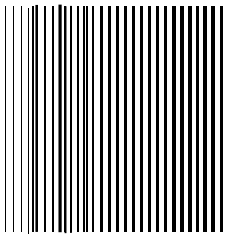


CHINO

IR-BZ Series
COMPACT INFRARED
THERMOMETER
Model: IR-BZP



INSTRUCTIONS

Always keep this instruction with the unit.

Please be sure to deliver these instructions
with the unit to the end user.

CHINO

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PREFACE/ Request and notices

Thank you for purchasing IR-BZ Series Compact Infrared Thermometer.
Please read this instruction manual for using this thermometer correctly, safely and also preventing troubles in advance.

◆ Request to the operator of the thermometer

Follow this instruction manual and use the thermometer correctly.

This instruction manual describes the maintenance of the thermometer, too.

Keep this manual with due care until this thermometer is discarded.

If you have unclear points or need technical assistance, please contact your sales agent of CHINO Corporation.

NOTE

1. The descriptions of this manual are subject to change without notice.
2. If a question has arisen or if an omission was found in this manual, please contact your nearest CHINO's sales agent or your dealer.
3. Copy right of this instruction manual belongs to CHINO Corporation. All or part of this instruction manual shall not be released to the third party.

Important explanation

To use this instrument correctly and safely, make sure to observe following safety precautions.

1. Working conditions and environment

- The working temperature range of this product is; -20 to 100°C for Detector and -10 to 65°C for Main unit. (No dew condensation)
- Do not use in atmospheres such as a dust, garbage, the corrosive gas.
- This product is a precision instrument. Avoid using in the places where; temperature changes widely, humidity is high, static electricity exist, heavy electric circuit exist or inductive interference is large and mechanical vibration and impact exist.
- Tip of Detector is glass lens. Dropping or impact may cause damage to the unit. Take due care when using.

2. Storage



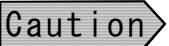
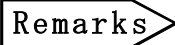

- Do not store the thermometer in hot and humid places.
- For failures of the thermometer, don't overhaul it by yourself, and contact your sales agent of CHINO Corporation.

3. Disposal

- When you discard this product, please obey the regulation of each local government.


4. Symbols in this instruction manual










The symbols shown below are used depending on important degrees for using the thermometer safely and avoiding unexpected situations.





| Important degree | Symbols | Contents |
|------------------|---|--|
| 1 |  | This symbol is indicated with a title for an explanation with Warning . |
| 2 |  | Indicates important information that must be observed to avoid the risk of fire or electric shock or other dangers that may result in serious personal injury or death, or damage to this product. |
| 3 |  | Indicates important information that must be observed to avoid the risk of personal injury or malfunctions of this product. |
| 4 |  | Indicates supplementary information that the operator is recommended to understand. |
| 5 |  | Indicates supplementary information or a reference to an operation. |

Warnings and Cautions

◆ To use this product, make sure to observe following matters and use it correctly.
 In addition, keep this instruction manual carefully in the place that you can reach at any time.

 Shows an act of the prohibition.

| | | |
|--|--|---|
|  Warning (May cause death or serious injury) | | |
|  | Don't operate this thermometer in places where combustible or volatile gas is existed. It is extremely dangerous to use the thermometer in such environment. |  |
|  | When connecting power to the power terminals, make sure to turn OFF power supply to prevent an electric shock. |  |
|  | Don't use the thermometer if it is broken, smoking or abnormal order is detected. These may cause fire. For such abnormal conditions, turn off the power supply immediately and contact your sales agent of CHINO Corporation. |  |
|  | Disassembling or modifying this thermometer may not only cause failure but also be dangerous to you. Disassembling or modifying this thermometer is prohibited. |  |

| | | |
|--|--|--|
|  Caution (May cause injury or physical damage) | | |
|  | Avoid using in the places where; temperature changes widely, humidity is high, close to heavy electric circuit exist, inductive interference is large, static electricity exists or magnetic field, and mechanical vibration and impact exist. Also avoid using under the atmosphere where dust and particles exist, corrosive gas exists and electric noise or static electricity exists and easily to interrupt. | |
|  | Do not wire the connection cable near a noise source; relay drive line and power line. Do not bundle the connection cable with the line that noise is overwrapping, and do not store it into the same duct. | |
|  | To use the thermometer safely, strictly observe the contents described in this instruction manual. If the contents of this instruction manual are not complied, damage to the thermometer, functional decline or damage to a system may occur. | |

1. Introduction

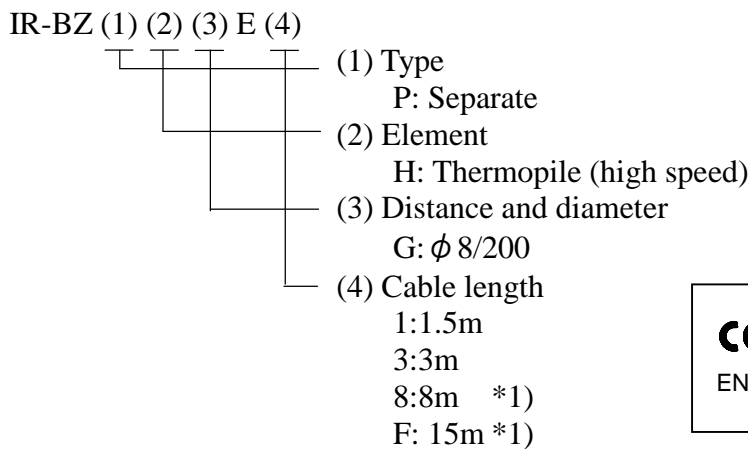
1.1 Outline

IR-BZP "Compact Infrared Thermometer" is composed of a Main unit, which CPU is built-in and various function settings are available from digital display and key operation, and Detector.

Heat resistance for a Detector is 100°C and it is also water-proof (IP65 equivalency) so it is excellent in environmental resistance.

2. Model

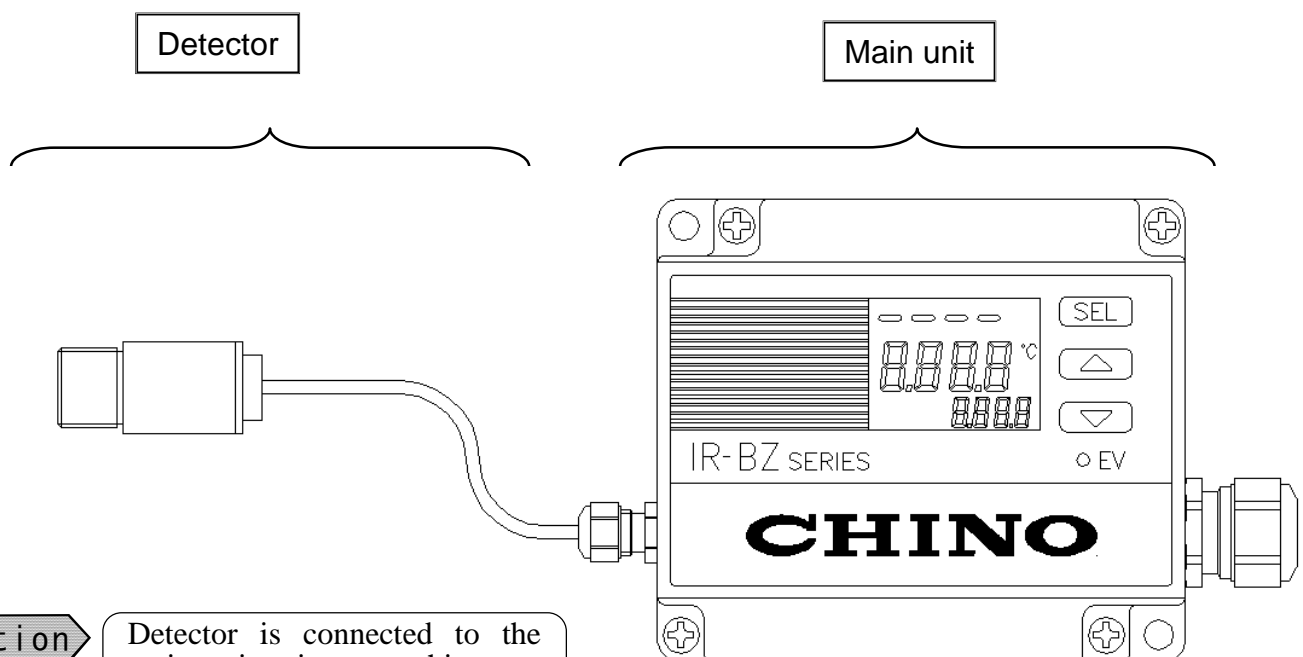
2.1 Model



*1) CE marking non-approved

*2) Conformity requirements : Use of power supply for IR-BZ exclusive use and the connecting cable up to 30m (indoor use)

2.2 Configuration

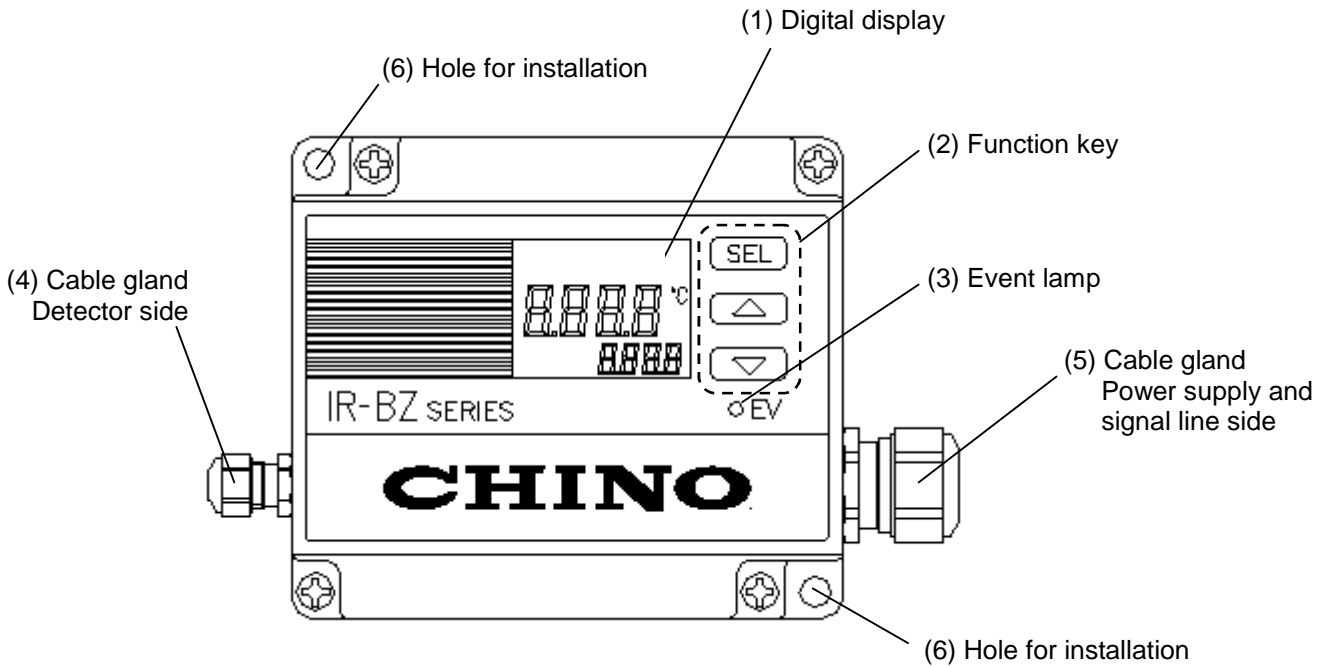


Caution Detector is connected to the main unit prior to a shipment. Detector can not be removed.

