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Shinko Technos QAM1-4 4 Points Analog I-O Module



#### **Preface**

- Thank you for purchasing our 4 points Analog I/O Module [QAM1-4].
- This manual contains instructions for the mounting and wiring when operating the 4 points Analog I/O Module [QAM1-4].
- To prevent accidents arising from the misuse of this instrument, please ensure the operator receives this manual.
- For details on how to use it, refer to the instruction manual (detailed version).
- Please access our website from the following URL or QR code to download the instruction manual (detailed version).

https://shinko-technos.co.jp/e/download/d\_manual\_download.html#Q



#### **Notes**

This instrument should be used in accordance with the specifications described in the

manual.

- If it is not used according to the specifications, it may malfunction or cause a fire.
- Be sure to follow the warnings, cautions and notices. If they are not observed, serious injury or malfunction may occur.
- The contents of this instruction manual are subject to change without notice.
- Care has been taken to ensure that the contents of this instruction manual are correct, but if there are any doubts, mistakes or questions, please inform our sales department.
- This instrument is designed to be installed on a DIN rail within a control panel. If it is not, measures must be taken to ensure that the operator does not touch power terminals or other high voltage sections.
- Any unauthorized transfer or copying of this document, in part or in whole, is prohibited.
- Shinko Technos Co., Ltd. is not liable for any damage or secondary damage(s) incurred as a result of using this product, including any indirect damage

#### **SAFETY PRECAUTIONS**

(Be sure to read these precautions before using our products.)

- The safety precautions are classified into categories: "Warning" and "Caution".
- Depending on circumstances, procedures indicated by Caution may result in serious consequences, so be sure to follow the directions for usage.
- Procedures which may lead to dangerous conditions and cause death or serious injury, if not carried out properly.

#### Caution

Procedures which may lead to dangerous conditions and cause superficial to medium injury or physical damage or may degrade or damage the product, if not carried out properly.

#### Warning

 To prevent an electrical shock or fire, only Shinko or qualified service personnel may handle the inner assembly. • To prevent an electrical shock, fire, or damage to instrument, parts replacement may only be undertaken by Shinko or qualified service personnel.

#### **Safety Precautions**

- To ensure safe and correct use, thoroughly read and understand this manual before using this instrument.
- This instrument is intended to be used for industrial machinery, machine tools and measuring equipment. Verify correct usage after purpose-of-use consultation with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- Please contact us for periodic maintenance (for a fee).
- This instrument must be used under the conditions and environment described in this manual. Shinko Technos Co., Ltd. does not accept liability for any injury, loss of life or damage occurring due to the instrument being used under conditions not otherwise stated in this manual.

#### **Caution with Respect to Export Trade Control Ordinance**

To avoid this instrument from being used as a component in, or as being utilized in the manufacture of weapons of mass destruction (i.e. military applications, military equipment, etc.), please investigate the end users and the final use of this instrument. In the case of resale, ensure that this instrument is not illegally exported.

#### **Precautions for Use**

#### **Installation Precautions**

#### Caution

This instrument is intended to be used under the following environmental conditions (IEC61010-1):

- Overvoltage Category II, Pollution degree 2 Ensure the mounting location corresponds to the following conditions:
- A minimum of dust, and an absence of corrosive gases
- No flammable, explosive gases

- No mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of -10 to 50°C(14°F to 122°F)
   that does not change rapidly, and no icing
- An ambient non-condensing humidity of 35 to 85 %RH
- No large capacity electromagnetic switches or cables through which large current is flowing
- No water, oil or chemicals or the vapors of these substances can come into direct contact with the unit.
- When installing this unit within a control panel, please note that ambient temperature
  of this unit
  - not the ambient temperature of the control panel must not exceed 50°C (122°F).
     Otherwise the life of electronic components (especially electrolytic capacitor) may be shortened.
- Avoid setting this instrument directly on or near flammable material even though the case of this instrument is made of flame-resistant resin.

