IDEC

INSTRUCTION SHEET

SmartAXIS
FT1A Series

Confirm that the delivered product is what you have ordered. Read this instruction sheet to make sure of correct operation. Make sure that the instruction sheet is kept by the end user.

SAFETY NOTE

In this operation instruction sheet, safety precautions are categorized in order of importance to Warning and Caution :

⚠ **WARNING**

Warning notices are used to emphasize that improper operation may cause severe personal injury or death.

⚠ **CAUTION**

Caution notices are used where inattention might cause personal injury or damage to equipment.

⚠ **WARNING**

- The SmartAXIS is not designed for use in medical equipment, nuclear power, railways, aviation, passenger vehicle equipment, or similar applications requiring a high degree of reliability and safety. The SmartAXIS cannot be used for such applications.
- When using the SmartAXIS in applications not described above that require a high degree of reliability in terms of functionality and precision, appropriate measures such as failsafe mechanisms and redundant mechanisms must be taken for the system containing the SmartAXIS.
- Emergency stop and interlocking circuits must be configured outside the SmartAXIS.
- If relays or transistors in the SmartAXIS output circuits should fail, outputs may remain at on or off state. For output signals which may cause serious accidents, configure monitor circuits outside the SmartAXIS.
- The SmartAXIS self-diagnostic function may detect internal circuit or program errors, stop programs, and turn outputs off. Configure circuits so that the system containing the SmartAXIS is not jeopardized when outputs turn off.
- Turn off power to the SmartAXIS before installation, removal, wiring, maintenance, and inspection of the SmartAXIS. Failure to turn power off may cause electrical shocks or fire hazard.
- Special expertise is required to install, wire, program, and operate the SmartAXIS. People without such expertise must not use the SmartAXIS.
- Install the SmartAXIS according to the instructions described in this Instruction Sheet. Improper installation will result in falling, failure, or malfunction of the SmartAXIS.

⚠ **CAUTION**

- The SmartAXIS is designed for installation in a cabinet. Do not install the SmartAXIS outside a cabinet.
- Install the SmartAXIS in environments described in FT1A series Pro/Lite user's manual. If the SmartAXIS is used in places where the SmartAXIS is subjected to high-temperature, high-humidity, condensation, corrosive gases, excessive vibrations, and excessive shocks, then electrical shocks, fire hazard, or malfunction will result.
- The environment for using the SmartAXIS is "Pollution degree 2." Use the SmartAXIS in environments of pollution degree 2 (according to IEC 60664-1).
- Prevent the SmartAXIS from falling while moving or transporting the SmartAXIS, otherwise damage or malfunction of the SmartAXIS will result.
- Wiring must use lead sizes that are appropriate for the applied voltage and current. Terminal screws must be tightened with the prescribed tightening torque.
- Prevent metal fragments and pieces of wire from dropping inside the SmartAXIS housing. Put a cover on the SmartAXIS modules during installation and wiring. Ingress of such fragments and chips may cause fire hazard, damage, or malfunction.
- Use a power supply of the rated value. Use of a wrong power supply may cause fire hazard.
- Use an IEC 60127-approved fuse on the power line outside the SmartAXIS. This is required when equipment containing the SmartAXIS is destined for Europe.
- Use an IEC 60127-approved fuse on the output circuit. This is required when equipment containing the SmartAXIS is destined for Europe.
- Use an EU-approved circuit breaker. This is required when equipment containing the SmartAXIS is destined for Europe.
- Make sure of safety before starting and stopping the SmartAXIS or when operating the SmartAXIS to force outputs on or off. Incorrect operation on the SmartAXIS may cause machine damage or accidents.
- Do not connect the ground wire directly to the SmartAXIS. Connect a protective ground to the cabinet containing the SmartAXIS using an M4 or larger screw. This is required when equipment containing the SmartAXIS is destined for Europe.
- Do not disassemble, repair, or modify the SmartAXIS modules.
- The SmartAXIS contains electronic parts and batteries. When disposing of the SmartAXIS, do so in accordance with national and local regulations.

- Recommended continuous turn on time is 15 hours when first use or did not turn on for a long time. When battery charging and discharging is repeated without that, battery life becomes shorter than the specification value.

1 Unpacking

Before installing the FT1A Series, make sure that following items are contained completely without damage during transportation.

