INSTRUCTION MANUAL

MICRO-COMPUTER BASED DIGITAL INDICATOR **JIR-301-M**

No.JIR31E6 2008.08

To prevent accidents arising from the misuse of this instrument, please ensure the operator receives this manual.

⚠ 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 consulting purpose of use with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- External protection devices such as protection equipment against excessive temperature rise, etc. must be installed, as malfunction of this product could result in serious damage to the system or injury to personnel. Also proper periodic maintenance is required.
- 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.

⚠ Caution

- 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. Not doing so could cause serious injury or malfunction.
- Specifications of the JIR-301-M and the contents of this instruction manual are subject to change without notice.
- This instrument is designed to be installed through a control panel. Measures must be taken to ensure that the operator cannot touch power terminals or other high voltage sections.
- Be sure to turn the power supply to the instrument OFF before cleaning this instrument.
- Use a soft and dry cloth when cleaning the instrument. (If paint thinner is used, it might deform or tarnish the unit.)
- As the display section is vulnerable, do not strike or scratch it with a hard object.
- 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.

Characters used in this manual

Indication	-1	0	1	2	3	4	5	6	7	8	9	℃	℉
Number, ℃/℉	-1	0	1	2	3	4	5	6	7	8	9	℃	℉
Indication	A	b	c	d	E	F	G	H	I	J	K	L	M
Alphabet	A	B	C	D	E	F	G	H	I	J	K	L	M
Indication	n	o	P	q	r	S	T	U	V	W	X	Y	Z
Alphabet	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

1. Model

1.1 Model

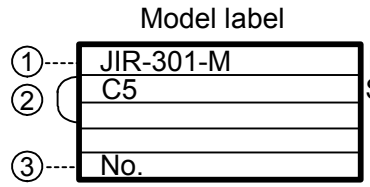
JIR–301–M □, □□□					Series name: JIR-301-M (W96 x H48 x D100mm)
Input	M				Multi-range *1
Power supply					100 to 240V AC (standard)
		1			24V AC/DC *2
Option			TA *3	Specified transmission output	DC current output	0 to 20mA DC
			TV		DC voltage output	0 to 1V DC 0 to 5V DC 1 to 5V DC 0 to 10V DC
			C5	Serial communication (RS-485) *4		
			P24	Insulated power output *5		
			BK	Color, Black		
			TC	Terminal cover		

A1, A2 and A3 alarm outputs are provided as standard for the JIR-301-M.
Alarm actions (5 types and No alarm action) and Energized/De-energized can be selected by keypad.

*1: An input type can be selected out of TC (10 types), RTD (2 types), DC current (2 types) and DC voltage (4 types) by keypad.
*2: Supply voltage 100 to 240V AC is standard. When ordering 24V AC/DC, enter "1" after the input code.
*3: **TA (4 to 20mA DC) is equipped as standard.**
*4: If the Serial communication option is added, HOLD function is not available.
*5: If the Insulated power output option is added, A2 output cannot be added.

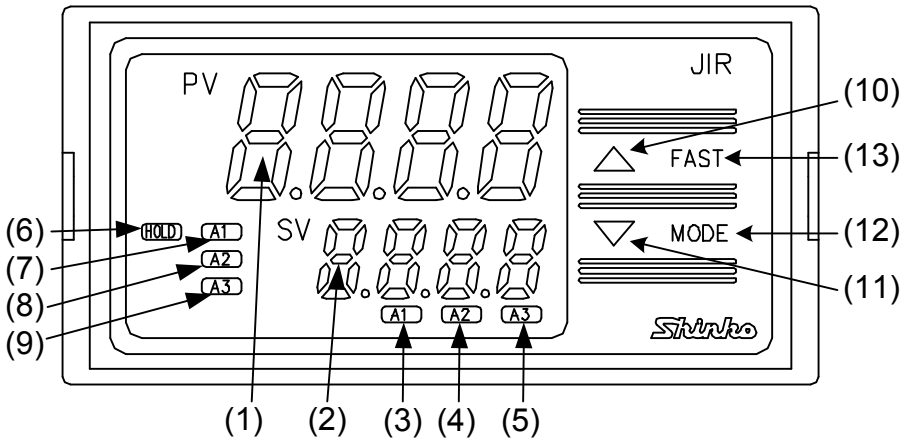
1.2 How to read the model label

Model labels are attached to the case and the inner assembly.



①: Model
②: Option, power supply ("1" is entered only for 24V AC/DC)
③: Serial No. (Only on the inner assembly)

2. Name and functions of sections



(1) **PV display** : Indicates PV (process variable) or characters in the setting mode with the red LED.
(2) **SV display** : Indicates the alarm value or set value in the setting mode with the green LED.
(3) **A1 action indicator**: When A1 output is ON, the red LED lights.
(4) **A2 action indicator**: When A2 output is ON, the red LED lights.
(5) **A3 action indicator**: When A3 output is ON, the red LED lights.
(6) **HOLD indicator** : When PV HOLD (Hold, Peak hold, Bottom hold) output is ON, the yellow LED lights.
(7) **A1 value indicator** : When A1 value is indicated, the green LED lights.
(8) **A2 value indicator** : When A2 value is indicated, the green LED lights.
(9) **A3 value indicator** : When A3 value is indicated, the green LED lights.
(10) **Increase key** : Increases the numeric value.
(11) **Decrease key** : Decreases the numeric value.
(12) **MODE key** : Selects the setting mode or registers the set value.
(To register the set value or selected value, press the MODE key)
(13) **FAST key** : Makes the set value change faster while holding down the Increase or Decrease key together.

⚠ Notice

When setting the specifications and functions of this instrument, connect terminals 2 and 3 for power source first, then set them referring to "5. Setup" before performing "3. Mounting to the control panel" and "4. Wiring".

3. Mounting to the control panel

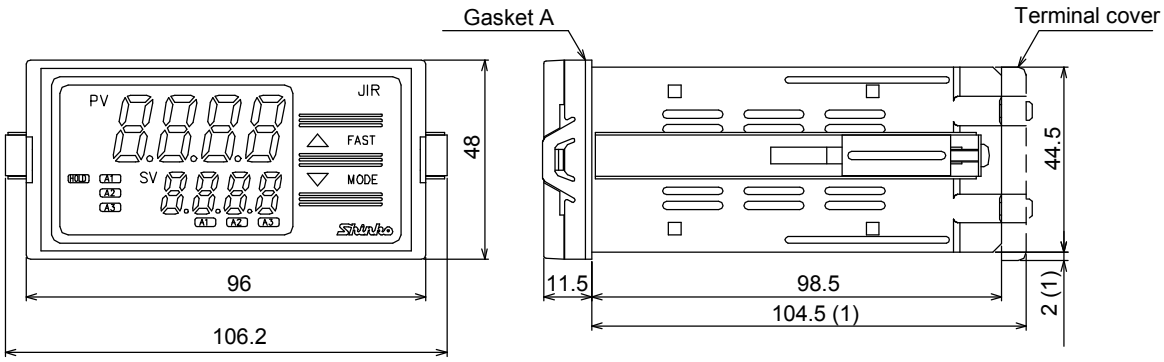
3.1 Site selection

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:

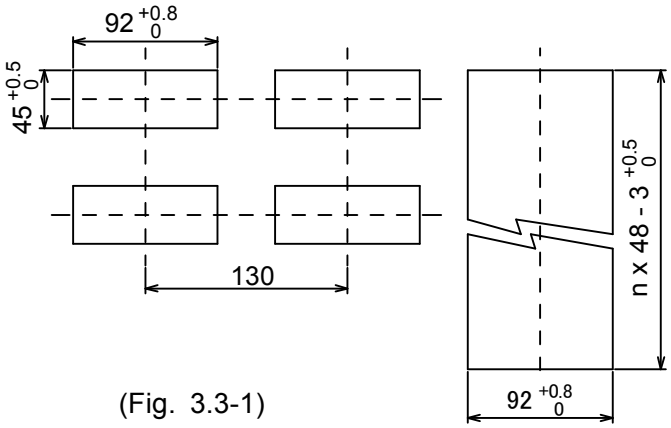
- A minimum of dust, and an absence of corrosive gases
- No flammable, explosive gases
- Few mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of 0 to 50℃ (32 to 122℉) that does not change rapidly, and no icing
- An ambient non-condensing humidity of 35 to 85%RH
- No large capacity electromagnetic switches or cables through which large current is flowing
- No water, oil or chemicals or where the vapors of these substances can come into direct contact with the instrument
- If the JIR-301 is installed through a control panel, the ambient temperature of the JIR-301 must be kept to under 50℃. Otherwise the life of electronic parts (especially electrolytic capacitors) of the JIR-301 will be shortened.

3.2 External dimensions (Scale: mm)



(Fig. 3.2-1)

3.3 Panel cutout (Scale: mm)



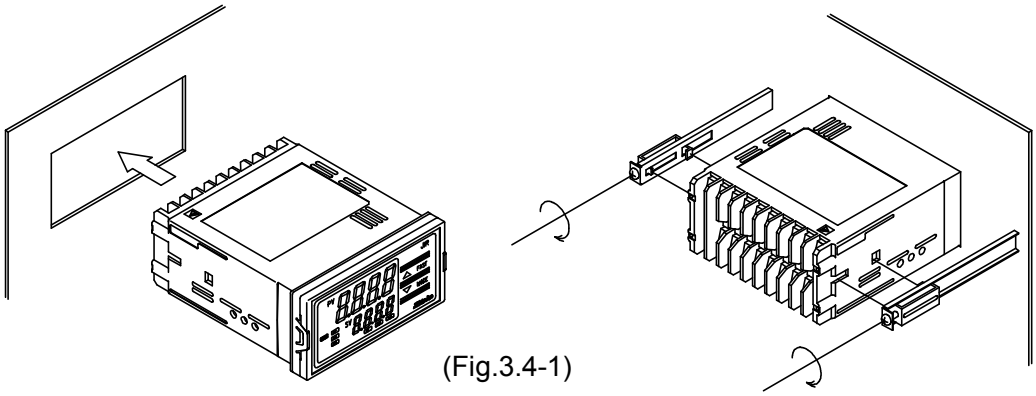
(Fig. 3.3-1)

Lengthwise close mounting
n: Number of units mounted

⚠Caution: If lengthwise close mounting is used for the instrument, IP66 (Dust-proof/Drip-proof) may be compromised, and all warranties will be invalidated.

3.4 Mounting

Mount the instrument vertically to ensure that it adheres to the Dust-proof/Drip-proof specification (IP66).
Mountable panel thickness: 1 to 8mm
Insert the instrument from the front side of the panel.
Attach the screw type mounting brackets by the holes at the top and bottom of the case, and secure the instrument in place with the screws.



(Fig.3.4-1)

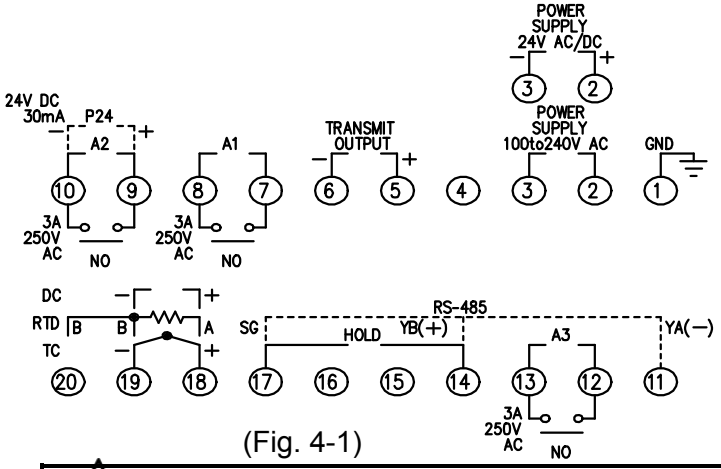
⚠ Warning

As the case is made of resin, do not use excessive force while screwing in the mounting bracket, or the case or screw type mounting bracket could be damaged.
The torque is approximately 0.12N•m.

4. Wiring

⚠ Warning

Turn the power supply to the instrument off before wiring or checking it.
Working or touching the terminal with the power switched on may result in severe injury or death due to Electric Shock.



(Fig. 4-1)

- GND : Ground terminal
- A1 : Alarm 1 output
- A2 : Alarm 2 output
- A3 : Alarm 3 output
- TRANSMIT OUTPUT: Transmission output
- P24 : Insulated power output
- HOLD : HOLD function
- RS-485 : Serial communication (RS-485)
- TC : Thermocouple
- RTD : Resistance temperature detector
- DC : DC current, DC voltage

For DC current input, connect 50Ω shunt resistor (sold separately) between input terminals.

- Dotted lines: Options.

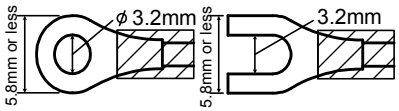
⚠ Notice

- The terminal block of the JIR-301-M is designed to be wired from the upper side. The lead wire must be inserted from the upper side of the terminal, and fastened by the terminal screw.
- Use a thermocouple and compensating lead wire in accordance with the sensor input specification of this instrument.
- Use the 3-wire RTD which corresponds to the input specification of this instrument.
- This instrument does not have a built-in power switch, circuit breaker or fuse. Therefore, it is necessary to install them in the circuit near the external instrument. (Recommended fuse: Time-lag fuse, rated voltage 250V AC, rated current 2A)
- **For a 24V AC/DC power source, do not confuse polarity when using direct current (DC).**
- 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.
- When wiring, keep input wires (thermocouple, RTD, etc.) away from AC sources or load wires to avoid external interference.
- Do not apply a commercial power source to the sensor connected to the input terminal nor allow the power source to come into contact with the sensor.

Lead wire solderless terminal

Use a solderless terminal with an insulation sleeve in which an M3 screw fits as shown below.