#### **Wiring Precautions**

#### Caution

- Do not leave bits of wire in the instrument, because they could cause a fire and malfunction.
- When wiring, use a crimping pliers and a solderless terminal with an insulation sleeve in which an M3 screw fits.
- The terminal block of this instrument has a structure that is wired from the left side. Be sure to insert the lead wire into the terminal of the instrument from the left side and tighten the terminal screw.
- Tighten the terminal screw using the specified torque. If excessive force is applied to the screw when tightening, the screw or case may be damaged.
- Do not pull or bend the lead wire with the terminal as the base point during or after wiring work. It may cause malfunction.
- This instrument does not have a built-in power switch, circuit breaker and fuse. It is
  necessary to install an appropriate power switch, circuit breaker and fuse near the
  instrument.

- When wiring the power supply (24 VDC), do not confuse the polarities.
- Do not apply a commercial power source to the sensor which is connected to the input terminal nor allow the power source to come into contact with the sensor.
- Use the thermocouple and compensation lead wire that match the sensor input specifications of the instrument.
- Use a RTD of 3-conducting wire type that meets the sensor input specifications of this instrument.
- When using a relay contact output type, externally use a relay according to the capacity of the load to protect the built-in relay contact.
- Separate the input line (thermocouple, RTD, etc.) from the power line and load line.

#### **Operation and Maintenance Precautions**

#### Caution

- It is recommended that auto-tuning (AT) be performed on the trial run.
- Do not touch live terminals. This may cause electrical shock or problems in operation.
- Turn the power supply to the instrument OFF when retightening the terminal or cleaning. Working on or touching the terminal with the power switched ON may result in severe injury or death due to electrical shock.
- Use a soft, dry cloth when cleaning the instrument. (Alcohol based substances may tarnish or deface the unit.)
- As the panel part is vulnerable, be careful not to put pressure on, scratch or strike it with a hard object.

CUnet is a registered trademark of StepTechnica Co., Ltd.

## **Specifications**

Power supply voltage 24 V DC 20 to 28 V DC Allowable voltage fluctuation Power consumption Approx. 5 W or less

Thermocouple input: (Within ±0.2% of each input span) Input reference accuracy (Ambient temp.: 23°C) Within 0 °C (32 °F), within ±0.4% of each input span

R, S input, 0 to 200 °C (32 to 392 °F): Within ±6 °C (12 °F) B input, 0 to 300 °C (32 to 572 °F): Accuracy is not

DC current input, DC voltage input: Within ±0.2% of each input span

DC current output, DC voltage output: Within ±0.2% of each input span

guaranteed.

RTD input: Within ±0.1% of each input span

Output reference accuracy (Ambient temp.: 23°C) Cold junction compensation

accuracy

Input sampling cycle

Within ±1°C at -10 to 50°C

20 ms (\*1), 50 ms (\*1), 125 ms (\*2)

(\*1): Valid only for DC current input and DC voltage input. (\*2): For temperature input, fixed at 125 ms regardless of setting.

Output update cycle Output circuit response 20 ms

time

Setting accuracy

Serial communication

100 ms or less (excluding 0 to 90% communication cycle time)

Comply with standard accuracy

Reads and sets various setting values, reads PV operating status,

and changes functions from an external computer. Communication line: EIA RS-485 compliant Communication method: Half-duplex communication

Synchronization method: Asynchronous Communication protocol: MODBUS RTU

Communication speed: 9600, 19200, 38400, 57600 bps

Data bit:

Parity: Even, odd, no parity

Stop bit:

CUnet communication Response delay: 0 to 1000 ms (factory default: 0 ms)

> Connection type: Multi-drop Communication method: 2-wire half-duplex Synchronization method: Bit-synchronous Error detection: CRC-16 Number of occupied slave addresses: 1

Maximum number of connected nodes: 64 nodes

Communication speed: 12 Mbps (100 m), 6 Mbps (200 m),

3 Mbps (300 m) (cable length)

Isolation method: Pulse transformer isolation

Ambient temperature Impedance:  $100 \Omega$ 

Ambient humidity -10 to 50 °C (no condensation or freezing)

35 to 85 %RH (no condensation) Environmental specification RoHS directive compliant