Item	Type Number	Number
Module	FT1A-****	1
Instruction sheet	B-1467,B-1468,B-1469	1 for each
(Japanese/English/Simplified Chinese)		

2 Parts Description

SmartAXIS Pro
Example: FT1A-H48KA
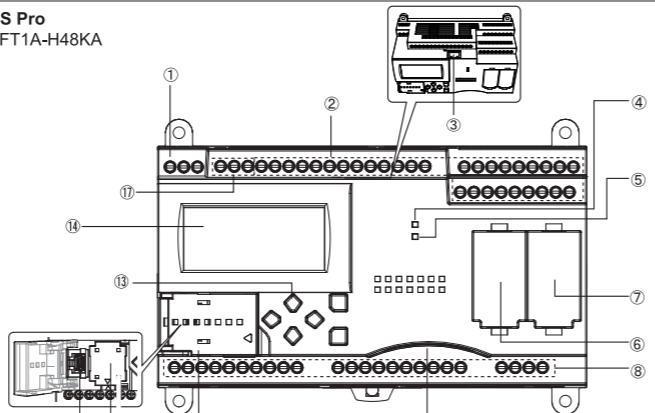
SmartAXIS Lite
Example: FT1A-B48KA
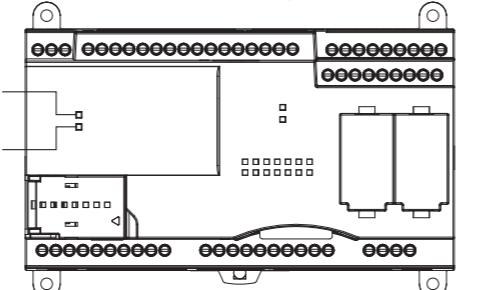

① Power Supply Terminals
② Input Terminals
③ Ethernet Port
④ Ethernet Status LED [Ethernet]
⑤ SD Memory Card Status LED [SD Access]
⑥ Expansion Communication Port (Port 2)
⑦ Expansion Communication Port (Port 3)
⑧ Output Terminals
⑨ SD Memory Card Slot
⑩ USB Port Cover
⑪ Memory Cartridge Port
⑫ USB Port (USB 2.0 Mini-B Connector)
⑬ Operation Switches
⑭ LCD
⑮ Power/Operation Status LED [PWR/RUN]
⑯ Error Status LED [ERR]
⑰ Sensor Power Terminals

3 Dimensions
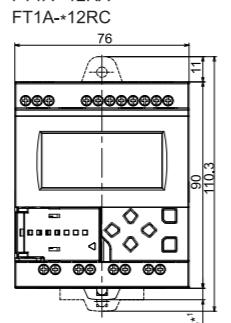
FT1A-*12RA
FT1A-*12RC

FT1A-*12RA

FT1A-*12RC
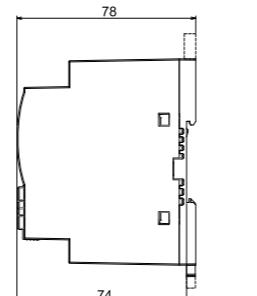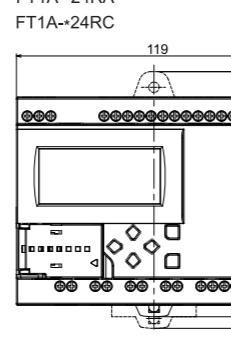
FT1A-*24RA
FT1A-*24RC

FT1A-*24RA

FT1A-*24RC
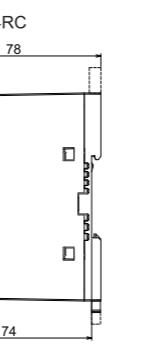
FT1A-*40RSA, FT1A-*40RKA
FT1A-*40RC

FT1A-*40RSA,
FT1A-*40RKA

FT1A-H40RC
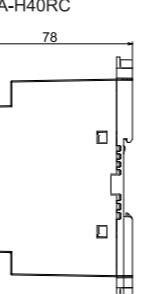
FT1A-*48SA, FT1A-*48KA
FT1A-*48SC, FT1A-*48KC
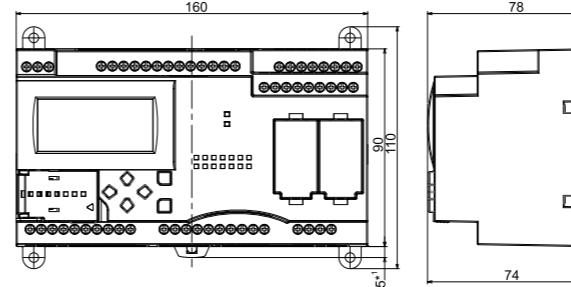
*1 9.3 mm when the clamp is pulled out.

### 4 Mounting

Mounting on DIN Rail
1. Fasten the DIN rail to a panel using screws firmly.
2. Using a flat screwdriver, lower the DIN rail hook and hang the SmartAXIS on the DIN rail.

2. Hook SmartAXIS over DIN rail.
DIN Rail
1. Lower DIN rail hook.
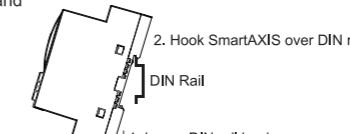
3. Align the SmartAXIS with the DIN rail and raise the DIN rail hook.

