INSTRUCTION MANUAL

DIGITAL INDICATOR JIR-301-M

No.JIR31E8 2014.02

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 purpose-of-use consultation with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- External protection devices such as protective 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. If they are not observed, serious injury or malfunction may occur.
- The contents of this instruction manual are subject to change without notice.
- This instrument is designed to be installed through the face of 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, dry cloth when cleaning the instrument. (Alcohol based substances may tarnish or deface the unit.)
- As the display section is vulnerable, do not strike or scratch it with a hard object or put pressure on it.
- 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.

1. Model

1.1 Model

<table>
<tr><td colspan="3">J I R – 3 0 1 – M □, □□□</td><td colspan="3">Series name: JIR-301-M (W96 x H48 x D100 mm)</td></tr>
<tr><td>Input</td><td>M</td><td></td><td colspan="3">Multi-range (*1)</td></tr>
<tr><td>Power supply</td><td></td><td>1</td><td colspan="3">24 V AC/DC (*2)</td></tr>
<tr><td rowspan="8">Option</td><td colspan="2" rowspan="8"></td><td>TA (0-20)</td><td rowspan="6">Specified Transmission output (*3)</td><td>Direct current output</td><td>0 to 20 mA DC</td></tr>
<tr><td>TV</td><td rowspan="4">DC voltage output</td><td>0 to 1 V DC</td></tr>
<tr><td>TV (0-5)</td><td>0 to 5 V DC</td></tr>
<tr><td>TV (1-5)</td><td>1 to 5 V DC</td></tr>
<tr><td>TV (0-10)</td><td>0 to 10 V DC</td></tr>
<tr><td>C5</td><td colspan="3">Serial communication (RS-485) (*4)</td></tr>
<tr><td>P24</td><td colspan="3">Insulated power output (*5)</td></tr>
<tr><td>BK</td><td colspan="3">Color, Black</td></tr>
<tr><td>TC</td><td colspan="3">Terminal cover</td></tr>
</table>

A1, A2 and A3 alarm outputs are standard features.

Alarm types (5 types plus No alarm action) and Energized/De-energized can be selected by keypad.

(*1) An input type can be selected out of thermocouple (10 types), RTD (2 types), Direct current (2 types) and DC voltage (4 types) by keypad.

(*2) Supply voltage 100 to 240 V AC is standard. When ordering 24 V AC/DC, enter ‘1’ after the input code.

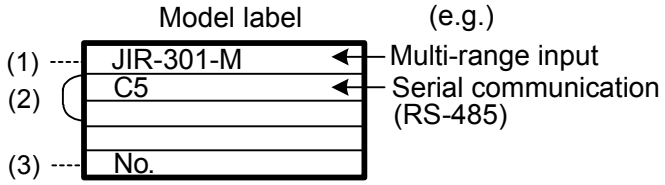
(*3) **TA (4 to 20mA DC) is equipped as standard.**

(*4) If Serial communication (RS-485) (C5 option) is ordered, the HOLD function cannot be used.

(*5) If Insulated power output (P24 option) is ordered, A2 output cannot be used.

1.2 How to Read the Model Label

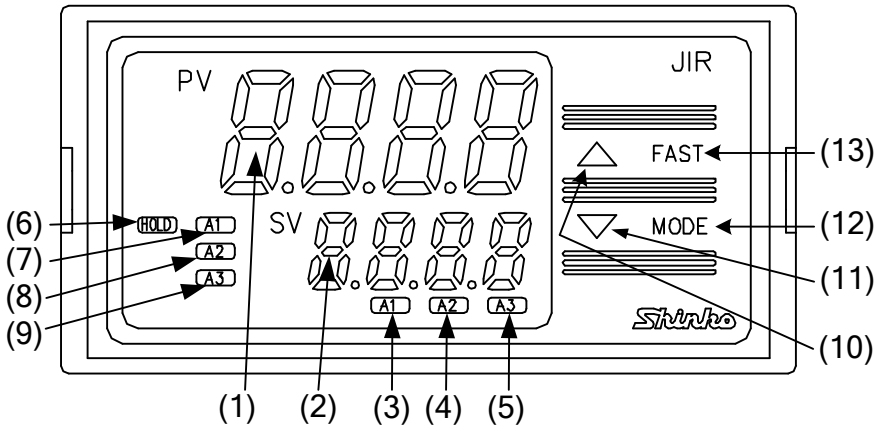
Model labels are attached to the case and the inner assembly.



(Fig. 1.2-1)

(1) Model
(2) Option, power supply ('1' is entered only for 24 V AC/DC.)
(3) Serial number

2. Name and Functions of Sections



(Fig. 2-1)

(1) **PV Display:** Indicates PV (process variable) or characters in the setting mode with the red LED.
(2) **SV Display:** Indicates alarm value or the 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 is held (HOLD, Peak HOLD, Bottom HOLD), 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 and registers the set value.
(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 the power supply 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