3. Names and functions of component parts

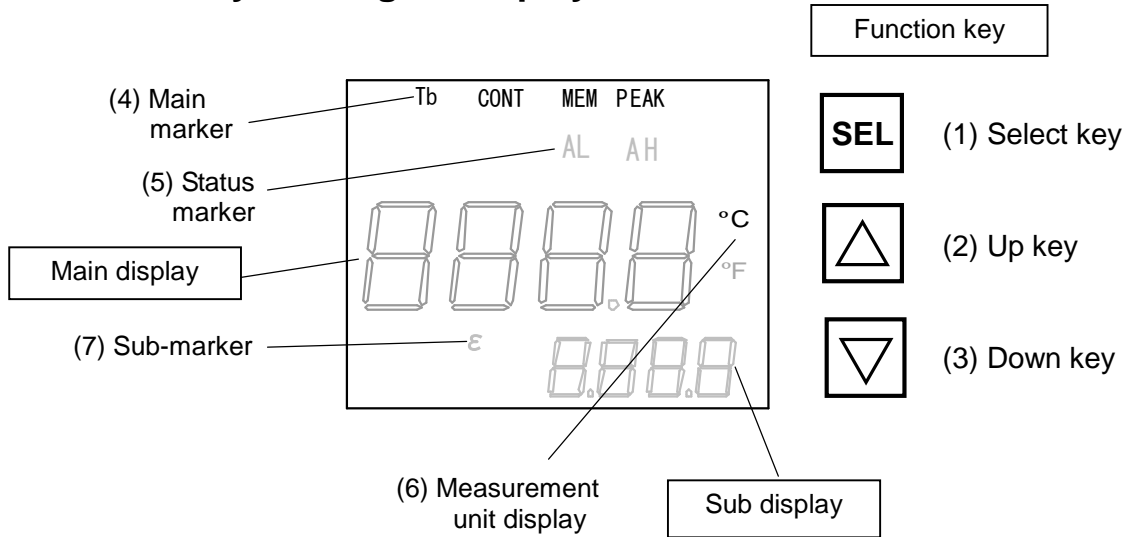
3.1 Main unit

3.1.1 Overview



| | |
|---|---|
| (1) Digital display | Main display: LCD 4-digits, Sub-display: LCD 4-digits, Status marker: Alarm status Sub-marker: Emissivity and Transmittance Measurement unit: °C or °F |
| (2) Function key | Three keys for displaying and setting parameters. |
| (3) Event lamp | Lights when self-diagnostic alarm activates. Also it will light when the contact output is set as ALM (high or low alarm) and alarm activates. |
| (4) Cable gland (Detector side) | Cable inlet for Detector (not removal). |
| (5) Cable gland (Power supply and signal line side) | Cable inlet for power supply and signal line. |
| (6) Hole for installation | φ 4.5 two holes for fixing the unit. |

3.1.2 Function key and Digital display



3.1.3 Function keys

| Name | Function | Indication |
|----------------------------|---|------------|
| (1) Select key | Use for switching measurement mode, operating mode and engineering mode, or for selecting parameters. | |
| (2) Up key (3) Down key | Use for a setting item selection or for numeric value changing. | |

3.1.4 Markers

Main display : At measuring, measured value of the thermometer is displayed. At operating mode and engineering mode, item selection or set value is displayed in 4-digit LCD.

Sub display : At measuring, error number, key lock status, detector temperature, main unit temperature is displayed depending on the setting. At operating mode and engineering mode, parameter name is displayed in 4-digit LCD. At emissivity setting, emissivity set value, and at transmittance setting, transmittance set value is displayed.

| Name | Marker | Function | Indication |
|----------------------|--------|--|------------|
| (4) Main marker | Tb | Not used. | "Tb" |
| | CONT | | "CONT" |
| | MEM | | "MEM" |
| | PEAK | | "PEAK" |
| (5) Status marker | AL | It is lit at low alarm activation. | "AL" |
| | AH | It is lit at high alarm activation. | "AH" |
| (6) Measurement unit | °C | It is lit when temperature is displayed in Celsius. | "C" |
| | °F | It is lit when temperature is displayed in Fahrenheit. | "F" |
| (7) Sub-marker | ε | It is lit at displaying emissivity. | "ε" |
| | r | It is lit at displaying transmittance. | "r" |

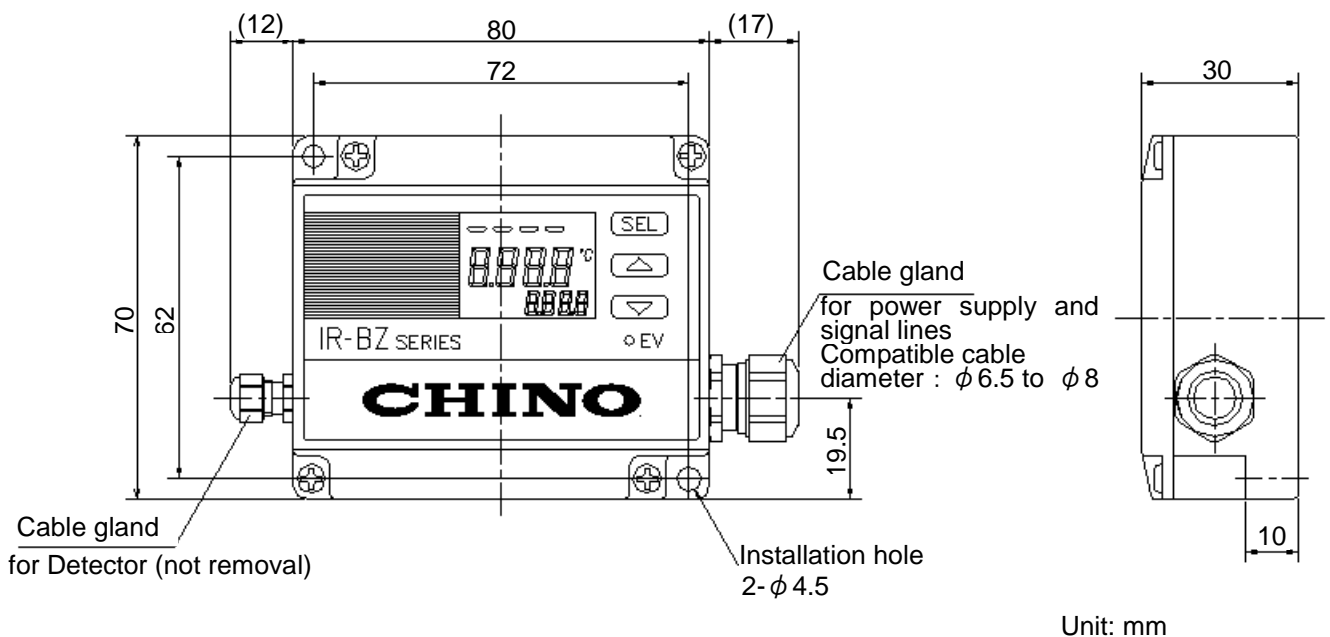
4. Installation

4.1 Installation of Main unit

Fix the Main unit by two installation holes.

Caution

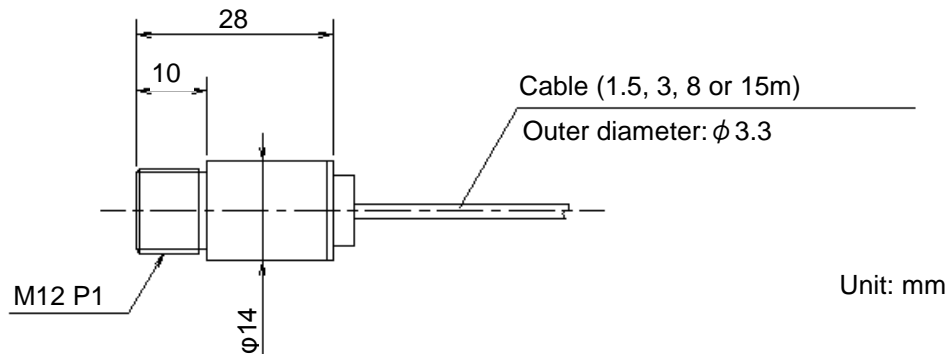
- Do not use the thermometer at following places where;
- Dust, particles and corrosive gas are in the atmosphere
 - Electric noise and static electricity are generated frequently
 - Ambient temperature is 65°C or higher or -10°C or lower
 - Ambient temperature changes widely or humid is high
 - Close to high frequency line or power line
 - Mechanical vibration and impact exist
 - Flammable or explosive gases exist



4.2 Installation of Detector

Detector is fixed by screw. Make a hole on desired equipment and fix by attachment nut.

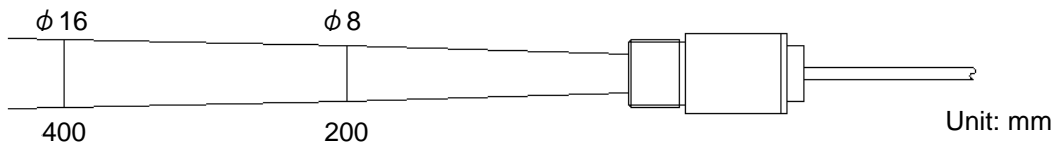
Fix a cable without looseness.



Caution

- Cable vibration will be the cause of noise so please fix it to not to vibrate.
 Cable allowable bending radius is 20mm.
 When screwing the nut, do not co-around the detector. If co-around then it will cause cable disconnection.

4.3 Measuring Diameter and Measuring Distance



5. Connections and Wirings

5.1 Connection to the Main unit

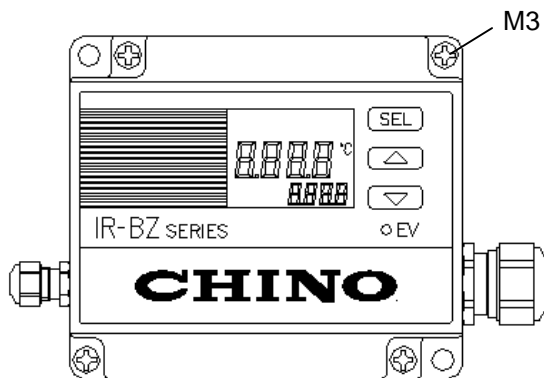
Warning

To prevent an electric shock, turn OFF the power source for wiring.

Detector is connected prior to a shipment. Connect a cable at the power supply and signal line. Use dedicated cable or commercial cable (twisted-pair cable with a shield, outer diameter $\phi 6.5$ to $\phi 8.0$, wire size 0.2 to 0.5mm²). Connect cable shield to FG. If using thermocouple output, use extension wire according to the thermocouple type. Conditions for cable length are as follow.

| Cable length | Wire size | Power supply voltage |
|-----------------|------------------------------------|----------------------|
| 5m or shorter | 0.2mm ² (AWG24) or more | 8V or higher |
| 50m or shorter | 0.2mm ² (AWG24) or more | 9.5V or higher |
| 100m or shorter | 0.3mm ² (AWG22) or more | 9.5V or higher |
| 200m or shorter | 0.3mm ² (AWG22) or more | 11V or higher |

(1) Loosen four of M3 screws of Main unit and remove a lid.