Weight

Approx. 170 g

Installation environment

Overvoltage Category II, Pollution degree 2 (IEC61010-1) Memory protection Non-volatile memory (Number of writes: 1 trillion times)

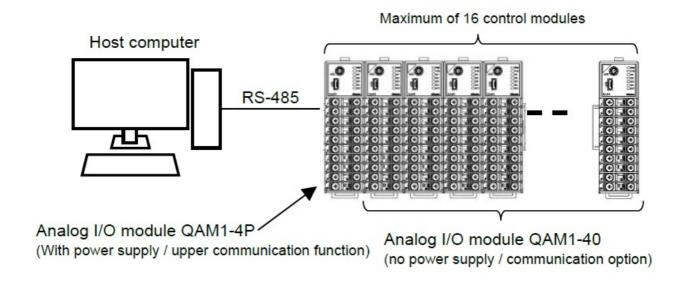
#### Overview

- This instrument is a 4 points Analog I/O Module.
- A multi-point measurement system can be configured with the control module alone, or via a host computer or PLC.
- A maximum of 16 instruments can be connected via BUS, and a maximum of 64

points can be measured.

• One block connected to BUS is called "1 unit".

## **Configuration example**



#### Model

•

QAM1-4				-						
<u></u>	0					 _		_	_	No option
Power supply / communication	l									With power supply / upper communication function
option	С									With power supply / CUnet communication function
Wiring type		Т								Terminal block type
			-0							Input 4 points
I/O type (*)			-1							Output 4 points
			-2							I/O 4 points each
Analog outpu	ut 1									
Analog outpu	ıt 2									Refer to
Analog outpu	ut 3									output code table
Analog output 4										
Analog intpu	Analog intput 1									
Analog intput 2							Refer to			
Analog intpu	t 3									intput code table
Analog intpu	t 4									

For input-only type, output code selection is invalid.

• For output-only type, input code selection is invalid.

## Output code table

Output code	Output type
Α	DC current output 4 to 20 mA DC
0	DC current output 0 to 20 mA DC
V	DC voltage output 0 to 1 V DC
1	DC voltage output 0 to 5 V DC
2	DC voltage output 1 to 5 V DC
3	DC voltage output 0 to 10 V DC
N (*)	No output

(\*): Output code N is valid only when I/O type 0 (Input 4 points) is selected.

# Intput code table

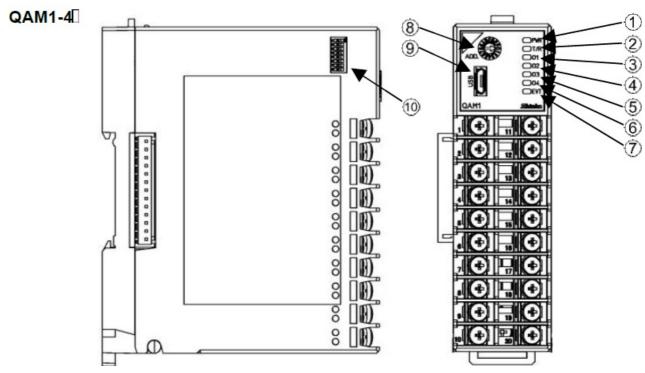
Input code	Input type	Input type	
		K	-200 to 1370 °C
		K	-200.0 to 400.0 °C
		J	-200 to 1000 °C
		R	0 to 1760 °C
		S	0 to 1760 °C
		В	0 to 1820 °C
		Е	-200 to 800 °C
		Т	-200.0 to 400.0 °C
		N	-200 to 1300 °C
			1

		PL-II	0 to 1390 °C
	Thermocouple	C(W/Re5-26)	0 to 2315 °C
	input	К	-328 to 2498 °F
		К	-328.0 to 752.0 °F
		J	-328 to 1832 °F
M		R	32 to 3200 °F
		S	32 to 3200 °F
		В	32 to 3308 °F
		Е	-328 to 1472 °F
		Т	-328.0 to 752.0 °F
		N	-328 to 2372 °F
		PL-II	32 to 2534 °F
		C(W/Re5-26)	32 to 4199 °F
	RTD input	Pt100	-200.0 to 850.0 °C
	πρατ	Pt100	-328.0 to 1562.0 °F
	DC voltage input	0 to 1 V DC	-2000 to 10000
		4 to 20 mA DC(Ext ernal receiving resi stor)	-2000 to 10000
	DC current input	0 to 20 mA DC(Ext ernal receiving resi stor)	-2000 to 10000