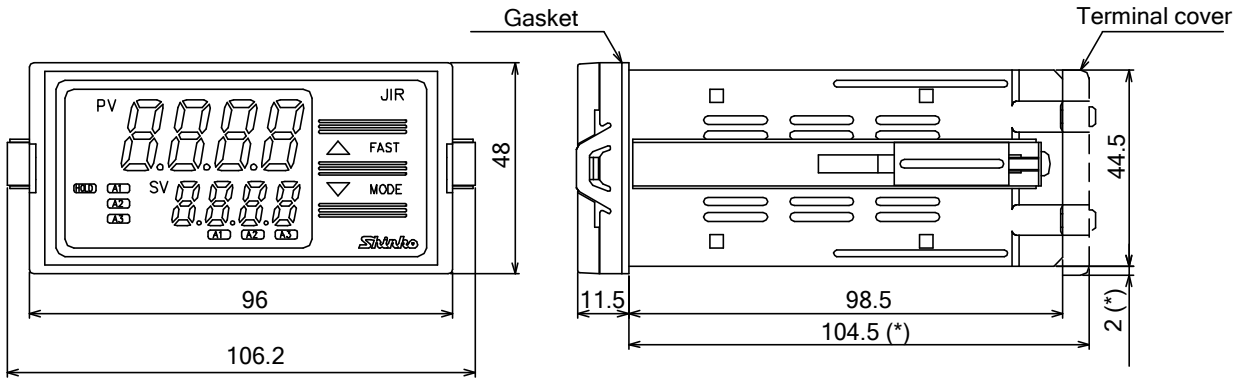
3.1 Site Selection

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
- No 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
- Take note that the ambient temperature of this unit - not the ambient temperature of the control panel - must not exceed 50 ℃ (122 ℉) if mounted through the face of a control panel. Otherwise the life of the electronic components (especially electrolytic capacitors) will be shortened.

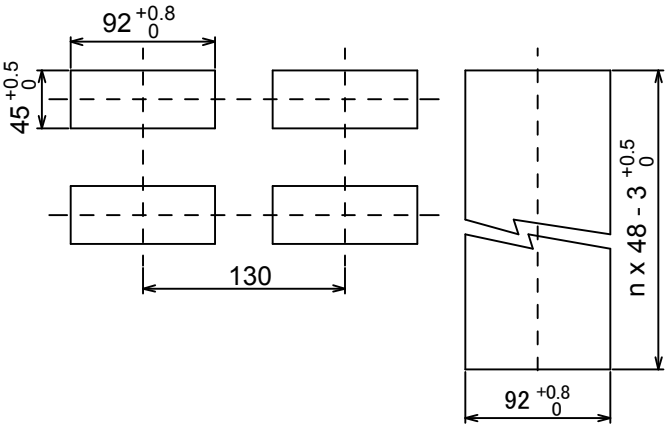
3.2 External Dimensions (Scale: mm)



(*) When TC option is ordered

(Fig. 3.2-1)

3.3 Panel Cutout (Scale: mm)



Lengthwise close mounting
n: Number of units mounted

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

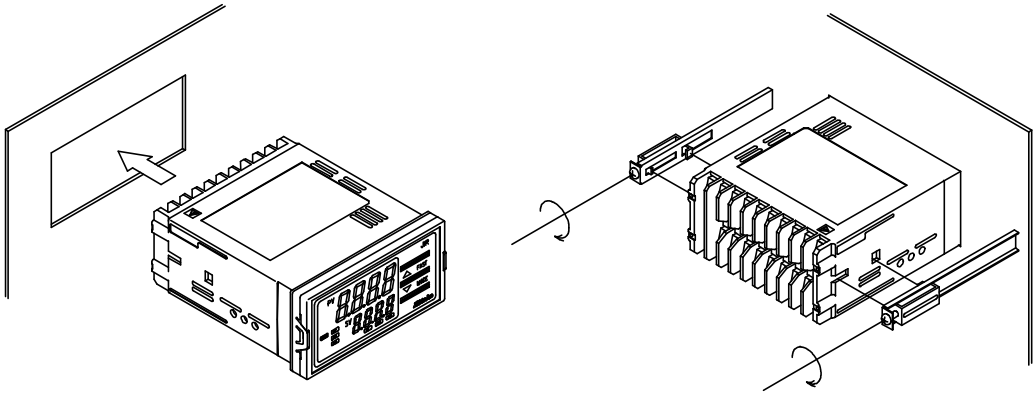
(Fig. 3.3-1)

3.4 Mounting

⚠ Notice

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 should be 0.12 N•m.

Mount the instrument vertically to ensure that it adheres to the Drip-proof/Dust-proof specification (IP66).
Mountable panel thickness: 1 to 8 mm
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)

4. Wiring

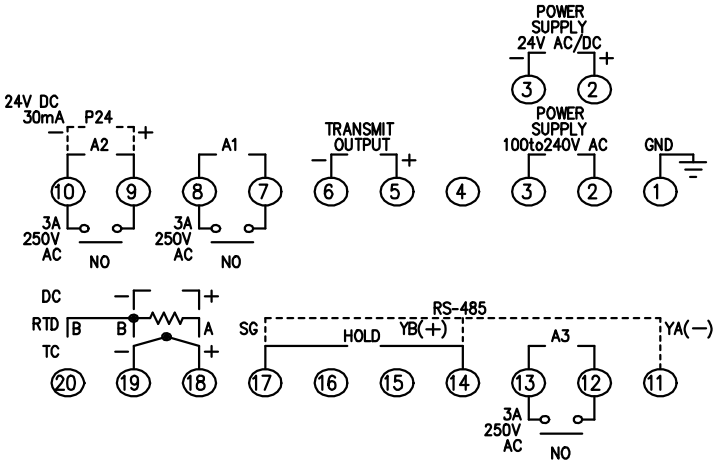
⚠ Warning

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

⚠ Caution

- 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 specifications of this instrument.
- Use the 3-wire RTD which corresponds to the input specifications of this instrument.
- This instrument does not have a built-in power switch, circuit breaker or fuse. Therefore, it is necessary to install a built-in power switch, circuit breaker or fuse near the external instrument. (Recommended fuse: Time-lag fuse, rated voltage 250 V AC, rated current 2 A)
- **For a 24 V 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 the input wires (thermocouple, RTD, etc.) away from AC sources or load wires.
- 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.

4.1 Terminal Arrangement



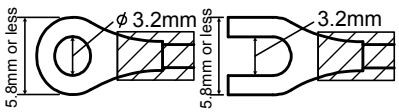
(Fig. 4.1-1)

- 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 input
- RS-485: Serial communication (RS-485)
- TC: Thermocouple input
- RTD: Resistance temperature detector input
- DC: DC voltage, current input
  For Direct current input, connect 50 Ω shunt resistor (sold separately) between input terminals.
- Dotted lines: Options.