DIN Rail
2. Raise DIN rail hook.
1. Align with DIN rail.
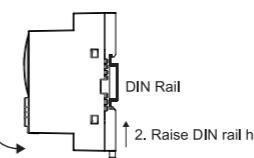
4. Secure both ends of the SmartAXIS using the DIN rail brackets.

DIN Rail Bracket (BNL6)
DIN Rail
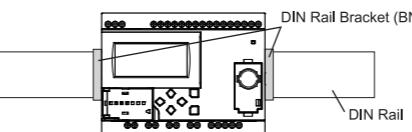
**Direct Mounting on Panel Surface**
Preparations
When directly mounting the 12- and 24-I/O types, pull out the direct-mounting hook and the DIN rail hook on the back of the SmartAXIS, and attach the SmartAXIS to the mounting plate using the screw holes. Attach the 40- and 48-I/O types to the mounting plate using the screw holes on the back of the SmartAXIS.

Direct-mounting Hook
Screw Hole
DIN Rail Hook
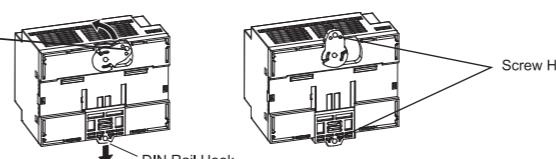
Mounting Hole Layout for Direct Mounting on Panel Surface
Attach the SmartAXIS to the mounting plate using M4 tapping screws as shown below or make 5- to 6-mm mounting holes and secure the SmartAXIS using M4 pan head screws.
Always give sufficient consideration to operability, ease-of-maintenance, and environmental resistance when deciding on the mounting position.

- 12-I/O type (FT1A-H12RA, FT1A-B12RA, FT1A-H12RC, FT1A-B12RC)
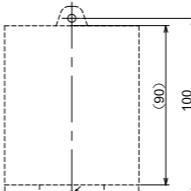
- 24-I/O type (FT1A-H24RA, FT1A-B24RA, T1A-H24RC, FT1A-B24RC)
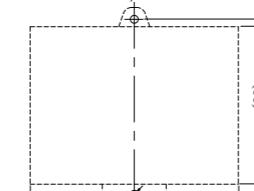
- 40-I/O type (FT1A-H40RKA, FT1A-H40RSA, FT1A-B40RKA, FT1A-B40RSA, FT1A-H40RC, FT1A-B40RC)

- 48-I/O type (FT1A-H48KA, FT1A-H48SA, FT1A-B48KA, FT1A-B48SA, FT1A-H48KC, FT1A-H48SC, FT1A-B48KC, FT1A-B48SC)
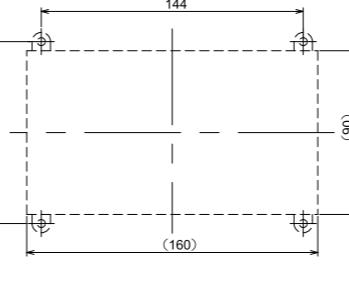
When directly mounting the SmartAXIS, tighten mounting screws with torque of 1 N·m.

5 Mounting Direction

The SmartAXIS can be mounted face-upward when the ambient temperature is 35°C or below, and can be mounted side-on when the ambient operating temperature is 40°C or below.

Allowable Mounting Direction at 40°C or below

Allowable Mounting Direction at 35°C or below
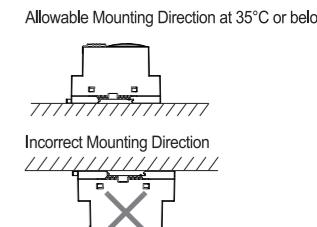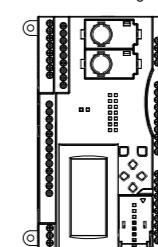
Incorrect Mounting Direction

Mounting Space
To allow for heat dissipation and facilitate replacement, ensure that there is at least 20 to 40 mm between the SmartAXIS and surrounding equipment and ducts.


