

SD20 SERIES

MICROPROCESSOR-BASED DIGITAL INDICATOR

INSTRUCTION MANUAL

Thank you for purchasing the Shimaden SD20 Series.
Please check that the delivered product is the correct item you ordered.
Please do not begin operating this product until you have read
this instruction manual thoroughly and understand its contents.

"Notice"

Please ensure that this instruction manual is given to the final user of the instrument.

Preface

This instruction manual is meant for those who will be involved in the wiring, installation, operation and routine maintenance of the SD 20 series.

This manual describes the care, installation, wiring, function, and proper procedures for the operation of SD20 series. Keep this manual at the work site during operation of the SD20 series. While using this instrument, you should always follow the guidance provided herein. For matters regarding safety, potential damage to equipment and/or facilities, additional instructions are indicated by the following headings:

⚠ WARNING

Exercise extreme caution as indicated. This heading indicates hazardous conditions that could cause injury or death of personnel.

⚠ CAUTION

Exercise extreme caution as indicated. This heading indicates hazardous conditions that could cause damage to equipment and/or facilities.

NOTE

This heading indicates additional instructions and/or notes.

The mark ⊕ designates a protective conductor terminal.
Make sure to properly ground it.

⚠ WARNING

SD20 series indicator is designed for indicating temperature, humidity and other physical subjects. It must not be used in any way that may adversely affect the safety, health or working conditions of those who come into contact with the effect of its usage. When used, adequate and effective safety countermeasures must be provided at all times. No warranty, express or implied, is valid in case of using this product without the use of proper safety countermeasures correspondingly.

⚠ CAUTION

To avoid damage to the connected equipment, facilities or the product itself due to a fault of the product, safety countermeasures must be taken before usage, such as proper installation of the fuse and the overheating protection device. No warranty, expressed or implied, is valid in case of usage without having implemented proper safety countermeasures.

⚠ CAUTION

- The ⚠ mark on the plate affixed to the instrument:
On the terminal nameplate affixed to the case of your instrument, the ⚠ mark is printed. This is to warn you of the risk of electrical shock which may result if the charger is touched while it is energized.
- A means to allow the power to be turned off, such as a switch or a breaker, should be installed in the external power circuit to be connected to the power terminal of the instrument.
Fix the switch or the breaker adjacently to the instrument in a position which allows it to be operated with ease, and with an indication that it is a means of turning the power off. The switch or the breaker should meet the requirements of IEC947, UL489, UL1066 or CSA C22.2 No.5.1.
- Fuse: Since the instrument does not have a built-in fuse, do not forget to install a fuse in the power circuit to be connected to the power terminal.
The fuse should be positioned between the switch or the breaker and the instrument and be attached to the L side of the power terminal.
Fuse Rating: 250V AC1.0A/lagged type
Use a fuse which meets the requirements of IEC127, UL248-1~2 48-16 or CSA C22.2 No.926.
- A voltage/current different from that of the input specification should not be added on the input terminal. It may reduce the life of the product and/or result in problems with the product.
For the rated voltage/current, see Specifications.
For the rated voltage (mV or V) or current (4-20mA) input, the input terminal should be connected with a device which meets the requirements of IEC1010 as input terminals.
- Voltage/current of a load to be connected to the output terminal and the alarm terminal should be within a rated range. Otherwise, the temperature will rise and reduce the life of the product and/or result in problems with the product.
For the rated voltage/current, see Specifications.
The output terminal should be connected with a device which meets the requirements of IEC1010.
- The SD20 series indicator is provided with a draft hole for heat discharge. Take care to prevent metal or other foreign matter from obstructing it. Failure to do so may result in problems with the product any may even result in fire.
- Do not block the draft hole or allow dust or the like to adhere to it. Any rise in temperature or insulation failure may result in a shortening of the life of product and/or problems with the product.
For spaces between installed instruments, refer to 1. External Dimensions and Panel Cutout on page 1.
- It should be noted that repeated tolerance tests against voltage, noise, surge, etc., may lead to deterioration of the instrument.
- User must not modify the instrument or operate it anomalously.

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Check before use

This product has been fully checked for quality assurance prior to shipment. Nevertheless, you are requested to make sure that there is no error, damage or shortage of delivered items by confirming the model codes and checking the external view of the product and the number of accessories.

Checking accessories:

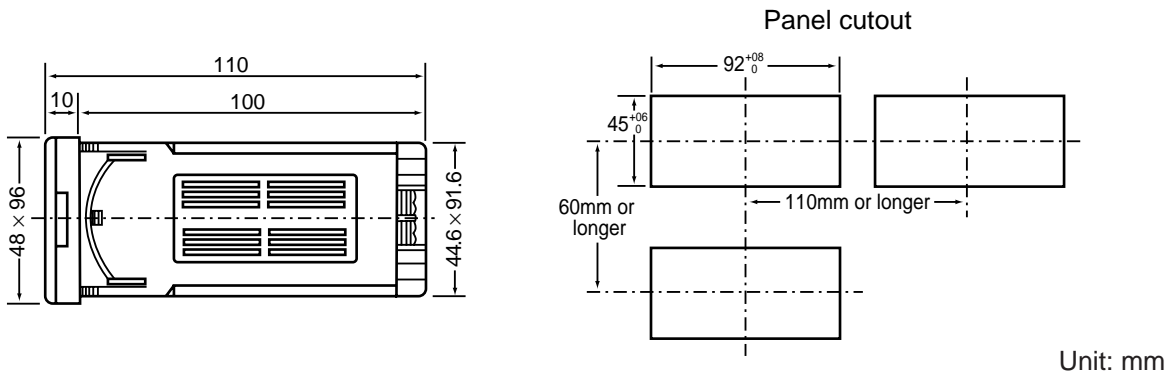
| | |
|--|---|
| Instruction manual | 1 set |
| Unit decal | 1 sheet |
| Communication Interface Instruction manual | 1 set (Included with the Communication function option) |
| Connector (DDK 225M-21421-188) | 1 piece (Included with the BCD option) |

NOTE: Contact our representative or out local office concerning any problems with the product, accessories or related items.

Caution for use

- 1) Avoid operating keys of the front panel with hand or sharp objects or motions. Lightly touch the operating keys with finger tip for operation.
- 2) Avoid using solvents such as thinner; wipe gently with a dry colth.

1 External Dimensions and Panel Cutout



2 Installation and Matters to be Attended to

2-1 Installation

The installation panel should have a thickness of 1~3.5mm.
The instrument is of a press-and-fit type. Press it from the front so as to fit firmly into the panel hole.

NOTE: The SD20 indicator is of a panel fit-in type. It must be fitted in the panel for use.

2-2 Matters to be Attended to

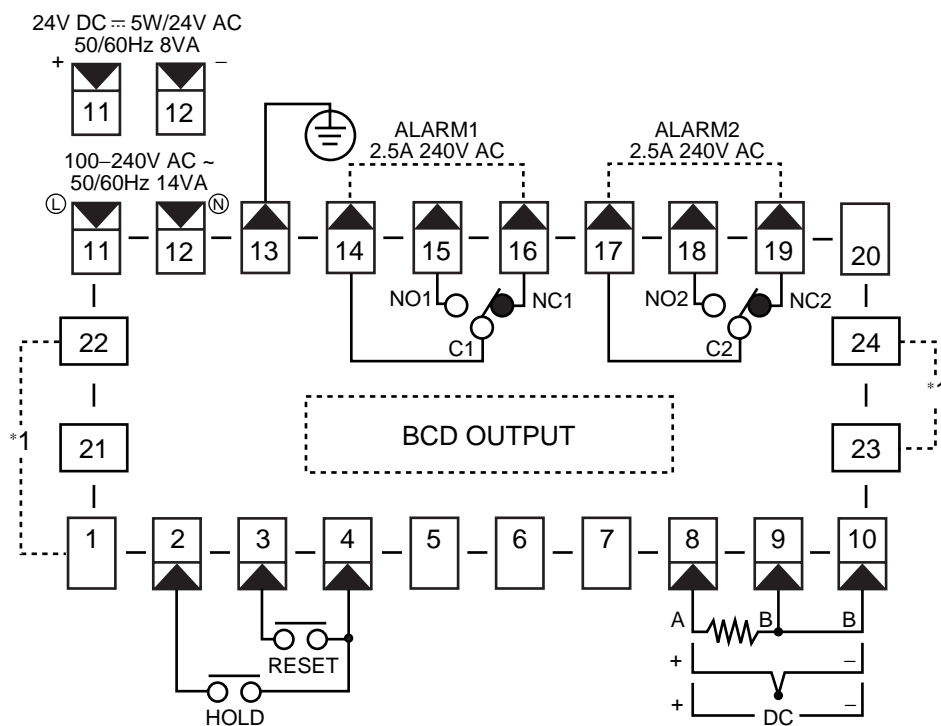
CAUTION

In case where there is an intention to operate this product at one of the following sites, be aware that the occurrence of life and/or other dangerous situations is considerable.
Exercise caution and avoid these places when selecting an operational site.