Solderless terminal	Manufacturer	Model	Tightening torque
Y type	Nichifu Terminal Industries CO.,LTD.	TMEV1.25Y-3	0.63N•m
	Japan Solderless Terminal MFG CO.,LTD.	VD1.25-B3A	
Round type	Nichifu Terminal Industries CO.,LTD.	TMEV 1.25-3	
	Japan Solderless Terminal MFG CO.,LTD.	V1.25-3	



(Fig. 4-2)

5. Setup

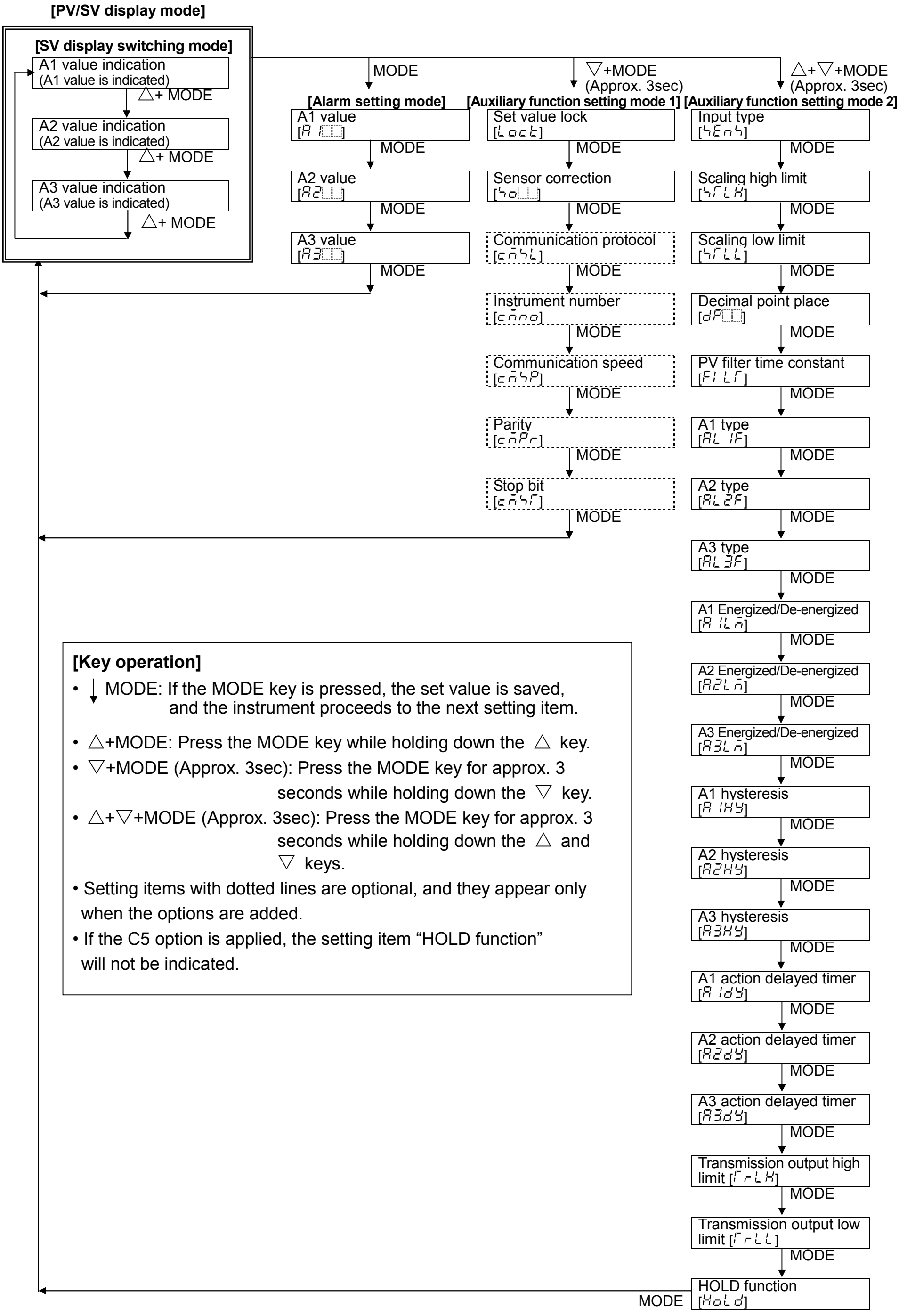
Wire the power terminals only. After the power is turned on, the sensor input characters and temperature unit are indicated on the PV display, and the input range high limit value is indicated on the SV display for approx. 3sec. (Table 5-1) (If any other value is set during the Scaling high limit setting, the value is indicated on the SV display) During this time, all outputs and the LED indicators are in an OFF status. Indication will then start, and the input value will be indicated on the PV display, and alarm value will be indicated on the SV display.

Sensor input	PV display℃	SV display	PV display℉	SV display
K	0 to 1370	1370	0 to 2500	2500
	0.0 to 400.0	400.0	0.0 to 750.0	750.0
J	0 to 1000	1000	0 to 1800	1800
R	0 to 1760	1760	0 to 3200	3200
S	0 to 1760	1760	0 to 3200	3200
B	0 to 1820	1820	0 to 3300	3300
E	0 to 800	800	0 to 1500	1500
T	0.0 to 400.0	400.0	0.0 to 750.0	750.0
N	0 to 1300	1300	0 to 2300	2300
PL-Ⅱ	0 to 1390	1390	0 to 2500	2500
C (W/Re5-26)	0 to 2315	2315	0 to 4200	4200
Pt100	0.0 to 850.0	850.0	0.0 to 999.9	999.9
	0 to 850	850	0 to 1500	1500
JPt100	0.0 to 500.0	500.0	0.0 to 900.0	900.0
	0 to 500	500	0 to 900	900
4 to 20mA DC *	4 to 20mA	Scaling high limit value	4 to 20mA	Scaling high limit value
0 to 20mA DC *	0 to 20mA		0 to 20mA	
0 to 1V DC	0.0 to 1.0V		0.0 to 1.0V	
0 to 5V DC	0.00 to 5.00V		0.00 to 5.00V	
1 to 5V DC	1.00 to 5.00V		1.00 to 5.00V	
0 to 10V DC	0.0 to 10.0V		0.0 to 10.0V	

(Table 5-1)

*** Connect 50Ω shunt resistor between input terminals.**

5.1 Operation flowchart



[Key operation]

- ↓ MODE: If the MODE key is pressed, the set value is saved, and the instrument proceeds to the next setting item.
- △+MODE: Press the MODE key while holding down the △ key.
- ▽+MODE (Approx. 3sec): Press the MODE key for approx. 3 seconds while holding down the ▽ key.
- △+▽+MODE (Approx. 3sec): Press the MODE key for approx. 3 seconds while holding down the △ and ▽ keys.
- Setting items with dotted lines are optional, and they appear only when the options are added.
- If the C5 option is applied, the setting item “HOLD function” will not be indicated.

