FA Goods

Analog Signal Conversion Module

FA-ATB8XTB, FA-ATKB8XTB
FA-ATKAA8XM
FA-ATSVM1X*****
FA-ATFTMXY

User's Manual

Thank you for purchasing FA Goods product.

Before using, please read this User's Manual and the relevant manuals carefully to ensure correct use.

MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED

● SAFETY PRECAUTIONS ●

(Always read these precautions prior to use.)

Before using this product, please read this User's Manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions presented in this manual are concerned with this product only. For programmable logic controller system safety precautions, refer to the User's Manual of the programmable logic controller to be used.

In this manual, the safety precautions are classified into two levels: "⚠WARNING" and "⚠CAUTION".

⚠ WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

[Design Precautions]

WARNING

- Configure safety circuits external to the product to ensure that the entire system operates safely even when a fault occurs in the external power supply or the product. Failure to do so may result in an accident due to an incorrect output or malfunction.

[Design Precautions]

CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm (3.94 inches) or more between them. Failure to do so may result in malfunction due to noise.
- At power on/off, voltage or current may instantaneously be output from the output terminal of this module. In such case, wait until the analog output becomes stable to start controlling the external device.

[Installation Precautions]

WARNING

- Shut off the external power supply (all phases) before installation. Failure to do so may result in electric shock.

[Installation Precautions]

⚠ CAUTION

- Use the product in an environment that meets the general specifications in this User's Manual. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- Use an input device type. Mistaken use of an output device type results in the risk of failure.
- Securely fix the module with a DIN rail or mounting screws. Incorrect mounting may cause malfunction, failure or drop of the module.
- Tighten the screw within the specified torque range.
  Undertightening can cause drop of the screw, short circuit or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Shut off the external power supply for the system in all phases before mounting or removing the module. Failure to do so may result in damage to, malfunction, or failure of the product.
- Do not directly touch any conductive parts and electronic components of this product. Doing so can cause malfunction or failure of the product.
- In attaching a signal conversion device to the Installation Base and performing conveyance and attachment to a board, please work by holding the Installation Base. If it works by holding a device, it will become device coming off and a cause of failure.

[Wiring Precautions]

⚠ WARNING

- Shut off the external power supply for the system in all phases before installation and wiring. Failure to do so may result electric shock or product damage.

[Wiring Precautions]

⚠ CAUTION

- Individually ground the FG terminals of the product with a ground resistance of 100 Ω or less. Failure to do so may result in electric shock or malfunction.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and terminal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm (3.94 inches) or more between them. Failure to do so may result in malfunction due to noise.
- Place the cables in a duct or clamp them. If not, dangling cables may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor connection.
- Tighten the terminal screw within the specified torque range.
  Undertightening can cause short circuit, fire, or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Install the connector to the module securely. Failure to do so may cause malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For a cable with connector, hold the connector by hand and pull it out. For a cable connected to a terminal block, loosen the terminal block screws first before removing the cable. Failure to do so may result in malfunction and damage to the module or cable.
- Before connecting the cables, check the type of interface to be connected. Connecting or erroneous wiring to the wrong interface may cause failure to the module and external devices.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- This product must be installed to control panels. Connect the main power supply to this product in the control panel through a relay terminal block. Wiring and replacement of a this product must be performed by qualified service personnel who is familiar with protection against electric shock.
- Keep a distance of 100mm (3.94 inches) or more between a thermocouple and the main circuit line or AC control lines. Also, keep the thermocouple away from a circuit that includes harmonics, such as a high-voltage circuit and a load circuit of an inverter.
- Do not place the module near a device that generates magnetic noise.
- When connecting programmable logic controller, check that the product configuration are correct. The modules may be failure or malfunction if the configuration is incorrect.
- For each module, please load the correct modules depending on their external input signal. The wrong loading of the modules could occur failures on the external sensor.

- Install the device in the unit surely. It causes the malfunction by damage, the drop, and the poor contact if not correctly installed.
  Moreover, mounting or removing the device it according to a correct procedure. It causes the malfunction by damage, the drop, and the poor contact if not correctly mounting or removing the module.
- Use it with power doesn't join the connector of this product. Failure or disconnection may cause malfunction.
- Install the protection cover and device in an unused connector and empty slot of the module. If the cover etc. are not installed, it causes a fire, the failure, and the malfunction by the foreign body.

[Startup and Maintenance Precautions]

⚠ WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Shut off the external power supply for the system in all phases before cleaning the module or retightening the terminal screws, connector screws, or module fixing screws. Failure to do so may result in electric shock or cause the module to fail or malfunction. Undertightening can cause drop of the screw, short circuit or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

[Startup and Maintenance Precautions]

⚠ CAUTION

- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy phone System) more than 25cm (9.85 inches) away in all directions from the programmable logic controller, this product. Failure to do so may cause malfunction.
- Shut off the external power supply for the system in all phases before mounting or removing the module. Failure to do so may cause the module to fail or malfunction or damage.
- After the first use of the product, do not mount/remove the module, and the cable more than 50 times (IEC 61131-2 compliant) respectively. Exceeding the limit of 50 times may cause malfunction.
- Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
  Failure to do so may cause the module to fail or malfunction.

[Disposal Precautions]

⚠ CAUTION
● When disposing of this product, treat it as industrial waste.

[Transportation Precautions]

⚠ CAUTION
● The shock that exceeds the range of the general specification during transportation must avoid this product for the precision instrument. Doing so results in the risk of failure. ● When fumigants that contain halogen materials such as fluorine, chlorine, bromine, and iodine are used for disinfecting and protecting wooden packaging from insects, they cause malfunction when entering our products. Please take necessary precautions to ensure that residual fumigant components do not enter our products, or treat the packaging with methods other than fumigation (such as a heat method). Additionally, disinfect and protect wood from insects before packing the products.

EMC and Low Voltage Directives

Compliance to the EMC Directive, which is one of the EU Directives, has been a legal obligation for the products sold in European countries since 1996 as well as the Low Voltage Directive since 1997. Manufacturers who recognize their products are compliant to the EMC and Low Voltage Directives are required to declare that print a "CE mark" on their products.

(1) Authorized representative in Europe

Authorized representative in Europe is shown below.

Name: Mitsubishi Electric Europe B.V.

Address: Gothaer strasse 8, 40880 Ratingen, Germany

(2) For the conformity to EMC and Low Voltage Directive of FA - Goods

To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the FA-Goods (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to “EMC and Low Voltage Directives Compliant Manual_50D-FA9010-108”.

Moreover, refer to the manual to compliant to EMC and Low Voltage Directives of PLC used.

CONTENTS

1. INTRODUCTION

This user's manual explains the specification and handling of the Installation base (FA-ATB8XTB, FA-ATKB8XTB) and the conversion adapter (FA-ATKAA8XM) and the Signal conversion device (FA-ATSVM1X*****) and the Through device (FA-ATFTMXY) of the Analog signal conversion module, etc.

By attaching the Signal conversion device to the Installation base, the Analog signal conversion module insulates between input and output and between channels, and changes and outputs various analog input signals, such as a sensor, to a predetermined signal.

2. GENERAL SPECIFICATIONS

<table>
<tr><td>Item</td><td colspan="5">Specifications</td></tr>
<tr><td>Operating ambient temperature</td><td colspan="5">0 to 55°C</td></tr>
<tr><td>Storage ambient temperature</td><td colspan="5">-25 to 75°C</td></tr>
<tr><td>Operating ambient humidity</td><td colspan="5">5 to 95% RH, no condensation</td></tr>
<tr><td>Storage ambient humidity</td><td colspan="5">5 to 95% RH, no condensation</td></tr>
<tr><td rowspan="6">Vibration resistance</td><td>Compliant standards</td><td colspan="4">JIS B 3502, IEC61131-2</td></tr>
<tr><td></td><td>Frequency</td><td>Acceleration</td><td>Amplitude</td><td>Sweep count</td></tr>
<tr><td rowspan="2">Under intermittent vibration</td><td>5 to 8.4Hz</td><td>—</td><td>3.5mm</td><td rowspan="2">10 times each in X, Y, and Z axis directions</td></tr>
<tr><td>8.4 to 150Hz</td><td>9.8m/s^2 (1G)</td><td>—</td></tr>
<tr><td rowspan="2">Under continuous vibration</td><td>5 to 8.4Hz</td><td>—</td><td>1.75mm</td><td rowspan="2">—</td></tr>
<tr><td>8.4 to 150Hz</td><td>4.9m/s^2 (0.5G)</td><td>—</td></tr>
<tr><td>Shock resistance</td><td colspan="5">Conforms to JIS B 3502 and IEC61131-2 (147m/s^2 (15G), 3 times each in X, Y, and Z axis directions)</td></tr>
<tr><td>Operating atmosphere</td><td colspan="5">There should be no corrosive gases.</td></tr>
<tr><td>Operating altitude (*1)</td><td colspan="5">2,000m or lower</td></tr>
<tr><td>Installation location</td><td colspan="5">Inside control panel</td></tr>
<tr><td>Overvoltage category (*2)</td><td colspan="5">II or lower</td></tr>
<tr><td>Pollution level (*3)</td><td colspan="5">2 or lower</td></tr>
</table>

*1: Do not use or store in a pressurized environment greater than the atmospheric pressure at an altitude of 0m.

*2: Indicates how an assumption has been made on the point at which the devices are connected from the public power grid to the machinery and equipment inside the facilities.

*3: This is a guideline indicating the extent to which conducting substances are found in the environment in which the devices are used.

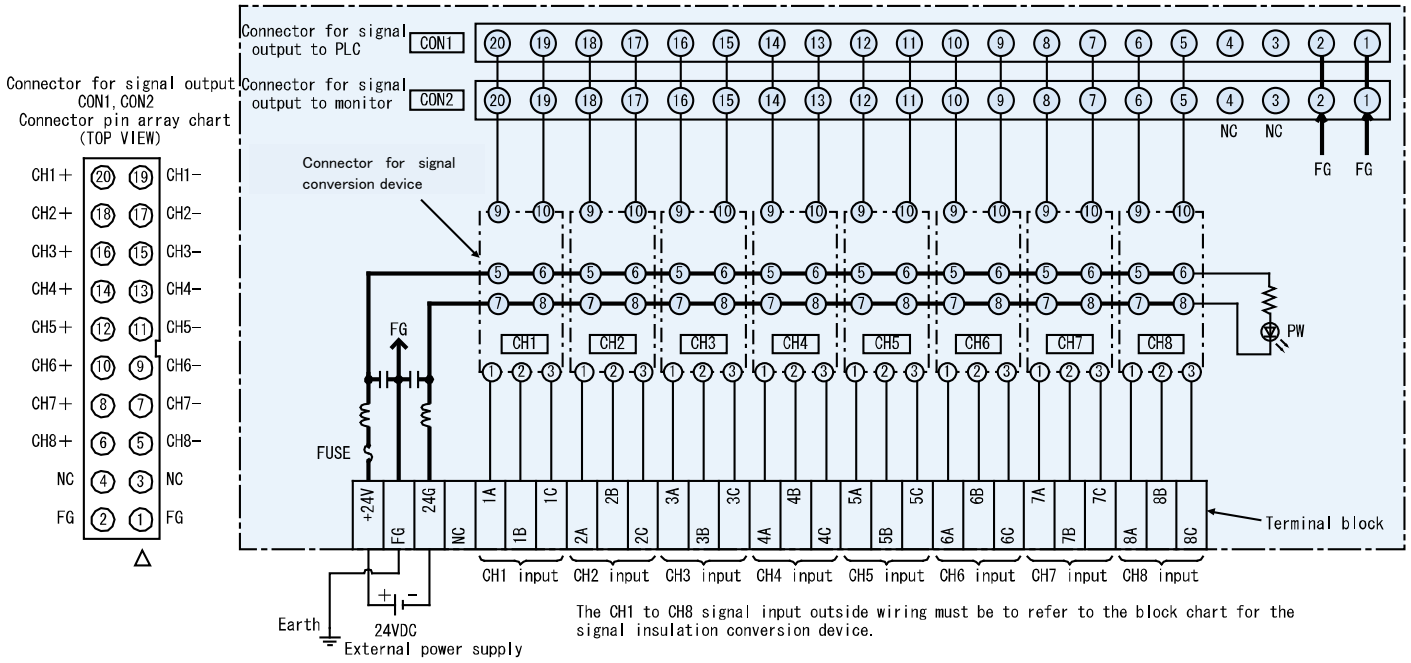
3. PERFORMANCE SPECIFICATIONS

3.1. Input type installation base (FA-ATB8XTB)

Item \ Model name		FA-ATB8XTB
Number of slots		8
Terminal block	Terminal block screws	M3 screw, Pitch of 7.62mm, spring-up screw with finger protector cover
		Terminal screw tightening torque range: 58.8 to 88.2N·cm (6 to 9kgf·cm)
	Applicable wire	Applicable wire: 0.5 to 1.25mm^2
Module mounting	Mounting screws	M4 × 0.7mm × 20mm or greater
		Tightening torque range: 78 to 118N·cm (8 to 12kgf·cm)
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (conform to JIS C 2812)
External supply power		24VDC±10%
Module consumption current (24VDC)		6mA or less (exclude current for Signal Conversion Device)
Dielectric withstand voltage, insulation resistance		Between input and output and power supply: 750 VAC 1 minute, 10MΩ or higher
Weight		About 320g

*1: Please install the dummy device (FA-ATNDM) in an unused slot to do an empty slot.
*2: When connecting a cable to a module, a cable connector is pushed in until it is locked of a connector.