- ⊙ There is inflammable or corrosive gas, soot or dust to impair insulation.
- ⊙ The ambient temperature is below -10°C and above $+50^{\circ}\text{C}$.
- ⊙ The ambient humidity is above 90% RH and there is dew condensation.
- ⊙ The instrument is subjected to strong vibrations and shocks.
- ⊙ There is a strong electric circuit or a source of inductive interference.
- ⊙ There is exposure to water drops or direct sunlight.
- ⊙ Where the elevation is in excess of 2,000m.

NOTE: The environmental conditions belong to the installation category II of IEC664 and the degree of pollution is 2.

3 Connection of Terminals



***1 Wiring Codes/Terminal Numbers for Each Function**

| Function | | Terminal Numbers | | | | |
|-------------------------|---------|------------------|------|------|------|------|
| | | 1 | 21 | 22 | 23 | 24 |
| Analog output | | | – | + | | |
| Communication | RS-232C | SG | SD | RD | | |
| | RS-422A | SG | SD – | SD + | RD – | RD + |
| | RS-485 | SG | – | + | | |
| DC output (24V DC 50mA) | | | | | – | + |

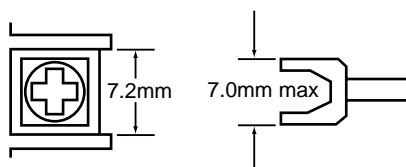
- ⊙ Alarm type such as lower limit alarm or higher limit alarm of alarm 1 and alarm 2 is selected by key operation.
- ⊙ For both higher limit alarm and lower limit alarm, the C1-NO1 (C2-NO2 in the case of alarm 2) contacts are closed when the set point of the alarm is reached.

4 Wiring

⚠ WARNING

- Always disconnect this product from any power source during wiring operation to prevent electrical shock.
- Be certain that the protective conductor terminal \oplus is properly grounded. Otherwise, a serious electric shock may result.
- Avoid touching the wired terminal and charged devices while supplying power.

- ⊙ For thermocouple input, use the designated compensating conductor and limit the external resistance to 100Ω or below.
- ⊙ For R.T.D. input, the lead wire resistance should be 5Ω or less per line, and three lines should have the same ohmic value.
- ⊙ Use of shielded cable for static induction and twist cable for electromagnetic induction is effective.
- ⊙ Connect the instrument to terminals according to the terminal diagram on page 2 and the wiring diagram attached onto the instrument case.
- ⊙ Use a suitable press-fit terminal for the M3.5 terminal screw in the wiring for the instrument.



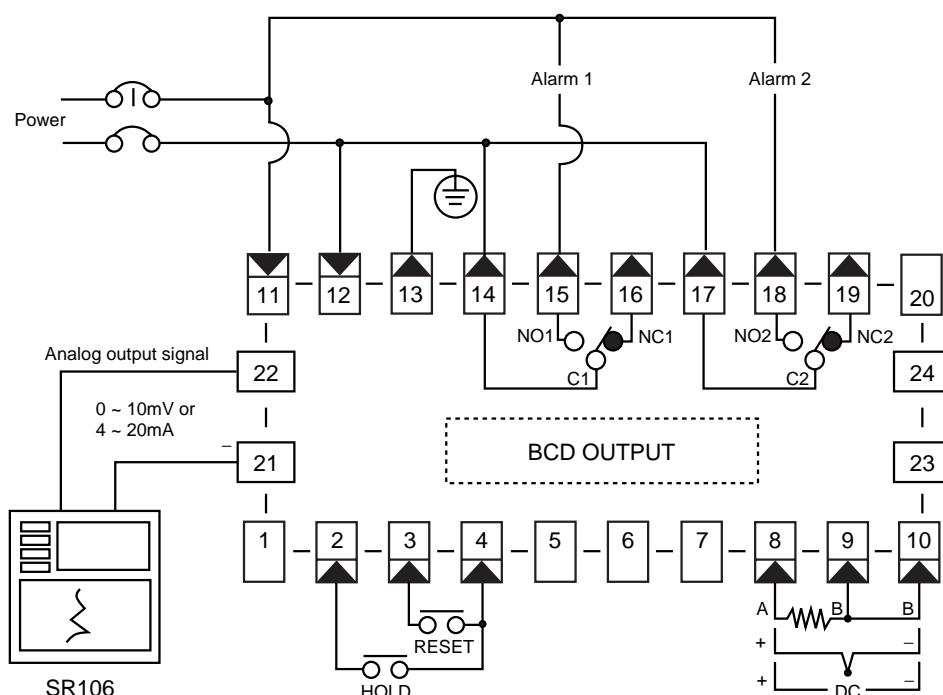
- ⊙ When wiring, use wire (1mm² minimum in sectional area) of 600V grade polyvinyl chloride insulated wire or equivalent wire which has the same ratings.

NOTE: When the instrument is installed in a place subject to vibrations or shocks, use round press-fit terminals to prevent disconnection from terminals.

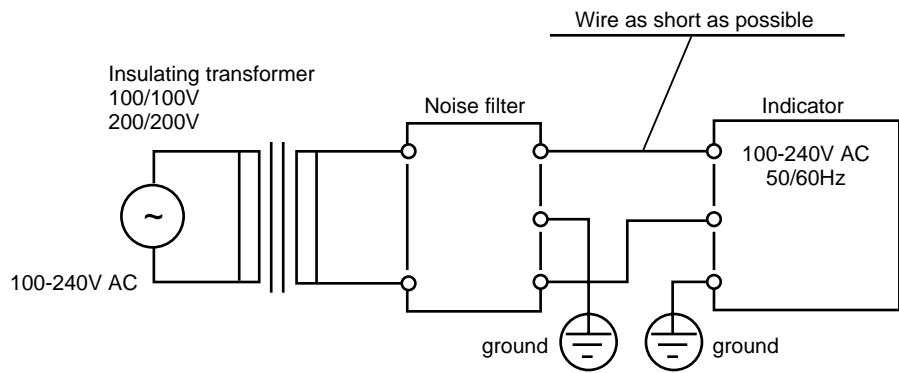
NOTE: For wiring for power supply, etc., use wire as provided in the Electric Supplies Control Act. Use wire 2mm² or larger for grounding. Grounding resistance should be 100Ω or less. The instrument should be grounded at one point contact with the GND terminal. Crossover wiring is not allowed.

Example of Wiring

- Example for the types with alarm and analog output functions

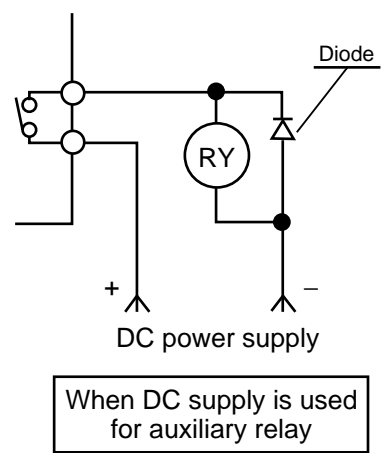
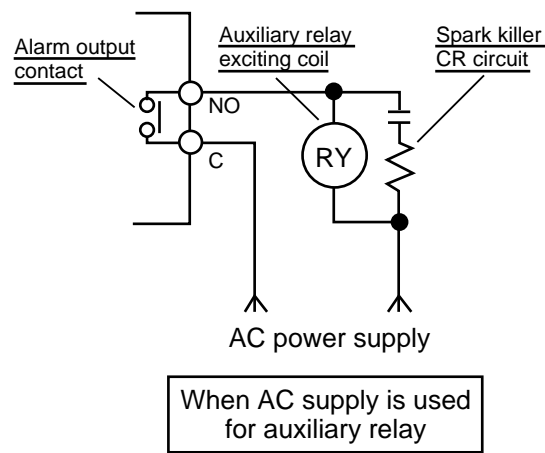


- ⦿ If there is significant noise from the power line, the installation of an insulating transformer and the use of a noise filter are recommended.



Recommended noise filter: TDK's ZMB2203-13

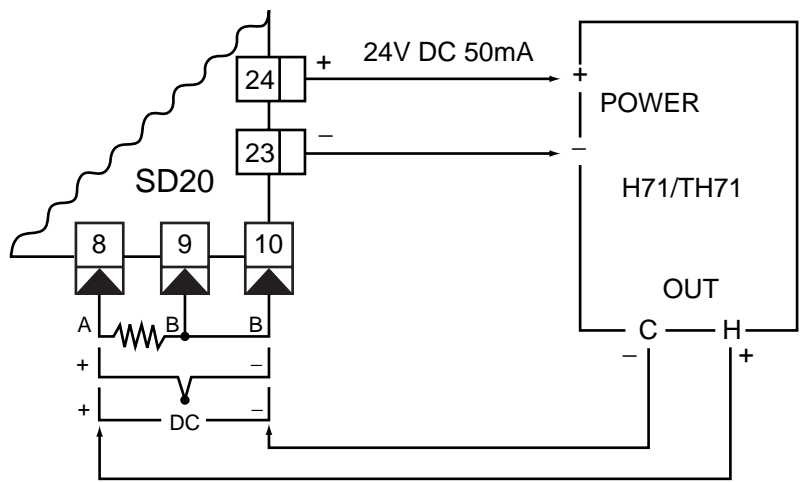
- ⦿ In case such a load (inductive) as relay, electromagnetic switch or electromagnetic valve is driven via an alarm relay contact, in order to get rid of sparks. A spark killer, CR (for AC) or diode (for DC) should be connected in parallel with an exciter coil as shown below.