20 mm minimum
40 mm minimum
40 mm minimum
DIN Rail
20 mm minimum
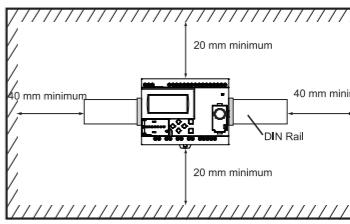
Mounting Two or More Units

40 mm minimum
20 mm minimum
DIN Rail
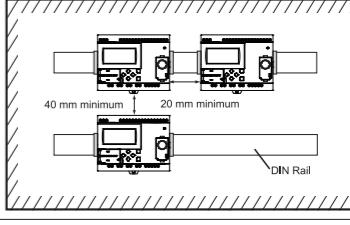
6 Power Supply Wiring

AC Power Type
AC power type models are connected as shown below.
Example: FT1A-*12**C

AC85 to 264V
Fuse
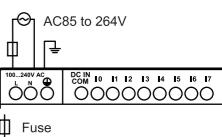
- When Power Is Turned Off
AC power type models detect a power failure when the power voltage drops below 85V AC. A momentary power interruption of 10 ms or less is not recognized as a power failure (at the rated voltage).
- Inrush Current at Powerup
When the SmartAXIS is powered up, an inrush current of a maximum of 35A flows. Use a power supply with sufficient capacity.

DC Power Type
DC power type models are connected as shown below.
Example: FT1A-*12**A


DC20.4 to 28.8V
Fuse
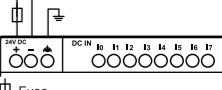
- When Power Is Turned Off
DC power type models detect a power failure when the power voltage drops below 20.4V DC. A momentary power interruption of 10 ms or less is not recognized as a power failure (at the rated voltage).
- Inrush Current at Powerup
When the SmartAXIS is powered up, an inrush current of a maximum of 30A flows. Use a power supply with sufficient capacity.

Power Supply Wiring
When connecting the power supply, be sure to observe the following:
- Use a stranded wire of UL1015 AWG22 or UL1007 AWG18 for power supply wiring. Make the power supply wiring as short as possible.
- Run the power supply wiring as far away as possible from motor lines.
- ⏚ is the protective ground terminal. To prevent electric shocks, use a D-type ground (type 3: ground resistance of 100 Ω or less).
- ⏚ is the functional ground terminal. To prevent malfunction or breakdown due to noise, use a D-type ground (type 3: ground resistance of 100 Ω or less).
- When connecting stranded wire or multiple wires to a terminal block, always use a ferrule.

Grounding
When grounding the power supply, be sure to observe the following:
Do not connect the ground line to a shared ground line with motor equipment. However, this can be done if both ground wires are the same length.
- Use a ground wire of UL1007 AWG16.
- Use a thick wire for grounding the SmartAXIS and make the grounding wire as short as possible to make sure that noises from external devices can be conducted to the ground effectively.
- As shown below, external devices that are the source of noise must be separated from the SmartAXIS and a D-type (type 3) ground installed.
- Make the distance of the ground line from the SmartAXIS as short as possible.

SmartAXIS | Inverter or similar external device
Type 3 Ground

SmartAXIS | Inverter or similar external device
A
Type 3 Ground | Length A = B

SmartAXIS | Inverter or similar external device

7 Input and Output Wiring

FT1A-H12RA, FT1A-B12RA
Terminal Arrangement and Wiring Diagrams

Input Side

Output Side

: Fuse
Ⓛ : Load
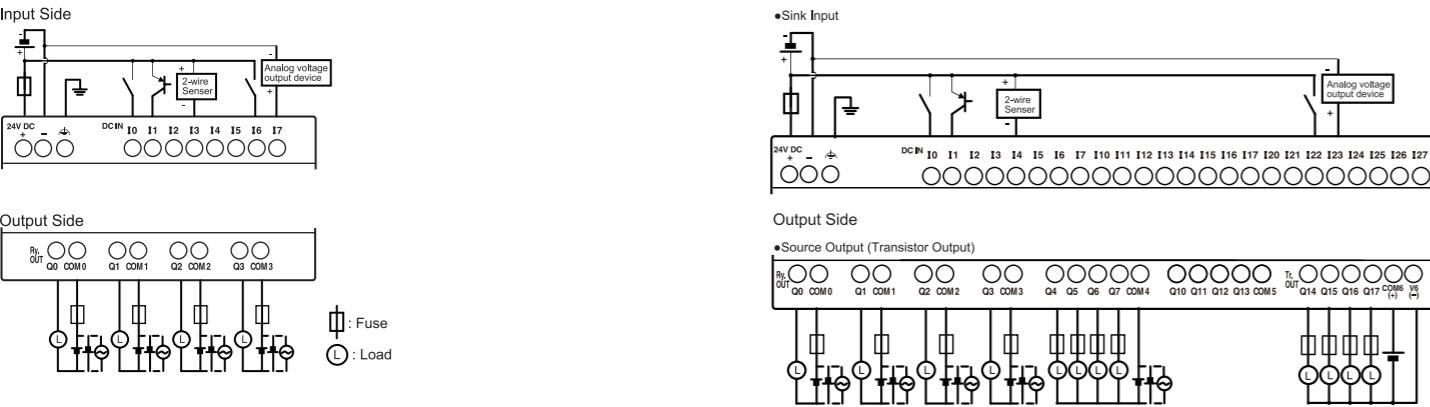
FT1A-H12RC, FT1A-B12RC
Terminal Arrangement and Wiring Diagrams