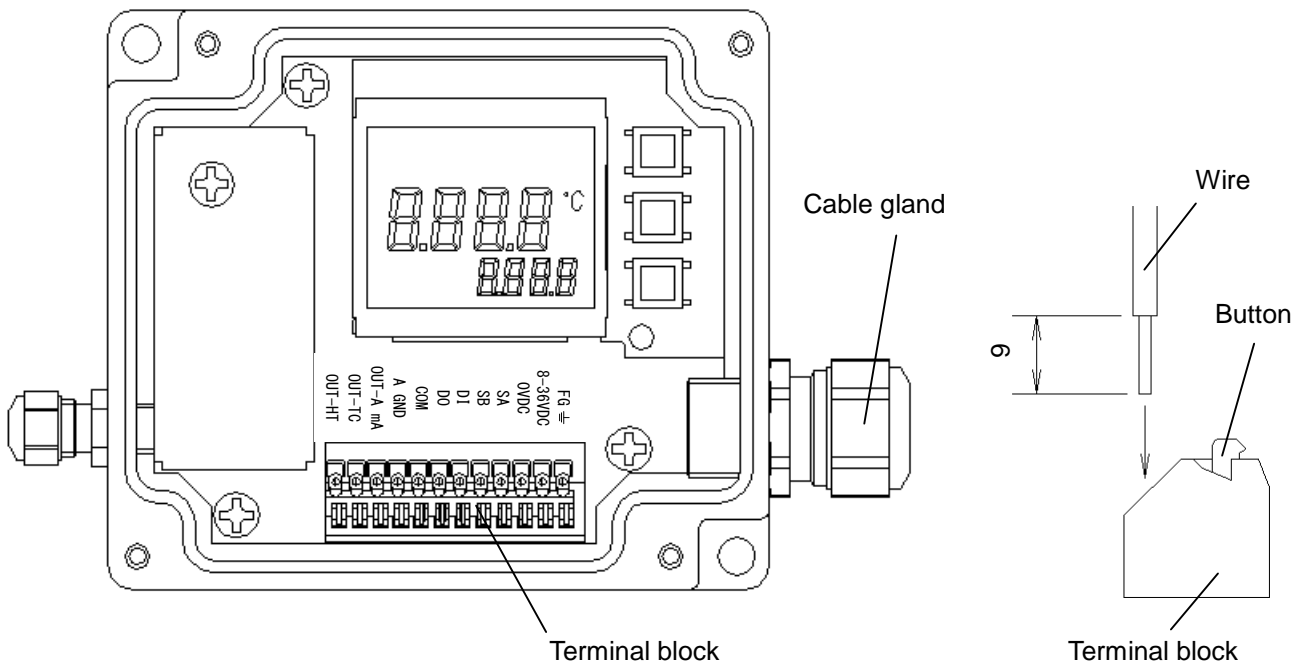
Warning

If taking out the lid, please conduct at clean condition such as no dust.

Warning

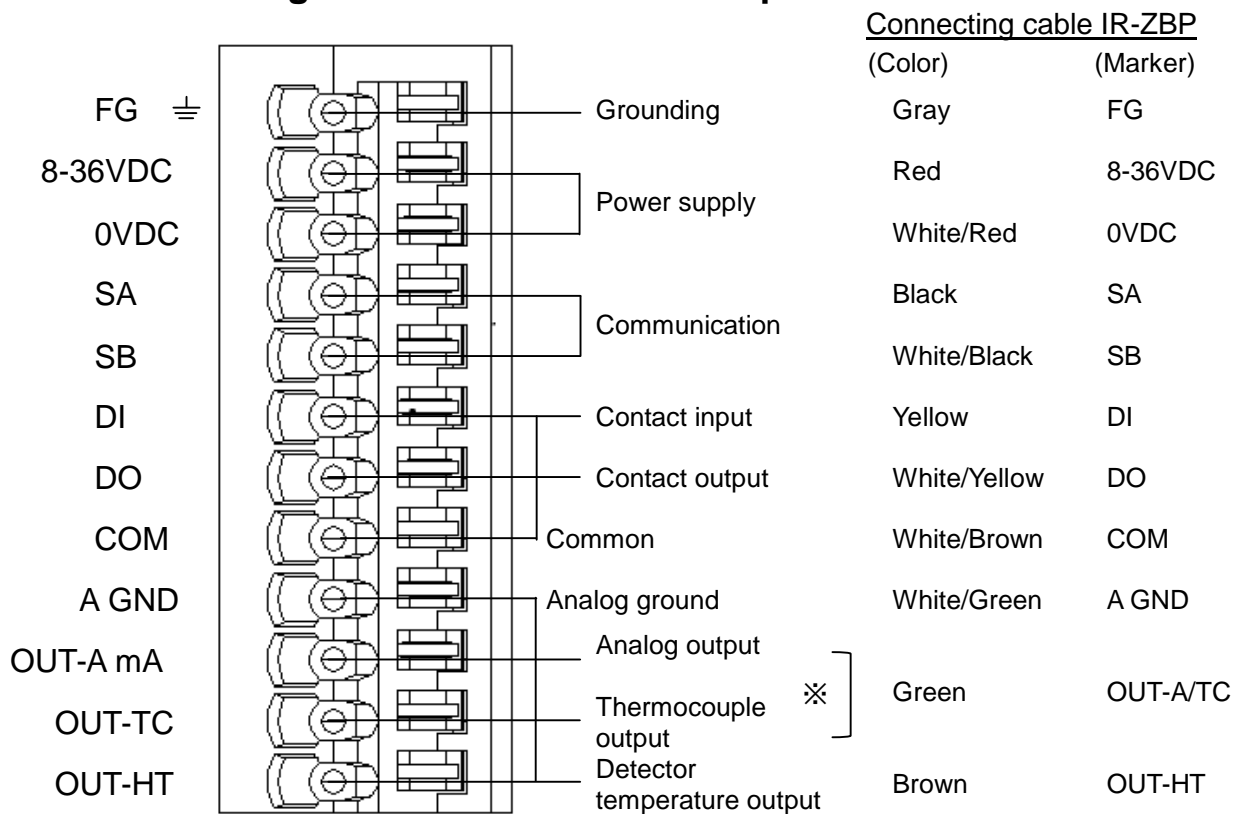
If take out the lid, please do not touch the electrical parts other than terminal block by screw driver or remove the screw.

(2) Set a cable to the cable gland and connect to a terminal block. Press a button on the terminal block while inserting the wire and release the button after the insertion.



5.2 Connections to input and output terminals

5.2.1 Terminal arrangement and terminal nameplate



※Analog output and TC output can not be used at the same time. Please connect either signal to be used.

5.2.2 Connection of power supply terminal

Warning

Make sure to turn OFF the power supply for preventing an electric shock when connecting power terminal.

Caution

Use 8 to 36VDC for power supply
Applicable power wire is 0.2 to 0.5mm².

5.2.3 Connection of grounding terminal

Caution

Provide a low impedance earth ground (grounding resistance 100Ω or lower) connection.

5.2.4 Connection to receiving devices

Remarks

Analog output is non-isolated 0 or 4 to 20mA DC, thermocouple EMF equivalent voltage.
Connect output terminal and receiving devices to each other.
Contact output is open collector output.
Use connecting external device rated (30V, 50mA) or lower.

Caution

When closing the lid after connection, confirm the packing is not sticking out from the groove.

6. Operating

When installation and connections are completed, turn ON the power supply.

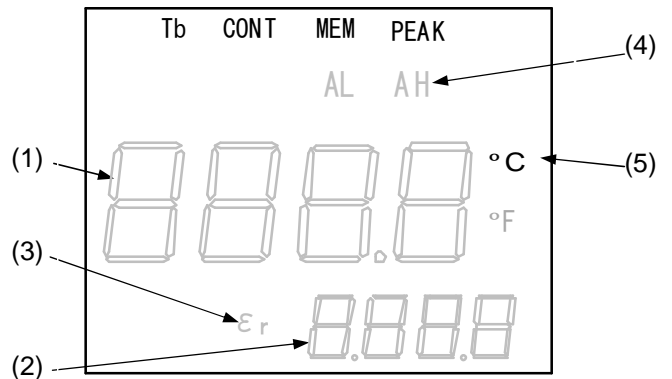
6.1 Digital display

Prepare a measurement by displaying “— — — —” on main display and “Init” on sub display. Measured value is displayed on the main display when measurement is started.

“AL” or “AH” on status marker is lit when low alarm or high alarm is activated.

(Only if alarm setting is set to low or high.)

Displaying “Lock” on sub display if key lock set is selected.



(1) Main display: 7-segment LCD 4-digit.
Measured value and set value/ setting item, selection value/ selection item are displayed.

[Measurement Mode]
Only "main display" is lit and nothing is displayed on sub display and sub marker.

(2) Sub display: 7-segment LCD 4-digit.
At measurement, selected item by SEL key and at setting, setting item is displayed.

(3) Sub marker: ε...emissivity
r...transmittance

(4) Status marker: AL...low alarm
AH...high alarm

(5) Measurement unit display:
°C...Celsius
°F...Fahrenheit

7. Start option/Parameter diagram

7.1 Start option

By key operation at start-up, following operation is performed.

| Key operation | Display mode | Remarks | Chapter of this manual |
|---|------------------|---------------------------------------|------------------------|
| Press SEL key at measurement mode | Operating mode | Parameter setting at operating mode | 8 |
| Long press SEL key at measurement mode | Engineering mode | Parameter setting at engineering mode | 9 |

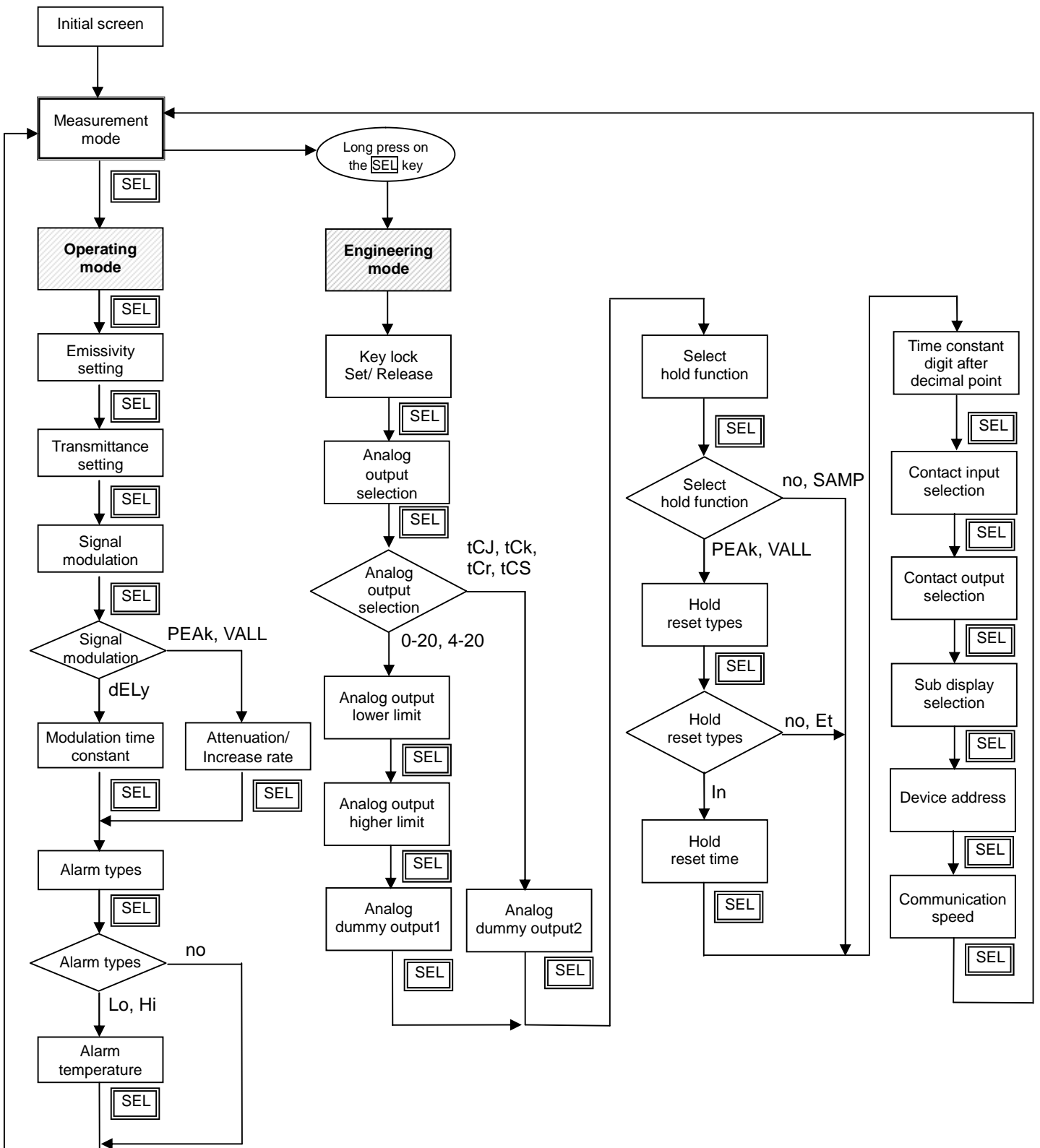
7.2 Display mode

Screens to be digital displayed are roughly classified into following 2 types.

| Type | Outline |
|------------------|---|
| Measurement mode | <ul style="list-style-type: none"> ▪ Turn ON the power supply and start measuring ▪ By pressing the SEL key, it shift to parameter setting screen at the operating mode and emissivity, transmittance, signal modulation and alarm etc. selection/ setting become enabled. (→ Refer to ◇Details of operating mode on "8. Operating mode") |
| Engineering mode | <ul style="list-style-type: none"> ▪ By long pressing (about 2 sec.) on the SEL key, it shift to setting screen at the engineering mode and key lock, analog output scaling, analog dummy output, hold function, contact output, sub display selection and communication setting etc. selection/ setting become enabled. (→ Refer to ◇Details of engineering mode on "9. Engineering mode") ▪ By completing the setting up to "9.10 Selection of communication speed", it returns to the measurement mode. |

*If there is no key operation on operating mode and engineering mode for 1 minute, it returns to the measurement mode automatically. Also long pressing on the **SEL** key shifts to the measurement mode immediately.