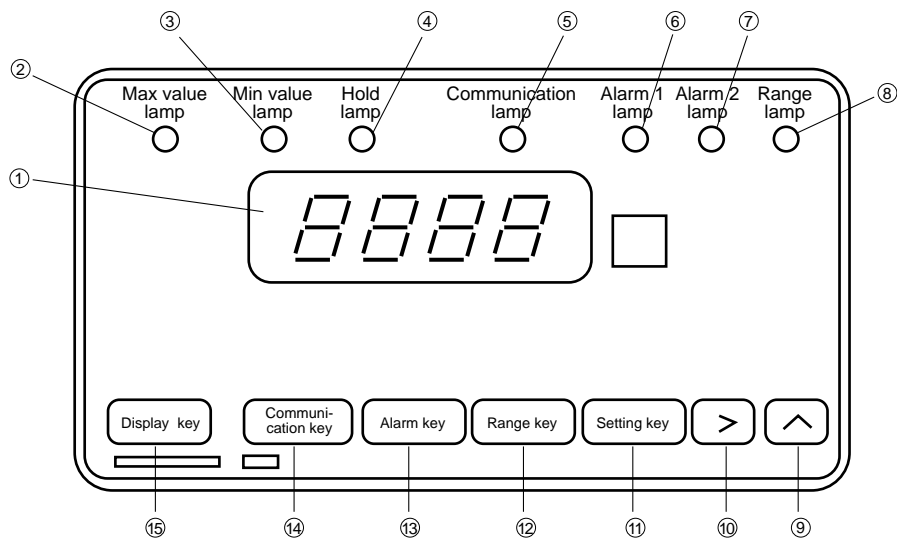
Typical Spark Killers (CR Filters)

| Manufacturer | Use | |
|---------------------|-------------|------------------------|
| | Small relay | Electromagnetic switch |
| Shizuki Denki | SK25B473MA | SK25B104MA |
| Nittsuko | CR2E333C121 | CR2E104C121 |
| Matsushita Electric | ECQJ0187X | ECQJ0186X |

- DC power supply for sensor
For this instrument, DC power supply (24V DC 50mA) for sensor can be selected to use an H71 or TH71 series humidity sensor combinedly. (This can not be used in case of an 24V AC or DC supply.)
- H71 or TH71 series humidity sensor



5 Front Panel Information



| | Name | Function | |
|---|--------------------------|---|--------|
| ① | Display screen | Displays PVs. Displays parameters and figures when various functions are set. | |
| ② | Max value lamp (MAX) | Remains lit while a max value is shown on display screen by means of display key. | |
| ③ | Min value lamp (MIN) | Remains lit while a min value is shown. | |
| ④ | Hold lamp (HOLD) | Remains lit while a processing value is held by means of an external signal. | |
| ⑤ | Communication lamp (COM) | Remains lit while in the communication mode. | Option |
| ⑥ | Alarm 1 lamp (AL1) | Lights when the alarm 1 function is put to work. | Option |
| ⑦ | Alarm 2 lamp (AL2) | Lights when the alarm 2 function is put to work. | Option |
| ⑧ | Range lamp (RNG) | Remains lit while the range block is operated. | |
| ⑨ | Up key | Increases a PV. | |
| ⑩ | Shift key | Takes a figure up or down. | |
| ⑪ | Setting (SET) key | Registers a set value. | |
| ⑫ | Range key | Moves to the range block. | |
| ⑬ | Alarm (ALM) key | Moves to the alarm block. | Option |
| ⑭ | Communication key | Moves to the communication block. | Option |
| ⑮ | Display key | Moves to the display block. | |

6 Selection of Measuring Range and Functions

6-1 How to Detach Inner Body

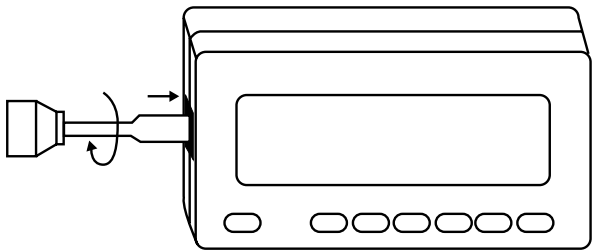
⚠ CAUTION

When the instrument is removed/replaced in the case, make sure the power is off. If it is done while the power is on, it may lead to problems with the product and/or other problems.

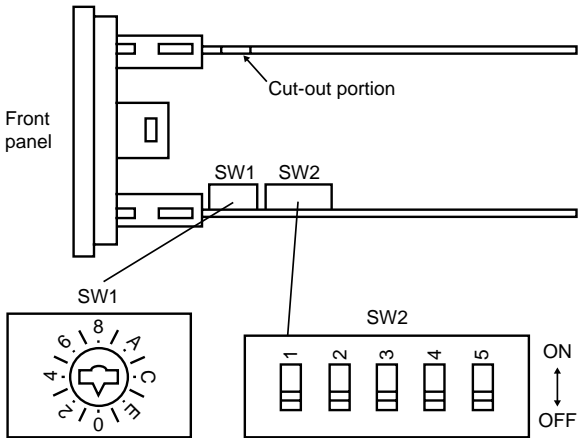
To set a function or to select a measuring range, the inner body has to be drawn out.

Insert a minus screwdriver of 6mm~9mm into the opening (where packing is exposed) of the front case and rotate the screwdriver while pushing up the lock lever behind the packing. Once the instrument comes out by a few millimeters, you can remove it by hand.

How to detach inner body



Position of switches (on the right side)



6-2 Selection of Function (SW2)

Select a function from the table and set it by means of a dip switch (SW2). Unless otherwise designated, all the switch knobs, codes 1 ~ 5, are pressed down (OFF) in the initial setting.

NOTE: The switch is set to ON or OFF easily when the switch knob is pressed by means of a thin tool such as a pincette or a small screwdriver. The switch tends to break if an unnecessarily high force is applied.

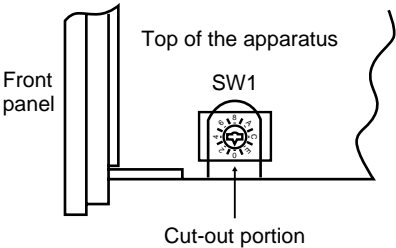
Table for Function Selection

| Function/Feature | Switch code | Switch Knob Position | |
|-----------------------|-------------|----------------------|--------------|
| | | Down (OFF) | UP (ON) |
| Display renewal cycle | 1 | 0.25 sec | 2.0 sec |
| RTD input standard | 2 | JPt (Former JIS) | Pt (JIS/IEC) |
| Alarm | 3 | Non-standby | Standby |
| Key lock | 4 | Unlocking | Lock setting |
| Unit | 5 | °C | °F |

6-3 Selection of Measuring Range

Select a measuring range from the table and set it by turning the rotary switch (SW1).
It is suggested that the set type of input and measuring range would be written on the label on top of the instrument.

When you operate the rotary switch, draw out the apparatus illustrated and insert a thin minus screwdriver through the cut-out portion on the top into the groove of the rotary switch. Rotate it to the intended setting point.



| Input | | | Measuring Range | | | | |
|---------------|-----------------|------|--|------|--------------|------|--------------------|
| Type | | Code | °C Reading | Code | °F Reading | Code | Rotary Switch Code |
| Thermo-couple | B *1 | 1B | 0 ~ 1800 | A47 | 32 ~ 3272 | A65 | A |
| | R | 1R | 0 ~ 1700 | A46 | 32 ~ 3092 | A64 | 8 |
| | S | 1S | 0 ~ 1700 | A46 | 32 ~ 3092 | A64 | 9 |
| | K | 1K | -200 ~ 1200 | A74 | -328 ~ 2192 | A79 | 0 |
| | | | -100.0 ~ 800.0 | A27 | -148 ~ 1472 | A72 | 1 |
| | E | 1E | 0.0 ~ 700.0 | A09 | 32 ~ 1292 | A63 | 3 |
| | J | 1J | -100 ~ 600.0 | A26 | -148 ~ 1112 | A71 | 2 |
| | T | 1T | -199.9 ~ 200.0 | A30 | -328 ~ 392 | A77 | 4 |
| | WRe5/26 | 1W | 0 ~ 2300 | A49 | 32 ~ 4172 | A66 | 7 |
| | U | 1U | -199.9 ~ 200.0 | A30 | -328 ~ 392 | A77 | 5 |
| | K | 1L | 0.0 ~ 600.0 | A08 | 32 ~ 1112 | A62 | 6 |
| | K *2 | 1K | 70.0 ~ 400.0 | A67 | | | - |
| RTD | JPt100 (JIS) | 2J | -199.9 ~ 600.0 | A31 | -328 ~ 1112 | A78 | B |
| | | | 0.00 ~ 99.99 *3 | A02 | 32.0 ~ 212.0 | A61 | C |
| | Pt100 (JIS/IEC) | 2F | -199.9 ~ 600.0 | A31 | -328 ~ 1112 | A78 | B |
| | | | 0.00 ~ 99.99 *3 | A02 | 32.0 ~ 212.0 | A61 | C |
| mV | 0 ~ 10 | 32 | The scaling function allows you to set a measuring range freely. scaling range: -1999 ~ 9999 count span: 100 ~ 10000 count max | | | | D |
| | 0 ~ 50 | 34 | | | | | E |
| | 0 ~ 100 | 36 | | | | | F |
| mA | 0 ~ 20 | 41 | | | | | E |
| | 4 ~ 20 | 42 | | | | | F |
| V | 0 ~ 1 | 62 | | | | | D |
| | 0 ~ 5 | 64 | | | | | E |
| | 0 ~ 10 | 66 | | | | | F |