5.2 Alarm setting mode

Character	Name, Function, Setting range	Default value
A 1□	**A1 value setting** • Sets A1 output action point. • Not available if No alarm action is selected during A1 type selection. • Refer to (Table 5.2-1).	0℃
A2□	**A2 value setting** • Sets A2 output action point. • Not available if the Insulated power output option is applied, or if No alarm action is selected during A2 type selection. • Refer to (Table 5.2-1).	0℃
A3□	**A3 value setting** • Sets A3 output action point. • Not available if No alarm action or High/Low limit range alarm is selected during A3 type selection. • Refer to (Table 5.2-1).	0℃

(Table 5.2-1)

Alarm type	Setting range
High limit alarm	Input range low limit to input range high limit value
Low limit alarm	Input range low limit to input range high limit value
High limit alarm with standby	Input range low limit to input range high limit value
Low limit alarm with standby	Input range low limit to input range high limit value
High/Low limit range alarm *1	None

• The placement of the decimal point follows the selection or input rating.
• When input has a decimal point, the negative low limit value is –199.9, and the positive high limit value is 999.9.
• Setting range of DC current and DC voltage input: Scaling low limit to Scaling high limit value.
*1: High/Low limit range alarm is available only for A3. If High/Low limit range alarm is selected, the setting items which are related to A3 (A3 value, A3 value indication, A3 action Energized/ De-energized, A3 hysteresis, A3 action delayed timer) will not be indicated.

5.3 SV display switching mode

Name, Function	Default value
A1 value indication • A1 value is indicated on the SV display, and A1 value indicator lights. • Not available if No alarm action is selected during A1 type selection.	0℃
A2 value indication • A2 value is indicated on the SV display, and A2 value indicator lights. • Not available if the Insulated power output option is applied, or if No alarm action is selected during A2 type selection.	0℃
A3 value indication • A3 value is indicated on the SV display, and A3 value indicator lights. • Not available if No alarm action is selected during A3 type selection, or if High/Low limit range alarm is selected.	0℃

5.4 Auxiliary function setting mode 1

Character	Name, Function, Setting range	Default value
Lock	**Set value lock** • Locks the set values to prevent setting errors. The setting item to be locked depends on the selection. • ---- (Unlock): All set values can be changed. Loc 1 (Lock 1): None of the set values can be changed. Loc2 (Lock 2): Only alarm setting mode can be changed. Loc3 (Lock 3): All set values except Input type can be changed. However, changed values revert to their previous value after power is turned off because they are not saved in the non-volatile memory. Do not change any setting items in Auxiliary function setting mode 2. If any item is changed while in this mode, it will affect the Alarm value.	Unlock
ro□	**Sensor correction** • Sets the correction value for the sensor. • Setting range: –100.0 to 100.0℃ (℉), or –1000 to 1000	0.0℃
cnvL	**Communication protocol** • Selects the communication protocol. • Available only when the Serial communication option is applied. • nonL: Shinko protocol nodA: Modbus ASCII mode nodr: Modbus RTU mode	Shinko protocol

cnno	**Instrument number** • Sets the individual instrument number to each instrument when communicating by connecting plural instruments in Serial communication. • Available only when the Serial communication option is added. • Setting range: 0 to 95	0
cnsP	**Communication speed** • Selects a speed to be equal to that of the host computer. • Available only when the Serial communication option is added. • □□24: 2400bps □□48: 4800bps □□96: 9600bps □192: 19200bps	9600bps
cnPr	**Parity** • Selects the parity. • Not available if the Serial communication option is not added, or if Shinko protocol is selected during the Communication protocol selection. • nonE: No parity EvEn: Even parity odd□: Odd parity	Even
cnsT	**Stop bit** • Selects the stop bit. • Not available if the Serial communication option is not added, or if Shinko protocol is selected during the Communication protocol selection. • Setting range: 1, 2	1

5.5 Auxiliary function setting mode 2

Character	Name, Function, Setting range	Default value
inty	**Input type** • The input type can be selected from thermocouple (10 types), RTD (2 types), DC current (2 types) and DC voltage (4 types), and the unit ℃/℉ can be selected as well. • When changing the input from DC voltage to other inputs, remove the sensor connected to this instrument first, then change the input. If the input is changed with the sensor connected, the input circuit may break.	K (–200 to 1370℃)

t□□C	K	–200 to 1370℃	t□□F	K	–320 to 2500 ℉
t□ .C		–199.9 to 400.0℃	t□ .F		–199.9 to 750.0℉
J□□C	J	–200 to 1000 ℃	J□□F	J	–320 to 1800 ℉
r□□C	R	0 to 1760 ℃	r□□F	R	0 to 3200 ℉
S□□C	S	0 to 1760 ℃	S□□F	S	0 to 3200 ℉
b□□C	B	0 to 1820 ℃	b□□F	B	0 to 3300 ℉
E□□C	E	–200 to 800 ℃	E□□F	E	–320 to 1500 ℉
T□ .C	T	–199.9 to 400.0℃	T□ .F	T	–199.9 to 750.0℉
n□□C	N	–200 to 1300 ℃	n□□F	N	–320 to 2300 ℉
PL2C	PL-Ⅱ	0 to 1390 ℃	PL2F	PL-Ⅱ	0 to 2500 ℉
c□□C	C (W/Re5-26)	0 to 2315 ℃	c□□F	C (W/Re5-26)	0 to 4200 ℉
Pt .C	Pt100	–199.9 to 850.0℃	Pt .F	Pt100	–199.9 to 999.9℉
JPt.C	JPt100	–199.9 to 500.0℃	JPt.F	JPt100	–199.9 to 900.0℉
Pt□C	Pt100	–200 to 850 ℃	Pt□F	Pt100	–300 to 1500℉
JPtC	JPt100	–200 to 500℃	JPtF	JPt100	–300 to 900 ℉
420A	4 to 20mA DC	–1999 to 9999			
020A	0 to 20mA DC	–1999 to 9999			
0□1V	0 to 1V DC	–1999 to 9999			
0□5V	0 to 5V DC	–1999 to 9999			
1□5V	1 to 5V DC	–1999 to 9999			
0 10V	0 to 10V DC	–1999 to 9999			

sclH	**Scaling high limit** • Sets scaling high limit value. • Available only for DC input • Setting range: Scaling low limit value to Input range high limit value	9999
sclL	**Scaling low limit** • Sets scaling low limit value. • Available only for DC input • Setting range: Input range low limit value to Scaling high limit value	–1999
dP□□	**Decimal point place** • Selects decimal point place. • Available only for DC input • □□□0: No decimal point □□0.0: 1 digit after decimal point □0.00: 2 digits after decimal point 0.000: 3 digits after decimal point	No decimal point