A	DC current input	4 to 20 mA DC(Buil t-in receiving resistor)	-2000 to 10000
	·	0 to 20 mA DC(Buil t-in receiving resistor)	-2000 to 10000
		0 to 5 V DC	-2000 to 10000
V	DC voltage input	1 to 5 V DC	-2000 to 10000
		0 to 10 V DC	-2000 to 10000
N (*)	No input		

(\*): Input code N is valid only when I/O type 1 (Output 4 points) is selected.

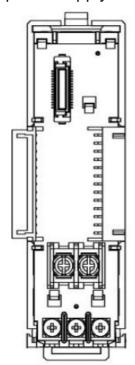
# **Name and Functions**

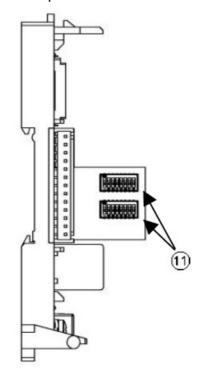


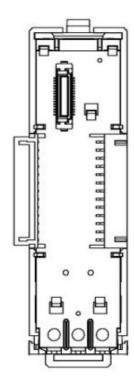
## **Base part**

- With power supply / upper communication function
- With power supply / Client communication function

• No power supply / communication option

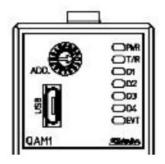




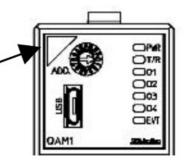


## Panel part

- Depending on whether have the option, the panel design differs.
- With power supply / upper communication function No power supply /
- With power supply / CUnet communication function communication option



There is a triangle mark on the upper left of the panel



## **Operation indicator**

No. Symbol (c	or) Name	Function	
---------------	----------	----------	--

1	PWR (Green)	Power indicator	When energized: Lights up Dur ing warm-up: Flashing for 3 sec . (500 ms cycle)Non-volatile IC memory error or ADC error: Flashing (500ms cycle)
2	T/R (Yellow)	Communication indicator	During communication TXoutput: lights up
3	O1 (Green)	Analog output 1 indicator	Always lights off
4	O2 (Green)	Analog output 2 indicator	Always lights off
5	O3 (Green)	Analog output 3 indicator	Always lights off
6	O4 (Green)	Analog output 4 indicator	Always lights off
7	EVT (Red)	Event indicator	<ul> <li>Sensor error: Flashing (250 ms cycle) Overscale/</li> <li>Under scale: Flashing (500 ms cycle)</li> <li>When powered by PC via U SB bus power: Flashing (250 ms cycle)</li> </ul>

## **Switch and connector**

No.	Symbol	Name
8	ADD.	Module address setting rotary switch
9	USB	Console communication connector
10		Communication specification setting dip switch
11		CUnet communication specification setting dip switch

## **Communication Parameter Setting**

#### **Setting of Communication Specifications**

#### Caution

- When connecting to the communication expansion module QMC1, the communication specification selection is not required.
- Use it in the factory default (all OFF).
- Use the communication specification setting dip switch on the left side of the instrument to set communication specifications.
- Set the communication speed, data bit, parity and stop bit.

The factory default settings are as follows.