Standard Thermocouple
B, R, S, K, E, J, T=JIS/ANSI/DIN/IEC
WRe5/26=(Hosking Mfg. Co.)
U, L=DIN 43710

RTD
JPt100=(old) JIS
Pt100=(New) JIS/DIN/IEC

*1 Thermocouple B: Accuracy not guaranteed below 400°C (750°F)
*2 Thermocouple K: 70.0 ~ 400.0 (Unit: Kelvin only) Codes 1K A67 05
*3 RTD: Accuracy ±0.2°C

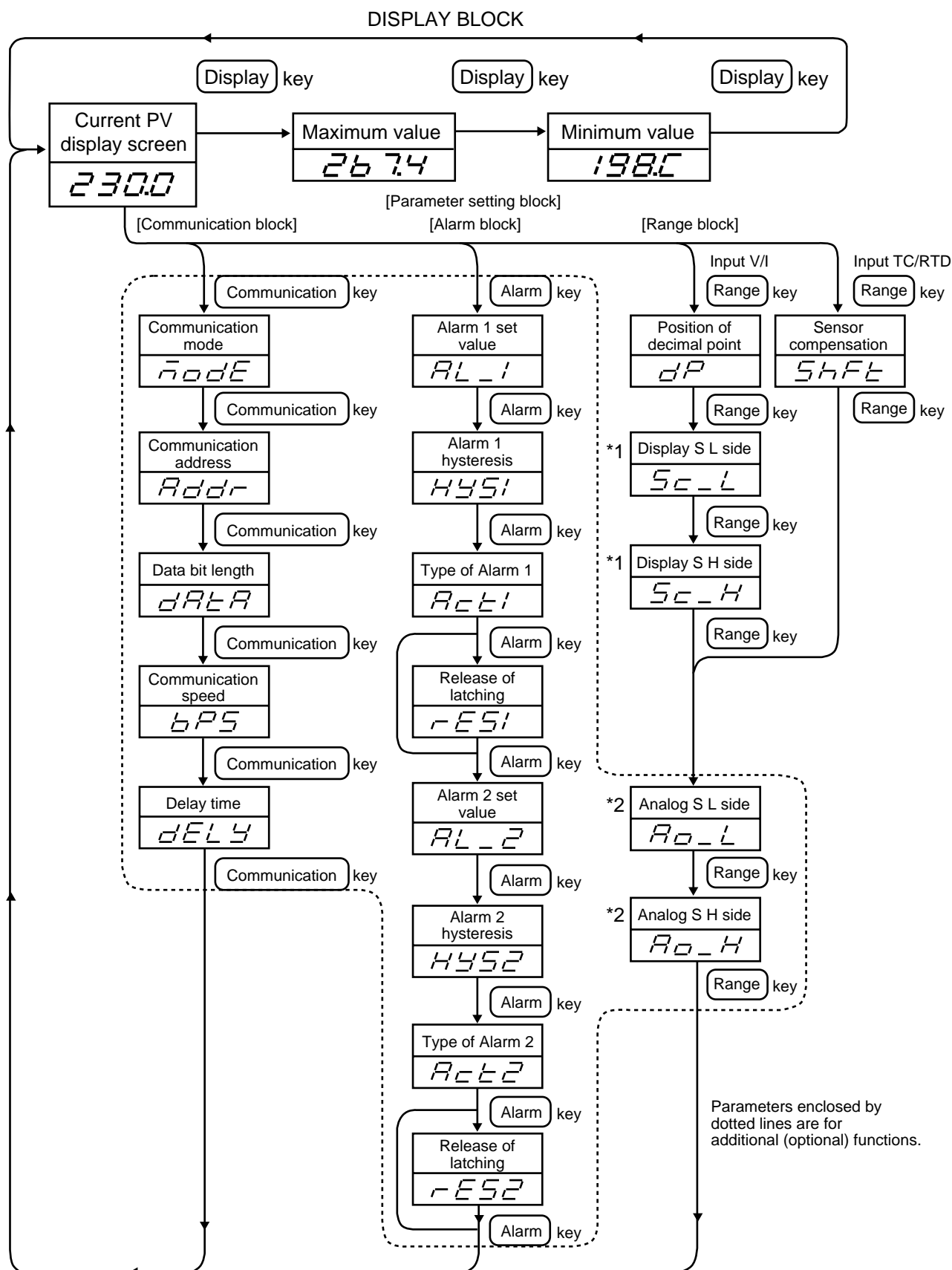
Although this series is designed for multirange and programmable range measurement, the instrument has been set as follows prior to the shipment:

| Type of input | Standard/Rating | Measurement Range |
|---------------|-----------------|--------------------------|
| Thermocouple | JIS K | -100.0 ~ 800.0°C |
| R. T. D. | JIS Pt 100 | -199.9 ~ 600.0°C |
| Voltage | 0 ~ 10mV | 0.0 ~ 100.0 without unit |
| Current | 4 ~ 20mA | 0.0 ~ 100.0 without unit |
| Voltage | 0 ~ 1V | 0.0 ~ 100.0 without unit |

The apparatus is attached with unit display sheets. Use whichever you like.

| ③ Unit | Code | ③ Unit | Code | ③ Unit | Code |
|--------------------|------|----------------------|------|------------------|------|
| Nil | 00 | inH ₂ O | 20 | m/s ² | 40 |
| °C | 01 | mmHg | 21 | rpm | 41 |
| °F | 02 | cmHg | 22 | mm | 42 |
| %RH | 03 | inHg | 23 | cm | 43 |
| % | 04 | 1/s | 24 | m | 44 |
| K | 05 | kg/h | 25 | mm ³ | 45 |
| mV | 06 | kg/cm ² | 26 | cm ³ | 46 |
| V | 07 | kgf/cm ² | 27 | m ³ | 47 |
| mA | 08 | Torr | 28 | in | 48 |
| A | 09 | mmAq | 29 | lb | 49 |
| W | 10 | l/min | 30 | g | 50 |
| μ S/cm | 11 | l/h | 31 | kg | 51 |
| mbar | 12 | m ³ /min | 32 | t | 52 |
| bar | 13 | m ³ /h | 33 | l | 53 |
| psi | 14 | Nm ³ /min | 34 | ppm | 54 |
| Psig | 15 | Nm ³ /h | 35 | pH | 55 |
| Pa. | 16 | mm/s | 36 | cal | 56 |
| kPa | 17 | m/s | 37 | kcal | 57 |
| mmH ₂ O | 18 | m/min | 38 | Nil | 58 |
| mH ₂ O | 19 | m/h | 39 | Nil | 59 |

7 Parameters



*1 Display S: Display scaling

*2 Analog S: Analog output scaling

The parameters of the SD20 series indicator are shown on page 10.

They are divided to the display block and the parameter setting block, which is further divided into three sections.

7-1 Display Block

Pressing the display (DISP) key repeatedly shows PV value → maximum value → minimum value.

7-2 Parameter Setting Block

7-2-1 Range Block

In the case of DC voltage or current input, higher and lower limit values of display range and the position of decimal point are set. In the case of sensor input, a sensor compensation and an output range if the optional analog output function is included, are set.

7-2-2 Alarm Block (Additional/optional function)

An action type of Alarm 1 or 2, hysteresis, action point and release of latching (holding of alarm action) are set.