Input Side

Output Side

: Fuse
Ⓛ : Load
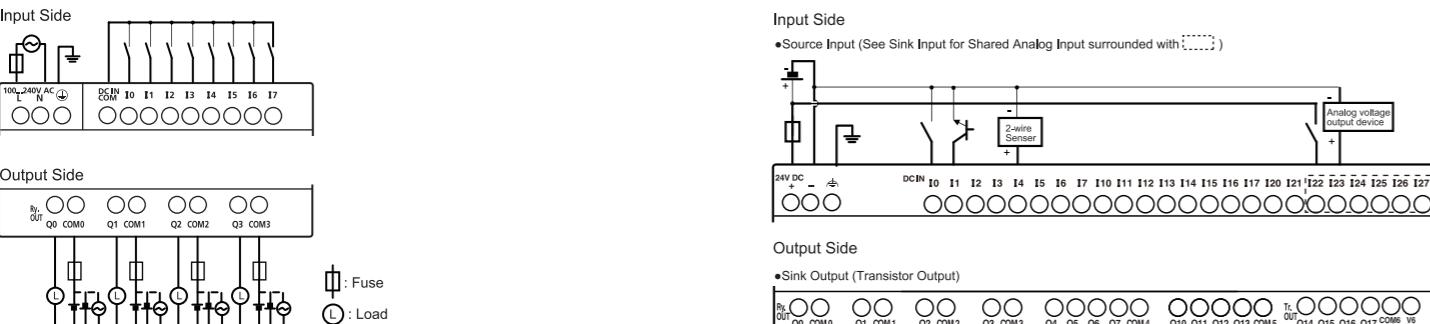
FT1A-H24RA, FT1A-B24RA
Terminal Arrangement and Wiring Diagrams

Input Side

Output Side

: Fuse
Ⓛ : Load
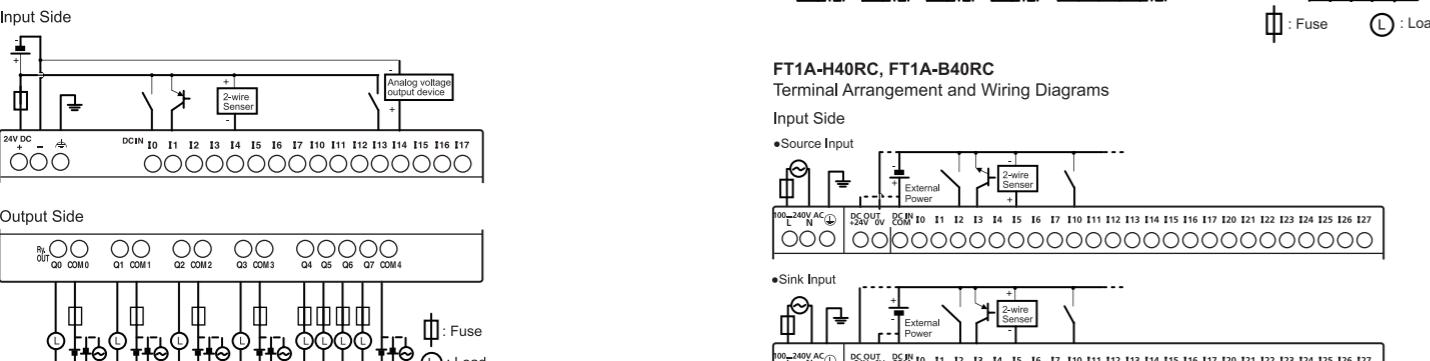
FT1A-H24RC, FT1A-B24RC
Terminal Arrangement and Wiring Diagrams