4.2 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	0.63 N•m
	Japan Solderless Terminal MFG CO.,LTD.	VD1.25-B3A	
Ring-type	Nichifu Terminal Industries CO.,LTD.	TMEV 1.25-3	
	Japan Solderless Terminal MFG CO.,LTD.	V1.25-3	

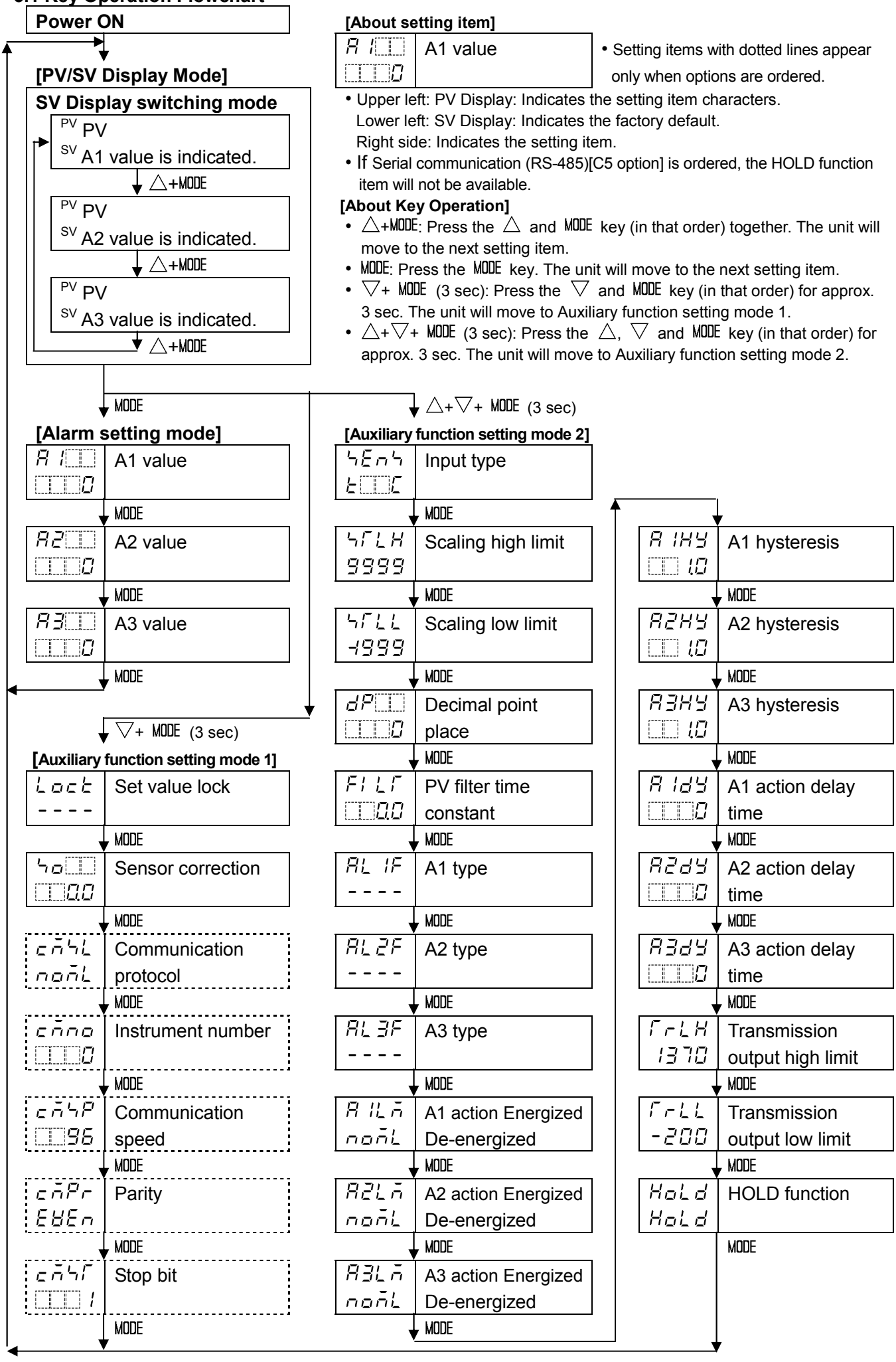


(Fig. 4.2-1)

5. Setup

Wire the power terminals only. After power is turned ON, the input characters and temperature unit will be indicated on the PV Display, and the input range high limit (thermocouple, RTD input) or scaling high limit (DC voltage, current input) will be indicated on the SV Display for approx. 3 sec.
During this time, all outputs and LED indicators are in an OFF status. Indication will then start, indicating the input value on the PV Display, and A1, A2 or A3 value on the SV Display.

5.1 Key Operation Flowchart



(Table 5-1)

Sensor input	PV Display (℃)	SV Display	PV Display (℉)	SV Display
K	K C	1370	K F	2500
	K .C	400.0	K .F	750.0
J	J C	1000	J F	1800
R	r C	1760	r F	3200
S	S C	1760	S F	3200
B	b C	1820	b F	3300
E	E C	800	E F	1500
T	T .C	400.0	T .F	750.0
N	n C	1300	n F	2300
PL-Ⅱ	PL2C	1390	PL2F	2500
C (W/Re5-26)	c C	2315	c F	4200
Pt100	Pt .C	850.0	Pt .F	999.9
JPt100	JPt.C	500.0	JPt.F	900.0
Pt100	Pt C	850	Pt F	1500
JPt100	JPt C	500	JPt F	900
4 to 20 mA DC	420A			
0 to 20 mA DC	020A			
0 to 1 V DC	0 1V	Scaling high limit value		
0 to 5 V DC	0 5V			
1 to 5 V DC	1 5V			
0 to 10 V DC	0 10V			