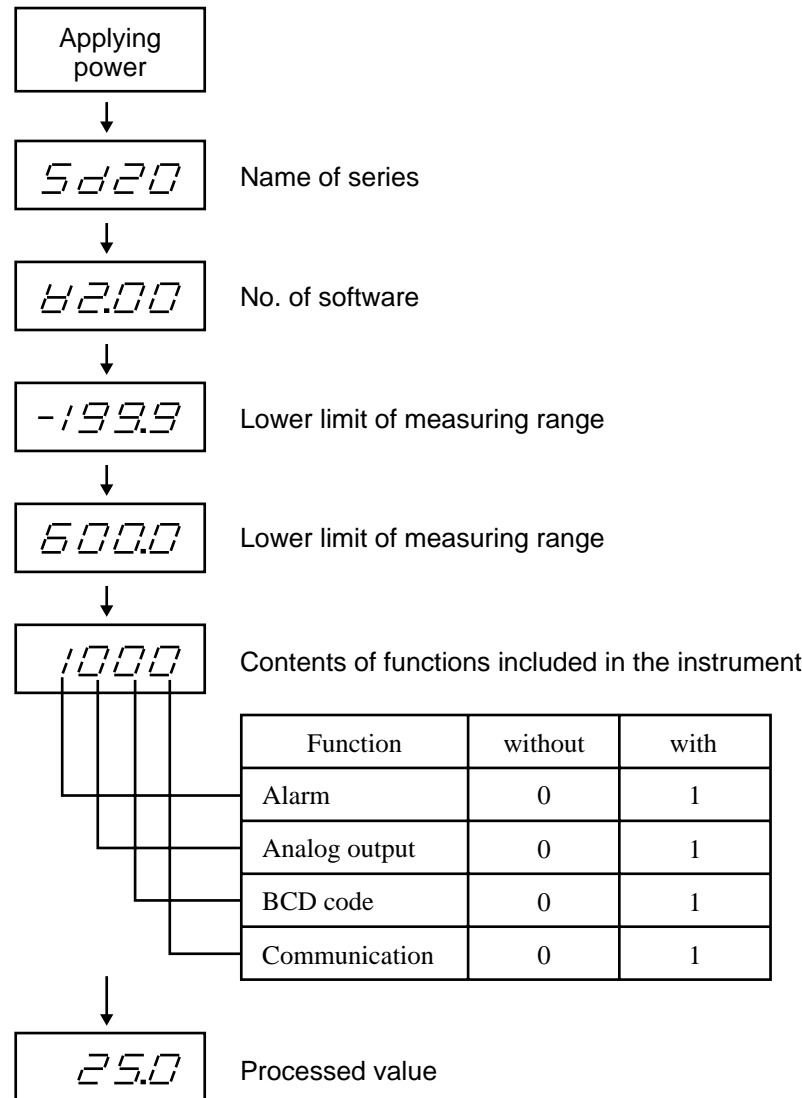
7-2-3 Communication Block (Additional/Optional function)

Communication mode, communication address, the length of data bit, the speed of communication and the time of delay are set. (For details, please refer to the instruction manual for communication interface.)

8 Operating Procedure

8-1 Display when power is applied

When power is applied to the instrument, the following characters and figures appear on the display screen at intervals of about one second, and then the current processed value is displayed.



8-2 Display Block (Common to all input types)

- ⊙ Repeatedly pressing the **[DISP]** key brings PV, maximum and minimum values onto display.
- ⊙ When the **[DISP]** key is pressed while operation is going on by means of any key other than the **[DISP]** key, the processed value display is returned.
- ⊙ When any key other than the **[DISP]** key is operated and that operation is interrupted for more than a minute, the processed value returns to the display.
- ⊙ While the maximum processed value is on display, the maximum value lamp remains lit.
- ⊙ While the minimum processed value is on display, the minimum value lamp remains lit.

8-3 Holding PV Value

When the terminals #2 and #4 are short-circuited by an external contact signal, the processed value at the time of short-circuiting is held and displayed prior to the current processed value. (The hold lamp lights.)

⦿ Even while the hold lamp is lit, the maximum and minimum values can be displayed by operating the **[DISP]** key.

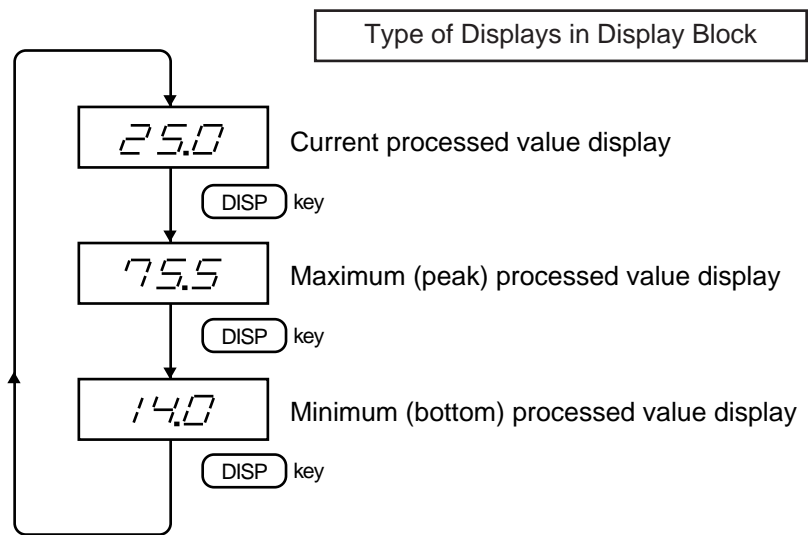
8-4 Release (Reset) of Display of Maximum/Minimum PV Values

When the terminals #2 and #4 are short-circuited by an external contact signal, display data of maximum and minimum values are released (reset).

Releasing (Reset) by Keyboard Operation

Pressing the entry (**[SET]**) key twice consecutively when the maximum value is on display also functions to release.

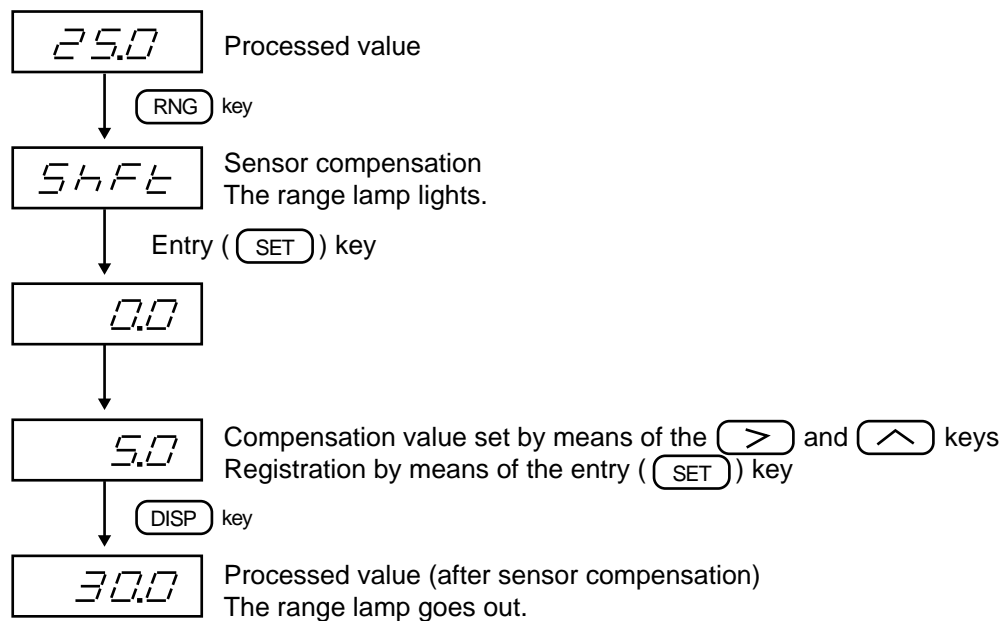
* Maximum/minimum processed values are initialized (reset) upon turning power ON.



8-5 Range Block

8-5-1 Sensor Compensation Function (Input shift) for Sensor
(thermocouple or R.T. D.) Input Type