Input Side
● Source Input

● Sink Input

Output Side

: Fuse
Ⓛ : Load
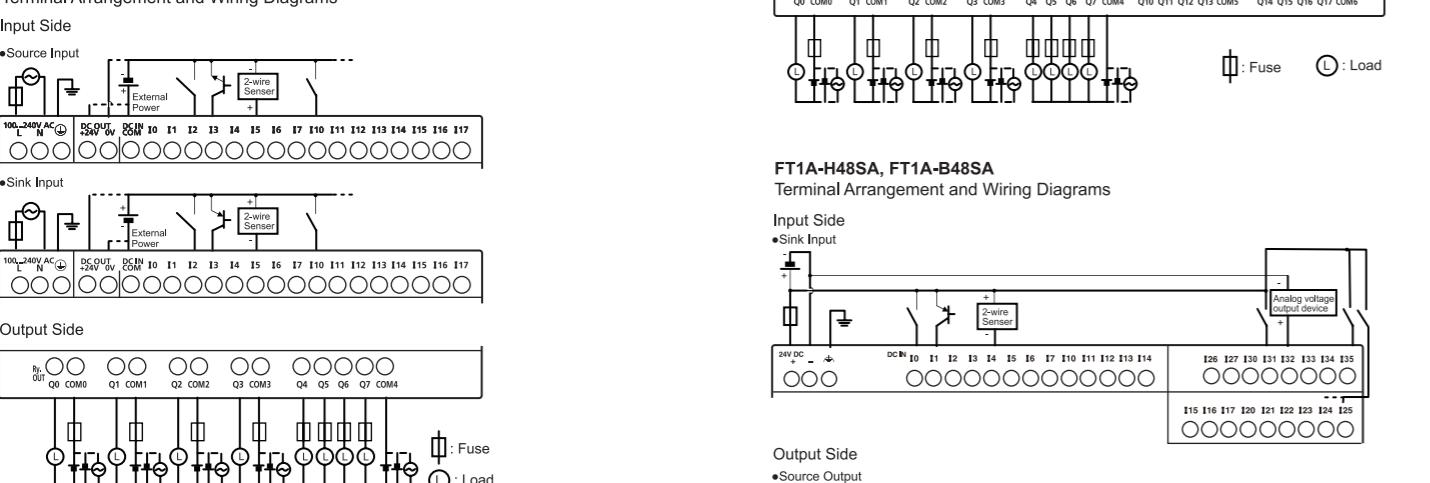
FT1A-H40RSA, FT1A-B40RSA
Terminal Arrangement and Wiring Diagrams

Input Side
● Sink Input

Output Side
● Source Output (Transistor Output)
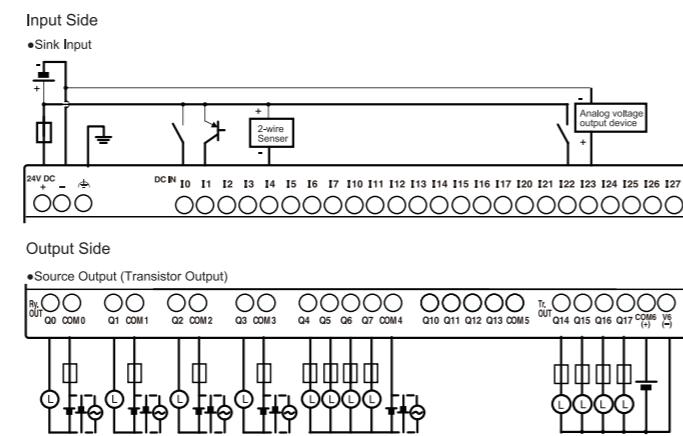
FT1A-H40RKA, FT1A-B40RKA
Terminal Arrangement and Wiring Diagrams

Input Side
● Source Input (See Sink Input for Shared Analog Input surrounded with ⌐ ⌐)

Output Side
● Sink Output (Transistor Output)

: Fuse   Ⓛ : Load
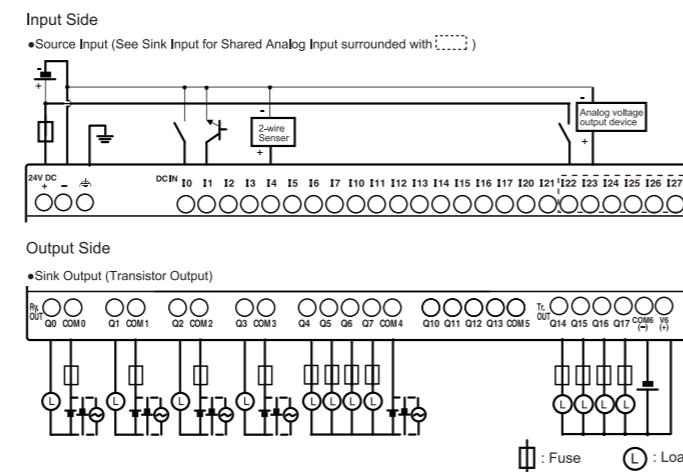
FT1A-H40RC, FT1A-B40RC
Terminal Arrangement and Wiring Diagrams

Input Side
● Source Input

● Sink Input

Output Side

: Fuse   Ⓛ : Load
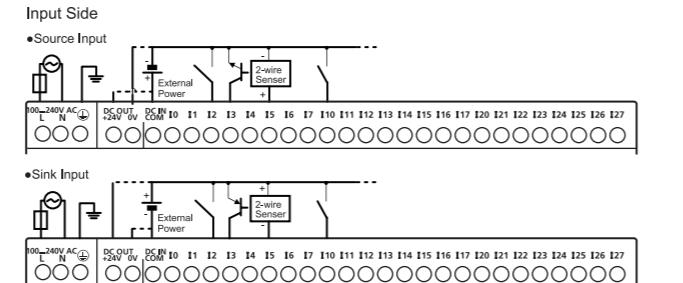
FT1A-H48SA, FT1A-B48SA
Terminal Arrangement and Wiring Diagrams