5.2 Alarm Setting Mode

Character	Name, Function, Setting range	Factory Default
A1 0	**A1 value** • Sets A1 output action point. • Not available if No alarm action is selected in [A1 type] • Setting range: Refer to (Table 5.2-1).	0 ℃
A2 0	**A2 value** • Sets A2 output action point. • Not available if the Insulated power output (P24 option) is ordered, or if No alarm action is selected in [A2 type] • Setting range: Refer to (Table 5.2-1).	0 ℃
A3 0	**A3 value** • Sets A3 output action point. • Not available if No alarm action or High/Low limit range alarm is selected in [A3 type] • Setting range: 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
Low limit alarm	Input range low limit to input range high limit
High limit alarm with standby	Input range low limit to input range high limit
Low limit alarm with standby	Input range low limit to input range high limit
High/Low limit range alarm (*)	None

- The placement of the decimal point follows the selection or input range.
- When the 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 voltage and current input: Scaling low limit to Scaling high limit value.

(*) High/Low limit range alarm is available only for A3. 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 delay time) will not be indicated.

5.3 SV Display Switching Mode

Name, Function	Factory Default
A1 value indication • A1 value is indicated on the SV Display, and the A1 value indicator lights. • Not available if No alarm action is selected in [A1 type]	0 ℃
A2 value indication • A2 value is indicated on the SV Display, and the A2 value indicator lights. • Not available if the Insulated power output (P24 option) is ordered, or if No alarm action is selected in [A2 type]	0 ℃

A3 value indication	0 ℃
• A3 value is indicated on the SV Display, and the A3 value indicator lights. • Not available if No alarm action or High/Low limit range alarm is selected in [A3 type]	

5.4 Auxiliary Function Setting Mode 1

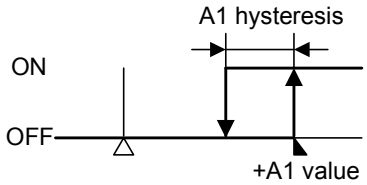
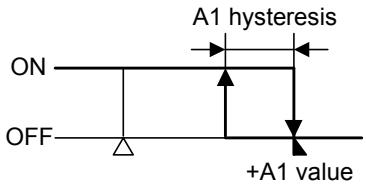
Character	Name, Function, Setting range	Factory Default
LocK ----	**Set value lock** • Locks the set values to prevent setting errors. The setting item to be locked depends on the selection. • ---- (Unlock): All set values can be changed. Loc 1 (Lock 1): None of the set values can be changed. Loc2 (Lock 2): Only Alarm setting mode (p.6) can be changed. Loc3 (Lock 3): All set values except the input type (p.8) 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
ho□□ □□0.0	**Sensor correction** • Sets the sensor correction value. 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 multiple JIR-301-M units, sometimes the measured temperatures (input value) do not concur due to differences in sensor accuracy or measured location. In this case, the measurement can be set at the desired temperature by adjusting the input value of sensors. However, it is effective within the input rated range regardless of the sensor correction value. PV after sensor correction=Current PV+ (Sensor correction value) • Setting range: –100.0 to 100.0 ℃ (℉), or –1000 to 1000 (The placement of the decimal point follows the selection or input range.)	0.0 ℃
cmnL nonL	**Communication protocol** • Selects the communication protocol. • Available only when the Serial communication option is ordered. • nonL: Shinko protocol modA: Modbus ASCII mode modr: Modbus RTU mode	Shinko protocol
cmno □□□0	**Instrument number** • Sets the individual instrument number of this unit. (The instrument numbers should be set one by one when multiple instruments are connected in Serial communication.) • Available only when the Serial communication option is ordered • Setting range: 0 to 95	0
cmsP □□96	**Communication speed** • Selects a communication speed equal to that of the host computer. • Available only when the Serial communication option is ordered • □□24: 2400 bps □□48: 4800 bps □□96: 9600 bps □192: 19200 bps	9600 bps
cmPr EvEn	**Parity** • Selects the parity. • Not available if the Serial communication option is not ordered, or if Shinko protocol is selected in [Communication protocol] • nonE: No parity EvEn: Even odd□: Odd	Even
cmsT □□□1	**Stop bit** • Selects the stop bit. • Not available if the Serial communication option is not ordered, or if Shinko protocol is selected in [Communication protocol] • □□□1: 1 □□□2: 2	1

5.5 Auxiliary function setting mode 2

Character	Name, Function, Setting range	Factory Default
sEns t□□C	**Input type** • The input type can be selected from thermocouple (10 types), RTD (2 types), Direct 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. **(Table 5.5-1)**	K (–200 to 1370℃)

Character	Input Range	Character	Input Range
t□□C	K -200 to 1370 ℃	t□□F	K -320 to 2500 ℉
t□ .C	K -199.9 to 400.0 ℃	t□ .F	K -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 20 mA DC -1999 to 9999		
020A	0 to 20 mA DC -1999 to 9999		
0□1V	0 to 1 V DC -1999 to 9999		
0□5V	0 to 5 V DC -1999 to 9999		
1□5V	1 to 5 V DC -1999 to 9999		
010V	0 to 10 V DC -1999 to 9999		

ScLH 9999	**Scaling high limit** • Sets scaling high limit value. • Available only for DC voltage, current inputs • Setting range: Scaling low limit to Input range high limit (The placement of the decimal point follows the selection.)	9999
ScLL -999	**Scaling low limit** • Sets scaling low limit value. • Available only for DC voltage, current inputs • Setting range: Input range low limit to Scaling high limit (The placement of the decimal point follows the selection.)	–1999
dP□□ □□□0	**Decimal point place** • Selects decimal point place. • Available only for DC voltage, current inputs • □□□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 □□0.0	**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 sec	0.0 seconds