Sensor compensation *SHIFT*



Setting Range of Sensor Compensation

Thermocouple input: ± 99.9 or ± 999 Unit

R.T.D. input: ± 99.9 or ± 9.99 Unit

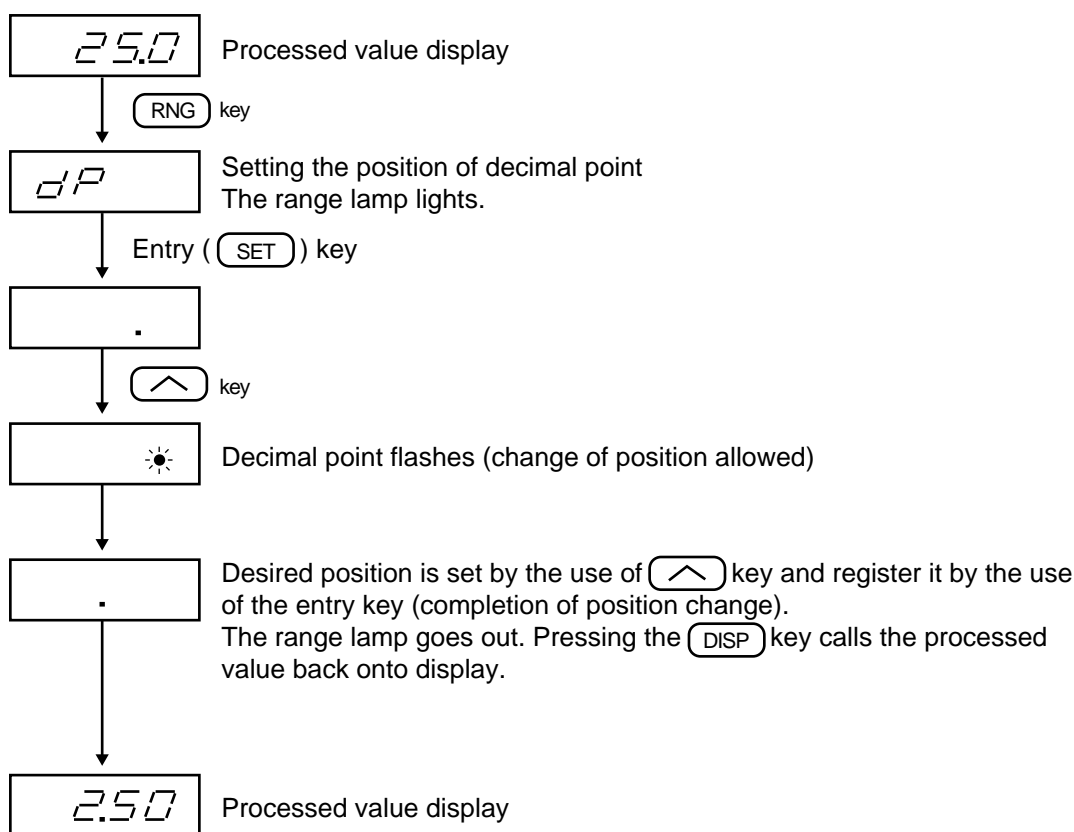
Sensor compensation function

This is the function for displaying input as value added with a predetermined bias. It is used when a processed value is lower than the actual value due to sensor error, etc., or compensation is necessary for a processed value which is within the precision range but varies from the value(s) obtained by other instrument(s).

8-5-2 Voltage/Current Input Type

(1) Setting decimal point ΔP

Pressing the range key when the processed value is on display brings the characters ΔP onto display, allowing selection or setting of the position of decimal point.



* When the decimal point is set at the third position from the right, the display shows .000, not 0.000.

(2) Setting lower limit of measuring range $Sc - L$

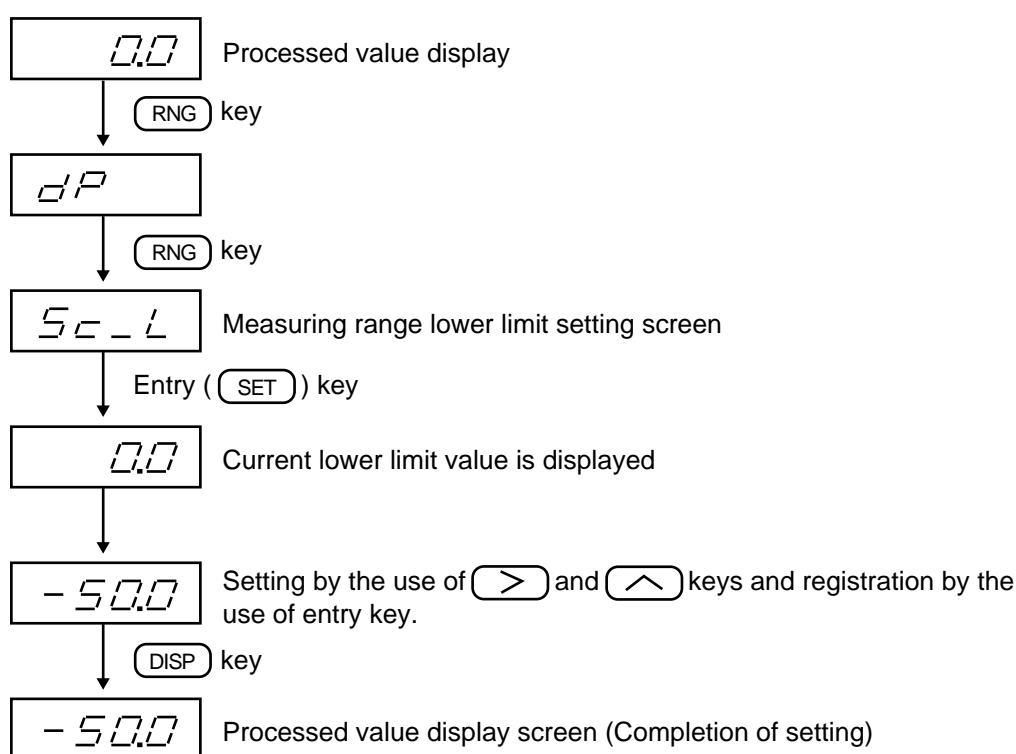
Display scaling function

Setting range: $-1999 \sim 9899$ Initial Value: 0.0

Pressing the range key twice in the current measuring range display screen brings the characters $Sc - L$ (lower limit of measuring range) onto display.

When the setting key is pressed, the display changes to figures.

Use the \triangleright and \wedge keys to set a desired value in the place of the flashing figure and register it by the use of the entry key.



* Scaling of Measuring Range

Measuring range: -1999 ~ 9999

The span between the lower and higher limits can be set as desired in a range from 100 to 10000 counts.

(3) Setting higher limit of measuring range *Sc_H*

Display scaling function

Setting range: -1899 ~ 9999 Initial value: 100.0

Pressing the **RNG** key in the preceding screen for measuring range lower limit setting calls the *Sc_H* (measuring range higher limit setting) screen.

For setting, follow the same steps as measuring range lower limit setting in (2) above.

8-5-3 Analog Output Scaling Function

Additional (optional) function/range block

Analog Output

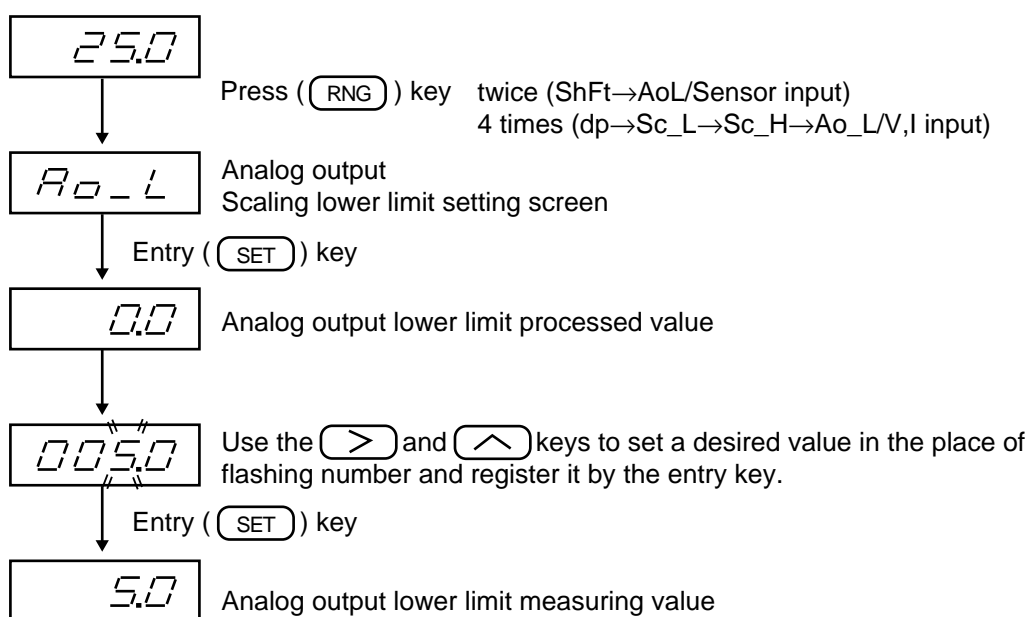
This is the function to output an analog voltage or current correspondingly to the processed value. The output can be used as an input signal into a recorder or a data collector.

(1) Analog output scaling lower limit setting *AO_L*

Setting range: within measuring range

Initial value: the same as measuring range

(This display does not appear if the function is not added.)



(2) Analog output scaling higher limit setting *Ao_H*

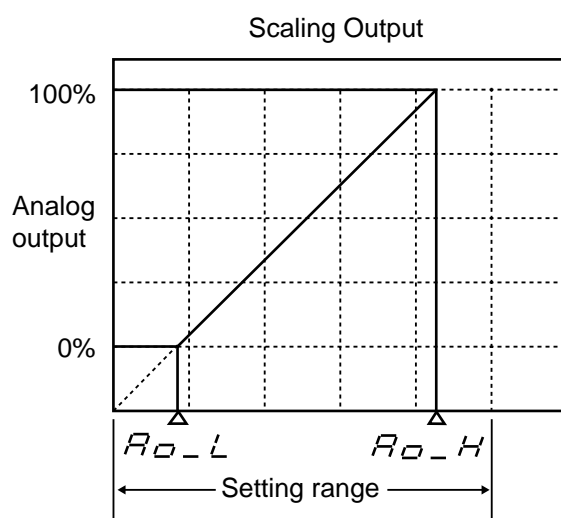
Setting range: -1999 ~ 9999

Initial value: same as measuring range

Pressing the **RNG** key in the preceding screen for analog output lower limit setting calls the *Ao_H* (analog output scaling higher limit) setting screen.