Input Side
● Sink Input

Output Side
● Source Output

: Fuse   Ⓛ : Load
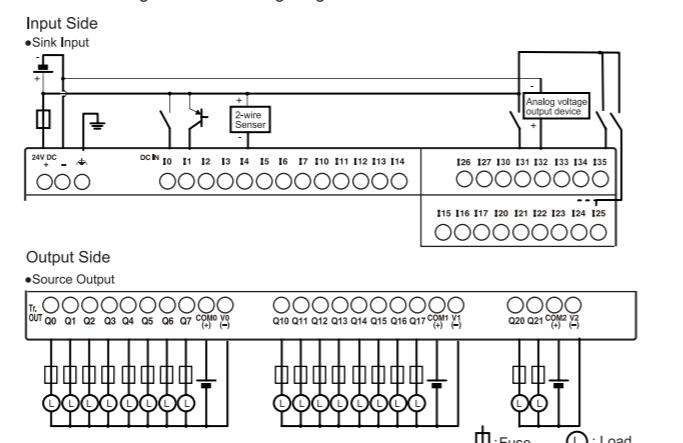
FT1A-H48KA, FT1A-B48KA
Terminal Arrangement and Wiring Diagrams

Input Side
● Source Input (See Sink Input for Shared Analog Input surrounded with ⌐ ⌐)

Output Side
● Sink Output

: Fuse   Ⓛ : Load
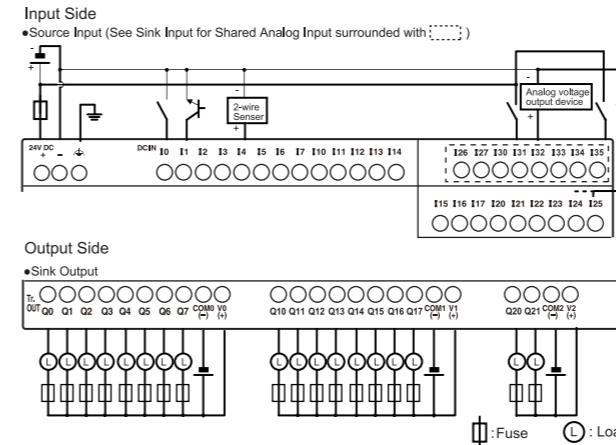
FT1A-B48SC, FT1A-H48SC
Terminal Arrangement and Wiring Diagrams

Input Side
● Source Input

● Sink Input

Output Side
● Source Output

: Fuse   Ⓛ : Load
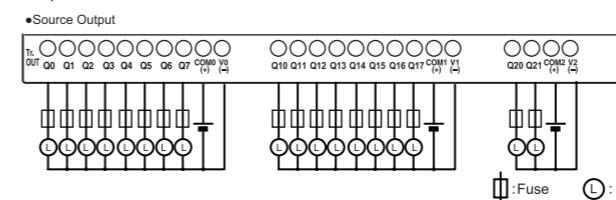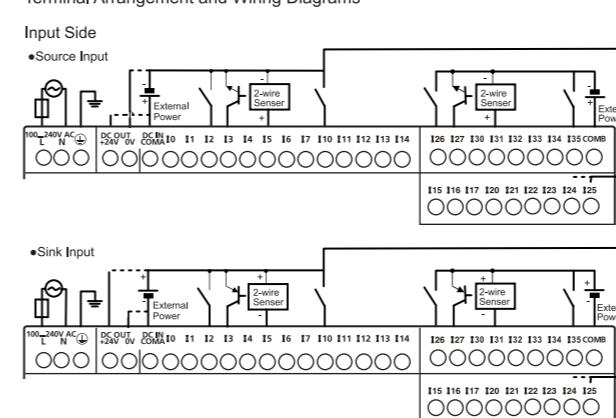
FT1A-H48KC, FT1A-B48KC
Terminal Arrangement and Wiring Diagrams