Character	Name, Function, Setting range	Factory Default
AL 1F ----	**A1 type** • Selects an A1 type. See Section 7.1 (p.11). • If A1 type is changed, A1 value will default to 0 (0.0). • ----: No alarm action H□□□ : High limit alarm L□□□ : Low limit alarm H□□ū : High limit alarm with standby L□□ū : Low limit alarm with standby	No alarm action
AL2F ----	**A2 type** • Selects an A2 type. See Section 7.1 (p.11). • If A2 type is changed, A2 value will default to 0 (0.0). • Not available if the Insulated power output (P24 option) is ordered • Selection items are the same as those of A1 type.	No alarm action
AL3F ----	**A3 type** • Selects an A3 type. [See Section 7.1 (p.11)]. • If A3 type is changed, the A3 value will default to 0 (0.0). • ----: No alarm action H□□□ : High limit alarm L□□□ : Low limit alarm H□□ū : High limit alarm with standby L□□ū : Low limit alarm with standby ū1 d□ : High/Low limit range alarm [See Section 7.2 (pp.11, 12)].	No alarm action
A1LA noAL	**A1 action Energized/De-energized** • Selects A1 action Energized/De-energized. When [alarm action Energized] is selected, A1 output (terminals 7-8) is conducted (ON) while A1 action indicator is lit. A1 output is not conducted (OFF) while A1 action indicator is unlit. When [alarm action De-energized] is selected, A1output (terminals 7-8) is not conducted (OFF) while A1 action indicator is lit. A1 output is conducted (ON) while A1 action indicator is unlit. For A2/A3, read A2/A3 for A1. (A2 output terminals: 9-10, A3 output terminals: 12-13) High limit alarm (when **Energized** is set) High limit alarm (when **De-energized** is set)  (Fig.5.5-1)  (Fig.5.5-2) • Not available if No alarm action is selected in [A1 type] • noAL : Energized rEV: De-energized	Energized
A2LA noAL	**A2 action Energized/De-energized** • Selects A2 action Energized/De-energized. • Not available if the Insulated power output (P24 option) is ordered, or if No alarm action is selected in [A2 type]. • noAL : Energized rEV: De-energized	Energized
A3LA noAL	**A3 action Energized/De-energized** • Selects A3 action Energized/De-energized. • Not available if No alarm action or High/Low limit range alarm is selected in [A3 type]. • noAL : Energized rEV: De-energized	Energized
A1HY □□.0	**A1 hysteresis** • Sets A1 hysteresis. • Not available if No alarm action is selected in [A1 type]. • Setting range: 0.1 to 100.0 ℃ (℉), or 1 to 1000 (The placement of the decimal point follows the selection or input range.)	1.0 ℃

Character	Name, Function, Setting range	Factory Default
A2HY □□ 1.0	**A2 hysteresis** • Sets A2 hysteresis. • Not available if the Insulated power output (P24 option) is ordered, or if No alarm action is selected in [A2 type]. • Setting range: 0.1 to 100.0 ℃ (℉), or 1 to 1000 (The placement of the decimal point follows the selection or input range.)	1.0 ℃
A3HY □□ 1.0	**A3 hysteresis** • Sets A3 hysteresis. • Not available if No alarm action or High/Low limit range alarm is selected in [A3 type]. • Setting range: 0.1 to 100.0 ℃ (℉), or 1 to 1000 (The placement of the decimal point follows the selection or input range.)	1.0 ℃
A1dY □□□0	**A1 action delay time** • Sets A1 action delay time. When setting time has elapsed after the input enters the alarm output range, the alarm is activated. • Not available if No alarm action is selected in [A1 type]. • Setting range: 0 to 9999 seconds	0 seconds
A2dY □□□0	**A2 action delay time** • Sets A2 action delay time. When setting time has elapsed after the input enters the alarm output range, the alarm is activated. • Not available if the Insulated power output (P24 option) is ordered, or if No alarm action is selected in [A2 type]. • Setting range: 0 to 9999 seconds	0 seconds
A3dY □□□0	**A3 action delay time** • Sets A3 action delay time. When setting time has elapsed after the input enters the alarm output range, the alarm is activated. • Not available if No alarm action or High/Low limit range alarm is selected in [A3 type]. • Setting range: 0 to 9999 seconds	0 seconds
rrLH 1370	**Transmission output high limit** • Sets the transmission output high limit value. **Standard Transmission output** 4-20 mA DC: Corresponds to the value at 20 mA DC output. **Optional Transmission output (TA, TV option)** 0-20 mA DC: Corresponds to the value at 20 mA DC output. 0-1 V DC: Corresponds to the value at 1 V DC output. 0-5 V DC, 1-5 V DC: Corresponds to the value at 5 V DC output. 0-10 V DC: Corresponds to the value at 10 V DC output. • Setting range: Transmission output low limit to input range high limit (The placement of the decimal point follows the selection or input range.)	1370 ℃
rrLL -200	**Transmission output low limit** • Sets the transmission output low limit value. **Standard Transmission output** 4-20 mA DC: Corresponds to the value at 4 mA DC output. **Optional Transmission output (TA, TV option)** 0-20 mA DC: Corresponds to the value at 0 mA DC output. 0-1 V DC, 0-5 V DC, 0-10 V DC: Corresponds to the value at 0 V DC output. 1-5 V DC: Corresponds to the value at 1 V DC output. • Setting range: Input range low limit to transmission output high limit (The placement of the decimal point follows the selection or input range.)	–200 ℃
HoLd HoLd	**HOLD function** • 3 types of HOLD function can be selected. • Not available if the Serial communication option is ordered • HoLd (HOLD): PV at the given time is held and indicated. P_H□ (Peak HOLD): The updated maximum PV is indicated. b_H□ (Bottom HOLD): The updated minimum PV is indicated. **[How to use HOLD function]** Connect terminals 14 and 17 to use the HOLD function. Disconnect terminals 14 and 17 to cancel the HOLD function.	HOLD

6. Operation

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.