For setting, follow the same steps as lower limit setting in (1) above.

$$* Ao_L < Ao_H$$



An analog signal corresponding to PV is output within a measuring range defined by *Ao_L* and *Ao_H*.

* When you have changed the measuring range, make sure to confirm the scaling value of the analog signal.

8-6 Alarm Block

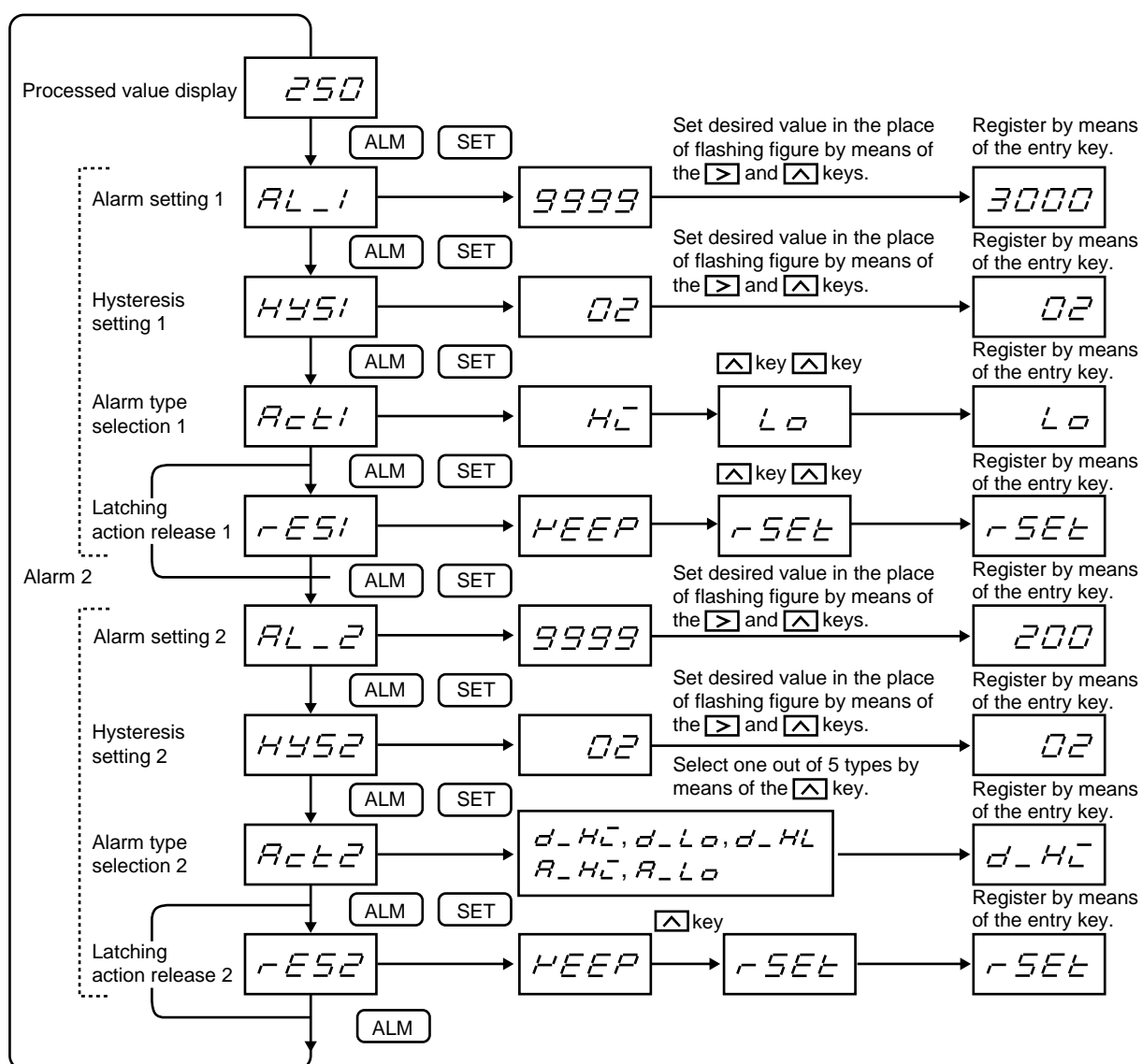
The instrument can be added with the two optional alarm functions, Alarm 1 (AL_1) and Alarm 2 (AL_2).

| | | |
|---|---|--|
| Setting of alarm Type 1 <i>Act1</i> | [<i>H1</i>] Absolute value higher limit alarm | |
| | [<i>L0</i>] Absolute value lower limit alarm | |
| Setting of alarm Type 2 <i>Act2</i> | [<i>d_H1</i>] Deviation higher limit alarm | |
| | [<i>d_L0</i>] Deviation lower limit alarm | |
| | [<i>d_HL</i>] Deviation higher and lower limit alarm | |
| | [<i>A_H1</i>] Absolute value higher limit alarm | |
| | [<i>A_L0</i>] Absolute value lower limit alarm | |

Alarm Function

▲ Alarm 1 set point △ Alarm 2 set point

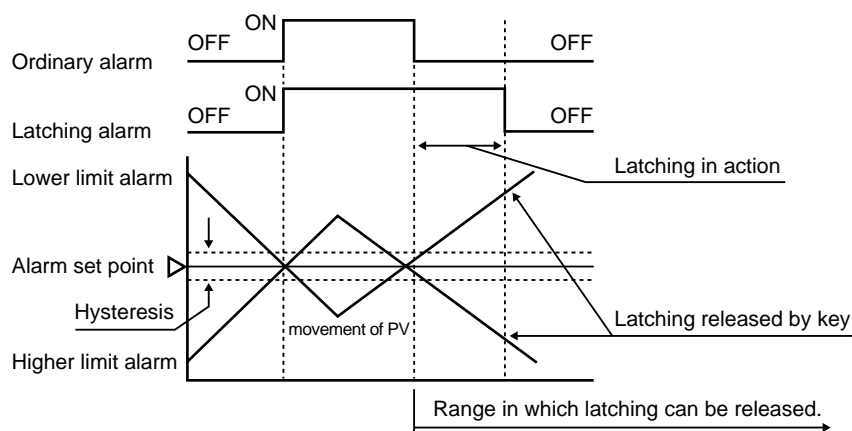
- * The deviation in Alarm 2 is relative to the set value in Alarm 1.
- * If *AL_2* (the amount of deviation) is set at a low value and hysteresis is large in the *d_HL* (deviation higher/lower limit) mode, alarm actions overlap and it may happen that releasing will not be possible once an alarm is output.
Therefore, values have to be set lest hysteresis should overlap.



Parameters in Alarm Block

8-6-1 Latching alarm (to be designated at the time of ordering)

Once an alarm is output, the state of output is maintained after the processed value gets out of the alarm action range. It is released by operating the front keyboard (See the "Releasing Latching Action" section).

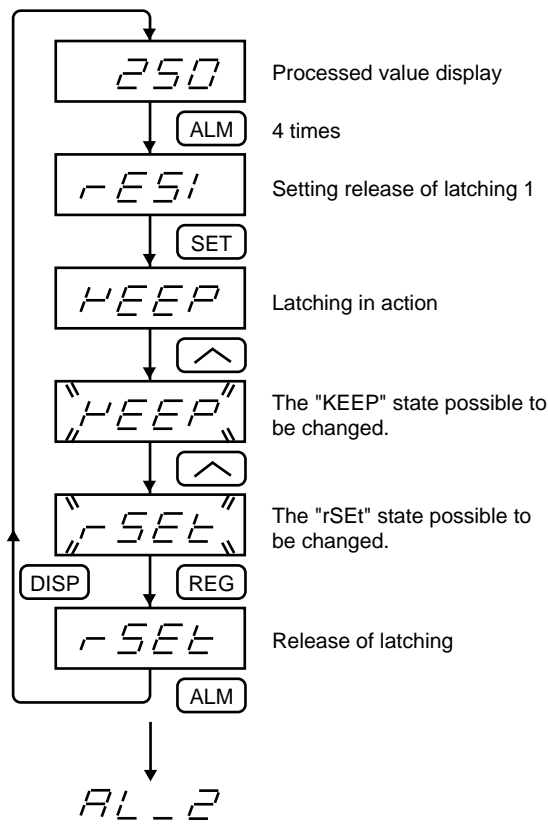


Latching actions

Releasing Latching Action
(An example of release of latching/releasing not possible while an alarm is output.)

Pressing the alarm key four times consecutively brings the parameter *rESl* onto the display.
Then, pressing the setting/entry key brings *KEEP* onto display flashes when the \wedge key is pressed to indicate that this state can be changed now. Pressing the \wedge key again changes the display to *rSEt* which flashes. When the entry/setting key is pressed, it stops flashing and the alarm latching action is released.