#### Communication speed

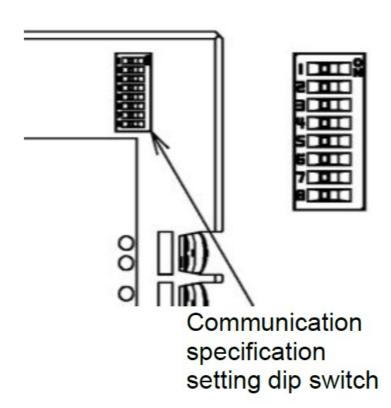
• With power supply / upper communication function: 57600 bps

• With power supply / CUnet communication function: 38400 bps

• Data bit: 8 bits

• Parity: Even

• Stop bit: 1 bit



## **Setting of communication speed**

Communication speci	fication setting dip switch	Communication speed
1	2	Communication speed
OFF	OFF	57600 bps
ON	OFF	38400 bps
OFF	ON	19200 bps
ON	ON	9600 bps

## Setting of data bit, parity and stop bit

Communication	n specification s	Data bit, parity and stop bit	
3	4	5	Data bit, parity and stop bit
OFF	OFF	OFF	8 bits, Even, 1 bit
ON	OFF	OFF	8 bits, Even, 2 bits
OFF	ON	OFF	8 bits, Odd, 1 bit
ON	ON	OFF	8 bits, Odd, 2 bits
OFF	OFF	ON	8 bits, None, 1 bit
ON	OFF	ON	8 bits, None, 2 bits

Dip switches No.6, No.7 and No.8 does not use. Leave it OFF.

## **Setting of Module Address**

#### Caution

When using the SIF function, module addresses should be set to consecutive numbers

starting from 1.

- When using the MODBUS specification, any number between 0 to F (1 to 16) can be set.
- The module addresses are set with the rotary switch.
- Use a small flat-blade screwdriver to set the module addresses.
- The value obtained by adding 1 to the value of the set rotary switch becomes the module addresses.



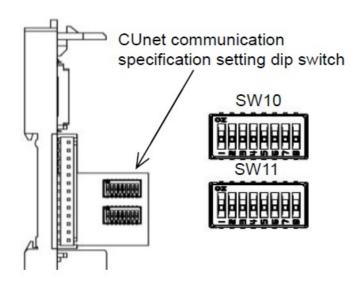
Module address setting rotary switch

Module address: 0 to F (1 to 16)

Rotary switch	0	1	9	А	В	F
Module address	1	2	10	11	12	16

## **Setting of CUnet communication specification**

- The CUnet communication specifications are set by the dip switches (SW10, SW11) on the base part.
- Refer to (1) in "7.2.2 Power Supply and Communication Terminal Arrangement" to remove the case.
- After setting, refer to (3) in "7.2.2
- Power Supply and Communication Terminal Arrangement" to mount the case.



# **Setting of Station Address and Communication Speed (SW10)**

No.	Setting item	Status	Factory default	
1		Bit0 ON: Enable, OFF: Disable	Disable	
2		Bit1 ON: Enable, OFF: Disable	Disable	
3	Station address	Bit2 ON: Enable, OFF: Disable	Disable	
4	setting	Bit3 ON: Enable, OFF: Disable	Disable	
5		Bit4 ON: Enable, OFF: Disable	Disable	
6		Bit5 ON: Enable, OFF: Disable	Disable	
7		• 7: OFF 8: OFF 12 Mbps		
8	Communication speed setting	<ul> <li>7: ON 8: OFF 6 Mbps</li> <li>7: OFF 8: ON 3 Mbps</li> <li>7: ON 8: ON Disable(12 Mbps)</li> </ul>	12 Mbps	

Select master address and number of occupied (OWN) items (SW11)

N o	Setti ng it em	Status	Facto ry def ault	
1	Mast er ad dress settin g	Bit0 ON: Ena ble, OFF: Dis able	Disab le	
2		Bit1 ON: Ena ble, OFF: Dis able	Disab le	
3		Bit2 ON: Ena ble, OFF: Dis able	Disab le	
4		Bit3 ON: Ena ble, OFF: Dis able	Disab le	
5		Bit4 ON: Ena ble, OFF: Dis able	Disab le	
6		Bit5 ON: Ena ble, OFF: Dis able	Disab le	
	Num ber o	7: OFF 8: OFF 1 item		
7				
	occu pied	7: ON 8: OFF 2 items		

	(OW	7: OFF 8:	1 ite	
	N) ite	ON 3 items	m	
	ms			
8				
	selec	7 0 1 0		
	tion(*	7: ON 8: ON 4 items		
	)	ON 4 Items		

The following items are allocated to global memory for each module.