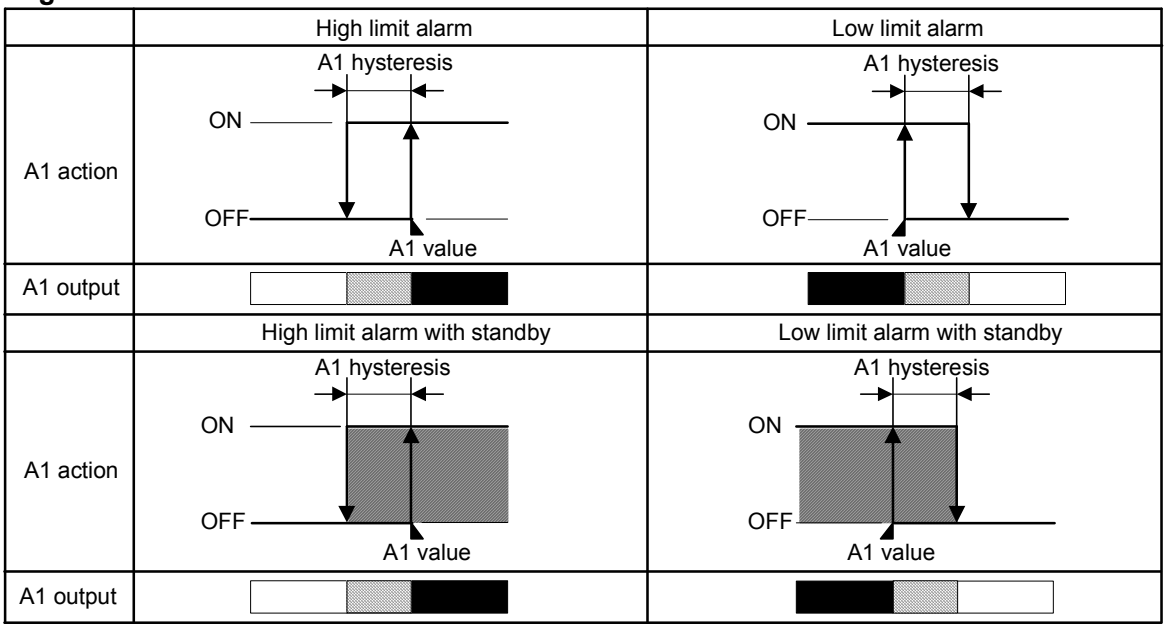
For approximate 3 sec after the power is switched ON, the input characters and the temperature unit are indicated on the PV Display, and input range high limit (thermocouple, RTD input) or scaling high limit (DC voltage, current input) is indicated on the SV Display. See (Table 5-1).
During this time, all outputs and LED indicators are in an OFF status.
After that, Indication starts, indicating input value on the PV Display, and A1, A2 or A3 value on the SV Display.

(2) Input each set value.

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

7. Alarm Action

7.1 High Limit Alarm and Low Limit Alarm action



: A1 output terminals 7-8: Closed (ON)

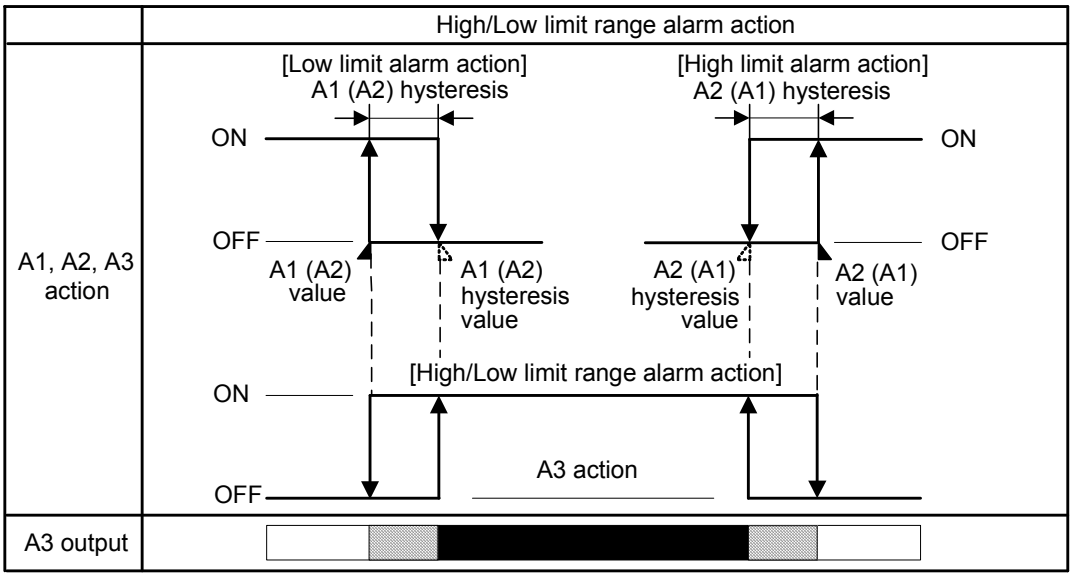
: A1 output terminals 7-8: Closed (ON) or Opened (OFF)

: A1 output terminals 7-8: Opened (OFF)

: Standby functions.

- A2 output: Terminals 9 and 10 are used.
  A3 output: Terminals 12 and 13 are used.
- The A1, A2 or A3 action indicator lights when their output terminals are closed (ON), and goes off when their output terminals are opened (OFF).

7.2 High/Low Limit Range Alarm Action (only for A3)




: A1 output terminals 7-8: Opened (OFF), A2 output terminals 9-10: Opened (OFF), A3 output terminals 12-13: Closed (ON).


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


: A1 output terminals 7-8: Closed (ON), A2 output terminals 9-10: Closed (ON), A3 output terminals 12-13: Opened (OFF).