FILT	**PV filter time constant** • Sets PV filter time constant. (If the value is set too large, it affects alarm action due to the delay of response) • Setting range: 0.0 to 10.0 seconds	0.0 seconds
AL 1F	**A1 type** • Selects an A1 type. ----: No alarm action H□□□: High limit alarm　H□□u: High limit alarm with standby L□□□: Low limit alarm　L□□u: Low limit alarm with standby	No alarm action
AL2F	**A2 type** • Selects an A2 type. • Not available if the Insulated power output option is added • Type selection and default value are the same as those of A1 type selection.	No alarm action
AL3F	**A3 type** • Selects an A3 type. ----: No alarm action H□□□: High limit alarm L□□□: Low limit alarm H□□u: High limit alarm with standby L□□u: Low limit alarm with standby oI d□: High/Low limit range alarm • High/Low limit range alarm is activated depending on A1 and A2 values. If both A1 and A2 are turned OFF, A3 is turned ON in combination with A1 High limit alarm (High limit alarm with standby) and A2 Low limit alarm (Low limit alarm with standby), or in combination with A1 Low limit alarm (Low limit alarm with standby) and A2 High limit alarm (High limit alarm with standby). • If High/Low limit range alarm is selected, A3 related setting items (A3 value, A3 value indication, A3 action Energized/De-energized, A3 hysteresis, A3 action delayed timer) are not available.	No alarm action
A1LA	**A1 action Energized/De-energized** • Selects A1 action Energized/De-energized. • Not available if No alarm action is selected during A1 type selection • nonL: Energized　rEVS: De-energized	Energized
A2LA	**A2 action Energized/De-energized** • Selects A2 action Energized/De-energized. • Not available if the Insulated power output option is added, or if No alarm action is selected during A2 type selection • Action selection and default value are the same as those of A1 action Energized/De-energized selection.	Energized
A3LA	**A3 action Energized/De-energized** • Selects A3 action Energized/De-energized. • Not available if No alarm action is selected during A3 type selection or if High/Low limit range alarm is selected. • Action selection and default value are the same as those of A1 action Energized/De-energized selection.	Energized
A1HY	**A1 hysteresis** • Sets A1 hysteresis. • Not available if No alarm action is selected during A1 type selection • Setting range: 0.1 to 100.0℃(℉), or 1 to 1000	1.0℃
A2HY	**A2 hysteresis** • Sets A2 hysteresis. • Not available if the Insulated power output option is added, or if No alarm action is selected during A2 type selection • Setting range: 0.1 to 100.0℃(℉), or 1 to 1000	1.0℃
A3HY	**A3 hysteresis** • Sets A3 hysteresis. • Not available if No alarm action is selected during A3 type selection, or if High/Low limit range alarm is selected. • Setting range: 0.1 to 100.0℃(℉), or 1 to 1000	1.0℃
A1dY	**A1 action delayed timer** • Sets A1 action delayed timer. When setting time has passed after the input enters the alarm output range, the alarm is activated. • Not available if No alarm action is selected during A1 type selection • Setting range: 0 to 9999 seconds	0 seconds

A2dY	**A2 action delayed timer** • Sets A2 action delayed timer. When setting time has passed after the input enters the alarm output range, the alarm is activated. • Not available if the Insulated power output option is added, or if No alarm action is selected during A2 type selection • Setting range: 0 to 9999 seconds	0 seconds
A3dY	**A3 action delayed timer** • Sets A3 action delayed timer. When setting time has passed after the input enters the alarm output range, the alarm is activated. • Not available if No alarm action is selected during A3 type selection, or if High/Low limit range alarm is selected. • Setting range: 0 to 9999 seconds	0 seconds
rLH	**Transmission output high limit** • Sets the transmission output high limit value. **Standard Transmission output** 4-20mA DC: Corresponds to the value at 20mA DC output **Optional Transmission output** 0-20mA DC: Corresponds to the value at 20mA DC output 0-1V DC: Corresponds to the value at 1V DC output 0-5V DC, 1-5V DC: Corresponds to the value at 5V DC output 0-10V DC: Corresponds to the value at 10V DC output • Setting range: Transmission output low limit value to input range high limit value	1370℃
rLL	**Transmission output low limit** • Sets the transmission output low limit value. **Standard Transmission output** 4-20mA DC: Corresponds to the value at 4mA DC output **Optional Transmission output** 0-20mA DC: Corresponds to the value at 0mA DC output 0-1V DC, 0-5V DC 0-10V DC: Corresponds to the value at 0V DC output 1-5V DC: Corresponds to the value at 1V DC output • Setting range: Input range low limit value to transmission output high limit value	–200℃
HoLd	**HOLD function** • 3 types of HOLD function can be selected. • Not available if the Serial communication option is added **[How to use HOLD function]** Connect terminals 14 and 17 to use HOLD function. • HOLD: PV at the given time is held and indicated. • Peak HOLD: The updated maximum PV is indicated. • Bottom HOLD: The updated minimum PV is indicated.	HOLD

Sensor correction function

This corrects the input value from the sensor. When a sensor cannot be set at the exact location where measurement is desired, the sensor measured temperature may deviate from the temperature in the measured location.

When measuring with plural JIR-301-M units, sometimes the measured temperatures (input value) do not concur due to differences in sensor accuracy or dispersion of load capacities. In such a case, the measurement can be set at the desired temperature by adjusting the input value of sensors.

Energized/De-energized

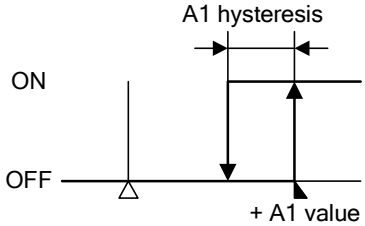
When [alarm action Energized] is selected, A1 (A2, A3) output (between terminals 7-8, 9-10, 12-13) is conducted (ON) while A1 (A2, A3) action indicator is lit.

A1 (A2, A3) output is not conducted (OFF) while A1 (A2, A3) action indicator is not lit.

When [alarm action De-energized] is selected, A1 (A2, A3) output (between terminals 7-8, 9-10, 12-13) is not conducted (OFF) while A1 (A2, A3) action indicator is lit.

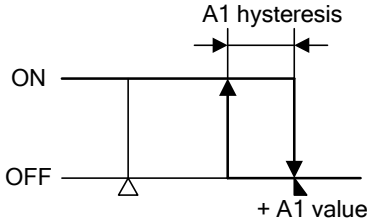
A1 (A2, A3) output is conducted (ON) while A1 (A2, A3) action indicator is not lit.

High limit alarm (when Energized is set)



(Fig.5.5-1)

High limit alarm (when De-energized is set)



(Fig.5.5-2)

6. Running

After the JIR-301-M is mounted to the control panel and wiring is completed, operate the unit following the procedures below.

(1) Turn the power supply to the JIR-301-M ON.

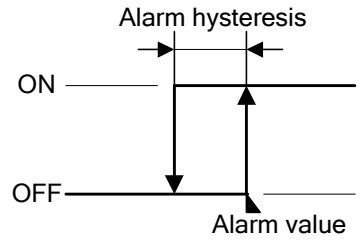
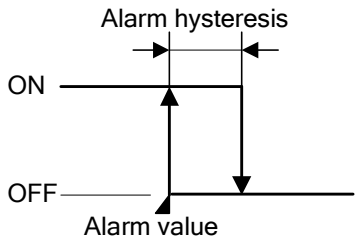
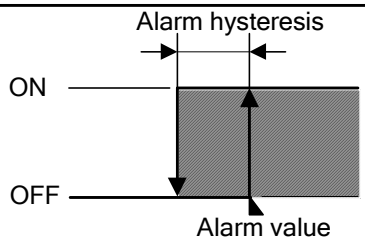
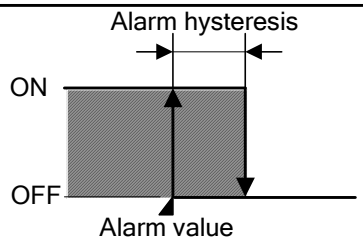
- For approx. 3sec after the power is switched ON, the sensor input characters and the temperature unit are indicated on the PV display, and input range high limit value is indicated on the SV display. See (Table 5-1).
  (If any other value has been set during the Scaling high limit setting, the value is indicated on the SV display)
  During this time, all outputs and LED indicators are in an OFF status.
- After that, input value is indicated on the PV display, and alarm value is indicated on the SV display.