Number of occupied (	QAM1				
OWN) items	DI item	DO item			
1	PV: 03E8-03EB	Output: 0014-0017			
2	Status 1: 03F4-03F7				
3	MV: 03EC-03EF				
4					

Shaded area is invalid because there is no allocation (no area is allocated in global memory)

## **Mounting**

#### Caution

- Turn off the power supply to this instrument when mounting or removing it.
- Mount the DIN rail horizontally.
- This instrument fits the following DIN rails. Top hat rail TH35 JIS C 2812-1988
- If this instrument is mounted in a position susceptible to vibration or shock, mount commercially available end plate at both ends of the instrument.

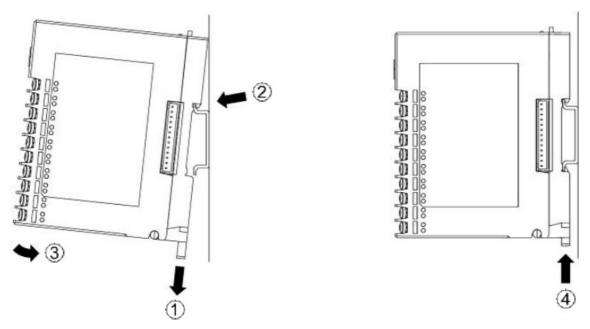
- When installing, make sure that the orientation (upper and lower) of this instrument is correct.
- When mounting or removing this instrument on the DIN rail, it must be tilted slightly.

Secure a space of 50 mm or more in the vertical direction of the instrument, considering the wiring space of the power supply/communication line and heat dissipation.

## **Mounting**

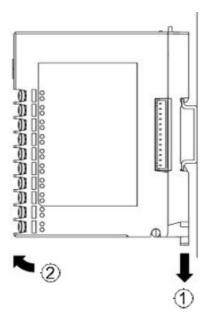
#### Mounting to the DIN rail

- 1. Lower the lock lever of this instrument. (The lock lever of this instrument has a spring structure, but if lower it in the direction of the arrow until it stops, it will be locked in that position.)
- 2. Hook the part 2 of this instrument onto the top of the DIN rail.
- 3. Insert the lower part of this instrument with the part 2 as a fulcrum.
- Raise the lock lever of this instrument.
   Make sure it is fixed to the DIN rail.



#### Removal from the DIN rail

- 1. Insert a flat blade screwdriver into the lock lever of this instrument and lower the lock lever until it stops.
- 2. Remove this instrument from the DIN rail by lifting it from below

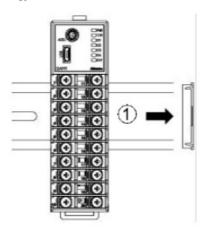


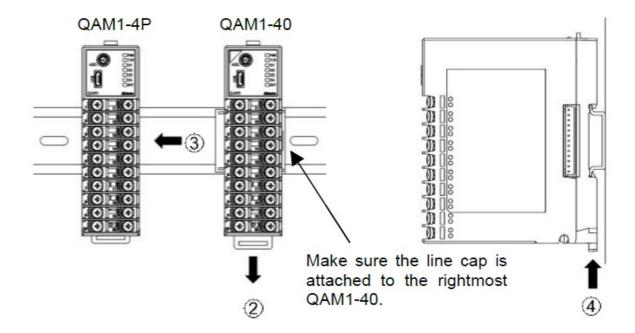
## Mounting multiple modules to the DIN rail

This section describes an example of mounting multiple modules on the DIN rail.