7.3 Parameter diagram (Operating mode·Engineering mode)

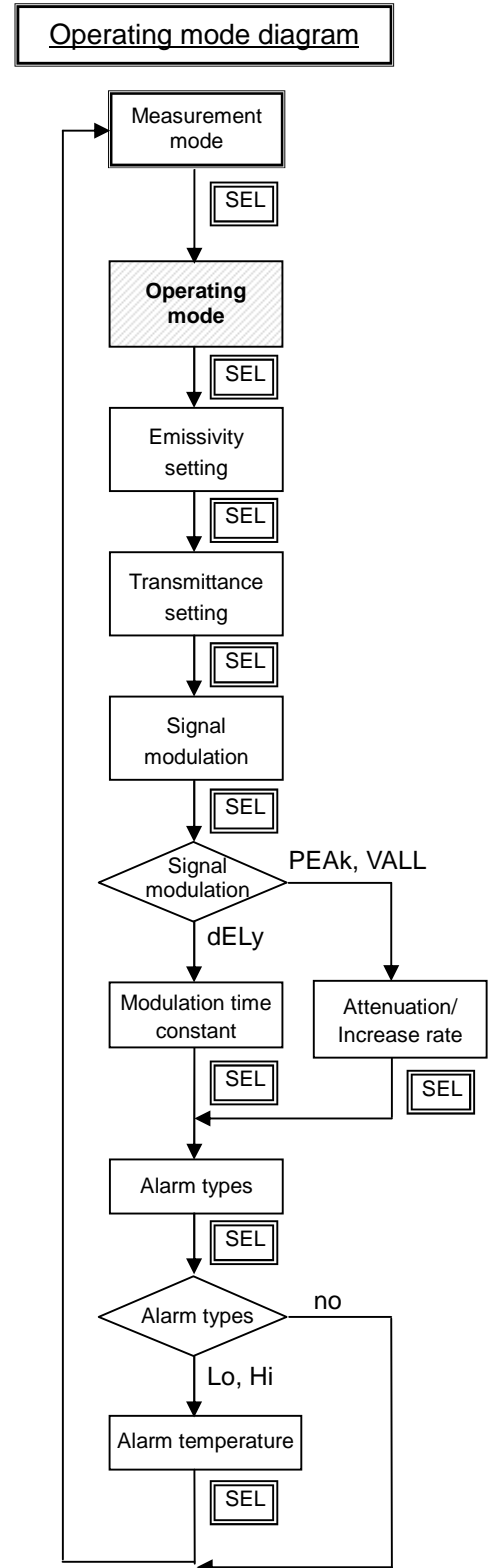


8. Operating mode

- 1) [Measurement mode screen] is displayed by turning ON the power supply.
- 2) Press **SEL** key to display [Operating mode screen] on the right.

For how to set/select parameters, refer to each chapter. Transition at pressing **SEL** key is shown on the right.

- *It returns to the measurement mode by long pressing (about 2 sec.) on **SEL** key.
- It also returns to the measurement mode if no key operation is performed for 1 minute.



◇Details of operating mode

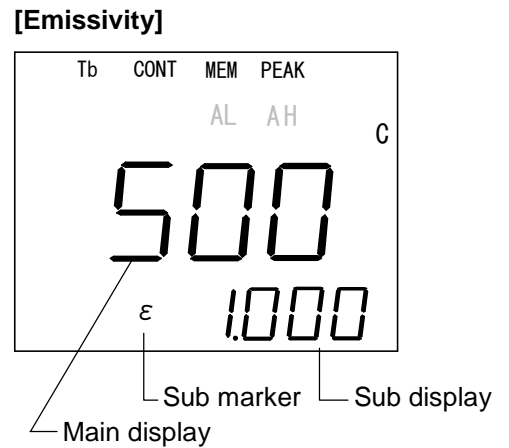
Press **SEL** key at measurement mode to operating mode.

Remarks → It returns to the measurement mode by long pressing (about 2 sec.) on **SEL** key.

Caution → It returns to the measurement mode if no key operation is performed for 1 minute.

8.1 Emissivity setting

- 1) Press the **SEL** key from measurement mode screen to display "ε" shown on the right figure. Present temperature is displayed on the main display.
- 2) Press **↑** key or **↓** key and change setting numeric value for emissivity.
Setting is completed by changing the numeric value.
- 3) It shifts to the next screen by pressing the **SEL** key.

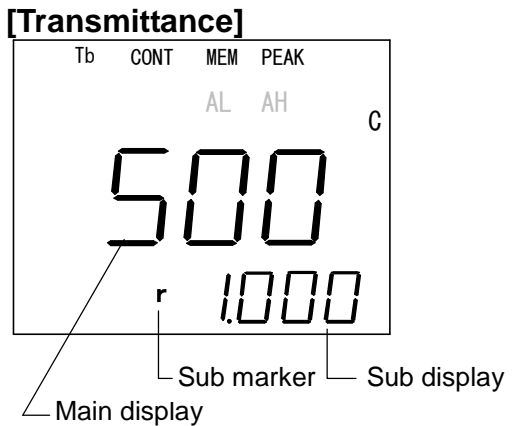


Remarks →

- Setting range is 1.999 to 0.100
- Default setting is 1.000

8.2 Transmittance setting

- 1) Press the **SEL** key couple of times to display "r" shown on the right figure on sub marker. Present temperature is displayed on the main display.
- 2) Press **↑** key or **↓** key and change setting numeric value for transmittance.
Setting is completed by changing the numeric value.
- 3) It shifts to the next screen by pressing the **SEL** key.



Remarks →

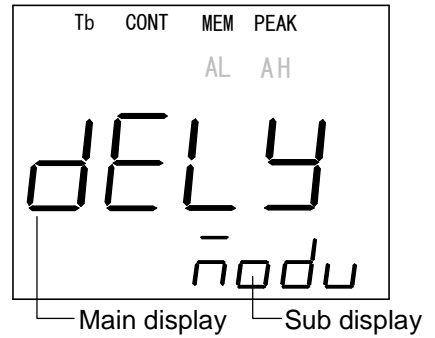
- Setting range is 1.999 to 0.100
- Default setting is 1.000

8.3 Signal modulation mode selection

Select form to modulate measurement signal (original signal).
 Select "dELy" to display REAL that is based on original signal and set modulation degree to 0.0.

- 1) Press the **[SEL]** key couple of times from measurement mode screen to display "Modu" shown on the right figure on sub marker.
- 2) Press **[↑]** key or **[↓]** key and change signal modulation.
 Selection is completed by changing the display.
- 3) It shifts to the next screen by pressing the **[SEL]** key.

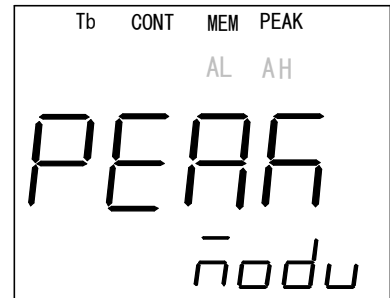
[dELy]



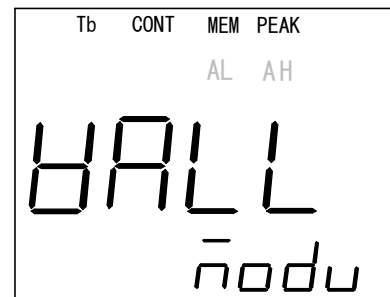
[Modes of signal modulation]

| | |
|------|--|
| dELy | It displays the value that is based on first order lag of time constant set at 8.4.1 Setting of modulation time constant. When signal value fluctuates, it displays in smooth form |
| PEAK | If temperature is rising, it displays the value based on original signal. If temperature is dropping, the value is displayed based on attenuation rate setting. (Refer to 8.4.2 Attenuation/Increase rate setting) |
| VALL | VALL is the opposite process of PEAK. If temperature is dropping, the value is displayed based on original signal. If temperature is rising, it displays the value is displayed based on increase rate setting. (Refer to 8.4.2 Attenuation/Increase rate setting) |

[PEAK]



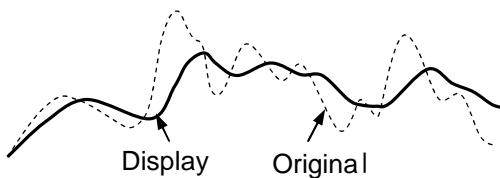
[VALL]



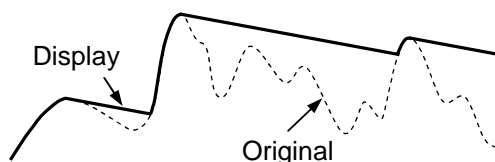
Remarks

• Default setting is "dELy"

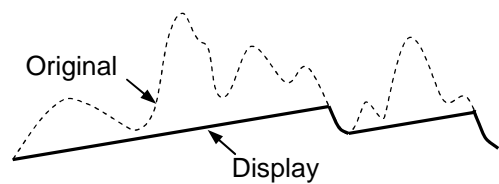
[dELy]



[PEAK]



[VALL]



8.4 Modulation degree setting

Caution

Modulation degree setting is used with "8.3 Signal modulation selection "

If "dELy" is selected in signal modulation mode selection, degree of first order lag (modulation time constant) can be adjusted by setting modulation time constant.

If "PEAK" or "VALL" is selected in signal modulation mode selection, signal attenuation rate after the peak is traced or signal increase rate after valley is traced can be set.

8.4.1 Setting of modulation time constant

(This is valid only if "dELy" is selected for signal modulation)

Remarks

Range of value available to be set changes depending on modulation time constant's digit after the decimal point
(Refer to 9.5 Setting of time constant digit after decimal point)

When original signal value fluctuates, it displays and output in smooth form.

The time constant stands for response of 63% level to the step change of the original signal.

1) Press the **[SEL]** key couple of times from measurement mode screen to display "tAu" shown on the right figure on sub display.

2) Press **[↑]** key or **[↓]** key and change numeric value of modulation time constant.

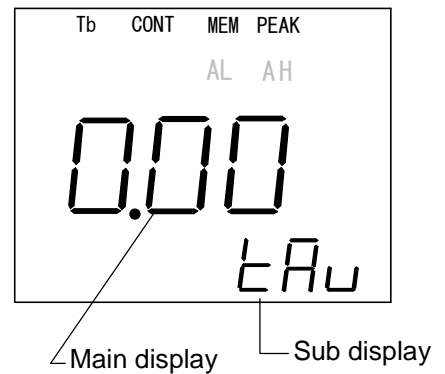
Setting is completed by changing the numeric value.

3) It shifts to the next screen by pressing the **[SEL]** key.

Remarks

- Setting range: 1-digit after the decimal point, 0.0 to 99.9(sec.)
2-digit after the decimal point, 0.00 to 9.99(sec.)
- Default setting is 0.00 (sec.)

[Modulation time constant]



Reference

- If time constant is 0.0 (sec.) on "dELy" setting, it become REAL.

8.4.2 Selection of attenuation/increase rate

(This is valid only if "PEAK" or "VALL" is selected for signal modulation)

PEAK or VALL can be traced. Signal attenuation rate after the peak or signal increase rate after valley is selected.