●Block chart



Notes:

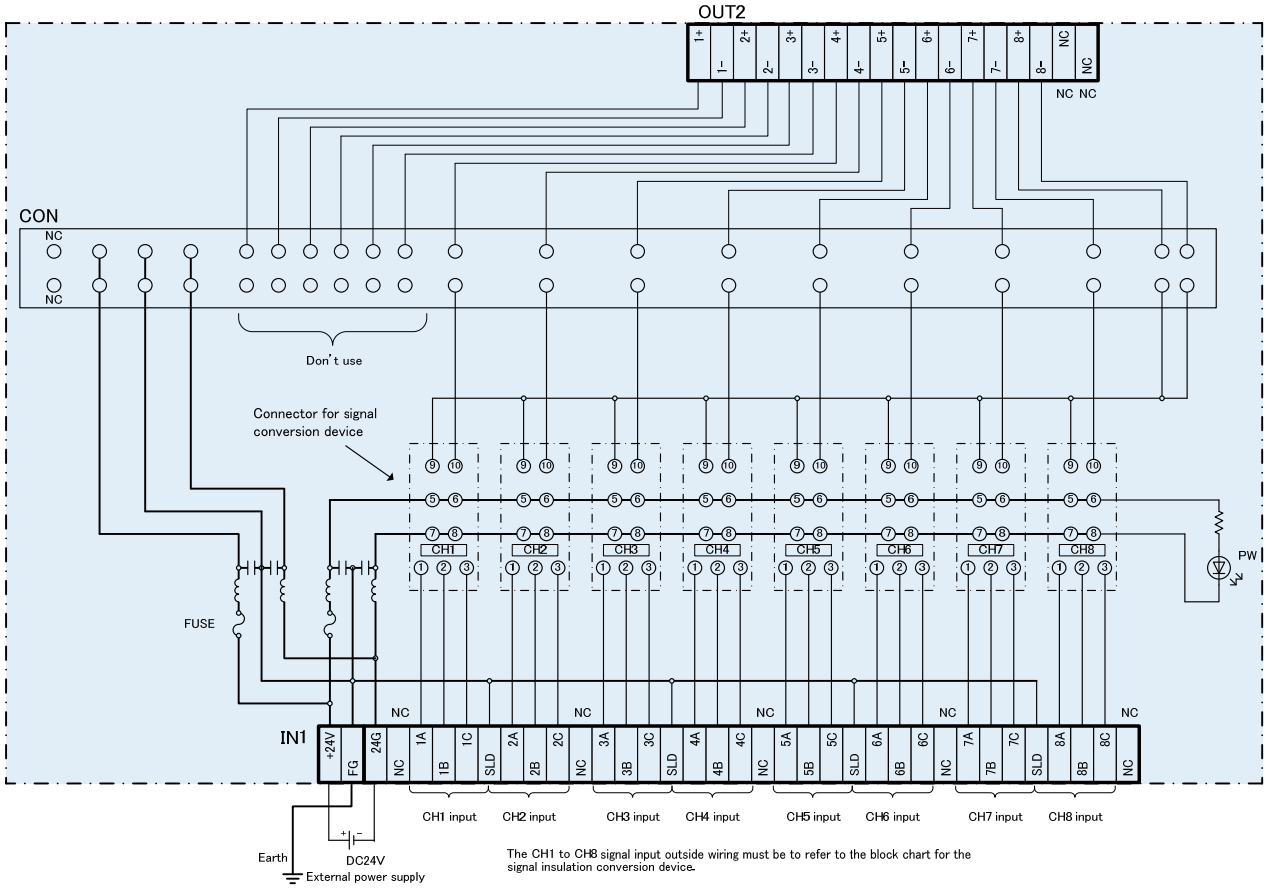
- The equipment connected with the monitor output must use the one with very large input resistance. (1MΩ or more is recommended.) The monitor output signal is 1 to 5V.
- Use shielded electrical wires.

3.2. Input type installation base for mounting adapter (FA-ATKB8XTB)

Item \ Model name		FA-ATKB8XTB
Number of slots		8
Terminal block (IN1, OUT2)	screw	M3 screw, Pitch of 7.62mm, spring-up screw with finger protector cover
	Applicable wire, Tightening torque	AWG 22 to AWG 14: 0.3-2mm^2 (with solderless terminal use), 58.8-88.2N•cm (6-9kgf•cm)
Module mounting	Mounting screws	M4 × 0.7mm × 20mm or greater Tightening torque range: 78 to 118N•cm (8 to 12kgf•cm)
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (conform to JIS C 2812)
External supply power		24VDC±10%
Module consumption current		24VDC: 6mA or less (exclude current for Conversion Adapter and Signal Conversion Device)
Dielectric withstand voltage, insulation resistance		Each input channels, each output channels, and between power supply: 750 VAC 1 minute, 10MΩ or higher
Weight		About 370g

*1: Please install the dummy device (FA-ATNDM) in an unused slot to do an empty slot.

●Block chart



Notes:

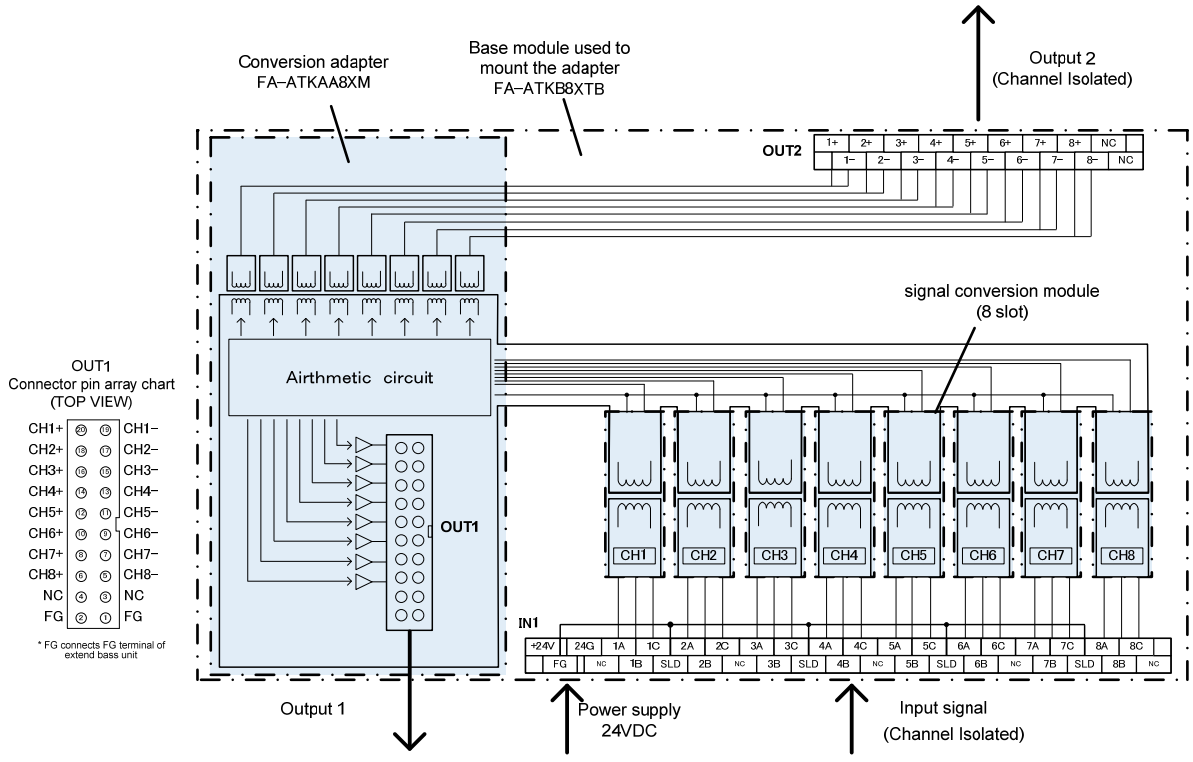
- Use shielded electrical wires. Note that the SLD terminals of the input terminal block (IN1) are internally connected to FG and can be used as relay terminals that ground the shields of the external wires.

3.3 Conversion adapter current connection (2 outputs) (FA-ATKAA8XM)

Item \ Model name		FA-ATKAA8XM
Number of points		8
Input signal		Depends on the output of dedicated Signal conversion device (1 to 5V DC) (*1)
Accuracy (While full scale)	Standard accuracy	±0.1% or less (ambient temperature 25°C±5°C)
	Temperature characteristics	±0.015%/°C or less
Output 1 (OUT1)	Interface	MIL20pin connector
	Output Signal	4 to 20 mA
	Permissible load resistance	250Ω to 350Ω
Output 2 (OUT2)	Interface	By output of extend base unit
	Output Signal	4 to 20 mA
	Permissible load resistance	600Ω or less
Response speed (*4)		10ms or less
Power supply		24V DC ±10% (via base module for mounting adapter)
Module consumption current		24V DC: 310mA or less (via base module for mounting adapter)
Isolation method		Lump outputs (OUT1) with inputs and outputs (OUT2) with each channels: Transformar isolation
Dielectric withstand voltage, insulation resistance		Lump outputs (OUT1) with inputs, outputs (OUT2) with each channels, and between power supply: 750VAC 1minute, 10MΩ or higher
Weight		About 200g

* 1: Current signal input of the Through module (FA-ATFTMXY) is not applicable.
* 2: Please combine the characteristics of signal conversion device that are combined when using the products. Calculate the accuracy in the following method.
  Example: When using FA-ATSVM1XA420
  Standard accuracy: ±0.2% = ±0.1% (Conversion adapter) + ±0.1% (Signal conversion device)
  Temperature characteristics: ±0.030%/°C = ±0.015%/°C (Conversion adapter) + ±0.015%/°C (Signal conversion device)
* 3: When connecting a cable, a cable connector is pushed in until it is locked of a connector.
* 4: It is time until it becomes 90% of an output to a rise pulse input.

●Block chart

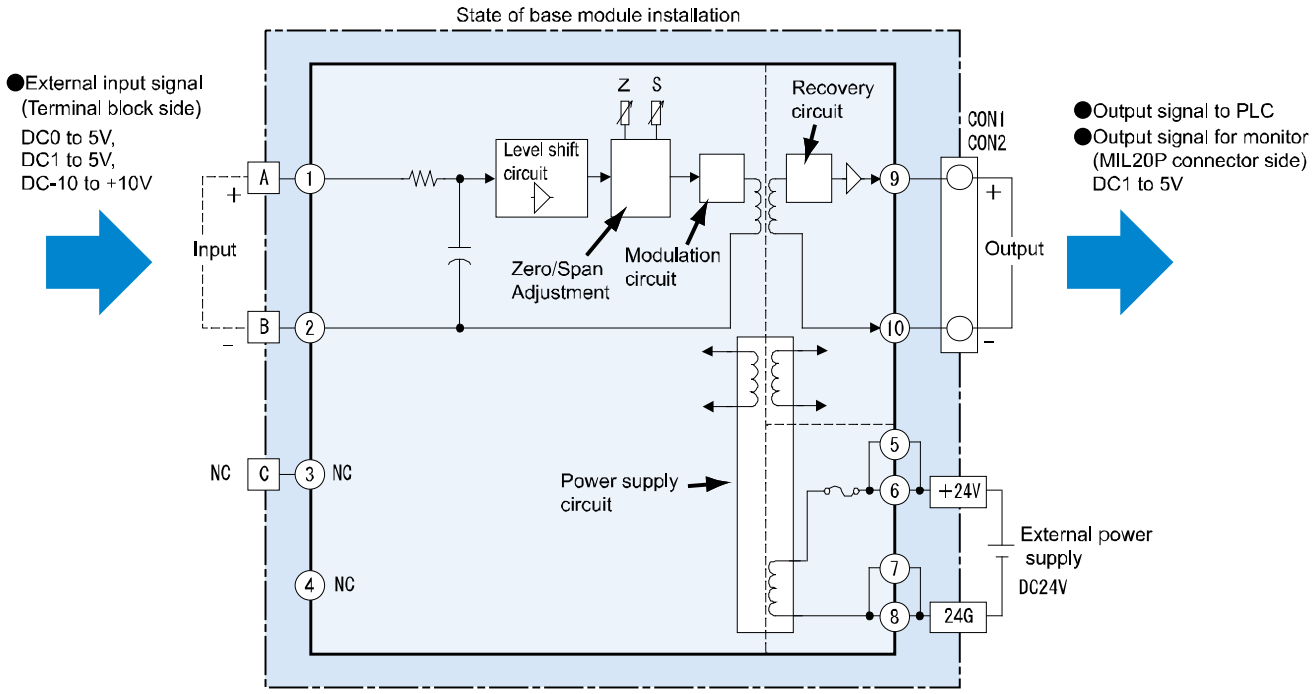


3.4. Voltage input signal conversion device (FA-ATSVM1XV****)

Item \ Model name		FA-ATSVM1XV05	FA-ATSVM1XV15	FA-ATSVM1XV1010
Number of points		1 point (1 channel)		
Input	Input signal	0 to 5V	1 to 5V	-10 to +10V
	Input resistance	1MΩ or higher		
	Disconnection detection function	None		
Accuracy (Full-scale against.)	Standard accuracy	±0.1% or lower (Surrounding air temperature 25°C±5°C)		
	Temperature characteristic	±0.015%/°C or lower		
Output (PLC side)	Output signal	1 to 5V		
	Output allowable load resistance	10kΩ or higher		
Response speed (*1)		15ms or lower		
Zero/Span Adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%		
Power supply		DC24V±10% (Supply by base module)		
Consumption current (DC24V)		20mA or lower		
Insulation type		Transformer insulation		
Dielectric withstand voltage, insulation resistance		Between Input/Output/Power: 750VAC 1 minute, 10MΩ or higher		
Weight		About 30g		

*1: It is time until it becomes 90% of an output to a rise pulse input.