(2) Input each set value.

Input each set value, referring to “5. Setup”.

7. Alarm action explanation

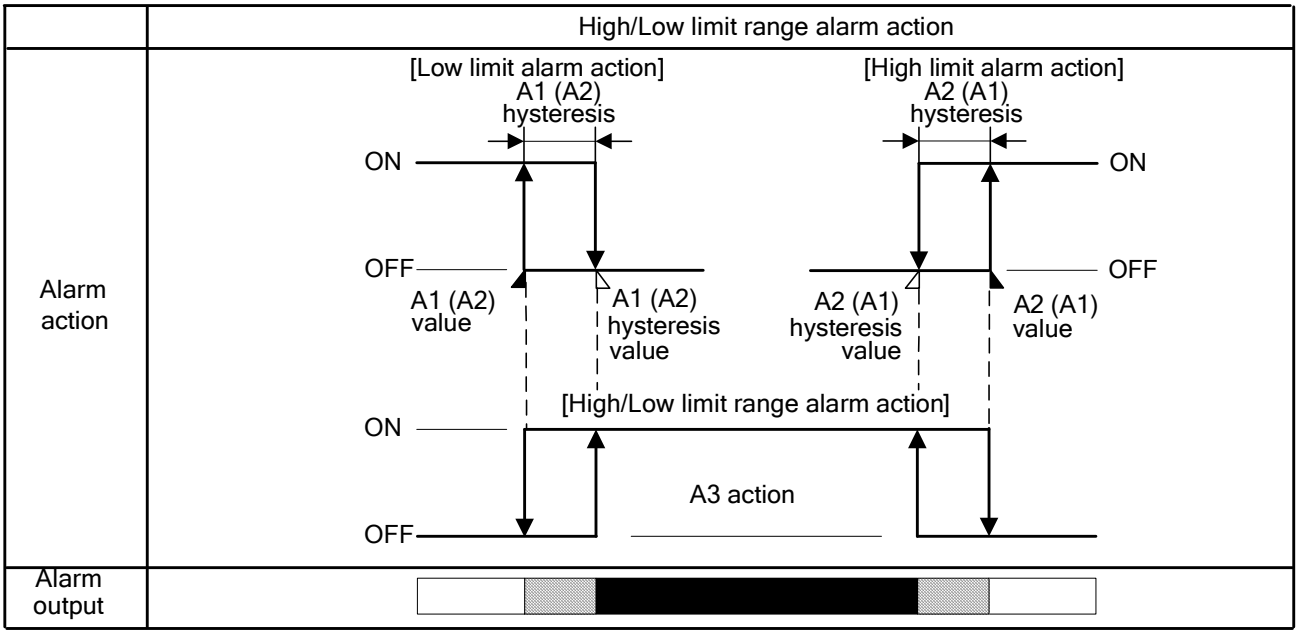
7.1 High limit alarm and Low limit alarm action

	High limit alarm	Low limit alarm
Alarm action		
Alarm output		
	High limit alarm with standby	Low limit alarm with standby
Alarm action		
Alarm output		

: A1 output terminals 7-8: Connected (ON)
: A1 output terminals 7-8: Connected (ON) or Disconnected (OFF)
: A1 output terminals 7-8: Disconnected (OFF)
: Standby functions.

Use terminals 9 and 10 for A2 output, and use terminals 12 and 13 for A3 output.
A1, A2 or A3 action indicator lights when their output terminals are connected, and goes off when their output terminals are disconnected.

7.2 High/Low limit range alarm action (only for A3)



A3 High/low limit range alarm is activated depending on the status of A1 and A2 action indicators (when both A1 and A2 are OFF, A3 is ON).
So when standby function, hysteresis and action delayed timer for A1 and A2 are set, be aware of the A3 action.

Note
- If A1 or A2 standby function is selected and while A1 or A2 standby functions, A3 is ON.
- When A1 or A2 hysteresis is increased, A3 ON span is decreased.
- When A1 or A2 action delayed timer setting (time) is increased, A3 ON time is increased.
- If A1 or A2 action delayed timer (time) is set and while A1 or A2 action delayed timer is working when power-on, A3 is ON.

■ : A1 output terminals 7-8: Disconnected (OFF), A2 output terminals 9-10: Disconnected (OFF), A3 output terminals 12-13: Connected (ON).

▨ : A1 output terminals 7-8, A2 output terminals 9-10, A3 output terminals 12-13: Connected (ON) or Disconnected (OFF).

□ : A1 output terminals 7-8: Connected (ON), A2 output terminals 9-10: Connected (ON), A3 output terminals 12-13: Disconnected (OFF).

8. Specifications

8.1 Standard specifications

Mounting : Flush
Setting : Input system using membrane sheet key

Display PV display : Red LED 4 digits, character size 16 x 7.2 mm (H x W)
SV display : Green LED 4 digits, character size 10 x 4.8 mm (H x W)

Accuracy (Setting and Indication):
Thermocouple : Within ±0.2% of each input span ±1digit, or within ±2℃ (4℉), whichever is greater
However R, S inputs, 0 to 200℃ (400℉): Within ±6℃ (12℉)
B input, 0 to 300℃ (600℉): Accuracy is not guaranteed.
K, J, E, T, N inputs, less than 0℃ (32℉): Within ±0.4% of each input span ±1digit
RTD : Within ±0.1% of each input span ±1digit, or within ±1℃ (2℉), whichever is greater
DC current : Within ±0.2% of each input span ±1digit
DC voltage : Within ±0.2% of each input span ±1digit

Input sampling period : 0.25 seconds

Input Thermocouple : K, J, R, S, B, E, T, N, PL-Ⅱ, C (W/Re5-26) External resistance, 100Ω or less (However, B input: External resistance, 40Ω or less)
RTD : Pt100, JPt100, 3-wire system
Allowable input lead wire resistance (10Ω or less per wire)

DC current : 0 to 20mA DC, 4 to 20mA DC
Input impedance: 50Ω shunt resistor must be externally connected.
Allowable input current (50mA or less)
DC voltage : 0 to 1V DC: Input impedance (1MΩ or more)
Allowable input voltage (5V or less)
Allowable signal source resistance (2kΩ or less)
: 0 to 5V DC, 1 to 5V DC, 0 to 10V DC: Input impedance (100kΩ or more)
Allowable input voltage (15V or less)
Allowable signal source resistance (100Ω or less)

A1, A2 output

The alarm action point can be set at random, and if the input reaches the randomly set action point, the alarm output turns on or off corresponding to the alarm type and Energized/De-energized selection.