A3 High/Low limit range alarm action is determined by setting A1 value and A2 value.
A3 is activated when both A1 and A2 are OFF – by combining A1 High limit alarm (or High limit alarm with standby) and A2 Low limit alarm (or Low limit alarm with standby) and vice versa.
When standby function, hysteresis or action delay timer for A1 and A2 are set, check the below A3 action.

Notes:

- If A1 or A2 standby function is selected, A3 is turned ON while A1 or A2 is in standby.
- When A1 or A2 hysteresis increases, A3 ON span decreases.
- When A1 or A2 action delay time (setting time) increases, A3 ON time increases.
- If A1 or A2 action delay time (setting time) is set, while A1 or A2 action delay time is working when power is turned ON, A3 is turned ON.

8. Specifications

8.1 Standard Specifications

Rating

Input

Thermocouple	K, J, R, S, B, E, T, N, PL-Ⅱ, C(W/Re5-26) External resistance: 100 Ω or less (However, B input: 40 Ω or less)
RTD	Pt100, JPt100 3-wire type Allowable input lead wire resistance: 10 Ω or less per wire
Direct current	0 to 20 mA DC, 4 to 20 mA DC: Input impedance: 50 Ω [50 Ω shunt resistor (sold separately) must be externally connected between input terminals.] Allowable input current: 50 mA DC or less [When the shunt resistor (sold separately) is used]
DC voltage	0 to 1 V DC: Input impedance: 1 MΩ or more Allowable input voltage: 5 V DC or less Allowable signal source resistance: 2 kΩ or less 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC: Input impedance: 100 kΩ or more Allowable input voltage: 15 V DC or less Allowable signal source resistance: 100 Ω or less

Supply voltage

Model	JIR-301-M	JIR-301-M 1
Supply voltage	100 to 240 V AC 50/60 Hz	24 V AC/DC 50/60 Hz
Allowable voltage fluctuation range	85 to 264 V AC	20 to 28 V AC/DC

General Structure

Dimensions	96 x 48 x 100 mm (W x H x D)
Mounting	Flush (Mountable panel thickness: 1 to 8 mm)
Material	Case: Flame-resistant resin, Color: Light gray
Drip-proof/dust-proof	IP66 (for front panel only)
Setting method	Input system using membrane sheet key
Display	PV Display: Red LED 4-digit, Character size, 16 x 7.2 mm (H x W) SV Display: Green LED 4-digit, Character size, 10 x 4.8 mm (H x W)

Indication Performance

Indicating accuracy

Thermocouple	Within ±0.2 % of each input span ±1 digit, 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 ±1 digit
RTD	Within ±0.1 % of each input span ±1 digit or within ±1 ℃ (2 ℉), Whichever is greater
DC voltage, current	Within ±0.2 % of each input span ±1 digit

Input sampling period	250 ms

Standard Function

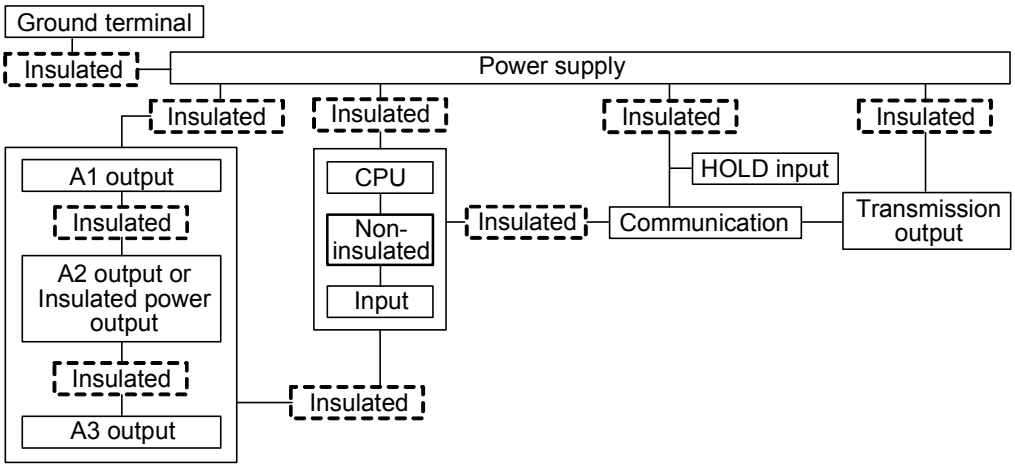
A1 output, A2 output, A3 output	The alarm action point can be set at random, and if the input reaches the randomly set action point, the alarm output turns ON or OFF corresponding to the alarm type and Energized/De-energized selection. The alarm type can be selected from; No alarm action, High limit alarm, Low limit alarm, High limit alarm with standby, Low limit alarm with standby and High/Low limit range alarm (for A3 only) 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: 3 A 250 V AC (resistive load) Electric life: 100,000 times

Transmission output	Converting the input value to analog signal every 250 ms, outputs the value in direct current. (Unaffected by the HOLD function) (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
Direct current	4 to 20 mA DC (Load resistance: Max 500 Ω)
Output accuracy	Within ±0.3 % of transmission output span

Insulation, Dielectric Strength

Circuit insulation configuration	
Insulation resistance	10 MΩ or more, at 500 V DC
Dielectric strength	Between input terminal and ground terminal: 1.5 kV AC for 1 minute Between input terminal and power terminal: 1.5 kV AC for 1 minute Between power terminal and ground terminal: 1.5 kV AC for 1 minute Between output terminal and ground terminal: 1.5 kV AC for 1 minute Between output terminal and power terminal: 1.5 kV AC for 1 minute (Output terminals: A1, A2 and A3 output terminals, transmission output terminals, communication terminals)

Attached Function

Set value lock	See 'Set value lock' on page 7.
Sensor correction	See 'Sensor correction' on page 7.
Input error indication	

Indication	Contents
[- - - -] flashes.	Overscale: Measured value has exceeded indication range high limit.
[- - - -] flashes.	Underscale: Measured value has exceeded indication range low limit.