●Block chart

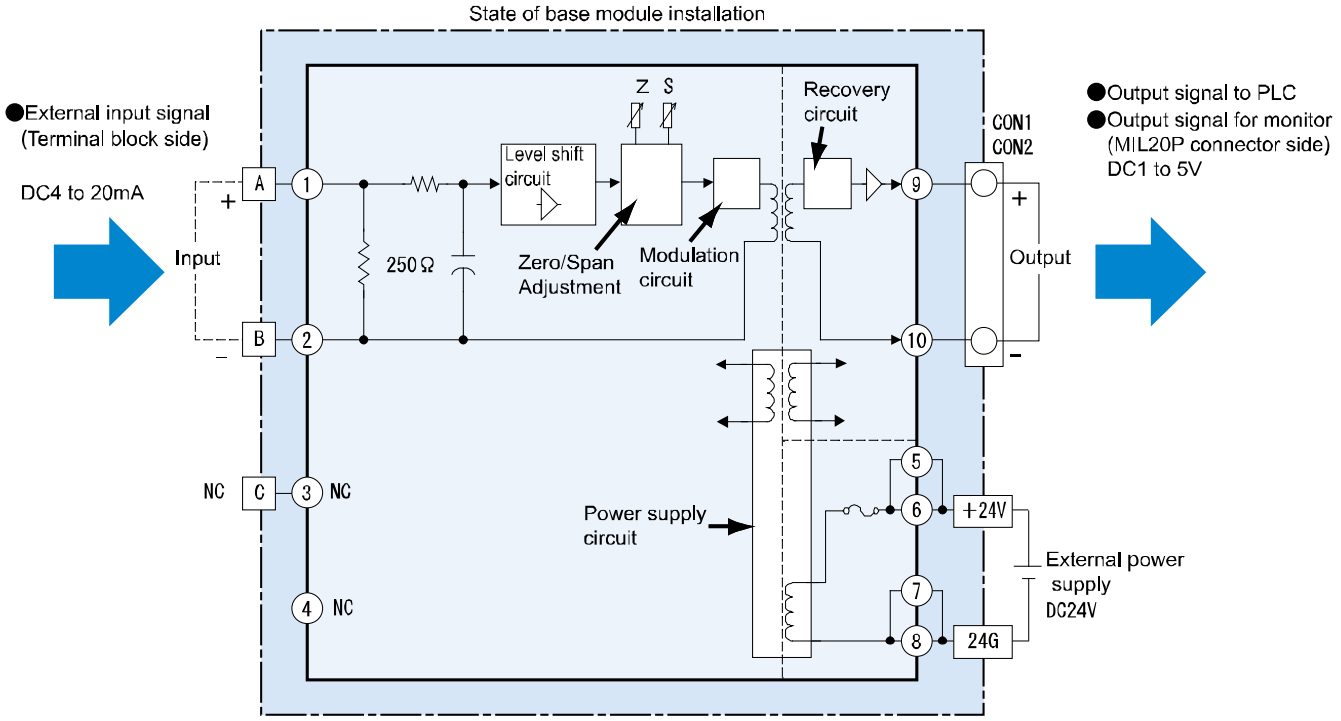


3.5. Current input signal conversion device (FA-ATSVM1XA420)

Item \ Model name		FA-ATSVM1XA420
Number of points		1 point (1 channel)
Input	Input signal	4 to 20mA
	Input resistance	250Ω
	Disconnection detection function	None
Accuracy (Full-scale against.)	Standard accuracy	±0.1% or lower (Surrounding air temperature 25°C±5°C)
	Temperature characteristic	±0.015%/°C or lower
Output (PLC side)	Output signal	1 to 5V
	Output allowable load resistance	10kΩ or higher
Response speed (*1)		15ms or lower
Zero/Span Adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%
Power supply		DC24V±10%(Supply by base module)
Consumption current (DC24V)		20mA or lower
Insulation type		Transformer insulation
Dielectric withstand voltage, insulation resistance		Between Input/Output/Power: 750VAC 1 minute, 10MΩ or higher
Weight		About 30g

*1: It is time until it becomes 90% of an output to a rise pulse input.

●Block chart

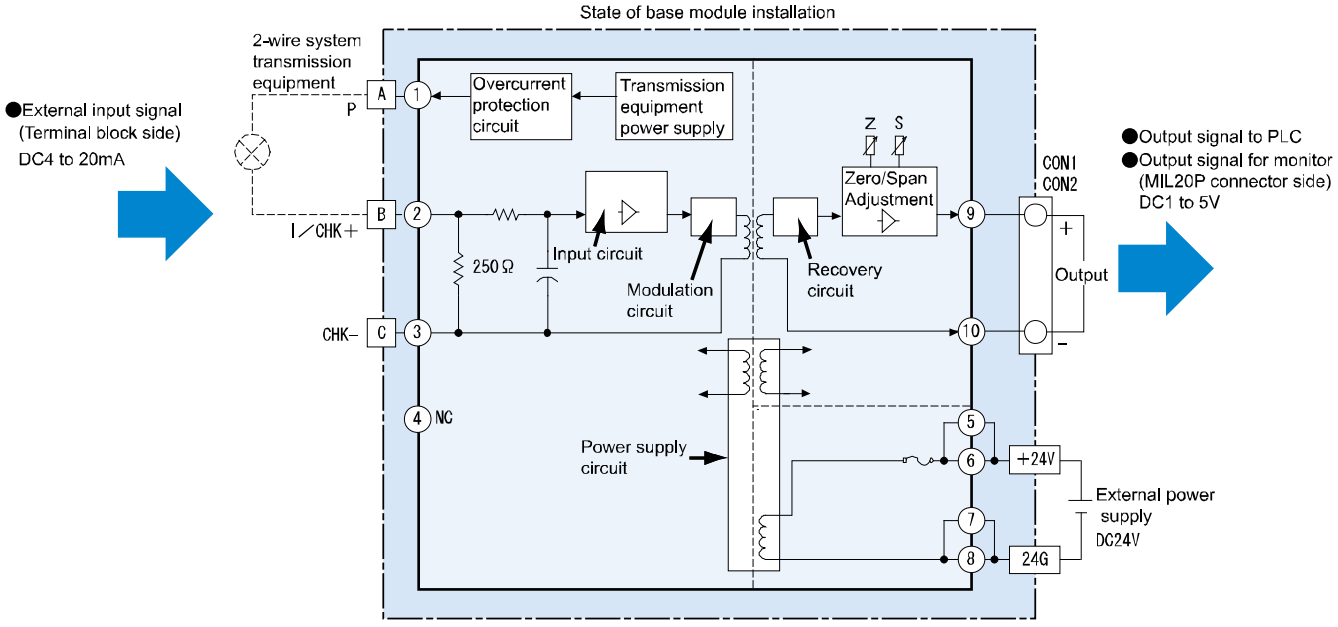


3.6. 2-wire system transmission equipment input signal conversion device (FA-ATSVM1XD)

Item \ Model name		FA-ATSVM1XD
Number of points		1 point (1 channel)
Input	Input signal	2-wire system transmission equipment
	Input resistance	250Ω
	Disconnection detection function	None
Power supply for Transmission equipment	Supply voltage	DC26V±2V
	Max supply current	24mA
	Short-circuit protection	Limitation current: 25 to 35mA
Accuracy (Full-scale against.)	Standard accuracy	±0.1% or lower (Surrounding air temperature 25°C±5°C)
	Temperature characteristic	±0.015%/°C or lower
Output (PLC side)	Output signal	1 to 5V
	Output allowable load resistance	10kΩ or higher
Response speed (*1)		15ms or lower
Zero/Span Adjustment		Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%
Power supply		DC24V±10%(Supply by base module)
Consumption current (DC24V)		68mA or lower
Insulation type		Transformer insulation
Dielectric withstand voltage, insulation resistance		Between Input/Output/Power: 750VAC 1 minute, 10MΩ or higher
Weight		About 30g

*1: It is time until it becomes 90% of an output to a rise pulse input.
*2: Please keep in mind that a base unit has the restrictions by the attachment direction in the case of three or more set use.

●Block chart



3.7. Thermo-couple temperature input signal conversion device (FA-ATSVM1XT*)

[K Thermo-couple]

Item \ Model name			FA-ATSVM1XTK	FA-ATSVM1XTK0040	FA-ATSVM1XTK0060	FA-ATSVM1XTK0080
Number of points			1 point(1 channel)			
Input	Input signal	Type	K Thermo-couple			
		Measurement range	-200 to 1200°C	0 to +400°C	0 to +600°C	0 to +800°C
	Input resistance		1MΩ or higher			
	Disconnection detection function		Upper bound excess			
Accuracy (Full-scale against.)	Standard accuracy		±0.1% or lower (Surrounding air temperature 25°C±5°C)			
	Error margin of linearization		±0.1% or lower			
	Temperature characteristic		±0.015%/°C or lower			
	Cold junction compensation accuracy		±0.5°C or lower (25°C±5°C), ±1°C or lower (0 to 55°C)			
Output (PLC side)	Output signal		1 to 5V			
	Output allowable load resistance		10kΩ or higher			
Response speed (*1)			100ms or lower			
Zero/Span Adjustment			Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%			
Power supply			DC24V±10%(Supply by base module)			
Consumption current (DC24V)			24mA or lower			
Insulation type			Transformer insulation			
Dielectric withstand voltage, insulation resistance			Between Input/Output/Power: 750VAC 1 minute, 10MΩ or higher			
Weight			About 40g			

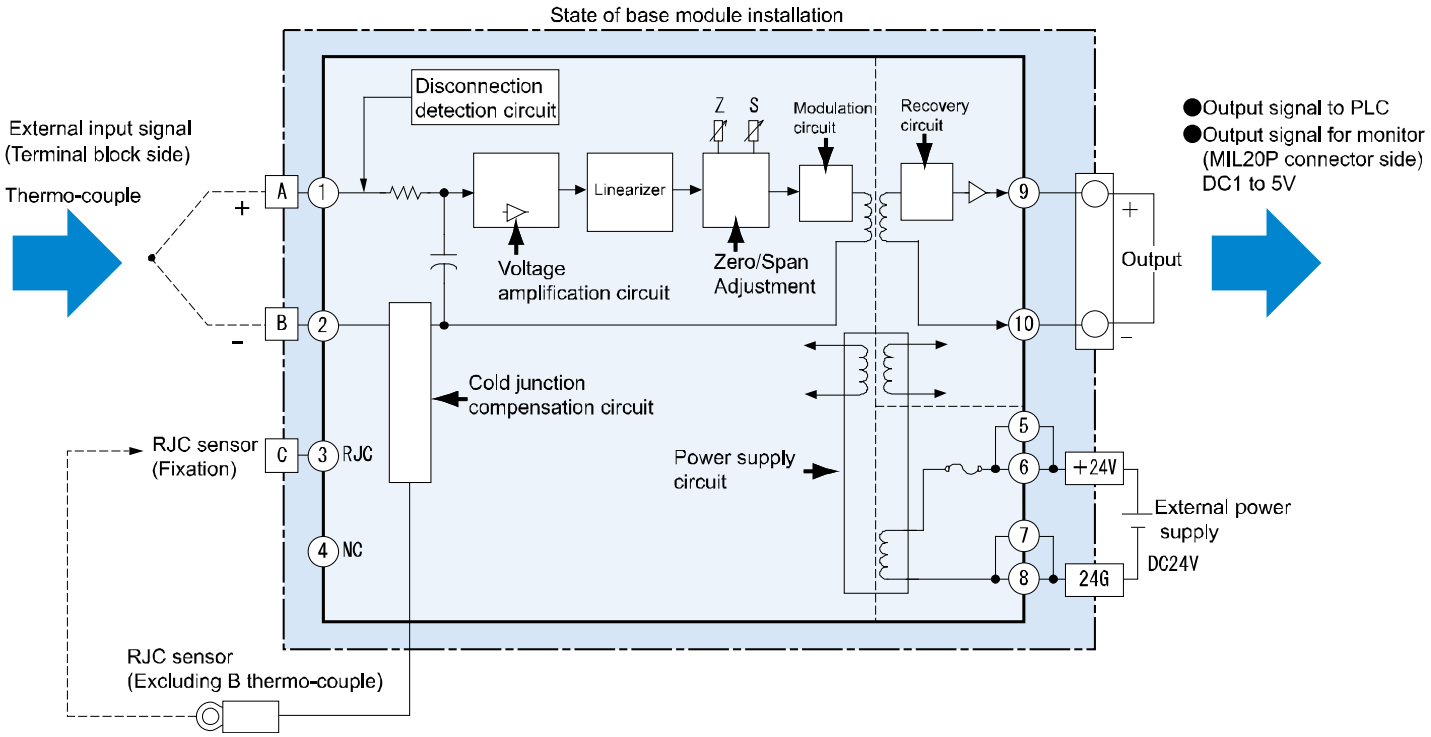
*1: It is time until it becomes 90% of an output to a rise pulse input.
*2: The input range (temperature range) is fixation in the value of a statement.
In demand of input ranges other than a statement, please ask.