Action : ON/OFF action
Hysteresis : 0.1 to 100.0℃ (℉), or 1 to 1000 (The placement of the decimal point follows the selection)
Output : Relay contact 1a
Control capacity, 3A 250V AC (resistive load)
Electric life, 100,000 cycles

A3 output The alarm action point can be set at random, and if the input reaches the randomly set action point, the alarm output turns on or off corresponding to the alarm type and Energized/De-energized selection.

The alarm action can be selected from a choice of: No alarm action, High limit alarm, Low limit alarm, High limit alarm with standby, Low limit alarm with standby and High/Low limit range alarm.

However, High/Low limit range alarm can be selected when A1 High limit alarm (High limit alarm with standby) and A2 Low limit alarm (Low limit alarm with standby) are combined, or when A1 Low limit alarm (Low limit alarm with standby) and A2 High limit alarm (High limit alarm with standby) are combined.

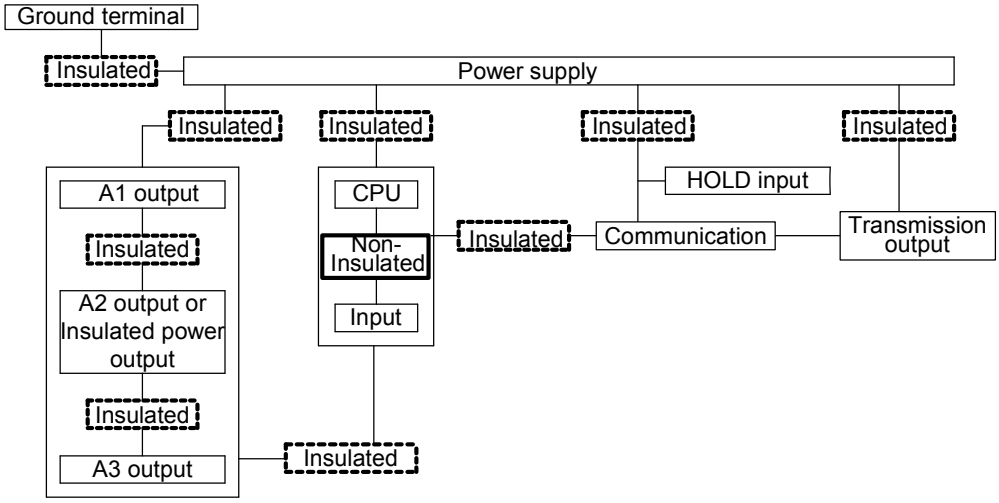
Action : ON/OFF action
Hysteresis : 0.1 to 100.0℃ (℉), or 1 to 1000 (The placement of the decimal point follows the selection)
Output : Relay contact 1a
Control capacity, 3A 250V AC (resistive load)
Electric life, 100,000 cycles

Transmission output

Converting the input value to analog signal every 0.25 seconds, outputs the value in DC current.
(When using the transmission output as an input for other instruments, check that the input impedance of these instruments is smaller than the maximum load resistance of the transmission output.)

Resolution : 1/12000
DC current : 4 to 20mA DC (load resistance, max. 500Ω)
Output accuracy : Within ±0.3% of output span

Power supply: 100 to 240V AC 50/60Hz, 24V AC/DC 50/60Hz
Allowable voltage fluctuation range: 100 to 240V AC : 85 to 264V AC
24V AC/DC : 20 to 28V AC/DC
Power consumption: Approx. 8VA
Circuit insulation configuration



Insulation resistance : 10MΩ or more, at 500V DC

Dielectric strength : 1.5kV AC for 1 minute between input terminal and ground terminal
1.5kV AC for 1 minute between input terminal and power terminal
1.5kV AC for 1 minute between power terminal and ground terminal
1.5kV AC for 1 minute between output terminal and ground terminal
1.5kV AC for 1 minute between output terminal and power terminal
Output terminal comprises A1, A2 and A3 output terminals, transmission output terminals and communication terminals.

Ambient temperature : 0 to 50℃ (32 to 122℉)
Ambient humidity : 35 to 85%RH (non-condensing)
Weight : Approx. 300g
External dimensions : 96 x 48 x 100mm (W x H x D)
Material : Flame-resistant resin (Case)
Color : Light gray (Case)
Attached function
[Set value lock]
[Sensor correction]
[Input abnormality]

Indication	Contents
Flashes [‾ ‾ ‾ ‾]	Overscale Measured value has exceeded indication range high limit value.
Flashes [_ _ _ _]	Underscale Measured value has dropped below indication range low limit value.

Thermocouple and RTD inputs

Input	Input range	Indication range
K, T	–199.9 to 400.0℃	–199.9 to 450.0℃
	–199.9 to 750.0℉	–199.9 to 850.0℉
K	–200 to 1370℃	–250 to 1420℃
	–320 to 2500℉	–370 to 2550℉
J	–200 to 1000℃	–250 to 1050℃
	–320 to 1800℉	–370 to 1850℉
R, S	0 to 1760℃	–50 to 1810℃
	0 to 3200℉	–50 to 3250℉
B	0 to 1820℃	–50 to 1870℃
	0 to 3300℉	–50 to 3350℉
E	–200 to 800℃	–250 to 850℃
	–320 to 1500℉	–370 to 1550℉
N	–200 to 1300℃	–250 to 1350℃
	–320 to 2300℉	–370 to 2350℉
PL-Ⅱ	0 to 1390℃	–50 to 1440℃
	0 to 2500℉	–50 to 2550℉
C (W/Re5-26)	0 to 2315℃	–50 to 2365℃
	0 to 4200℉	–50 to 4250℉
Pt100	–199.9 to 850.0℃	–199.9 to 900.0℃
	–200 to 850℃	–210 to 900℃
	–199.9 to 999.9℉	–199.9 to 999.9℉
	–300 to 1500℉	–318 to 1600℉
JPt100	–199.9 to 500.0℃	–199.9 to 550.0℃
	–200 to 500℃	–206 to 550℃
	–199.9 to 900.0℉	–199.9 to 999.9℉
	–300 to 900℉	–312 to 1000℉

DC current and voltage inputs
If input value exceeds Indication range high limit value, PV display flashes "‾ ‾ ‾ ‾", and if input value drops below the Indication range low limit value, the PV display flashes "_ _ _ _".

Indication range : [Scaling low limit value – Scaling span x 1%] to [Scaling high limit value +Scaling span x 10%]
(If the input value is out of the range –1999 to 9999, the PV display flashes "‾ ‾ ‾ ‾" or "_ _ _ _")

DC input disconnection: When DC input is disconnected, PV display flashes "_ _ _ _" for 4 to 20mA DC and 1 to 5V DC inputs, and "‾ ‾ ‾ ‾" for 0 to 1V DC input.
For 0 to 20mA DC, 0 to 5V DC and 0 to 10V DC inputs, the PV display indicates the value corresponding with 0mA or 0V.

[Burnout]
When the thermocouple or RTD input is burnt out, PV display flashes "- - - -".

[Self-diagnosis]
The CPU is monitored by a watchdog timer, and if an abnormal status is found on the CPU, the JIR-301-M is switched to warm-up status.