• Thermocouple, RTD input

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 voltage, current input

If measured value exceeds Indication range high limit value, PV Display flashes "‾ ‾ ‾ ‾", and if measured 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 %]

(When the range is outside of -1999 to 9999, "‾ ‾ ‾ ‾" or "_ _ _ _" flashes.)

DC input disconnection:

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

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 temp. compensation	This detects the temperature at the connecting terminal between the thermo-couple and the instrument, and always maintains it at the same status as if the reference junction location temperature was at 0 ℃ (32 ℉).
Power failure countermeasure	The setting data is backed up in the non-volatile IC memory.
Warm-up indication	After power is turned ON, the input characters and temperature unit will be indicated on the PV Display, and the input range high limit (thermocouple, RTD input) or scaling high limit (DC voltage, current input) will be indicated on the SV Display for approx. 3 sec.
HOLD function	The HOLD function can be selected by the keypad. To cancel the HOLD function, disconnect terminals 14 and 17.

HOLD	Connect terminals 14 and 17. PV at the given time is held and indicated.
Peak HOLD	Connect terminals 14 and 17. The updated maximum PV is indicated.
Bottom HOLD	Connect terminals 14 and 17. The updated minimum PV is indicated.

Other

Power consumption	Approx. 8 VA
Ambient temperature	0 to 50 ℃ (32 to 122 ℉)
Ambient humidity	35 to 85 %RH (non-condensing)
Weight	Approx. 300 g
Accessories	Screw type mounting brackets (1 set), Instruction manual (1 copy), Unit label (1 label), Terminal cover 1 piece (When the TC option is ordered)

8.2 Optional Specifications

Serial communication (C5 option)

When this option is ordered, the HOLD function cannot be used.
The following operations can be carried out from an external computer.
- Reading and setting of various set values
- Reading of PV and action status
- Function change

Communication interface	EIA RS-485
Communication method	Half-duplex communication
Communication speed	2400, 4800, 9600, 19200 bps
Synchronization method	Start-stop synchronization
Parity	Even, Odd and No parity (Selectable by keypad)
Stop bit	1, 2 (Selectable by keypad)
Communication protocol	Shinko protocol, Modbus ASCII, Modbus RTU (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 (*1)	7	7	8
Parity	Even	Selection[Even](*2)	Selection[No parity](*2)
Stop bit	1	Selection [1](*2)	Selection [1](*2)

(*1) Data bit is automatically selected upon selecting the communication protocol.
(*2) [ ]: Basic set value

Insulated power output (P24 option)

If this option is ordered, the A2 function cannot be used.

Output voltage	24±3 V DC (When load current 30 mA)
Ripple voltage	Within 200 mV (When load current is 30 mA)
Max load current	30 mA

Specified Transmission output (T□ option)

Standard Transmission output can be changed to any of the following types.

Option Code	Transmission Output Type	
TA(0-20)	Direct current	0 to 20 mA DC (Load resistance: Max 500 Ω)
TV	DC voltage	0 to 1 V DC (Load resistance: Min 100 kΩ)
TV(0-5)		0 to 5 V DC (Load resistance: Min 500 kΩ)
TV(1-5)		1 to 5 V DC (Load resistance: Min 500 kΩ)
TV(0-10)		0 to 10 V DC (Load resistance: Min 1 MΩ)

Color Black(BK option): Panel: Dark gray, Case: Black

Terminal cover (TC option): 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	Possible Cause and Solution
[- - - -] is flashing on the PV Display.	• Burnout of thermocouple, RTD or disconnection of DC voltage (0 to 1 V 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 approximate 100 Ω 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 1 V 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.

[- - - -] is flashing on the PV Display.	• Check whether the input terminals of thermocouple, RTD or DC voltage (0 to 1 V 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 5 V DC) or Direct current (4 to 20 mA DC) is disconnected. **How to check whether the input signal wire is disconnected** [DC voltage (1 to 5 V DC)] If the input to the input terminals of the instrument is 1 V 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. [Direct current (4 to 20 mA DC)] If the input to the input terminals of the instrument is 4 mA 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 5 V DC) or current (4 to 20 mA 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 match with the instrument terminals. Ensure that they are wired properly.
The PV Display keeps indicating the value which was set in [Scaling low limit].	• Check whether the input signal source for DC voltage (0 to 5 V DC, 0 to 10 V DC) and Direct current (0 to 20 mA DC) is disconnected. **How to check whether the input signal wire is disconnected** [DC voltage (0 to 5 V DC, 0 to 10 V DC)] If the input to the input terminals of the instrument is 1 V DC and if the value corresponding to 1 V DC is indicated, the instrument is likely to be operating normally, however, the signal wire may be disconnected. [Direct current (0 to 20 mA DC)] If the input to the input terminals of the instrument is 1 mA DC and if the value corresponding to 1 mA 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 5 V DC, 0 to 10 V DC) or direct current (0 to 20 mA DC) are securely mounted to the instrument input terminals.
The indication of the PV Display is irregular or unstable.	• Check whether the sensor input or temperature unit (℃ or ℉) is correct. Select the sensor input and temperature unit (℃ or ℉) properly. • Sensor correction value is unsuitable. Set it to a suitable value. • Check whether the specification of the sensor is correct. • AC is leaking into the sensor circuit. Use an ungrounded type sensor. • There may be equipment that interferes with or makes noise near the JIR. Keep the unit clear of any potentially disruptive equipment.
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 the HOLD function is working (Terminals 14 and 17 are connected). Release the HOLD function by disconnecting terminals 14 and 17.
The values do not change by the △ or ▽ key.	• Set value lock (Lock 1 or Lock 2) is selected. Select [Unlock].

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

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