[B, S, E, T, R, J, N Thermo-couple]

Item \ Model name			FA-ATSVM1XTB	FA-ATSVM1XTS	FA-ATSVM1XTE	FA-ATSVM1XTT	FA-ATSVM1XTR	FA-ATSVM1XTJ	FA-ATSVM1XTN
Number of points			1 point(1 channel)						
Input	Input signal	Type	B Thermo-couple	S Thermo-couple	E Thermo-couple	T Thermo-couple	R Thermo-couple	J Thermo-couple	N Thermo-couple
		Measurement range	+600 to +1700°C	0 to +1600°C	-200 to +900°C	-200 to +350°C	0 to +1600°C	-40 to +750°C	-200 to +1250°C
	Input resistance		1MΩ or higher						
	Disconnection detection function		Upper bound excess						
Accuracy (Full-scale against.)	Standard accuracy		±0.1% or lower (Surrounding air temperature 25°C±5°C)						
	Error margin of linearization		±0.1% or lower						
	Temperature characteristic		±0.015%/°C or lower						
	Cold junction compensation accuracy		±0.5°C or lower (25°C±5°C), ±1°C or lower (0 to 55°C)						
Output (PLC side)	Output signal		1 to 5V						
	Output allowable load resistance		10kΩ or higher						
Response speed (*3)			100ms or lower						
Zero/Span Adjustment			Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%						
Power supply			DC24V±10% (Supply by base module)						
Consumption current (DC24V)			24mA or lower						
Insulation type			Transformer insulation						
Dielectric withstand voltage, insulation resistance			Between Input/Output/Power: 750VAC 1 minute, 10MΩ or higher						
Weight			About 40g						

*3: It is time until it becomes 90% of an output to a rise pulse input.
*4: The input range (temperature range) is fixation in the value of a statement.
In demand of input ranges other than a statement, please ask.

●Block chart

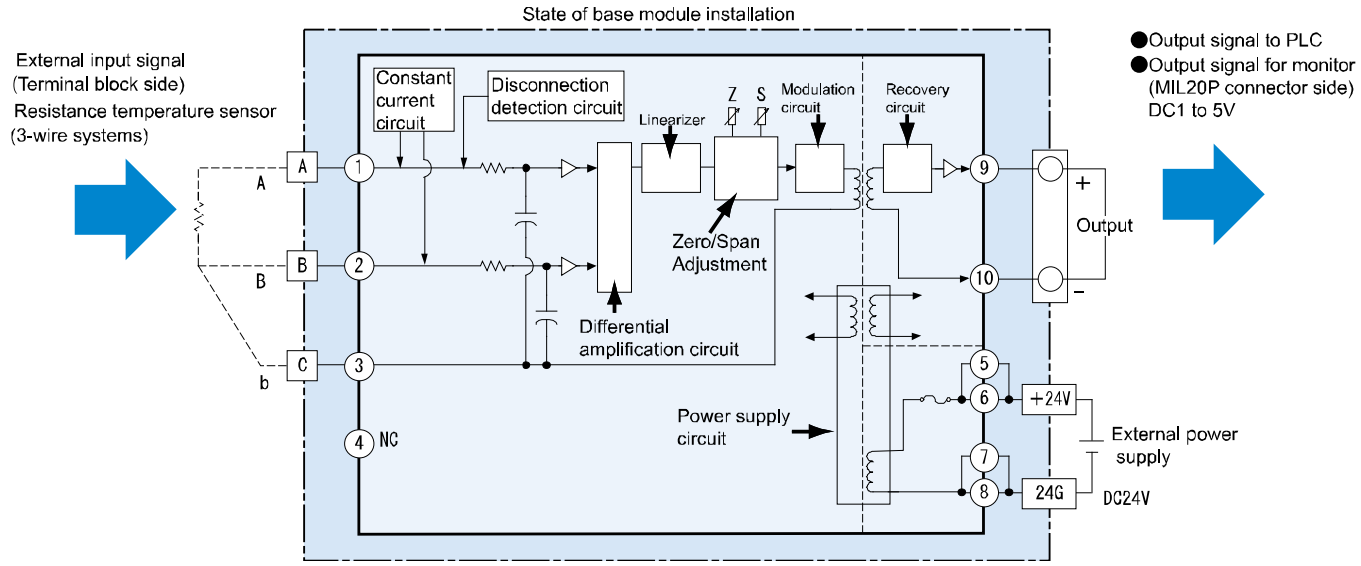

State of base module installation
Disconnection detection circuit
Z
S
Modulation circuit
Recovery circuit
External input signal
(Terminal block side)
Thermo-couple
A
1
+
B
2
-
Linearizer
Voltage amplification circuit
Zero/Span Adjustment
9
10
Output
+
-
●Output signal to PLC
●Output signal for monitor
(MIL20P connector side)
DC1 to 5V
Cold junction compensation circuit
RJC sensor
(Fixation)
C
3
RJC
4
NC
Power supply circuit
5
6
+24V
7
8
24G
External power supply
DC24V
RJC sensor
(Excluding B thermo-couple)

3.8. Resistance temperature sensor input signal conversion device (FA-ATSVM1XR***)

Item \ Model name			FA-ATSVM1XRPT	FA-ATSVM1XRPT0010	FA-ATSVM1XRPT0020	FA-ATSVM1XRJPT
Number of points			1 point (1 channel)			
Input	Input signal	Type	Pt100			JPt100
		Measurement range	-200 to +650°C	0 to +100°C	0 to +200°C	-200 to +600°C
	Disconnection detection function		Upper bound excess			
Accuracy (Full-scale against.)	Standard accuracy		±0.1% or lower (Surrounding air temperature 25°C±5°C)			
	Error margin of linearization		±0.1% or lower			
	Temperature characteristic		±0.010%/°C or lower			
Output (PLC side)	Output signal		1 to 5V			
	Output allowable load resistance		10kΩ or higher			
Response speed (*1)			100ms or lower			
Zero/Span Adjustment			Zero adjustment range: -2 to 2%, Span adjustment range: 98 to 102%			
Power supply			24VDC ±10% (Supply by base module)			
Consumption current (24VDC)			25mA or lower			
Insulation type			Transformer insulation			
Dielectric withstand voltage, insulation resistance			Between Input/Output/Power: 750VAC 1 minute, 10MΩ or higher			
Weight			About 40g			

*1: It is time until it becomes 90% of an output to a rise pulse input.
*2: The input range (temperature range) is fixation in the value of a statement.
In demand of input ranges other than a statement, please ask.

●Block chart

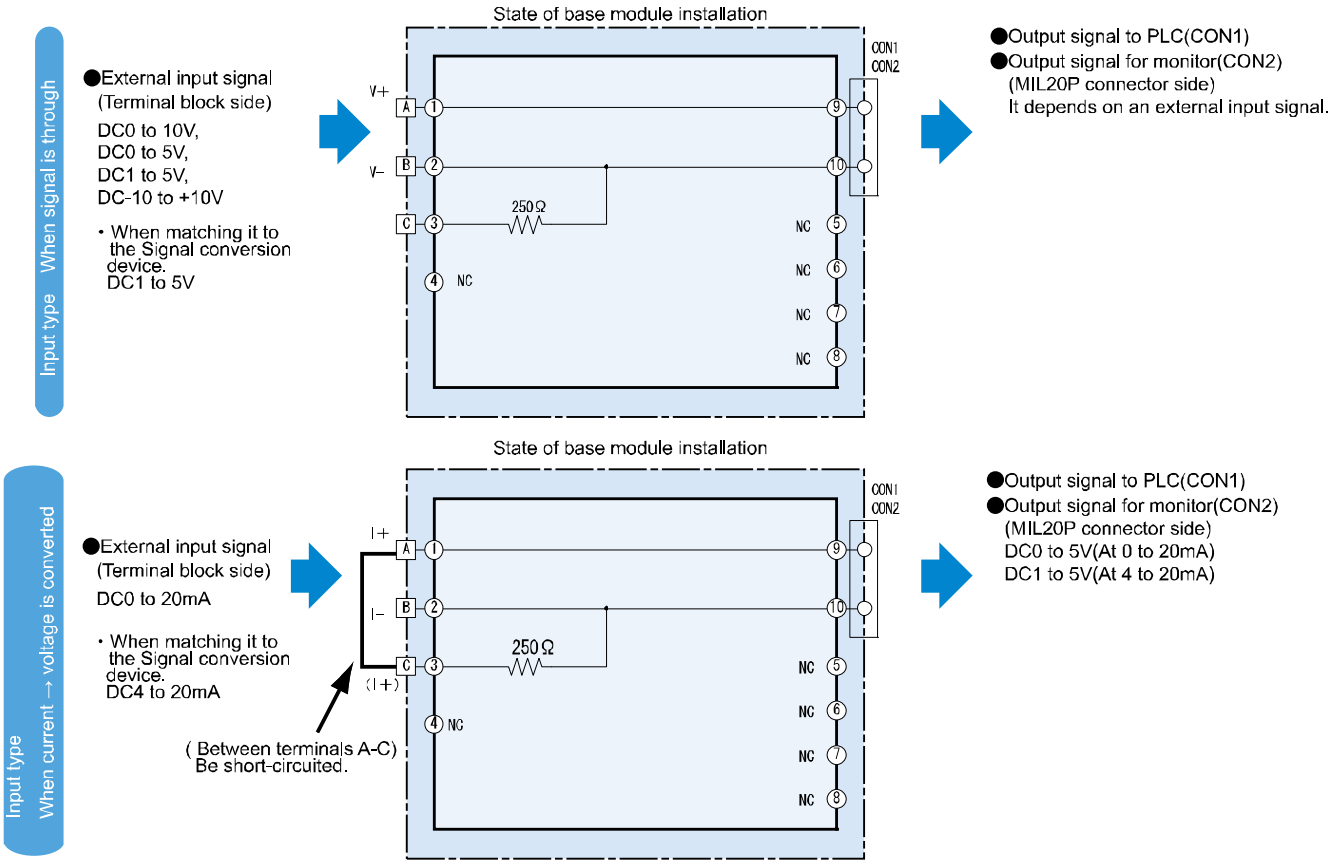


3.9. Through device (FA-ATFTMXY)

Item \ Model name		FA-ATFTMXY	
Number of points		1 point (1 channel)	
Conversion type		When signal is through	When current → voltage is converted (*1)
Input	Resistance	–	250Ω
	Resistor accuracy	–	±0.1% or less
	Characteristic of temperature of resistor	–	±0.0025%/°C or less
Permissible I/O signal		Voltage: 10V or less, Current: 20mA or less	
Weight		About 30g	

*1: When current → voltage is converted, it should be short-circuited between base module terminal block A-C terminals.
*2: When using conversion adapter, the Through module (FA-ATFTMXY) is not applicable.