1) Press the **[SEL]** key couple of times from measurement mode screen to display "dEC" shown on the right figure on sub display.

2) Press **[↑]** key or **[↓]** key and change numeric value of attenuation/increase rate.

Selection is completed by changing the display.

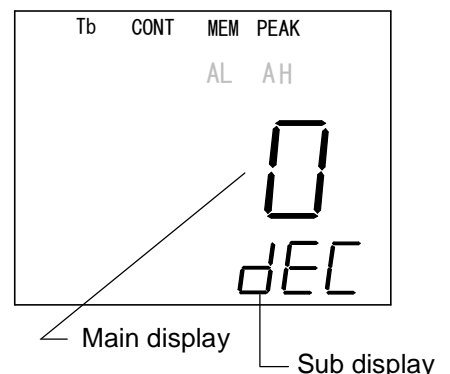
(Change in order of 0→2→5→10 or 10→5→2→0(°C/sec.))

3) It shifts to the next screen by pressing the **[SEL]** key.

Remarks

- Default setting is 0 (°C/sec.)

[Attenuation/Increase rate]



8.5 Alarm setting

Select alarm type (high, low or no alarm) and set temperature alarm point (only one point, high or low alarm).

If "ALM" is selected at contact output, contact point is output based on the set value.

In other case, AL and AH of status marker lights up only.

Remarks

For measured value to perform alarm judgement, use the value after hold process.
(Refer to 9.4 Selection of hold function)

8.5.1 Alarm type selection

- 1) Press the **SEL** key couple of times from measurement mode screen to display "AL1M" shown on the right figure on sub display.
- 2) Press **↑** key or **↓** key and change type of alarm 1.
Selection is completed by changing the display.
- 3) It shifts to the next screen by pressing the **SEL** key.

[Alarm types]

Hi: High alarm(If an indication value exceeds the alarm point, open collector of the contact output turns ON)

Lo: Low alarm(If an indication value fall below the alarm point, open collector of the contact output turns ON)

no: no alarm

Remarks

•Default setting is Hi

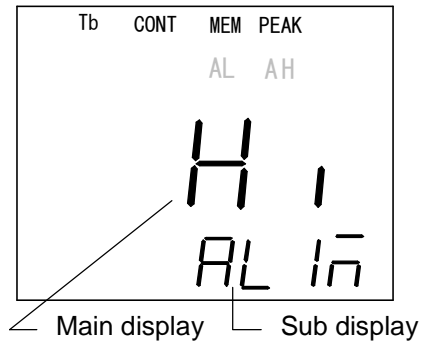
8.5.2 Temperature setting of alarm

- 1)After registering "Alarm" at previous section, press the **SEL** key to display "ALM1" shown on the right figure on sub display.
- 2) Press **↑** key or **↓** key and change temperature value of the alarm.
Setting is completed by changing the numeric value.
- 3) It shifts to the next screen by pressing the **SEL** key.

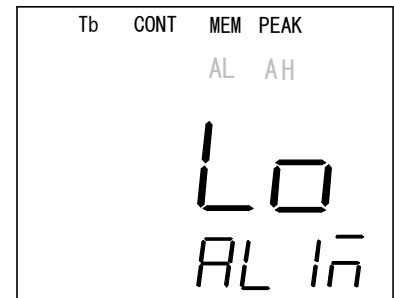
Remarks

•Temperature range:-50 to 3500 (°C)
•Default setting is 1000 (°C)

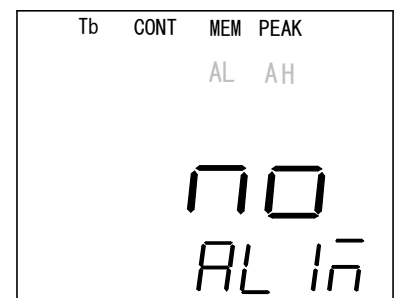
[High alarm]



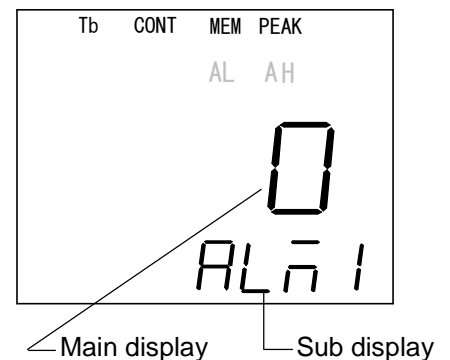
[Low alarm]



[No alarm]



[Temperature setting of alarm]

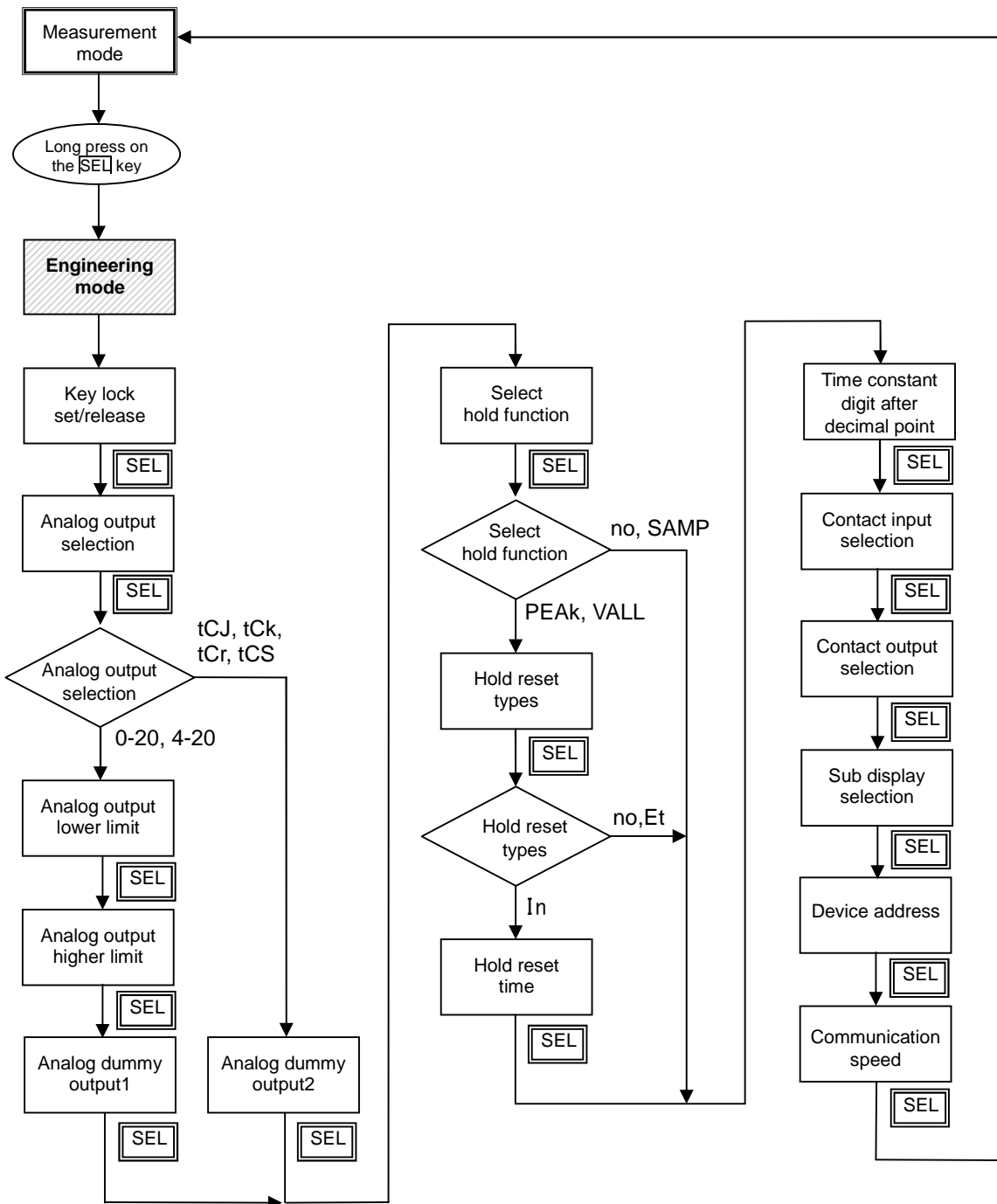


9. Engineering mode

[Measurement mode screen] is displayed by turning ON the power supply.
 Long press on the **[SEL]** key to display [Engineering mode screen] on the below.
 For how to set/select parameters, refer to each chapter.
 Transition at pressing **[SEL]** key is shown below.

*It returns to the measurement mode by long pressing (about 2 sec.) on **[SEL]** key.
 It also returns to the measurement mode if no key operation is performed for 1 minute.

Engineering mode diagram



◇Details of engineering mode

Long press on the **SEL** key at measurement mode screen to display engineering mode screen.

Remarks It returns to the measurement mode by long pressing (about 2 sec.) on **SEL** key.

Caution It returns to the measurement mode if no key operation is performed for 1 min.

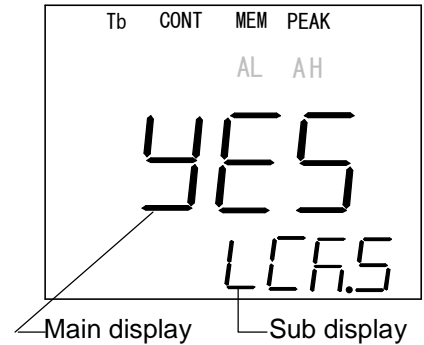
9.1 Key lock set/release

By activating key lock, all the setting in the operating mode and engineering mode setting screen cannot be changed.

(Except deactivate the key lock setting.)

- 1) Press the **SEL** from engineering mode screen to display "LCK.S" shown on the right figure on sub display.
- 2) Press **↑** key or **↓** key and select key lock set (YES) or release (NO). Set/release is completed by changing the display.
- 3) It shifts to the next screen by pressing the **SEL** key.

[Key lock set]



Remarks

- Default setting is no (release)
- Displaying "Lock" on sub display if key lock set is selected (Refer to 6.1 Digital display).

[Key lock release]



9.2 Selection of analog output

- 1) Press the **[SEL]** key couple of times from engineering mode screen to display "OutS" shown figure below on sub display.
- 2) Press **[↑]** key or **[↓]** key and change analog output type. Selection is completed by changing the display.
- 3) It shifts to the next screen by pressing the **[SEL]** key.

[Analog output types]

- 0-20 :0 to 20mA
 - 4-20 :4 to 20mA
 - tCJ :J thermocouple*
 - tCK :K thermocouple*
 - tCr :R thermocouple*
 - tCS :S thermocouple*
- *Output voltage corresponding to EMF of thermocouple.

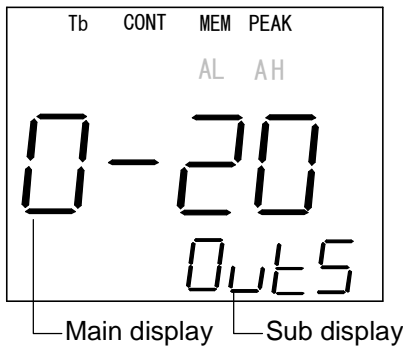
Remarks

- Default setting is 4-20 (mA)
- Outputtable max. temperature range is from -50 to 1100°C and upper limit depends on the unit from 1030 to 1100°C.

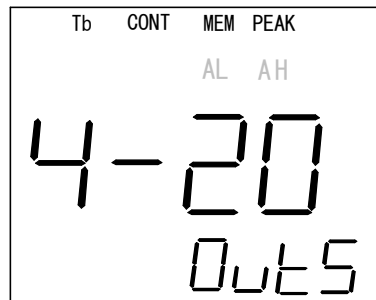
Remarks

- When selecting 0-20 or 4-20, output is from OUT-A mA terminal
- When selecting tCJ, tCK, tCr or tCS output is from OUT-TC terminal (Refer to 5.2 Connections to input and output terminals).