Flow Chart of Releasing Latching Alarm



9 Codes for Instrument Selection

| Item | Code | Specification | |
|---|-------|---|---|
| 1. Series | SD20- | 48 × 96 DIN Size Digital Instruction Scale | |
| 2. Input | 1 | Thermocouple B, R, S, K, E, J, T, WRe5-26, U, L Multi-input | |
| | 2 | RTD Jpt 100/Pt 100 | Multi-input |
| | 3 | Voltage (mV) 0~10, 0~50, 0~100mV DC | Multi-input programmable range Scaling range: −1999~9999 counts Span: within a range count from 100~10000 |
| | 4 | Current (mA) 0~20, 4~20mA DC | |
| | 6 | Voltage (V) 0~1, 0~5.0, 0~10V DC | |
| | 8 | K. T. C. (Thermocouple) for Kelvin (K) Unit (Measuring 70.0~400.0K) | |
| 3. Power Supply | 90 - | 100–240V AC ±10% 50/60Hz | |
| | 10 - | 24V AC ±10% (50/60Hz) | When 24V DC or AC is selected, Item 6. DC power for sensor cannot be selected. |
| | 02 - | 24V AC ±10% | |
| 4. Alarm | 00 | None | |
| | 10 | Individual settings and outputs 2 points (1c contact) contact capacity = 250V AC 2.5A/resistive load | |
| | 11 | Same as above with latching function | |
| 5. Analog output and communication function | 00 | None | |
| | 03 | 0~10mV DC Output resistance 10Ω | Scaling (within measuring range) |
| | 04 | 4~20mA DC load resistance below 300Ω | |
| | 06 | 0~10V DC max load current below 2mA | |
| | 15 | RS-485 | When communication function is selected, Item 6. DC power supply for sensor cannot be selected. |
| | 16 | RS-422A | |
| | 17 | RS-232C | |
| | 20 | BCD | |
| 6. DC power for sensor (Selection not possible in case power supply is 24V AC or DC) | 00 - | None | |
| | 24 - | 24V DC 50mA | |
| 7. Front sheet letter | J | Japanese | |
| | E | English | |
| 8. Remarks | 0 | Without | |
| | 9 | With | |

NOTE: If BCD output function is added, CE marking does not apply.

10 Troubleshooting

10-1 Identifying cause of trouble

If something goes out of order, (A) investigate input/output, (B) confirm that the wiring and terminals are in order and not loose, and (C) check the relevant settings. If you have any queries regarding problems or the handling of the instrument, please call our company.

10-2 Display in case of input problems

| Problem | | Display | Type of Input | | |
|---|-------------------------------------|------------------|--------------------------|-----------------------|-----------------------------|
| | | | Thermo-couple input type | RTD input type | Voltage/ current input type |
| Thermocouple disconnection | | HHHH | <input type="radio"/> | | |
| Cold contact compensation rose to +80°C or more. | | HH-- | <input type="radio"/> | | |
| Cold contact compensation down to −20°C or lower. | | LL-- | <input type="radio"/> | | |
| 10000 ~ 10999 counts when input is within +10% of measuring range. | | 4000~4999 | | <input type="radio"/> | <input type="radio"/> |
| Input is +10% or more above measuring range. | | HHHH | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| −2000 ~ −2999 counts when input is within −10% of measuring range. | | 7000~7999 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Input is −10% below measuring range. | | LLLL | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <div>Terminal No.</div> <div><div>A</div><div>B</div><div>B</div></div> <div><div><div></div><div></div><div></div></div><div><div>8</div><div>9</div><div>10</div></div></div> | disconnection of terminal number 8 | HHHH | | <input type="radio"/> | |
| | disconnection of terminal number 9 | Error in display | | <input type="radio"/> | |
| | disconnection of terminal number 10 | LLLL | | <input type="radio"/> | |

SPECIFICATIONS

- Display:
 - Range Display: 7-segment LED (4-digit)
 - Displays: Measuring range, max. hold, bottom hold
 - Display Accuracy: $\pm 0.25\% + 1$ digit of measuring range (Thermocouple B: Accuracy not guaranteed below 400°C (700°F))
 - Display Cycle Range: 0.25 sec. or 2 sec. (by internal switch)
 - Legend Change: °C and °F (by internal switch)
 - Monitor Display: Max., min., hold, communication, alarm and range
- Setting:
 - Setting Method: By front key
 - Setting Keys: Display, Communication, Alarm, Range, Setting, Shift and Up
 - Type of Setting: Position of decimal point, display scaling, sensor compensation, analog output scaling, alarm, alarm sensitivity, latching OFF, communications (interface), etc.
- Input:
 - Sampling Cycle: 0.25 sec.
 - Thermocouples: T, J, E, K, R, S, B, WRe5-26, DIN 43710 U & L
 - Kelvin Legend: 70.0~400.0K (available only T/C 'K', option)
 - Input Resistance: 500kΩ min.
 - External Resistance Allowable Range: 100Ω max.
 - Sensor Compensation: ± 99.9 or ± 999 Unit (depending on communication signal)
 - Burnout Scaling: Up-scale (standard feature)
 - R.T.D.: JPt100/Pt100 (DIN/JIS) changeable
 - Rated Amperage: Approx. 0.5mA
 - Lead Wire Resistance: 5Ω max. per wire
 - Sensor Compensation: ± 99.9 or ± 9.99 Unit (dependend on communication signal)
 - Voltage: 0~10mV, 0~50mV or 0~100mV DC changeable
 - Input Resistance: 500kΩ min.
 - Current: 4~20mA or 0~20mA DC changeable
 - Receiving Resistance: 250Ω
 - Display Scaling: Only voltage and current inputs available (–1999~+9999, 100~10000 counts)
 - Setting Method & Decimal Point Position: By front key
 - Isolation: Between input and internal circuit
- External Control
 - HOLD: Present value is maintained by external contact signal
 - RESET: Maximun value or minimum value is released by external contact signal.
 - Isolation: External contact signal input is isolated from the system and various types of output (not isolated from sensor input, however)
- Data storage: By non-volatile memory (EEPROM)
- Operating Ambient Conditions
 - Operating ambient temperature/humidity ranges: –10 to +50°C / 90% max. (no dew condenstation)
 - Limit in altitude: 2000 meters above sea level or lower
 - Category: II
 - Degree of pollution: 2
- Applicable standards: Safety: IEC1010-1 and EN61010-1
EMC: EN61326
During EMC testing, the apparatus continues to operate at a measurement accuracy within $\pm 10\%$ FS.
- Optional Functions:
 - Alarm:
 - Alarm Points: 2 Point
 - Alarm Method: Individual Setting/individual output
 - Alarm 1: Absolute value high limit or absolute value low limit (selectable)
 - Alarm 2: Absolute value high limit, absolute value low limit, deviation high limit, deviation low limit or deviation high/low limit (selectable)
 - Deviation high limit, deviation low limit and deviation high/low limit alarm can be selected deviation for alarm 1.
 - Alarm Setting Range: –1999~9999 (absolute value high limit, absolute value low limit, deviation high limit and deviation low limit) 1~9999 (deviation high/low limit)
 - Alarm Setting: By front key
 - Alarm Sensitivity: 0.2~9.9 or 2~99 by front key
 - Alarm Output: 1c contact, 250V AC, 2.5A/Resistive load
 - Inhibit/Non-Inhibit: Selectable by internal switch
 - Latching Alarm: Available as option
- Analog Output:
 - Output: 0~10mV DC (output resistance: 10Ω)
0~10V DC (load current: 2mA max.)
4~20mA DC (load resistance: 300Ω max.)
 - Output Accuracy: $\pm 0.25\%$ FS of diplay value
 - Resolution: Approx. 0.0125FS (1/8000)
 - Isolation: Isolated between input and internal circuit
 - Output Scaling: By front key
- Interface:
 - Type of Interface: RS-232C, RS422A or RS-485
 - Speed: 1200, 2400, 4800, or 9600 bps selectable
 - Data Bit: 7-bit odd-parity or 8-bit w/o parity selectable
 - Address: 0~31
 - Code: ASCII Code
 - Isolation: Isolated between input and internal circuit
- Sensor Power Supply: 24V DC ($\pm 3V$) 50mA
- Power Supply: 100~240V, AC, 50/60Hz, 24V AC or 24V DC
- Power Consumption: 100~240V, AC: approx. 14VA
24V AC: approx. 8VA, 24V DC: approx. 5W
- Insulation Resistance: 500V DC 20MΩ between input terminal and power supply terminal
500V DC 20MΩ between input terminal and protective conductor terminal
- Dielectric Strength: One minute at 2300V AC between input terminal and power supply terminal
One minute at 1500V AC between power supply terminal and protective terminal
- Protective strength: Only front panel has simple dust-proof and drip-proof structure
- Material: Resin molding
- External Dimensions: 48(H) × 96(W) × 110(D) mm
- Mounting: Push in panel (one-touch mount)
- Panel thickness: 1.0~3.5mm
- Size of mounting hole: H45 × W92mm
- Weight: Approx. 300g

—MEMO—

The contents of this manual are subject to change without notice.

Temperature and Humidity Control Specialists

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