●Block chart

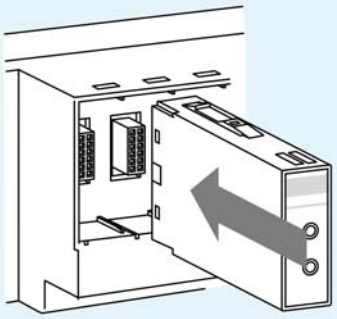


4. Installing the Conversion adapter and Signal conversion device

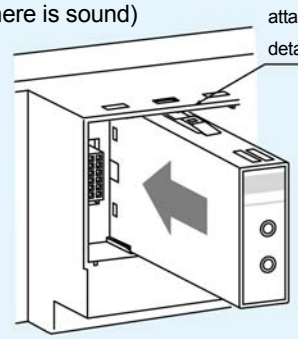
4.1. Installing the signal conversion device

(1) How to mounting to a base

1) The signal conversion device is set to the slot of the base.

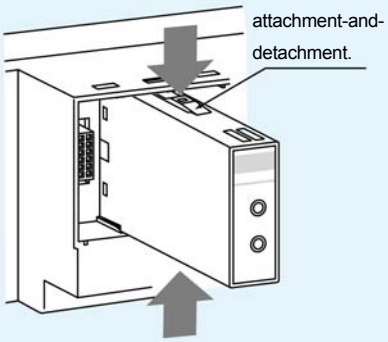


2) It inserts unit a signal conversion device attachment-and-detachment hook locks (there is sound)

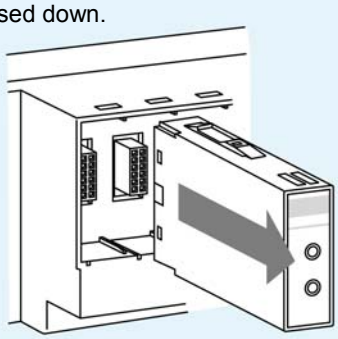


(2) How to remove from a base

1) An attachment-and-detachment hook is pushed from both sides.



2) A signal conversion device is drawn out with an attachment-and-detachment hook pressed down.

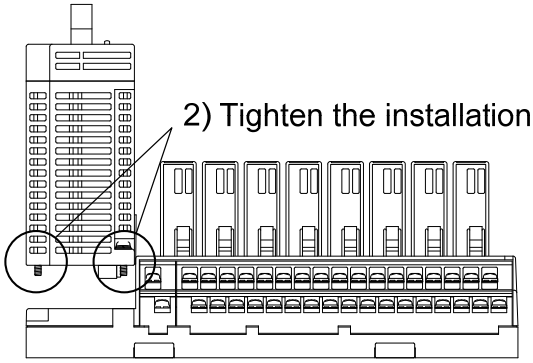


Note
Use an input device type (devices with purple lines). Mistaken use of an output device type (devices with orange lines) results in the risk of failure.

Point
(1) It works with the main body of installation Base without having the device part when installing it in transportation and the enclosure with the device installed on Base. (2) The dummy device (FA-ATNDM) is sold for dustproof measures when there is an empty slot in Base.

4.2. Installing the conversion adapter (When using FA-ATKB8XTB)

1) Insert the conversion adapter vertically into the base unit.

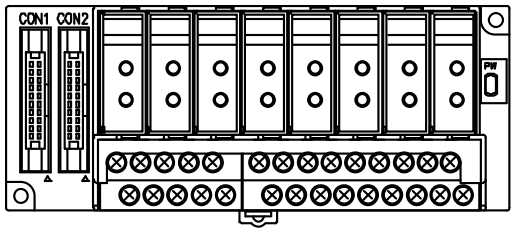


Specified installation torque: 36-48N·cm (3.7-4.8kgf·cm)

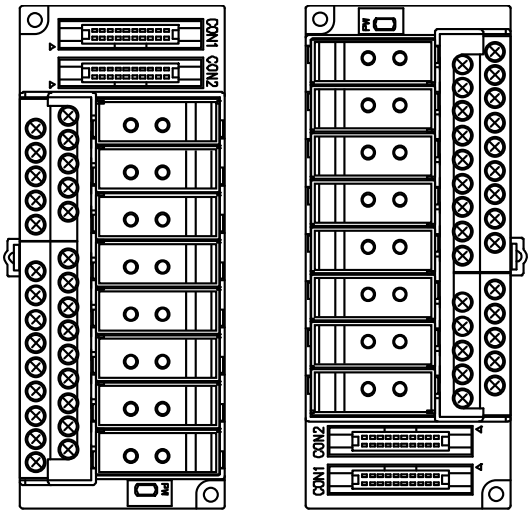
5. MODULE MOUNTING ORIENTATION

5.1. Input type installation base (FA-ATB8XTB)

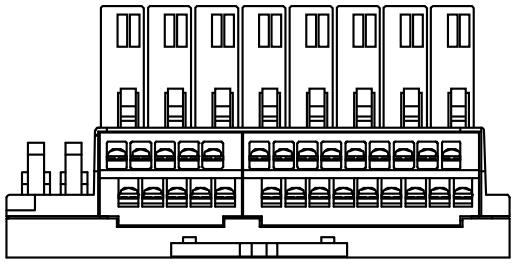
Horizontal mounting



Vertical mounting



Plane mounting



Restriction:

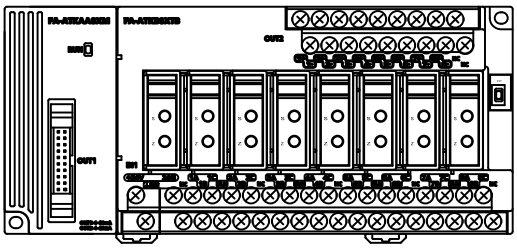
Please adjust the surrounding air temperature to 50°C or less when you use three devices or more "FA-ATSVM1XD" at “Vertical mounting” and “Plane mounting”.

5.2. Input type installation base for mounting adapter (FA-ATKB8XTB)

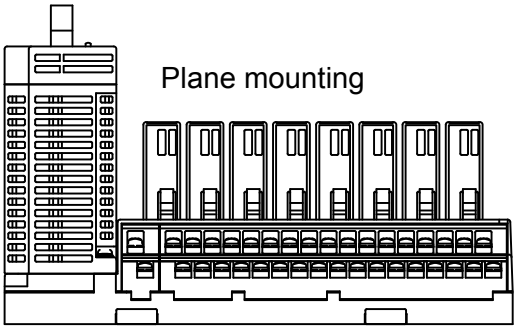
(1)Installation Orientation

Install the product using one of the four orientations below.

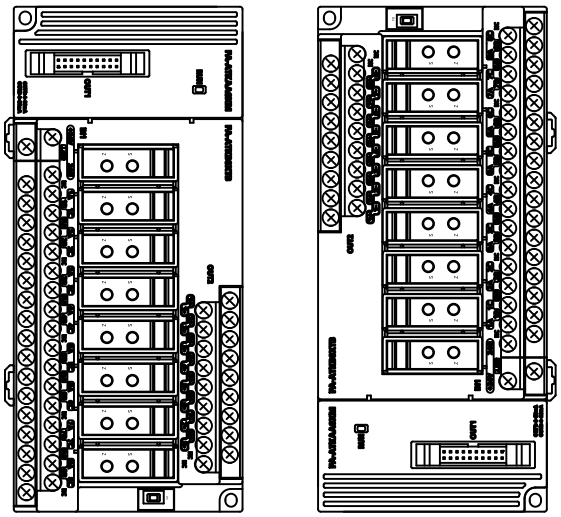
Horizontal mounting



Plane mounting

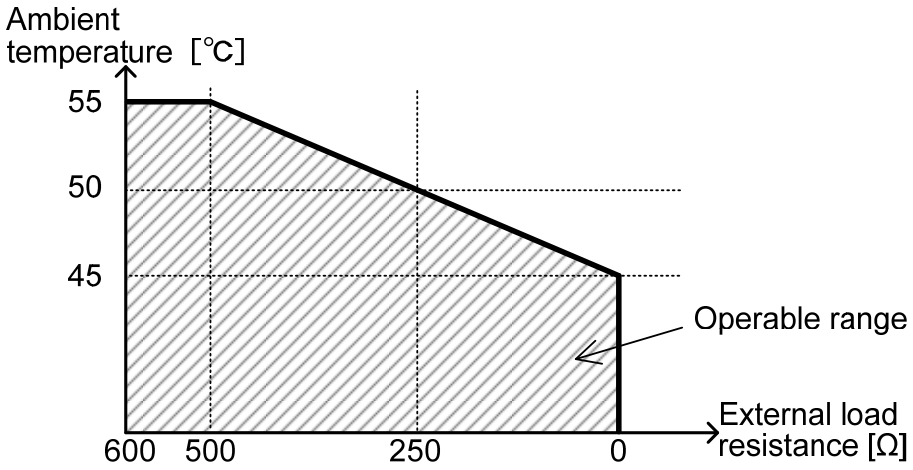


Vertical mounting



Restrictions:

1) For vertical mounting, be sure to keep the ambient temperature within the range of 45˚C or less, or follow the relationship between the ambient temperature and the external load resistance value of output 2 shown in the graph on the right. Additionally, if using three or more "FA-ATSVM1XD" devices, use the products in an environment with an ambient temperature of 50˚C or less, even if the external load resistance is 250Ω or greater.

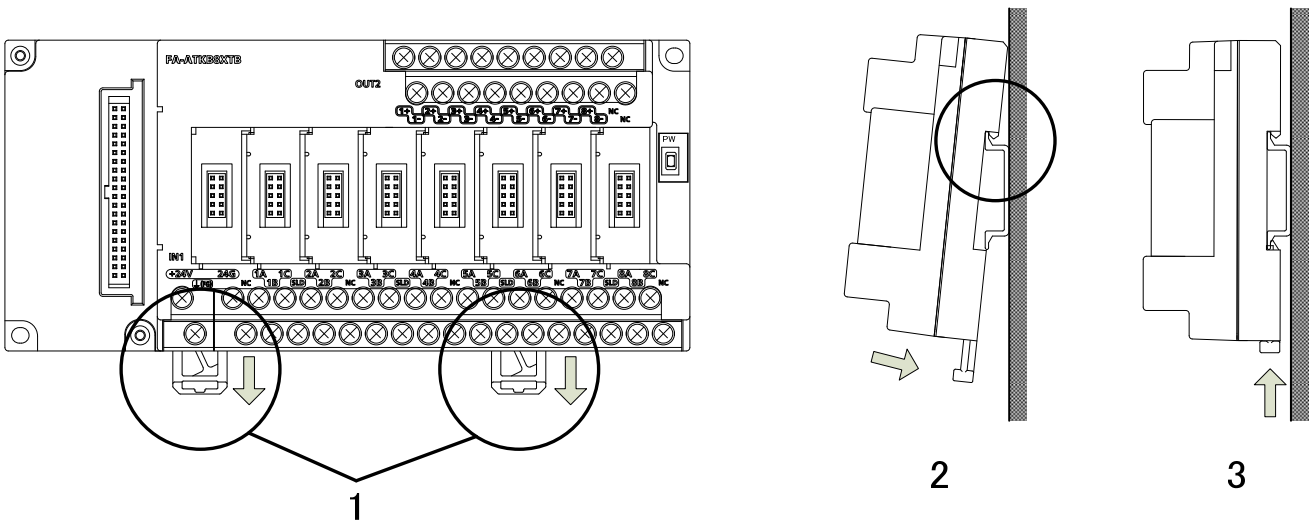


2) For plane mounting, if using three or more "FA-ATSVM1XD" devices, use the products in an environment with an ambient temperature of 50˚C or less.

(2) Installing the Product to a DIN Rail

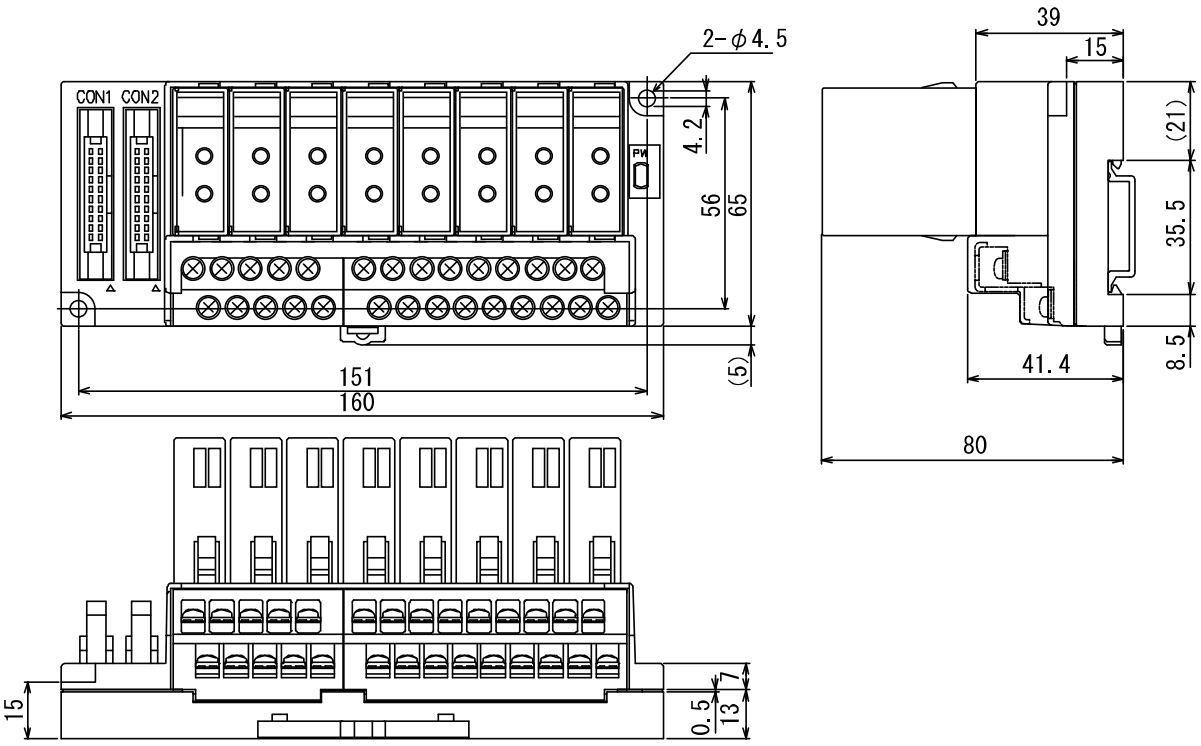
Install the product to a DIN rail following the steps 1) to 3) below.