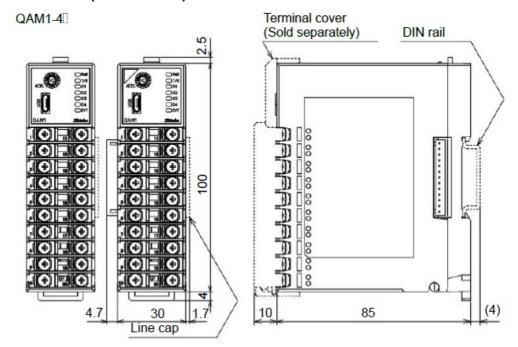
- 1. Remove the line cap on the right side of the QAM1-4P.
- 2. Lower the lock lever of the QAM1-40, and mounting the QAM1-40 to the DIN rail.
- 3. Slide the QAM1-40 to the left and connect the connectors to each other.
- 4. Raise the lock lever of the QAM1-40.

Make sure it is fixed to the DIN rail.





## **External Dimensions(Scale: mm)**



## Wiring

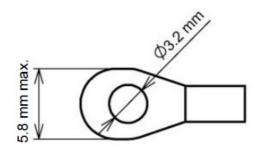
## Warning

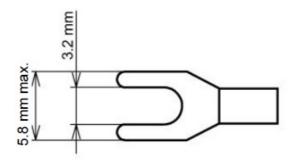
- Turn off the power supply to this instrument before wiring.
- If you work while the power is supplied, you may get an electric shock, which could result in an accident resulting in death or serious injury.

#### **Recommended Terminal**

Use a solderless terminal with an insulation sleeve in which an M3 screw fits as shown below. Use the Ring-type for the power supply and communication section.

Solderle ss Termi nal	Manufacturer	Model	Compatible wire size	Tightening torque
Y-type	NICHIFU TERMINAL I NDUSTRIES CO., LT D.	TMEX1.25Y -3	AWG22 to	
	J.S.TMFG.CO.,LTD.	VD1.25-B3A		Input/output section: 0.63 N m Power supply section:0.5 N m serial communi cation section:0.3 N m
	NICHIFU TERMINAL I NDUSTRIES CO., LT D.	TMEX1.25-3	AWG22 to 16	
Ring-typ e		TMEX2-3S	AWG16 to	
	J.S.TMFG.CO.,LTD.	V1.25-3	AWG22 to	



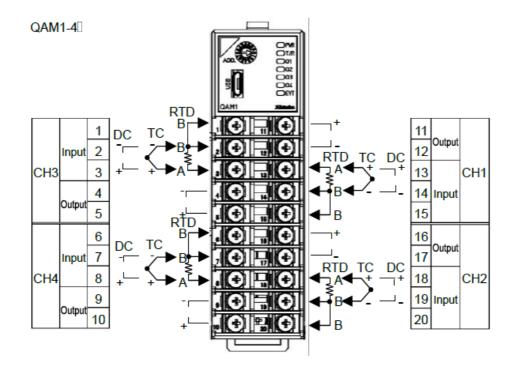


# **Terminal Arrangement**

# **Input and Output Terminal Arrangement**

## Caution

Please note that CH1, CH2 and CH3, CH4 have different terminal arrangements.



- For DC current input (with an external receiving resistor), connect a receiving resistor [option 50  $\Omega$  (RES-S01-050)] between each input terminal (+ and -).
- For DC current input (built-in receiving resistor), a receiving resistor (50  $\Omega$ ) is not required.

### **Power Supply and Communication Terminal Arrangement**

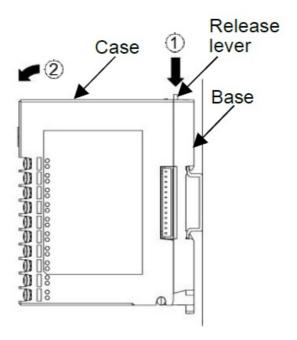
#### Caution

Be sure to use the correct polarity for the power supply voltage (24 V DC).

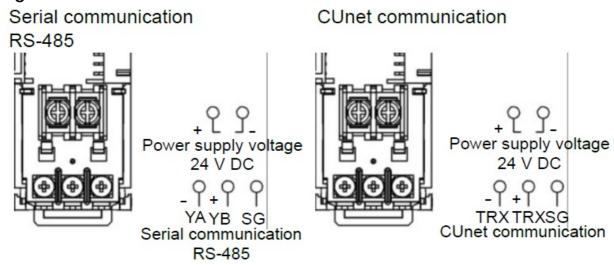
The terminal block for power supply and communication is located on the base of this instrument. Wiring by the following procedure.

