLC              | TYPE             | TYPICAL WIRING |
|------------------|------------------|----------------|
| FX2C-□□MT-ESS/UL | Source (-ve S/S) |                |



■ Outputs

| PLC   | TYPE   | TYPICAL WIRING |
|---|--------|----------------|
| FX2C-□□MT-ESS/UL<br>FX2NC-□□MT-DSS<br>FX2NC-□□EYT-DSS | Source |                |
| FX2C-□□MT-E/UL<br>FX2NC-□□MT-D/UL<br>FX2NC-□□EYT-D/UL | Sink   |                |

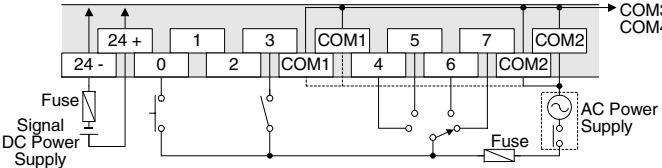
For the I/O specifications and detailed information, refer to the FX2c Hardware Manual or the FX2nc Hard-ware Manual.

7. AC INPUT BLOCK WIRING

■ Specifications

|                      |           |  |
|----------------------|-----------|--|
| Input                | Voltages  | 85 - 132V AC 50/60Hz                     |
|                      | Impedance | 21kΩ / 50Hz<br>18kΩ / 60Hz               |
|                      | Current   | 6.2mA 110V AC/60Hz<br>4.7mA 100V AC/50Hz |
| Circuit isolation    |           | Photocoupler                             |
| Operation indication |           | LED of base unit                         |
| Switch Rating        | OFF ⇒ ON  | 80V 3.8mA                                |
|                      | ON ⇒ OFF  | 30V 1.7mA                                |
| Response time        |           | 25 - 30ms                                |
| Signal input supply  |           | 24V DC 3mA/1pt                           |

■ Typical wiring

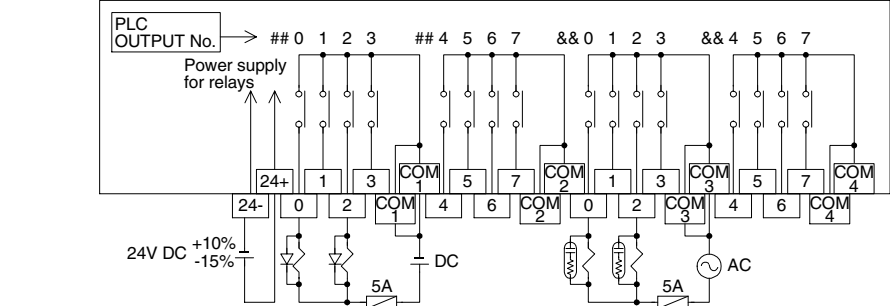


8. OUTPUT BLOCKS WIRING

■ Outputs specification

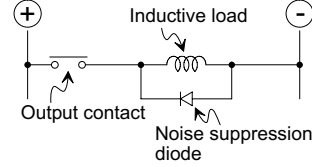
|                        | RELAY                           | TRIAC                             | TRANSISTOR                        |
|------------------------|---------------------------------|-----------------------------------|-----------------------------------|
| Switched voltages      | Less than 250V AC 30V DC        | Between 85 - 242V AC              | 5 - 30V DC                        |
| Circuit isolation      | By relay coil                   | Photocoupler                      | Photocoupler of base unit         |
| Operation indication   | LED is lit when coil is active. | LED is lit when output is active. | LED is lit when output is active. |
| Maximum load           | resistive                       | 2A/pt 8A/4pts(com)                | 0.3A/pt 0.8A/4pts(com)            |
|                        | inductive                       | 80VA                              | 15VA, 100V AC<br>36VA, 240V AC    |
|                        | indicator                       | 100W                              | 30W                               |
| Leakage current        | —                               | 1mA, 100V AC<br>2mA, 200V AC      | 0.1mA 30V DC                      |
| Minimum load           | 2mA 5V DC                       | 0.4VA, 100V AC<br>1.6VA, 200V AC  | —                                 |
| Response time          | OFF⇒ON                          | Approx. 10ms                      | Approx. 0.2ms                     |
|                        | ON⇒OFF                          | Approx. 10ms                      | Approx. 1.5ms                     |
| Indicator input supply | 24V DC 5mA/1pt                  | 24V DC 7mA/1pt                    | 24V DC 7mA/1pt                    |

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



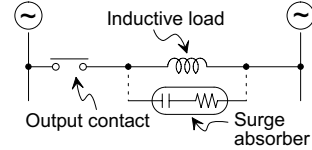
Terminal blocks are not equipped with built-in fuses. In order to prevent breakdown of circuits caused by load short-circuit, provide a fuse of 5 to 10 A for every four points.

[ 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. 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 ]



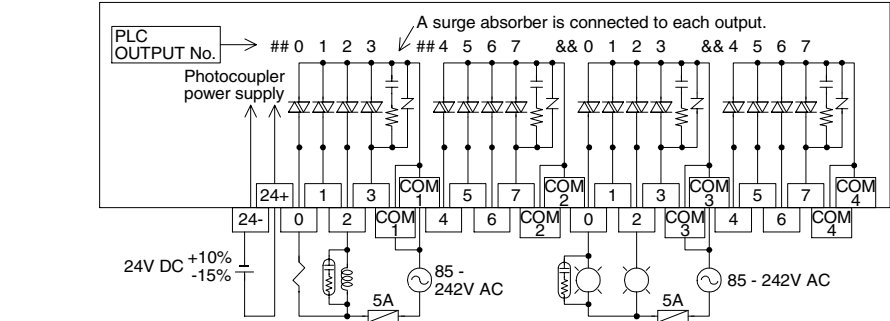
When a surge absorber is connected to an AC inductive load in parallel, noise generation is reduced.  
0.1 μF capacitor + 100 to 120 Ω resistor

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.