1) Pull the DIN rail installation hooks downward until you hear a click.
2) Hook the tabs located on the upper side of the module onto the upper side of the DIN rail, and then insert the tabs rearward to install.
3) Insert the DIN rail installation hooks of the module until you hear a click, locking the hooks.

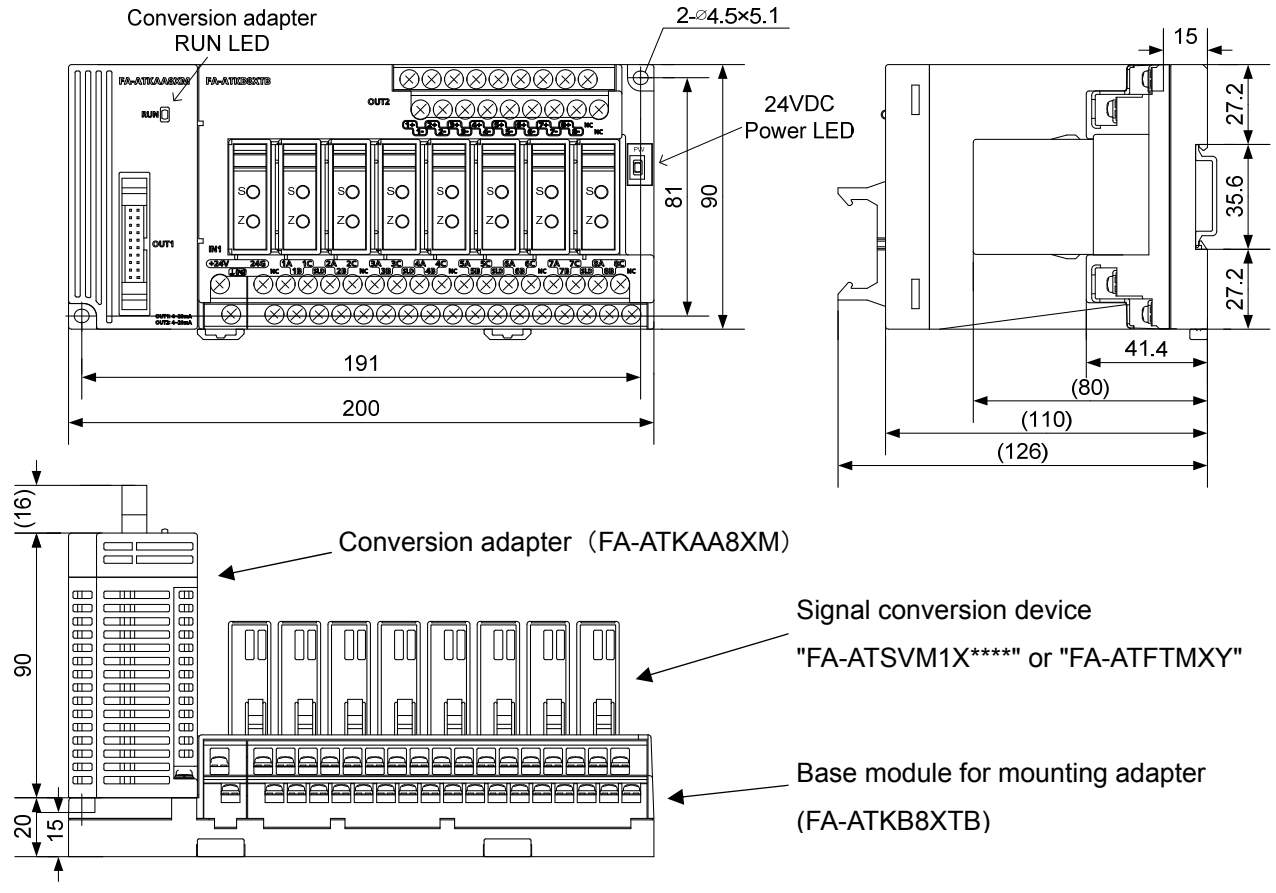


6. EXTERNAL DIMENSIONS

6.1. Input type installation base (FA-ATB8XTB) **[Unit: mm]**



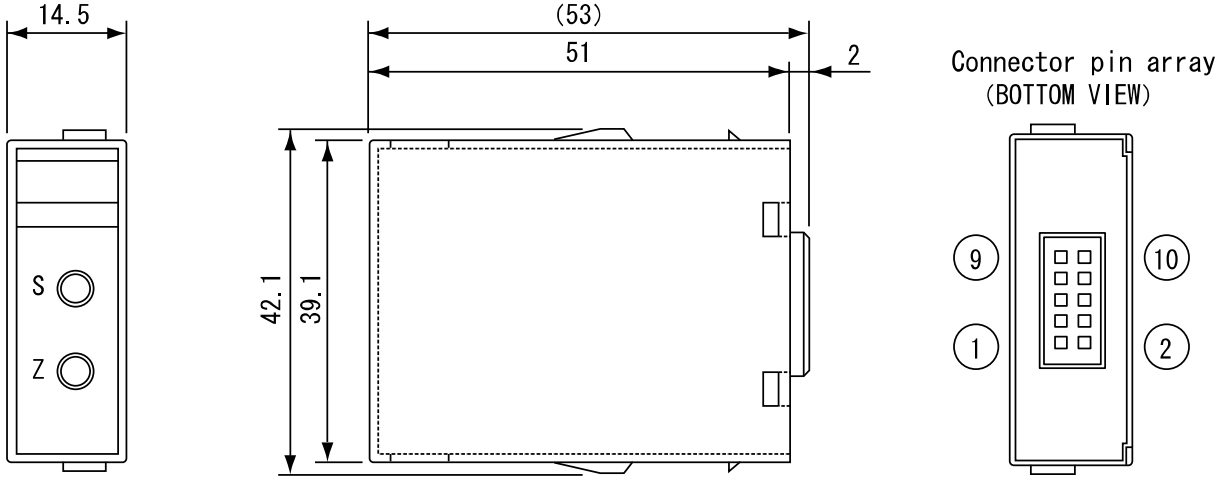
6.2. Input type installation base for mounting adapter (FA-ATKB8XTB)
Conversion adapter (FA-ATKAA8XM), Signal conversion module installation state **[Unit: mm]**



6.3. Signal conversion device (FA-ATSVM1X*****)

Through device (FA-ATFTMXY)

[Unit: mm]

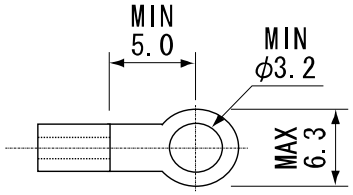


7. APPLICABLE CRIMPING TERMINALS

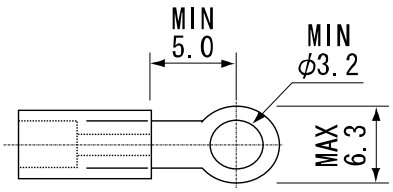
Type		Round		Y	
Maker	Applicable wire size	Bare crimping terminal	Insulated crimping terminal	Bare crimping terminal	Insulated crimping terminal
Nichifu, Co., Ltd. NTM	0.3～1.25mm²	R1.25-3N R1.25-3.5N	TG$^{V}_{N}$1.25-3N TG$^{V}_{N}$1.25-3.5N	1.25Y-3 1.25Y-3N 1.25Y-3L 1.25Y-3.5	TG$^{V}_{N}$1.25Y-3 TG$^{V}_{N}$1.25Y-3N TG$^{V}_{N}$1.25Y-3L TG$^{V}_{N}$1.25Y-3.5
	1.25～2.0mm²	R2-3N	TG$^{V}_{N}$2-3N	2Y-3 2Y-3.5S	TG$^{V}_{N}$2Y-3 TG$^{V}_{N}$2Y-3.5S
Japan Solderless Terminal Co., Ltd. JST	0.3～1.25mm²	1.25-MS3	V1.25-MS3	1.25-B3A 1.25-C3A 1.25-N3A 1.25-C3.5A	V1.25-B3A V1.25-N3A
	1.25～2.0mm²	2-MS3	V2-MS3	2-N3A 2-M3A	V2-N3A
Nippon Tanshi Co., Ltd. NTK	0.3～1.25mm²	R1.25-3ML R1.25-3.5SL	RAV1.25-3ML RAP1.25-3ML	VD1.25-3L VD1.25-3.5SS VD1.25-3.5S	VDAV1.25-3L VDAV1.25-3.5SS VDAV1.25-3.5S
	1.25～2.0mm²	R2-3SL	RAV2-3SL RAP2-3SL	VD2-3S VD2-3.5SS VD2-3.5S	VDAV2-3.5SS VDAV2-3.5S

● Size of crimping terminal [Unit: mm]

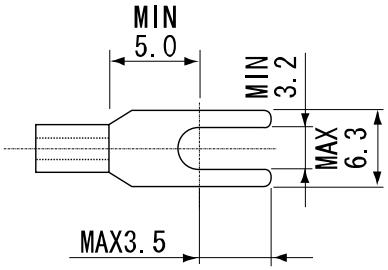
Round bare crimping terminal



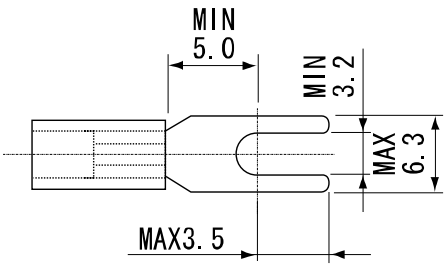
Round insulated crimping terminal



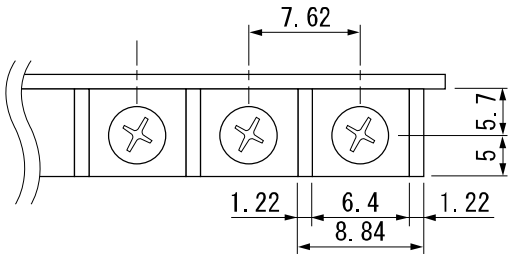
Y bare crimping terminal



Y insulated crimping terminal



● Terminal trapezoid [Unit: mm]



8. CONNECTED TARGET MODEL/PLC MODULE, CONNECTION CABLE

8.1. Input type installation base (FA-ATB8XTB)

PLC Module Model			Connection Cable Model
MELSEC-Q Series Analog input module	Q68ADV		FA-CBL**ATQ8XVT
	Q68ADV	Conversion adapter: FA-Q6TCA	FA-CBL**ATQ8XVA
CC-Link Analog input module	AJ65BT-64AD AJ65SBT-64AD AJ65SBT2B-64AD		FA-CBL**ATF
Each company PLC General analog input Module	General analog input module		FA-CBL**ATF