#### Case removal

- 1. Push the release lever on the top of this instrument to unlock it.
- 2. Remove the case



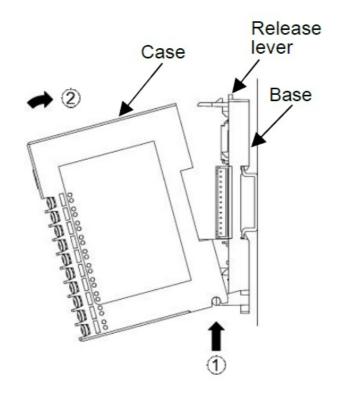
#### Wiring



For CUnet communication, install a terminator [ optional 100  $\Omega$  (RES-S07-100)] on the last module of the communication line.

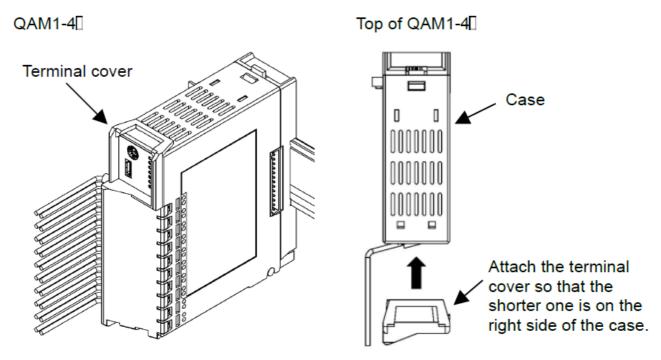
## **Case mounting**

- 1. Hook the case on the lower part 1 of this instrument.
- 2. Mount the case so that the lower part 1 of this instrument is the fulcrum and covers the release lever. There is a clicking sound.



### **Using Terminal Cover Precaution**

- Attach the terminal cover TC-QTC (sold separately) so that the shorter one is on the right side of the case.
- For the wiring of terminal numbers 11 to 20, pass through the left side of the terminal cover.



## SHINKO TECHNOS CO., LTD. OVERSEAS DIVISION

• Head Office: 2-5-1, Senbahigashi Minoo, Osaka Japan

RL: <a href="https://shinko-technos.co.jp/e/">https://shinko-technos.co.jp/e/</a>

• E-mail: overseas@shinko-technos.co.jp

• Tel: +81-72-727-6100

• Fax: +81-72-727-7006

## **Frequently Asked Questions**

- Q: Where can I find the detailed version of the instruction manual?
  - A: You can download the detailed version of the instruction manual from our website using the following URL or QR code: <a href="https://shinko-technos.co.jp/e/download/d\_manual\_download.html#Q">https://shinko-technos.co.jp/e/download/d\_manual\_download.html#Q</a>
- Q: What should I do if I encounter communication issues with the module?
  - A: Check the wiring connections and communication settings to ensure they are configured correctly. If issues persist, refer to the troubleshooting section in the manual or contact our customer support for assistance.
- Q: Is there a recommended ambient temperature range for operating the module?
  - A: While the manual does not specify an ambient temperature range, it is advisable to operate the module within a controlled environment to ensure optimal performance and longevity.

# **Documents / Resources**



Shinko Technos QAM1-4 4 Points Analog I-O Module [pdf] Instruction Manual

QAM1-4, QAM1-4 4 Points Analog I-O Module, 4 Points Analog I-O Module e, Analog I-O Module

#### References

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- Shinko Technos for temperature and humidity control
- User Manual

■ SHINKO

**TECHNOS** 

♦ 4 Points Analog I O Module, Analog I-O Module, I/O Module, QAM1-4, QAM1-4 4 Points Analog I O Module, SHINKO TECHNOS

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# **Shinko Technos RD-600 Series Infrared Temperature Sensor Instruction Manual**

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