Have in mind that the life time of a relay contact becomes considerably shorter even in the condition below if the rush current is shut down.

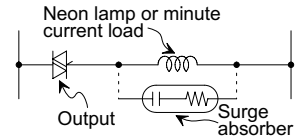
| LOAD CAPACITY<br>(Test condition: ON for 1 second<br>and OFF for 1 second) |                 | LIFE TIME OF<br>CONTACT | EXAMPLE OF APPLICABLE LOAD<br>(Magnetic switch manufactured by<br>our company) |
|--|-----------------|-------------------------|--|
| 35VA   | 0.35A / 100V AC | 3,000,000 times         | S-K10 ~ S-K150<br>S-N10 ~ S-N35  |
|  | 0.17A / 200V AC |                         |  |
| 80VA   | 0.8A / 100V AC  | 1,000,000 times         | S-K180 ~ S-K400  |
|  | 0.4A / 200V AC  |                         |  |
| 120VA  | 1.2 / 100V AC   | 200,000 times           | S-K600, S-K800   |
|  | 0.6A / 200V AC  |                         |  |

■ Triac output block FX-16EYS-ES-TB/UL 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 10 A for every four points.

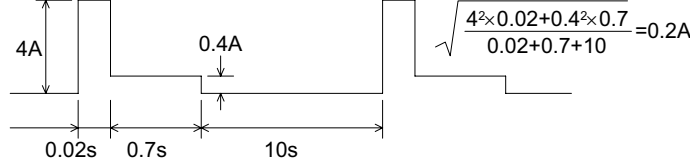
[ MINUTE CURRENT LOAD ]



To a neon lamp or a minute current load of 0.4VA/100V AC, 1.6VA/200V AC or less, connect a surge absorber in parallel.

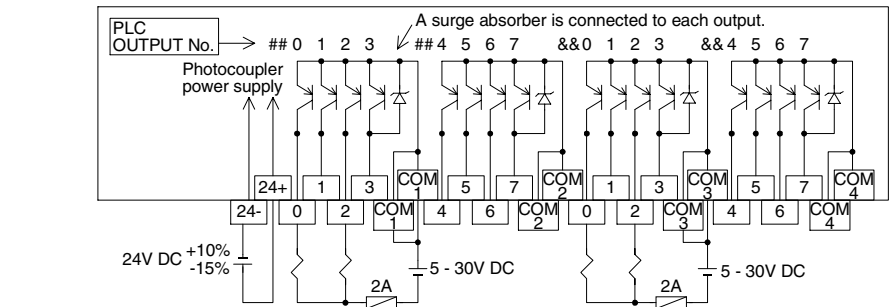
[ OUTPUT CURRENT ]

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 an average). When turning on and off frequently a load with large rush current, set the square average current to 0.2 A or less.

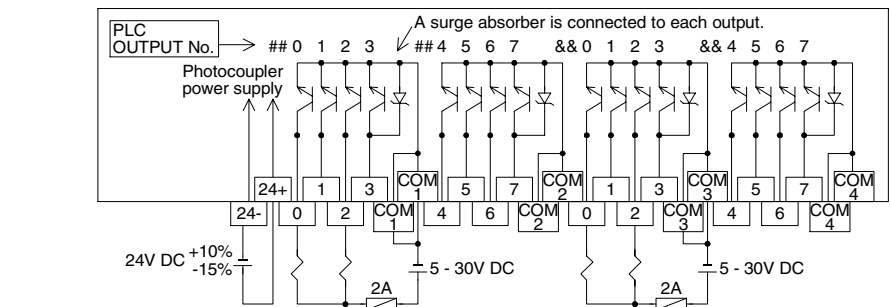


■ Transistor output blocks wiring

FX-16EYT-ESS-TB/UL (source)



FX-16EYT-ES-TB/UL, FX-16EYT-TB (sink)



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.

[ 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.

「电器电子产品有害物质限制使用标识要求」的表示方式

15 Note: This symbol mark is for China only.

含有有害6物质的名称, 含有量, 含有部品  
本产品中所含有的有害6物质的名称, 含有量, 含有部品如下表所示。

|        |      | 产品中有害物质的名称及含量 |        |        |               |            |              |
|--------|------|---------------|--------|--------|---------------|------------|--------------|
| 部件名称   |      | 有害物质          |        |        |               |            |              |
|        |      | 铅 (Pb)        | 汞 (Hg) | 镉 (Cd) | 六价铬 (Cr (VI)) | 多溴联苯 (PBB) | 多溴二苯醚 (PBDE) |
| 可编程控制器 | 外壳   | ○             | ○      | ○      | ○             | ○          | ○            |
|        | 印刷基板 | ×             | ○      | ○      | ○             | ○          | ○            |

本表格依据SJ/T 11364的规定编制。

○:表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。  
×:表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。

基于中国标准法的参考规格: GB/T15969. 2

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MITSUBISHI ELECTRIC CORPORATION

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Specifications are subject to  
change without notice