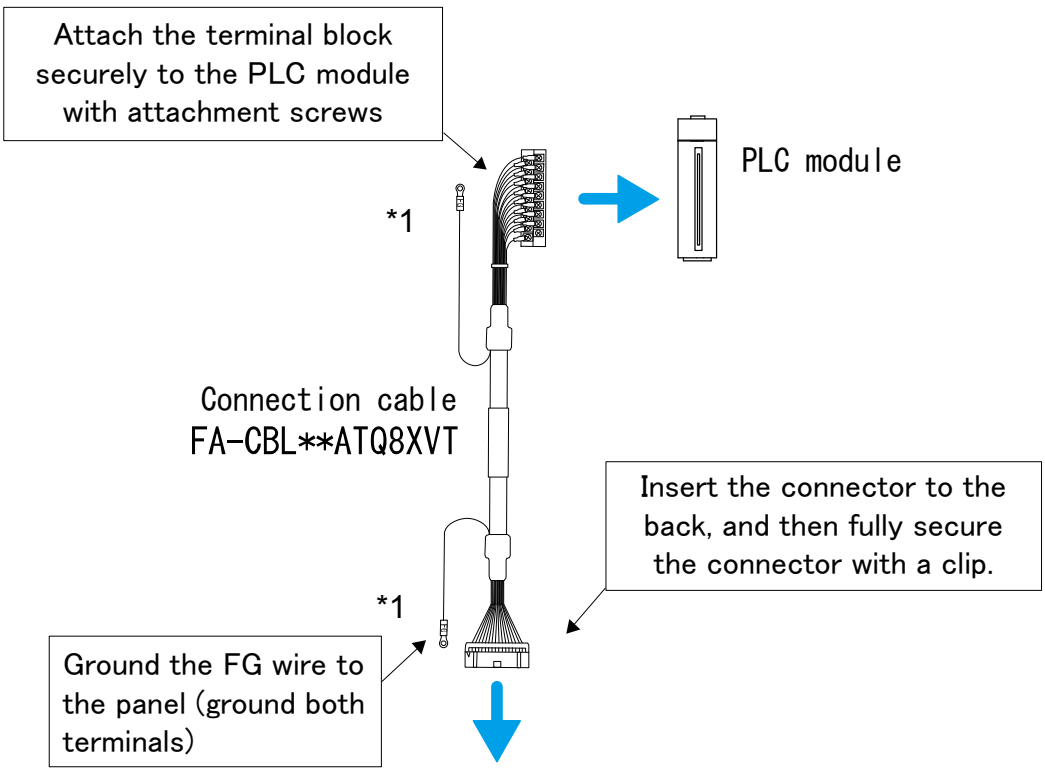
8.2. Input type installation base for mounting adapter (FA-ATKB8XTB) (When using FA-ATKAA8XM)

PLC Module Model			Connection Cable Model
MELSEC-Q Series Analog input module	Q68ADI		FA-CBL**ATQ8XVT
	Q68ADI	Conversion adapter: FA-Q6TCA	FA-CBL**ATQ8XVA
CC-Link Analog input module	AJ65BT-64AD AJ65SBT-64AD AJ65SBT2B-64AD		FA-CBL**ATF
Each company PLC General analog input module	General analog input module		FA-CBL**ATF

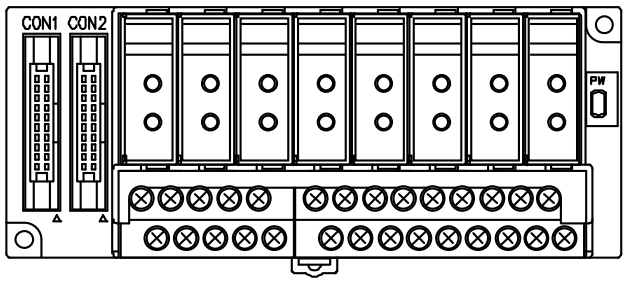
9. INSTALLATION METHOD

9.1. Connection example with terminal block PLC module

9.1.1. When cable with terminal block is used.

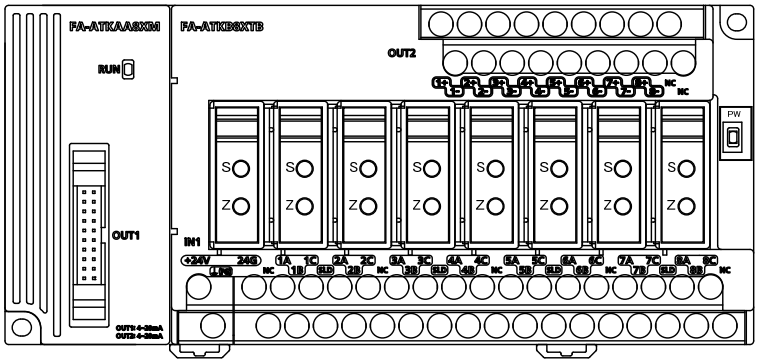


FA-ATB8XTB



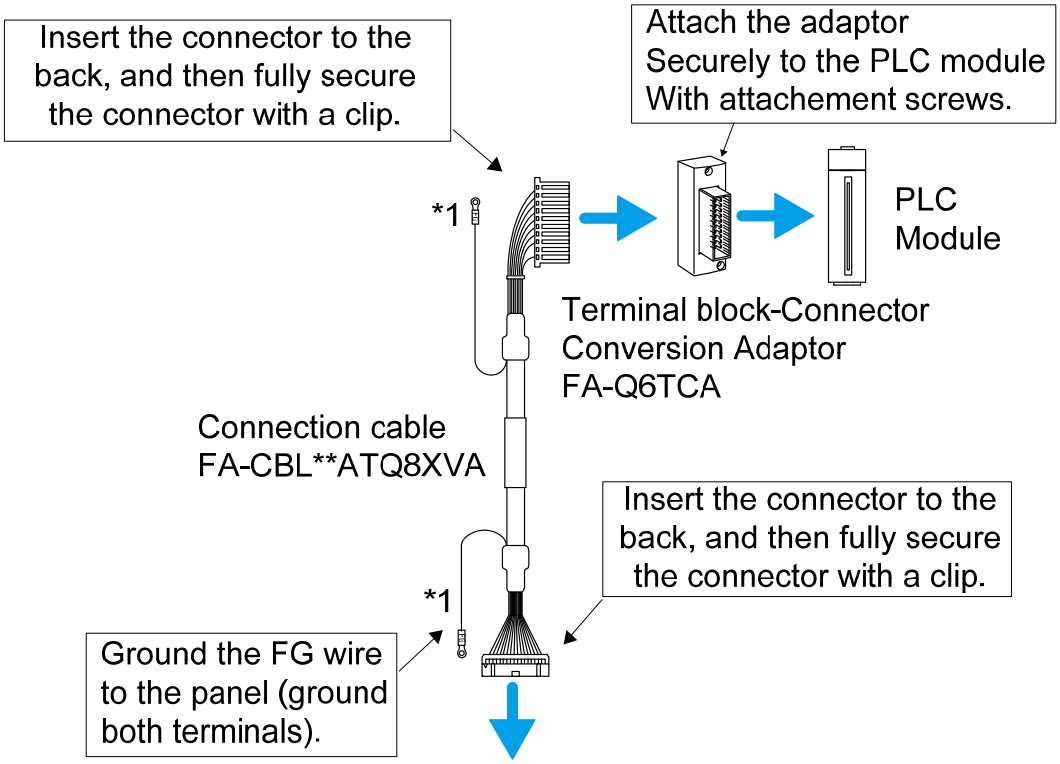
or

FA-ATKB8XTB

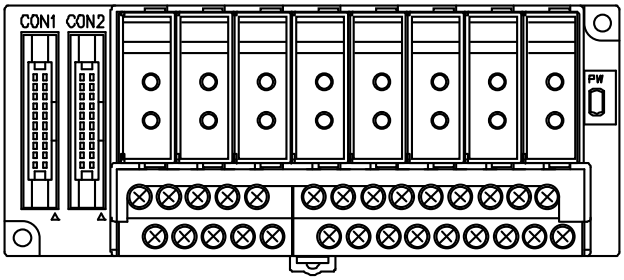


*1 ground the FG wire of the cable to the panel.

9.1.2 When terminal block - connector conversion adapter is used.

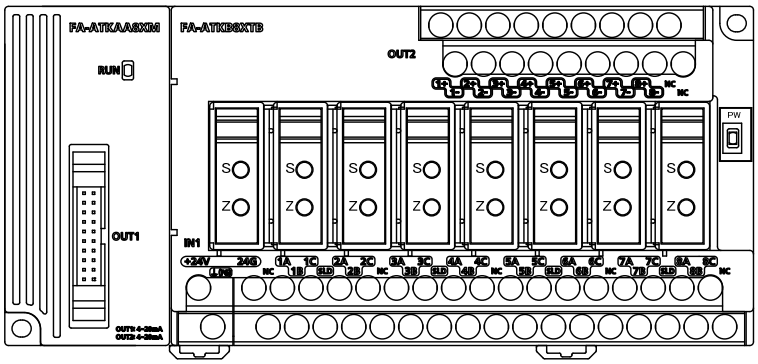


FA-ATB8XTB



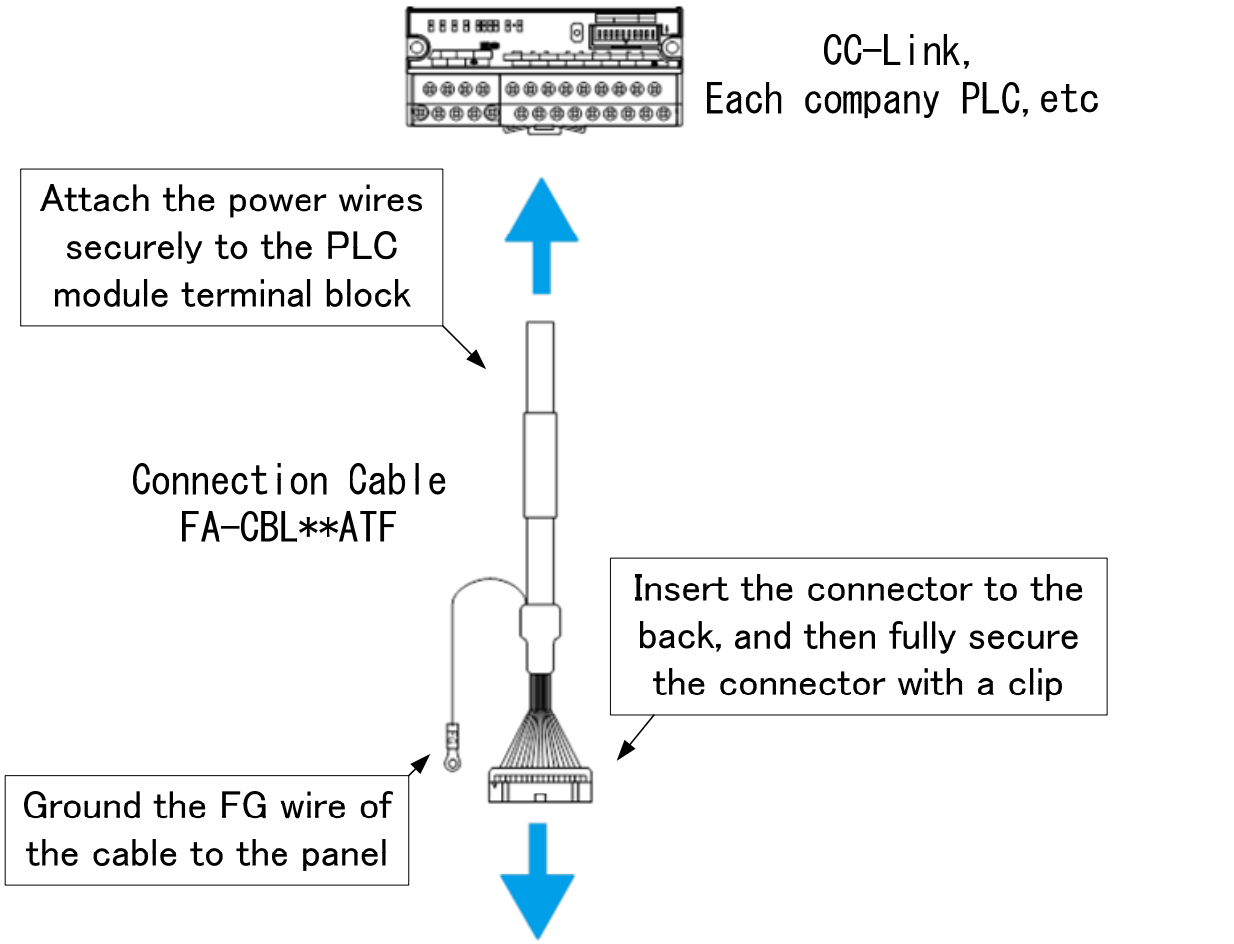
or

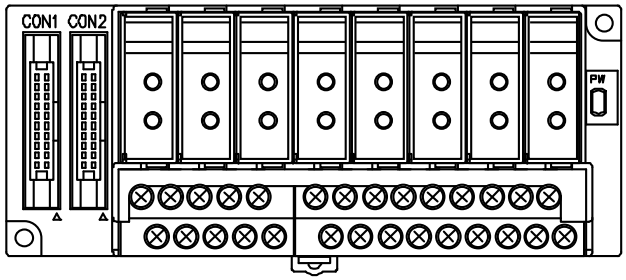
FA-ATKB8XTB



*1: Ground the FG wire of the cable to the panel.