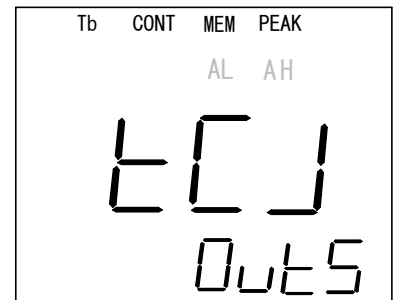
[0-20]



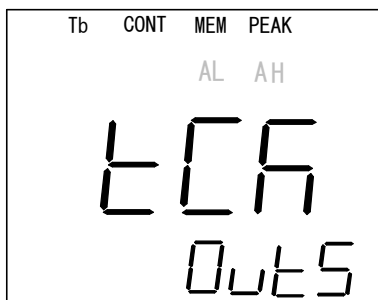
[4-20]



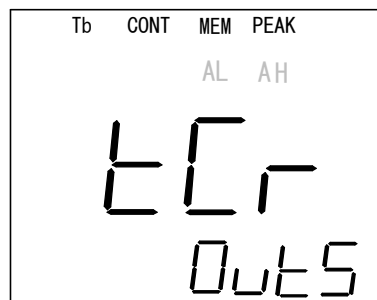
[tCJ]



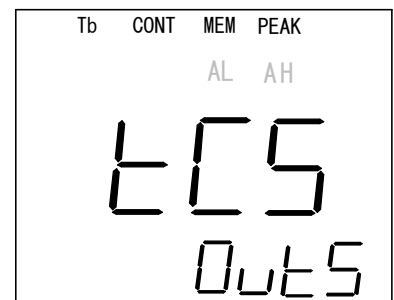
[tCK]



[tCr]



[tCrS]

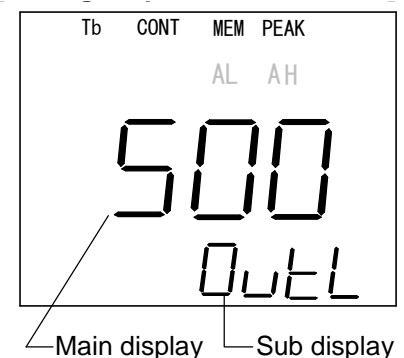


9.2.1 Setting of analog output minimum value

(This is valid only if "0-20" or "4-20" is selected for analog output selection)

- 1) Press the **[SEL]** key couple of times from engineering mode screen to display "OutL" shown on the right figure on sub display.
- 2) Press **[↑]** key or **[↓]** key and change set value of analog output minimum value. Setting is completed by changing the numeric value.
- 3) It shifts to the next screen by pressing the **[SEL]** key.

[Analog output minimum value]



Remarks

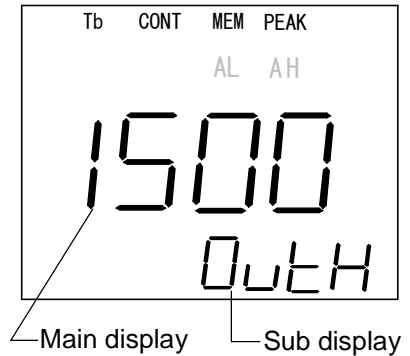
- Setting range is -50 to 3500 (°C)
- Default setting is 0 (°C)

9.2.2 Setting of analog output maximum value

(This is valid only if "0-20" or "4-20" is selected for analog output selection)

- 1) Press the **[SEL]** key couple of times from engineering mode screen to display "OutH" shown on the right figure on sub display.
- 2) Press **[↑]** key or **[↓]** key and change set value of analog output maximum value.
Setting is completed by changing the numeric value.
- 3) It shifts to the next screen by pressing the **[SEL]** key.

[Analog output maximum value]



Remarks

- Setting range is -50 to 3500 (°C)
However, outputtable upper limit depends on the unit from 1030 to 1100°C.
- Default setting is 1000 (°C).

9.3 Analog dummy output

Analog output is simulated at set ratio. 0 to 100% corresponds to 4 to 20mA or 0 to 20mA.

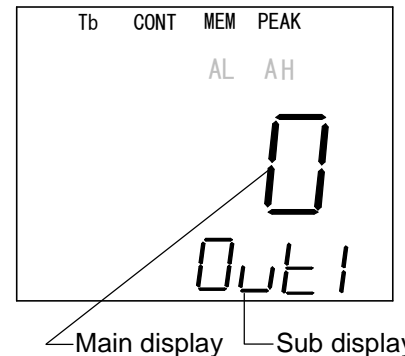
At analog dummy output1 and 2, it does not return to the measurement screen even if there is no key operation for 1 minute.

9.3.1 Analog dummy output1

(This is valid only if "0-20" or "4-20" is selected for analog output selection)

- 1) Press the **[SEL]** key couple of times from engineering mode screen to display "Out1" shown on the right figure on sub display.
- 2) Press **[↑]** key or **[↓]** key and change set value of analog dummy output1.
Setting is completed by changing the numeric value.
- 3) It shifts to the next screen by pressing the **[SEL]** key.

[Analog dummy output1]



Remarks

- Setting range is 0 to 100(%)
(e.g.) In a case of 4 to 20mA
0%= 4mA
50%=12mA
100%=20mA
- Default setting is 0% (4mA)

Caution

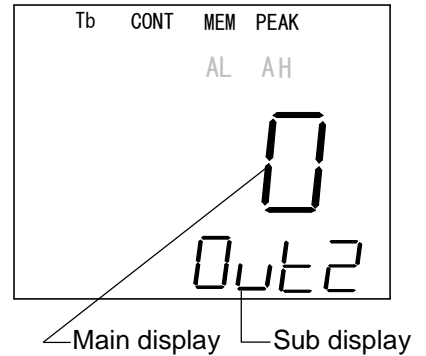
When the screen is just switched to analog dummy output1 "Out1", "0" is displayed on main display, but dummy output1 is not output yet.
To output 0%, change numeric value first then set to "0" again.
If not setting dummy output, press the **[SEL]** key while "0" is lit to continue to the next screen.

9.3.2 Analog dummy output2

(This is valid only if "tCJ", "tCk", "tCr" or "tCS" is selected for analog output selection)

- 1) Press the **SEL** key couple of times from engineering mode screen to display "Out2" shown on the right figure on sub display.
- 2) Press **↑** key or **↓** key and change set value (temperature) of analog dummy output2.
Setting is completed by changing the numeric value.
- 3) It shifts to the next screen by pressing the **SEL** key.

[Analog dummy output2]



Remarks

- Setting range is -50 to 3500 (°C)
Output EMF corresponding to set temperature and selected thermocouple
Output range is as below.
tCJ: -50 to 1200°C
tCk: -50 to 1370°C
tCr: -50 to 1760°C
tCS: -50 to 1760°C
However, outputtable max. temperature range is from -50 to 1100°C and upper limit depends on the unit from 1030 to 1100°C.
- Default setting is 0 (°C)

9.4 Selection of hold function

Caution Alarm judgment is done by a value that is processed as hold. (Refer to 8.5 Alarm setting)

Caution Hold processing is performed to modulating signal. (Refer to 8.3 Signal modulation mode selection)

Select whether to use hold function or not. If using the function, select it from sample, peak or valley hold.

If peak or valley hold is selected, following 9.4.1 Set of hold reset method is required.

If internal (time reset) method is selected, following 9.4.2 Setting of hold reset time is required.

If sample hold, following 9.7 Selection of contact input of SAMP (sample hold) is required.

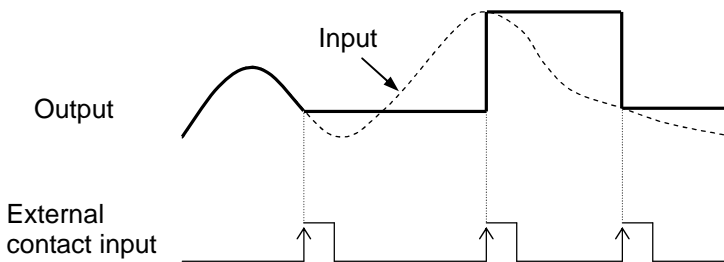
- 1) Press the **SEL** key couple of times from engineering mode screen to display "HoLd" shown on the right figure on sub display.
- 2) Press **↑** key or **↓** key and change hold function types. Selection is completed by changing.
- 3) It shifts to the next screen by pressing the **SEL** key.

Remarks ·Default setting is no (no hold mode)

[Hold function types]

- no : no hold mode
- PEAK : peak hold
- VALL : valley hold(opposite process of PEAK)
- SAMP : sample hold

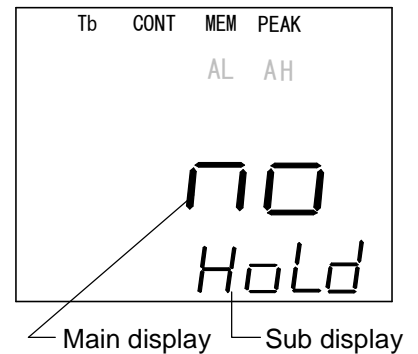
[Sample hold]



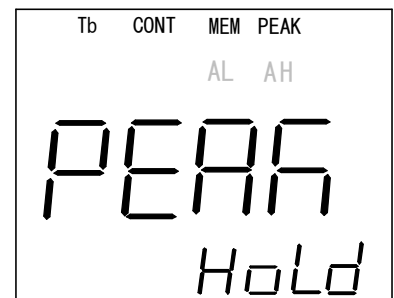
Caution Temperature display and analog output of sample hold mode are measured value hold at start up of external contact input.

Caution Sample hold is hold at startup of external contact input. (55ms or more is necessary for contact input start up detecting pulse width)

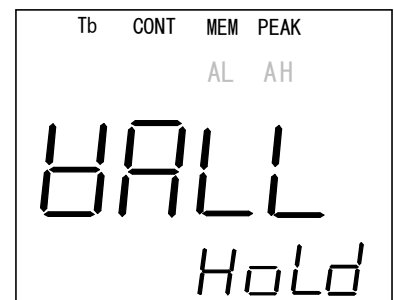
[No hold]



[Peak hold]



[Valley hold]



[Sample hold]

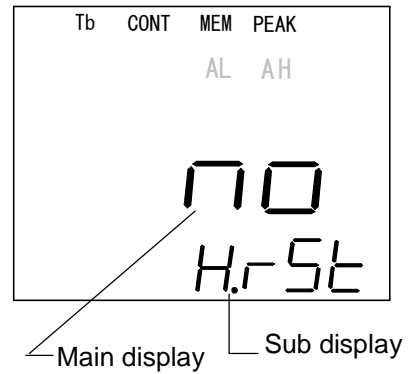


9.4.1 Selection of hold reset type

(Register this function if peak or valley hold is selected at previous section.)

- 1) After register of "PEAK" or "VALL" at the previous section, press the **SEL** key to display "H.rSt" shown on the right figure on sub display.
- 2) Press **↑** key or **↓** key and change hold reset types. Selection is completed by changing.
- 3) It shifts to the next screen by pressing the **SEL** key.

[No reset]

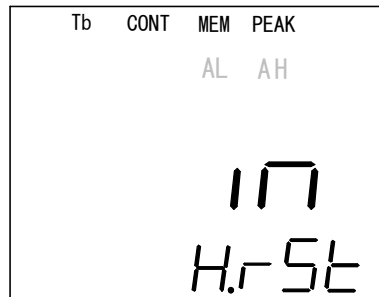


Remarks → ·Default setting is no (no reset)

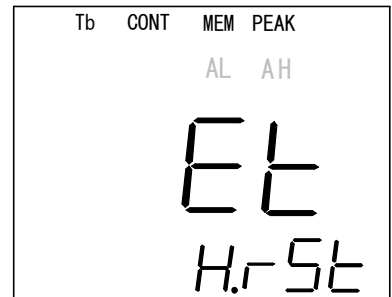
[Reset method types]

- no : no reset
- in : internal reset
- Et : external reset

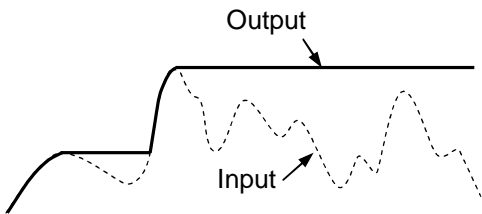
[Internal reset]



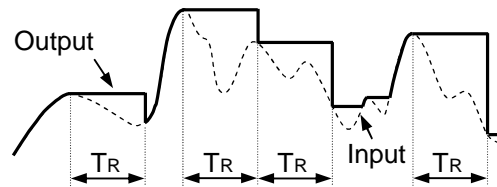
[External reset]



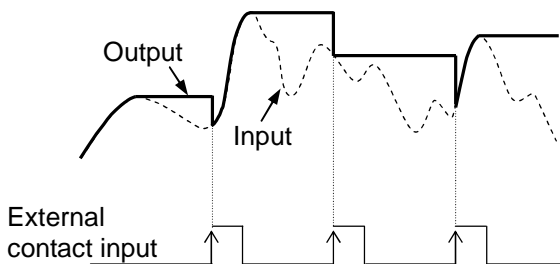
[Peak hold (no reset)]



[Peak hold (internal reset)]



[Peak hold (external reset)]



Caution →

TR : reset time (0.0 to 99.9sec)
 After peak (valley) temperature detection, the temperature is held during TR.
 If setting is 0.0, hold time is less than 0.1 sec.