[Automatic cold junction temperature compensation] (Only thermocouple input type)
This detects the temperature at the connecting terminal between the thermocouple and the instrument, and always keeps it on the same status as if the reference junction is at 0℃ (32℉).

[Power failure countermeasure]
The setting data is backed up in the non-volatile IC memory.

[Warm-up indication]
After the power supply to the instrument is turned on, the sensor input character and temperature unit are indicated on the PV display, and input range high limit value is indicated on the SV display for 3 seconds.
For DC current and voltage inputs, the scaling high limit value is indicated.

[HOLD function]
The following HOLD functions can be selected by keypad.
HOLD : By connecting terminals 14 and 17, PV at the given time is being held and indicated.
Peak HOLD : By connecting terminals 14 and 17, the updated maximum PV is indicated.
Bottom HOLD: By connecting terminals 14 and 17, the updated minimum PV is indicated.

Dust-proof/Drip-proof: IP66 (only front face)

Accessories : Screw type mounting brackets 1 set
Instruction manual 1 copy
Unit label 1 label
Terminal cover 1 piece (When the TC option is added)

8.2 Optional specifications

Specified transmission output (Option code: TA, TV)
Converting the input value to analog signal every 0.25 seconds, outputs the value in DC current or voltage. (When using the transmission output as an input for other instruments, check that the input impedance of these instruments is smaller than the maximum load resistance of the transmission output.)
Resolution : 1/12000
Output accuracy: Within ±0.3% of output span
DC current : 0 to 20mA DC (Load resistance: Max. 500Ω)
DC voltage : 0 to 1V DC (Load resistance: Min. 100kΩ)
0 to 5V DC (Load resistance: Min. 500kΩ)
1 to 5V DC (Load resistance: Min. 500kΩ)
0 to 10V DC (Load resistance: Min. 1MΩ)

Serial communication (Option code: C5)
When this option is added, HOLD function is not available.
The following operations can be carried out from the external computer.
(1) Reading and setting of the various set values
(2) Reading of the PV and action status
(3) Change of the functions

Communication interface : EIA RS-485
Communication method : Half-duplex communication
Synchronization method : Start-stop synchronization
Communication speed : 2400, 4800, 9600, 19200bps (Selectable by keypad) (Default: 9600bps)
Parity : Even, Odd and No parity (Selectable by keypad) (Default: Even)
Stop bit : 1, 2 (Selectable by keypad) (Default: 1)
Communication protocol : Shinko protocol, Modbus RTU, Modbus ASCII (Selectable by keypad)
Connectable number of units : Maximum 31 units to 1 host computer
Communication error detection: Double detection by parity and checksum

Data format:

Communication protocol	Shinko protocol	Modbus ASCII	Modbus RTU
Start bit	1	1	1
Data bit	7	7	8
Parity	Even	Selection (Even)	Selection (No parity)
Stop bit	1	Selection (1)	Selection (1)

Data bit is automatically selected upon selecting the communication protocol.
( ): Basic set value

Insulated power output (Option code: P24)
If this option is added, A2 function cannot be used.
Output voltage : 24±3V DC (When load current is 30mA)
Ripple voltage : Within 200mV (When load current is 30mA)
Maximum load current: 30mA

Color Black (Option code: BK)
Front panel frame and case: Black

Terminal cover (Option code: TC)
Electrical shock protection terminal cover

9. Troubleshooting

If any malfunctions occur, refer to the following items after checking the power supply to the JIR-301-M.

Problem	Presumed cause and solution
[- - - -] is flashing on the PV display.	• Burnout of thermocouple, RTD or disconnection of DC voltage (0 to 1V DC). Change each sensor. **How to check whether the sensor is burnt out** [Thermocouple] If the input terminals of the instrument are shorted, and if a value around room temperature is indicated, the instrument is likely to be operating normally, however the sensor may be burnt out. [RTD] If approx. 100Ω of resistance is connected to the input terminals between A-B of the instrument and between B-B is shorted, and if approximate 0℃ (32℉) is indicated, the instrument is likely to be operating normally, however the sensor may be burnt out. [DC voltage (0 to 1V DC)] If the input terminals of the instrument are shorted, and if a scaling low limit value is indicated, the instrument is likely to be operating normally, however, the signal wire may be disconnected. • Check whether the input terminals of thermocouple, RTD or DC voltage (0 to 1V DC) are securely mounted to the instrument input terminals. Ensure that the sensor terminals are securely connected to the instrument input terminals.
[- - - -] is flashing on the PV display.	• Check whether input signal source for DC voltage (1 to 5V DC) or DC current (4 to 20mA DC) is disconnected. **How to check whether the input signal wire is disconnected** [DC voltage (1 to 5V DC)] If the input to the input terminals of the instrument is 1V DC and if a scaling low limit value is indicated, the instrument is likely to be operating normally, however, the signal wire may be disconnected. [DC current (4 to 20mA DC)] If the input to the input terminals of the instrument is 4mA DC and if a scaling low limit value is indicated, the instrument is likely to be operating normally, however the signal wire may be disconnected. • Check whether the input signal wire for DC voltage (1 to 5V DC) or DC current (4 to 20mA DC) is securely connected to the instrument input terminals. Ensure that the input signal wire is securely connected to the instrument input terminals. • Check whether polarity of thermocouple or compensating lead wire is correct. Check whether codes (A, B, B) of the RTD agree with the instrument terminals. Ensure that they are wired properly.

The PV display keeps indicating the value which was set during Scaling low limit setting.	• Check whether the input signal source for DC voltage (0 to 5V DC, 0 to 10V DC) and DC current (0 to 20mA DC) is disconnected. **How to check whether the input signal wire is disconnected** [DC voltage (0 to 5V DC, 0 to 10V DC)] If the input to the input terminals of the instrument is 1V DC and if the value corresponding to 1V DC is indicated, the instrument is likely to be operating normally, however, the signal wire may be disconnected. [DC current (0 to 20mA DC)] If the input to the input terminals of the instrument is 1mA DC and if the value corresponding to 1mA DC is indicated, the instrument is likely to be operating normally, however, the signal wire may be disconnected. • Check whether the input lead wire terminals for DC voltage (0 to 5V DC, 0 to 10V DC) or DC current (0 to 20mA DC) are securely mounted to the instrument input terminals.
The indication of the PV display is abnormal or unstable.	• Check whether the sensor input or temperature unit (℃ or ℉) is correct. Select the sensor input and temperature unit (℃ or ℉) properly. • Sensor correcting value is unsuitable. Set it to a suitable value. • Check whether the specification of the sensor is correct. • AC leaks into the sensor circuit. Use an ungrounded type sensor. • There may be equipment that interferes with or makes noise near the JIR-301-M. Keep equipment that interferes with or makes noise away from the JIR-301-M.
The PV display is indicating [Err 1].	• Internal memory is defective. Contact our agency or us.
The value on the PV display does not change.	• Check whether HOLD function is working. Release the HOLD function.
The values do not change by △ or ▽ key.	• Set value lock (Lock 1 or Lock 2) is selected. Release the lock selection.

• For all other malfunctions, please contact our main office or dealers.

SHINKO TECHNOS CO., LTD.
OVERSEAS DIVISION

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