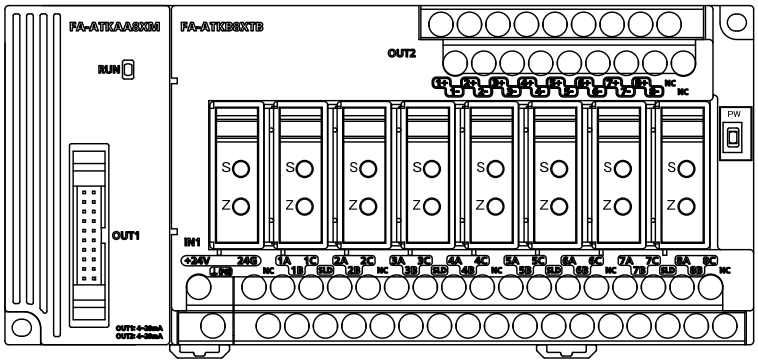
9.1.3. When rose line cable is used.





FA-ATB8XTB

or



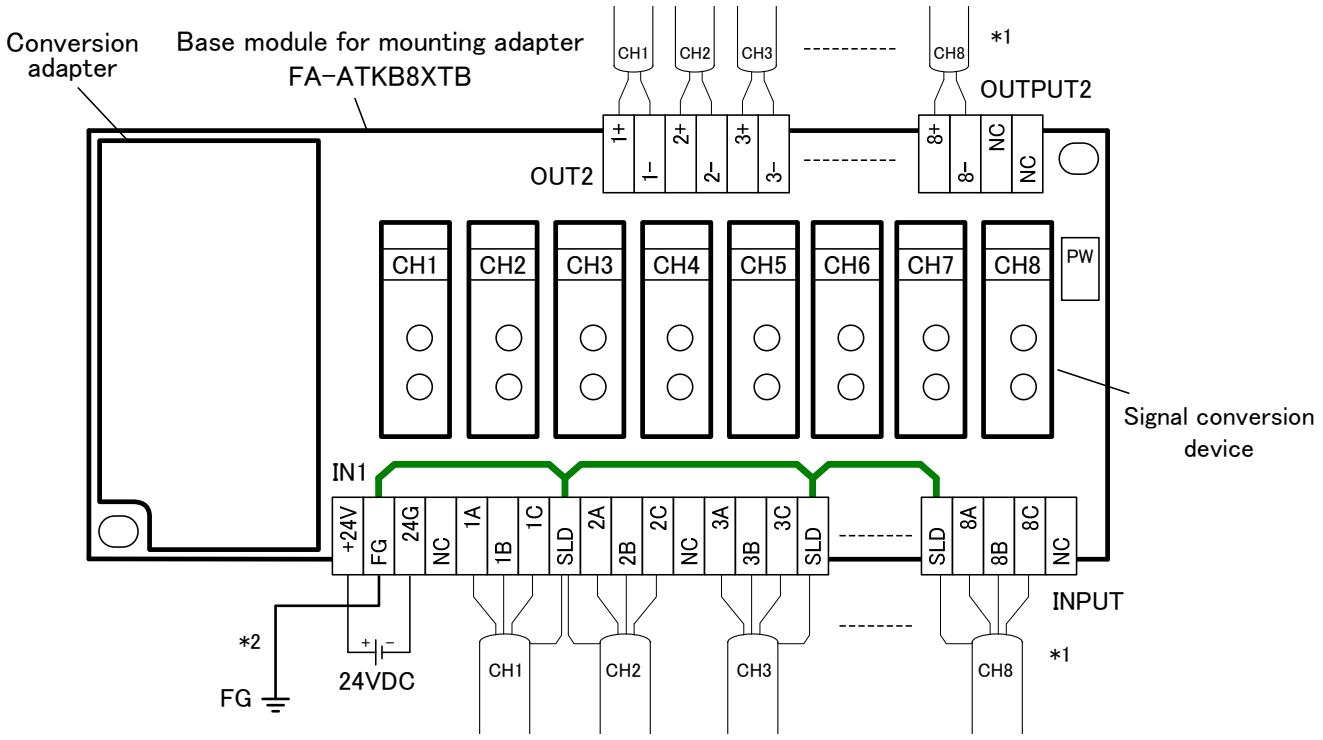
FA-ATKB8XTB

[FA-CBL*ATF pin assignment]

Signal name	Core wire color	Dots	Dot color
CH1+	Pink	2	Black
CH1−		2	Red
CH2+	Yellow	2	Black
CH2−		2	Red
CH3+	White	2	Black
CH3−		2	Red
CH4+	Light gray	2	Black
CH4−		2	Red
CH5+	Orange	2	Black
CH5−		2	Red
CH6+	Pink	2	Black
CH6−		1	Red
CH7+	Yellow	1	Black
CH7−		1	Red
CH8+	White	1	Black
CH8−		1	Red
NC	Light gray	1	Black
NC		1	Red
FG	Orange	1	Black
FG		1	Red

9.2. External wiring

Execute external wiring as shown in the figure below. Example: FA-ATKB8XTB

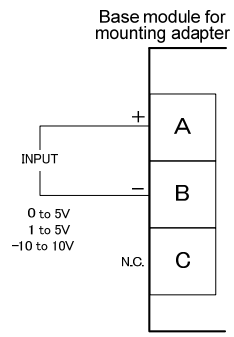
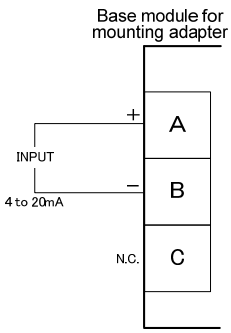
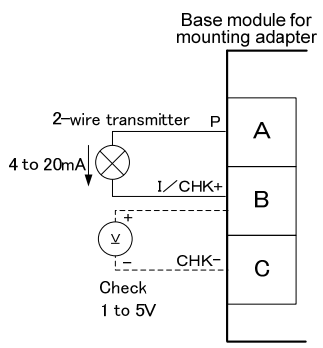
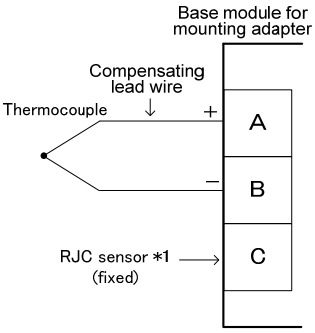


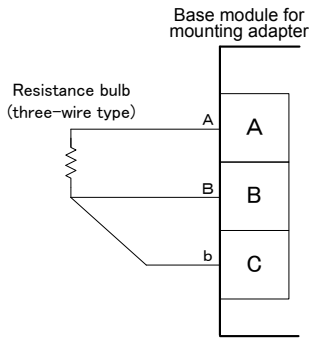
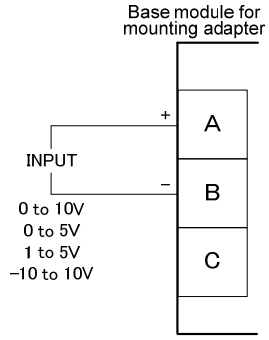
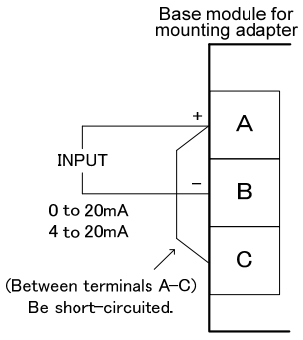
*1: Use shielded electrical wires, and ground the shields. Note that the SLD terminals of the input terminal block (IN1) are internally connected to FG and can be used as relay terminals that ground the shields of the external wires.

*2: Be sure to ground the FG terminal regardless of whether or not the SLD terminals are used.

The wiring to the input terminal block (IN1) differs according to the mounted signal conversion device. The wiring to the base module by each device is as shown below.

●Wiring connection diagrams of wiring to base module by signal conversion device

Voltage input (FA-ATSVM1XV****)	Current input (FA-ATSVM1XA420)	2-wire transmitter (FA-ATSVM1XD)	Thermocouple temperature (FA-ATSVM1XT*)
			

Resistance bulb (FA-ATSVM1XR***)	Through device (FA-ATFTMXY) *2	
	When signal is through	When current → voltage is converted
		

*1: Secure the end (round solderless terminal) of the RJC sensor of the thermocouple temperature input device to the terminal block. The round solderless terminal area and device internal circuit are electrically isolated. Please do not strongly pull, do not twist, and do not bend RJC sensor of the thermocouple temperature input signal conversion device. It becomes a cause of failure of a RJC sensor.

*2: Signals other than voltage input (1-5V) are not applicable, when using FA-ATKB8XTB.

10. PRECAUTIONS

(1) Please go through a warm-up to make sure for ten minutes or more though this module works at the same time as turning on the power supply.

(2) Because signal isolation conversion device had been proofread when having shipped it, it is not necessary to proofread again.
However, please Zero/Span adjust it according to the following when the adjustment with connected equipment is taken or the customer executes the proofreading.
(Trimmer operation/// Right(Clockwise)Rotation ; Largeness,
Left(Counterclockwise)Rotation ; Smallness)

1) Please go through a warm-up for ten minutes or more after turning on the power supply of the module.
2) The signal equivalent to 0% in the input range is input, the Zero adjustment trimmer is adjusted, and the output signal is matched to 0%.
3) The signal equivalent to 100% in the input range is input, the Span adjustment trimmer is adjusted, and the output signal is matched to 100%.
4) Please repeat above-mentioned 2) to 3) several times and adjust Zero/Span completely.
5) Please input the signal within range 25%, 50%, 75% of the input, and confirm the linearity of the output.

(3) When the monitor output is used, the handling is different according to the usage condition of the device. Please see the following tables about handling by each device.

11. GRATIS WARRANTY TERMS AND GRATIS WARRANTY RANGE

If any fault or defect (hereinafter referred to as “Failure”) attributable to Mitsubishi Electric should occur within the gratis warranty period, Mitsubishi Electric shall replace the product free of charge via the distributor from whom you made your purchase.

●Gratis Warranty Period
The gratis warranty period of this product shall be one (1) year from the date of purchase or delivery to the designated place.

●Gratis Warranty Range
(1) The gratis warranty range shall be limited to normal use based on the usage conditions, methods and environment, etc., defined by the terms and precautions, etc., given in the instruction manual, user’s manual, and caution labels on the product.
(2) In the following cases, a repair fee shall be applied even if within the gratis warranty period.
1) Failure resulting from inappropriate storage or handling, carelessness or negligence by the user, or Failure caused by the user’s hardware or software design.
2) Failure caused by unapproved modifications, etc., to the product by the user.
3) Failure that could have been avoided if, when the Mitsubishi Electric Engineering product was assembled into the user’s device, safeguards defined by legal regulations applicable to the user’s device or functions or structures considered standard by the industry had been provided.
4) Failure recognized as preventable if the consumed products specified in instruction manuals, etc., were normally maintained or replaced.
5) Replacement of consumable parts (relays, etc.).
6) Failure caused by external factors beyond anyone’s control such as fires or abnormal voltage, and Failure caused by Force Majeure such as earthquakes, lightning, or wind and water damage.
7) Failure caused by reasons unpredictable by scientific technology standards at the time of shipment from Mitsubishi Electric Engineering.
8) Any other failure not attributable to Mitsubishi Electric Engineering or found by the user to not be attributable to Mitsubishi Electric Engineering.

12. WARRANTY PERIOD AFTER DISCONTINUATION OF PRODUCTION

(1) MEE shall offer product repair services (fee applied) for seven (7) years after production of the product has been discontinued. Discontinuation of production shall be reported via distributors.
(2) Product supply (including spare parts) is not possible after production has been discontinued.

13. EXCLUSION OF OPPORTUNITY LOSS AND SECONDARY LOSS FROM WARRANTY LIABILITY

Regardless of the gratis warranty period, MEE shall not be liable for compensation for damages arising from causes not attributable to MEE, opportunity losses or lost profits incurred by the user due to Failures of MEE products, damages or secondary damages arising from special circumstances, whether foreseen or unforeseen by MEE, compensation for accidents, compensation for damages to products other than MEE products, or compensation for other work carried out by the user.

⚠ FOR YOUR SAFETY

- This product has been manufactured as a general-purpose product for general industry applications, etc. The product is not intended for use in devices or systems used under conditions in which human life could be greatly affected.
- When considering application of this product to special applications, such as nuclear power, electrical power, aerospace, medical, or manned transport devices or systems, contact our sales service desk.
- Although this product was manufactured under a strict quality management system, the product shall be systematically provided with backup and fail-safe functions when applied to equipment that may lead to a major accident or damage in the unlikely event any failure or defect should occur in the product.

MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED

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Homepage URL: http://www.mee.co.jp/

⚠ During product use, be sure to ensure safety in the unlikely event failure occurs. Mitsubishi Electric Engineering assumes no responsibility whatsoever for any secondary damage caused by the failure of this product.

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Information such as specifications is subject to change without notice.

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