Caution →

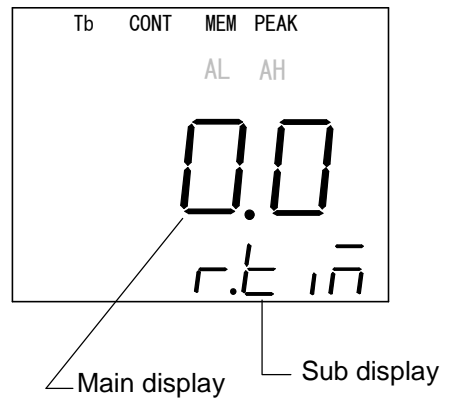
If using external rest, following 9.7 Selection of contact input of H.rSt(hold reset) is required. External reset is reset at external contact input start up. (55msec or more is necessary for contact input start up detecting pulse width)

9.4.2 Setting of hold reset time

Register this function if "in" (internal reset) is selected at previous section.
Set hold reset time.

- 1) Press the **SEL** key couple of times from engineering mode screen to display "r.tiM" shown on the right figure on sub display.
- 2) Press \uparrow key or \downarrow key and change hold reset time.
Setting is completed by changing the numeric value.
- 3) It shifts to the next screen by pressing the **SEL** key.

[Hold reset time]



Remarks

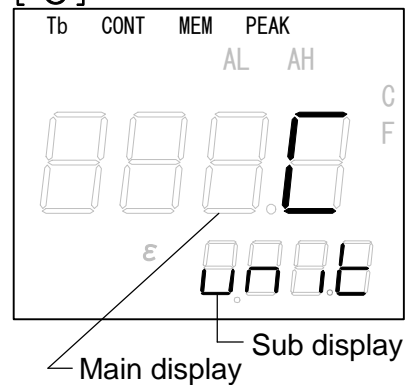
- Setting range is 0.0 to 99.9 (sec.)
- Default setting is 0.0 (sec.)

9.5 Measurement unit selection

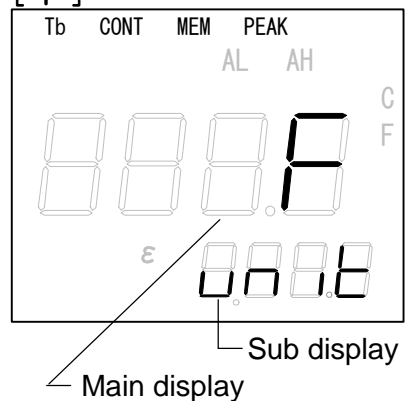
This mode is for the selection of the measurement unit for measured temperature.

- 1) Press the **SEL** key couple of times from engineering mode screen to display "unit" shown on the right figure on sub display.
- 2) Press \uparrow key or \downarrow key, select "C" or "F".
Selection is completed by changing.
- 3) It shifts to the next screen by pressing the **SEL** key.

[°C]



[°F]



[Measurement units]

C : °C (Celsius)

F : °F (Fahrenheit)

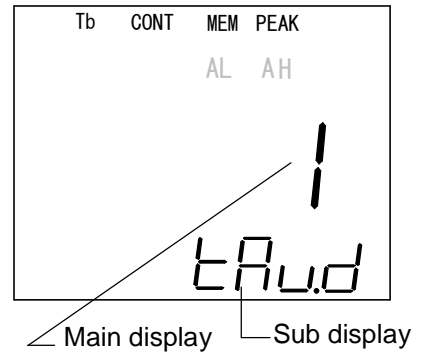
Remarks

The default is C (°C)

9.6 Setting of time constant digit after decimal point

- 1) Press the **SEL** key couple of times from engineering mode screen to display "tAu.d" shown on the right figure on sub display.
- 2) Press **↑** key or **↓** key and change time constant digit after decimal point.
Setting is completed by changing.
- 3) It shifts to the next screen by pressing the **SEL** key.

[Time constant digit after decimal point]



Remarks

- Setting range is 1 to 2 (digit) after the decimal point
- Default setting is 1-digit after the decimal point

Caution

- Change set value of modulation time constant at changing time constant digit after decimal point
- Changing digit after the decimal point 1→2
If set value of modulation time constant is 10.0 or more, change to 9.99
 - Changing digit after the decimal point 2→1
Round down 2-digit after the decimal point for modulation time constant

9.7 Selection of contact input

Select a function to use contact input.

- 1) Press the **SEL** key couple of times from engineering mode screen to display "din" shown on the right figure on sub display.
- 2) Press **↑** key or **↓** key and change contact input types. Selection is completed by changing.
- 3) It shifts to the next screen by pressing the **SEL** key.

[Contact input types]

no: no contact input

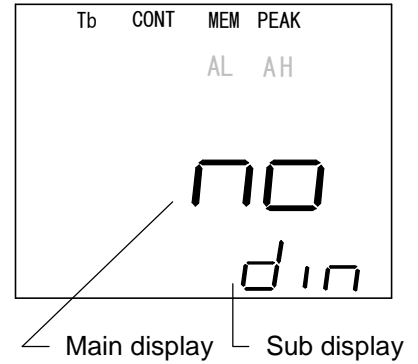
H.rSt: hold reset

SAMP: sample hold

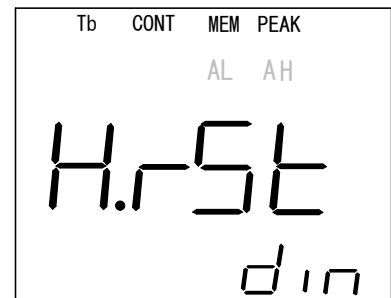
Remarks

- Default setting is no (no contact input)
- For each operation details, refer 9.4.1 Selection of hold reset type for hold rest and 9.4 Selection of hold function for sample hold.

[No contact input]



[Hold reset]



[Sample hold]

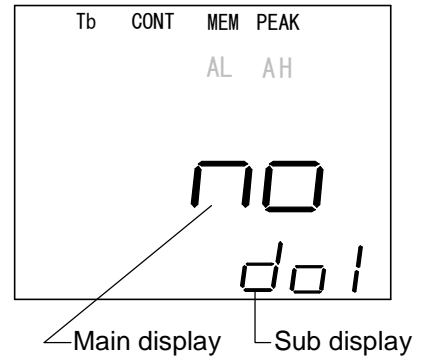


9.8 Selection of contact output

Select a signal to output at contact output.

- 1) Press the **[SEL]** key couple of times from engineering mode screen to display "do1" shown on the right figure on sub display.
- 2) Press **[↑]** key or **[↓]** key and change contact output types. Selection is completed by changing.
- 3) It shifts to the next screen by pressing the **[SEL]** key.

[No contact output]



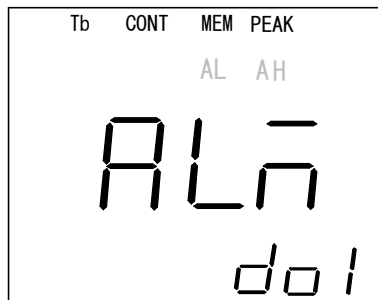
Remarks

• Default setting is ALM (high/low alarm)

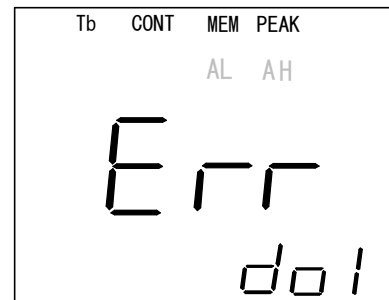
[High/low alarm]

[Contact output types]

- No : no contact output
- ALM : high/low alarm
(shorten when alarm)
- Err : self diagnostic error
(shorten when normal)



[Self-diagnosis error]



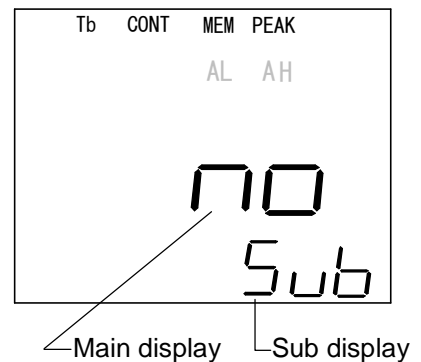
9.9 Selection of sub display

Detector temperature or Main unit temperature can be display on sub display.

By selecting "HEAd", temperature of IR-BZ Detector is displayed.
By selecting "AMP", temperature of IR-BZ Main unit is displayed.
If "no" is selected, temperature is not displayed on sub display.

- 1) Press the **[SEL]** key couple of times from engineering mode screen to display "Sub" shown on the right figure on sub display.
- 2) Press **[↑]** key or **[↓]** key and change sub display types. Selection is completed by changing.
- 3) It shifts to the next screen by pressing the **[SEL]** key.

[No temperature display]



Remarks

• Default setting is no (no display)

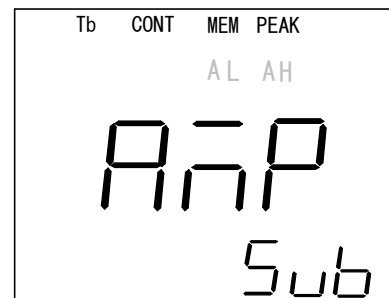
[Sub display types]

- No : no temperature display
- HEAd : temperature of IR-BZ Detector is displayed.
- AMP : temperature of IR-BZ Main unit is displayed.

[Temperature display of Detector]



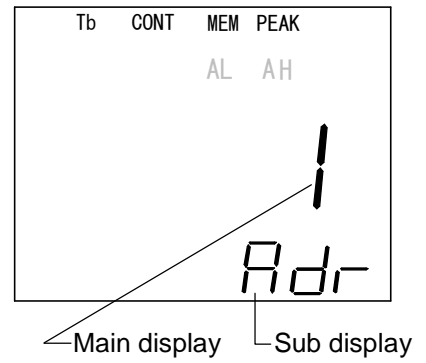
[Temperature display of Main unit]



9.10 Setting of device address

- 1) Press the **SEL** key couple of times from engineering mode screen to display "Adr" shown on the right figure on sub display.
- 2) Press **↑** key or **↓** key and change set value of device address.
Setting is completed by changing the numeric value.
- 3) It shifts to the next screen by pressing the **SEL** key.

[Device address]



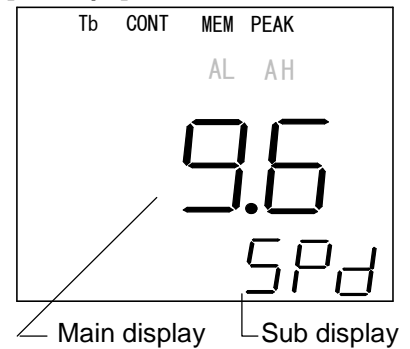
Remarks

- Setting range is 1 to 32
- Default setting is 1

9.11 Selection of communication speed

- 1) Press the **SEL** key couple of times from engineering mode screen to display "SPd" shown on the right figure on sub display.
- 2) Press **↑** key or **↓** key and change communication speed types.
Setting is completed by changing.
- 3) It returns to the measurement screen by pressing the **SEL** key.