Input Side
● Source Input

● Sink Input

Output Side
● Sink Output

: Fuse   Ⓛ : Load
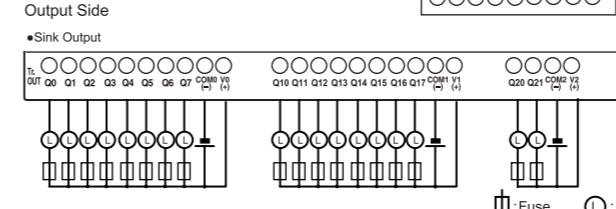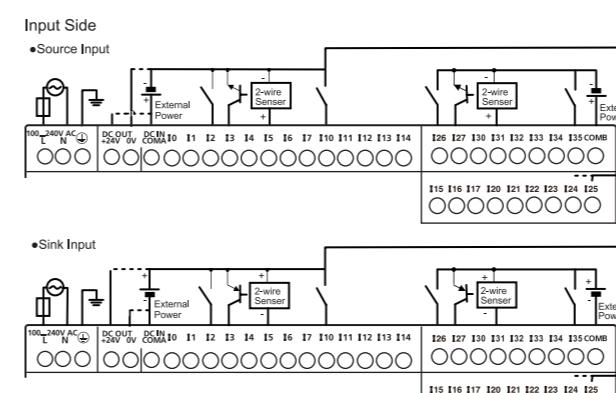
8 Terminal Connection

Terminals for Terminal Blocks

Crimp ferrules using a tool of the correct size. Cut the end of the wire to the same length as, or about 0.5 mm longer than, the ferrule, and ensure that the core wire does not protrude from the end of the sheath and that there are no whiskers or similar issues.

For 2-wire connection — Cable (AWG 22 to 18)
For 1-wire connection — Cable (AWG 24 to 18)
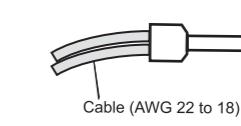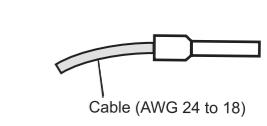
10 to 11 mm
Length of Stripped Section
Single Wire: AWG 16 to 12 (UL)
Stranded Wire: AWG 12 to 14 (JIS)

Correct — 0 to 0.5 mm
Whisker   Damage
Core wire visible   Stripped section too short
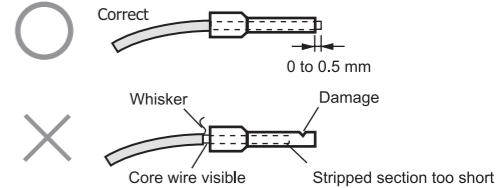
Ferrules

The ferrules and crimping tools below can be used.
Ferrules and crimping tools made by Phoenix Contact are recommended.

Quantity of Cables	Cable Size	Phoenix Type	Order No.	Pcs./Pkt.
For 1-wire connection	UL1007 AWG16	AI 1,5-8 BK	32 00 04 3	100
	UL1007 AWG18	AI 1-8 RD	32 00 03 0	100
	UL1015 AWG22	AI 0,5-8 WH	32 00 01 4	100
	UL2464 AWG24	AI 0,25-8 YE	32 03 03 7	100
For 2-wire connection	UL1007 AWG18	AI-TWIN 2 x 0,75-8 GY	32 00 80 7	100
	UL1015 AWG22	AI-TWIN 2 x 0,5-8 WH	32 00 93 3	100

Crimping Tool Order No.

Tool Name	Phoenix Type	Order No.	Pcs./Pkt.
Crimping Tool	CRIMPFOX ZA 3	12 01 88 2	1

Screw Terminal Tightening Torque : 0.5N·m

9 Regarding use in hazardous location

This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or non-hazardous locations only. (FT1A Version V140 or later)
This equipment is open-type and shall be mounted in a suitable enclosure.

⚠ **WARNING**

Warning - Explosion Hazard - Substitution of any components may impair suitability for Class I, Division 2.
Avertissement: Risque d'explosion. La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de classe I, division 2.
Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
Avertissement: Risque d'explosion. Avant de déconnecter l'equipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.
Warning - Explosion Hazard - The USB connector is not for use in the Division 2 area. Use of these connectors in a division 2 area could result in an explosion.
Avertissement: Risque d'explosion. Le connecteur USB n'est pas destiné à être utilisé dans une zone à risque d'explosion 2 . Risque d'explosion de l'appareil en cas d'utilisation des connecteurs USB dans une zone 2.

10 Regarding the Marine Standard Approved

This product complies with the following the Marine Standard. (FT1A Version V130 or later)
 -ABS (American Bureau of Shipping)
 -DNV GL (DNV GL AS)
 -LR (Lloyd's Register of Shipping)
 -NK (Nippon Kaiji Kyokai)
(Regarding the usable area, environment, please contact us.)

When using the Pro, Lite as the Marine Standard Approved Products, attach a ferrite core (ZCAT3035-1330 manufactured by TDK Corporation) to the power cables (2 turns)(except earth cable), the cable for Ethernet port (2 turns). And attach a ferrite core (ZCAT1730-0730) manufactured by TDK Corporation) to the cable for communication cartridge (2 turns).

IDEC CORPORATION