[9600bps]



Remarks

- Default setting is 9.6 (9600bps)

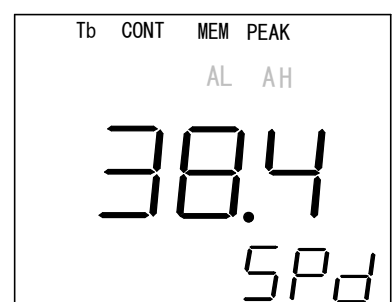
[Communication speed types]

- 9.6: 9600bps
- 19.2: 19200bps
- 38.4: 38400bps
- 57.6: 57600bps
- 115.2: 115200bps

[19200bps]



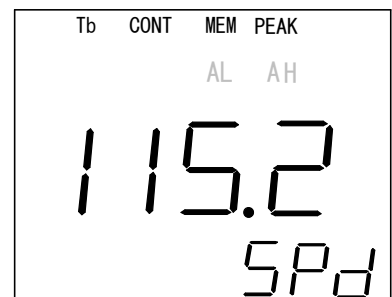
[38400bps]



[57600bps]







[115200bps]



10. Self-diagnostic function and Overflow/underflow indication

10.1 Self-diagnostic function

Self-diagnostic function is built-in to this thermometer and an error number is displayed at abnormal conditions.

| Sub display | Contents | Countermeasures | Output (Note) |
|---|---|---|---------------|
|  | Abnormal Detector temperature | Check if the Detector is overheated or overcooled. | ○ |
|  | Abnormal main unit temperature | Check if the main unit is overheated or overcooled. | ○ |
|  | E ² PROM abnormal (Impossible to write or read to or from E ² PROM) | Off-site repair, return to the factory. | ○ |
|  | Abnormal input signal | Check if the thermometer is used in the temperature exceeding measuring temperature range on a large scale. Check if the cable between the Detector and the main unit is disconnected. | ○ |

Caution

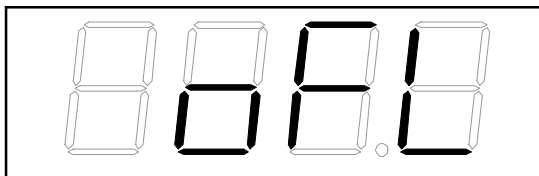
If an abnormal condition is detected, abnormal output (OFF at abnormal condition) is output from contact output terminal for item with ○ in output column in the table above.
This output is available when "Err"; self diagnostic error is selected in contact output selection in the engineering mode.

10.2 Overflow/underflow indication

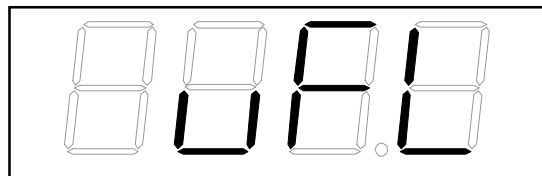
Overflow indication is displayed when it is (maximum temperature of measuring range +30) °C or higher.

Underflow indication is displayed when it is (minimum temperature of measuring range -30) °C or lower.

[Overflow indication]



[Underflow indication]



11. Maintenance

11.1 Regular inspection

Perform following check-ups regularly or depending on the situation.

11.2 Troubleshooting

If a trouble is recognized, check following items and perform troubleshooting.

11.2.1 Measuring value not displayed or displayed lower

| Inspection items | Countermeasures |
|---|--|
| 1) Check that power is supplied to the thermometer and power supply voltage is in the normal range. | Supply normal power supply voltage. |
| 2) Check that temperature of measuring surface is not out of thermometer's measuring range. | Use a thermometer corresponding to the measuring range. |
| 3) Check that setting of emissivity in the main unit is not too high. | Refer to 8.1 Emissivity setting and set correct emissivity. |
| 4) Check that optical path is not interfered. | Refer to 4.3 Measuring Diameter and Measuring Distance and assure the field of view. |

11.2.2 Measuring value displayed higher

| Inspection items | Countermeasures |
|--|---|
| 1) Check that temperature of measuring surface is not exceeding thermometer's measuring range. | Use a thermometer corresponding to the measuring range. |
| 2) Check that setting of emissivity is not too low. | Refer to 8.1 Emissivity setting and set correct emissivity. |

11.2.3 Indication fluctuates

| Inspection items | Countermeasures |
|---|---|
| 1) Check that power supply voltage is in normal range. | Supply normal power supply voltage. |
| 2) Check that there is no obstacle such as vapor in the optical path. | Remove the vapor by air purge etc. |
| 3) Check for temperature fluctuation on the measuring surface. | Refer to 8.1 Emissivity setting, 8.3 Signal modulation selection, and 8.4 Modulation degree setting and set emissivity and signal modulation again. |
| 4) Check for emissivity of measuring surface for change | |

11.2.4 oFL or uFL is displayed

| Indication | Cause | Countermeasures |
|------------|--|--|
| oFL | Temperature is exceeding maximum temperature of measuring range. | Refer to 11.2.2 Measuring value displayed higher |
| uFL | Temperature is below minimum temperature of measuring range . | Refer to 11.2.1 Measuring value not displayed or displayed lower |

12. Specifications

12.1 Specifications

| | |
|---|---|
| Model | IR-BZPHGE□ |
| Measuring system | Wide-band infrared radiation thermometer |
| Detecting element | Thermopile |
| Measuring wavelength | 8 to 14μm |
| Measuring range | 0 to 1000°C |
| Accuracy ratings *1 | Below 20°C : ±2°C 20°C or higher , below 100°C : ±1°C 100°C or higher : ±1% of measured value |
| Reproducibility | ±0.5°C or ±0.5% of measured value |
| Resolution | 2°C |
| Response time *2 | 15msec |
| Measuring distance and diameter *3 | φ8/200 |
| Emissivity/ transmittance correction | Setting range: 1.999 to 0.100 |
| Signal modulation | DELAY : first order lag trace (modulation time constant 0.0 to 99.9s, minimum 0.01s step), if modulation time constant is 0, it is REAL PEAK : maximum value trace (attenuation rate 0, 2, 5 and 10°C/s selection) VALL : minimum value trace (increase rate 0, 2, 5 and 10°C/s selection) |
| Display | LCD 4-digit (temperature and parameter) Display resolution below 1000°C: 0.1°C, 1000°C or higher: 1°C |
| Optical system | Fixed focus lens type |
| Lens aperture | φ7mm |
| Analog output [OUT-A mA] | 0 to 20mA DC/4 to 20mA DC selection · Allowable load resistance 500Ω or lower · Output scaling: set from -50 to 3500°C · Dummy output: set from analog output 0 to 100% range |
| Thermocouple output [OUT-TC] | Select from TC-J, K, R and S · Output correspond to thermocouple EMF · Dummy output: output EMF correspond to set temperature |
| Detector unit temperature output [OUT-HT] | 0 to 5V · Correspond to Detector temperature -20 to 180°C |
| Contact output | Self diagnostic error alarm, high alarm, low alarm: select 1 point Output type: open collector 1 point (30V DC/ 50mA) |
| Contact input | Non voltage contact point Sample hold or peak/valley hold reset |
| Communication interface | RS-485: transmit measured data, transmitted and receive parameters |
| Operation key | · Operating mode: emissivity, transmittance, signal modulation and alarm etc. setting · Engineering mode: key lock, output scaling, contact and communication function setting etc. |
| Self diagnostic | Detector / Main unit temperature abnormal, input signal error |
| Working temperature range | Detector : -20 to 100°C Main unit : -10 to 65°C |
| Power supply | 8 to 36V DC |
| Power consumption | Maximum 1.5VA |
| Connections | Cage cramp type (connection using spring without using screws) applicable wire range 0.2 to 0.5mm ² , cable outer diameter φ6.5 to 8.0mm |
| Protection structure | IP65 equivalency |
| Installation method | Mounting on a wall or DIN rail installation (option) |
| Cable length | 1.5m, 3m, 8m, 15m |
| Cable outer diameter | φ3.3mm |
| Material | Detector : Stainless steel Main unit : Die casting zinc |
| External dimensions | Detector : φ14 x 28L (installation M12 x 1.0 screw) Main unit : H70 x W80 x D30mm |
| Weight | Detector : 50g (including cable 3m) Main unit : 450g |
| CE marking | Conformity standards EN61326-1 ClassA (except IR-BZPHGE8, IR-BZPHGEF) Conformity requirements Use of power supply for IR-BZ exclusive use and the connecting cable up to 30m (indoor use) *The measured value may vary up to ±4% of measuring range under the EMC test environment. |

*1 Based on reference operation condition 23±5°C, ε=1.0, factory default inspection result

*2 90% response

*3 at 90% energy

13. Parameter selection/ setting

13.1 List of parameter selection/ setting (operating mode)



| Selection/ setting item | Sub display | Setting range | Default setting | Chapter of this manual |
|----------------------------------|---------------|---|-----------------------|------------------------|
| Emissivity setting | ε | 1.999 to 0.100 | 1.000 | 8.1 |
| Transmittance setting | r | 1.999 to 0.100 | 1.000 | 8.2 |
| Signal modulation mode selection | Modu | dELy, PEAK, VALL | dELy | 8.3 |
| Modulation degree setting *1 | tAu dEC | 0.0 to 99.9(sec.) 0, 2, 5, 10 °C/ sec. | 0.0 sec. 0°C/ sec. | 8.4.1 8.4.2 |
| Alarm type selection | AL1M | Hi: high alarm Lo: low alarm no: no alarm | Hi | 8.5.1 |
| Alarm temperature setting | ALM1 | -50 to 3500°C | 1000°C | 8.5.2 |

*1: Parameter of modulation degree selection depends on the setting of signal modulation mode selection.
(Refer to 8.3 Signal modulation selection)

13.2 List of parameter selection/ setting (engineering mode)

| Selection/ setting item | Sub display | Setting range | Default setting | Chapter of this manual |
|--|-------------|--|---------------------------------|------------------------|
| Key lock setting/ release | LCK.S | YES, no | no | 9.1 |
| Analog output selection | OutS | 0-20 : 0 to 20mA 4-20 : 4 to 20mA tCJ : J thermocouple tCK : K thermocouple tCr : R thermocouple tCS : S thermocouple | 4-20mA | 9.2 |
| Analog output minimum value setting | OutL | -50 to 3500°C | 0°C | 9.2.1 |
| Analog output maximum value setting | OutH | -50 to 3500°C | 1000°C | 9.2.2 |
| Analog dummy output 1 | Out1 | 0 to 100% | 0% | 9.3.1 |
| Analog dummy output 2 | Out2 | -50 to 3500°C | 0°C | 9.3.2 |
| Hold function selection | HoLd | no :no hold mode PEAk : peak hold VALL : valley hold SAMP : sample hold | no | 9.4 |
| Hold reset type | H.rSt | no : no reset in : internal reset Et : external reset | no | 9.4.1 |
| Hold reset time | r.tiM | 0.0 to 99.9sec. | 0.0 sec. | 9.4.2 |
| Setting of time constant digit after decimal point | tAu.d | After the decimal point 1 to 2 digit(s) | After the decimal point 1 digit | 9.5 |
| Contact input selection | din | no : no contact input H.rSt : peak/valley hold reset SAMP : sample hold | no | 9.6 |
| Contact output selection | do1 | no : no contact output ALM : high/ low temperature alarm Err : self diagnostic error | ALM | 9.7 |
| Sub display selection | Sub | no : no display HEAd : IR-BZ Detector AMP : IR-BZ Main unit | no | 9.8 |
| Devise address setting | Adr | 1 to 32 | 1 | 9.9 |
| Communication speed selection | SPd | 9.6 : 9600bps 19.2 : 19200bps 38.4 : 38400bps 57.6 : 57600bps 115.2 : 115200bps | 9.6 (9600bps) | 9.10 |

14. Initialization method

- 1) On measurement mode screen, press and hold  key+ key for 2 sec.
- 2)"init" in main display blinks.
- 3) Press and hold for 3sec.
- 4) Blinking " init " lights up and initialization is completed.

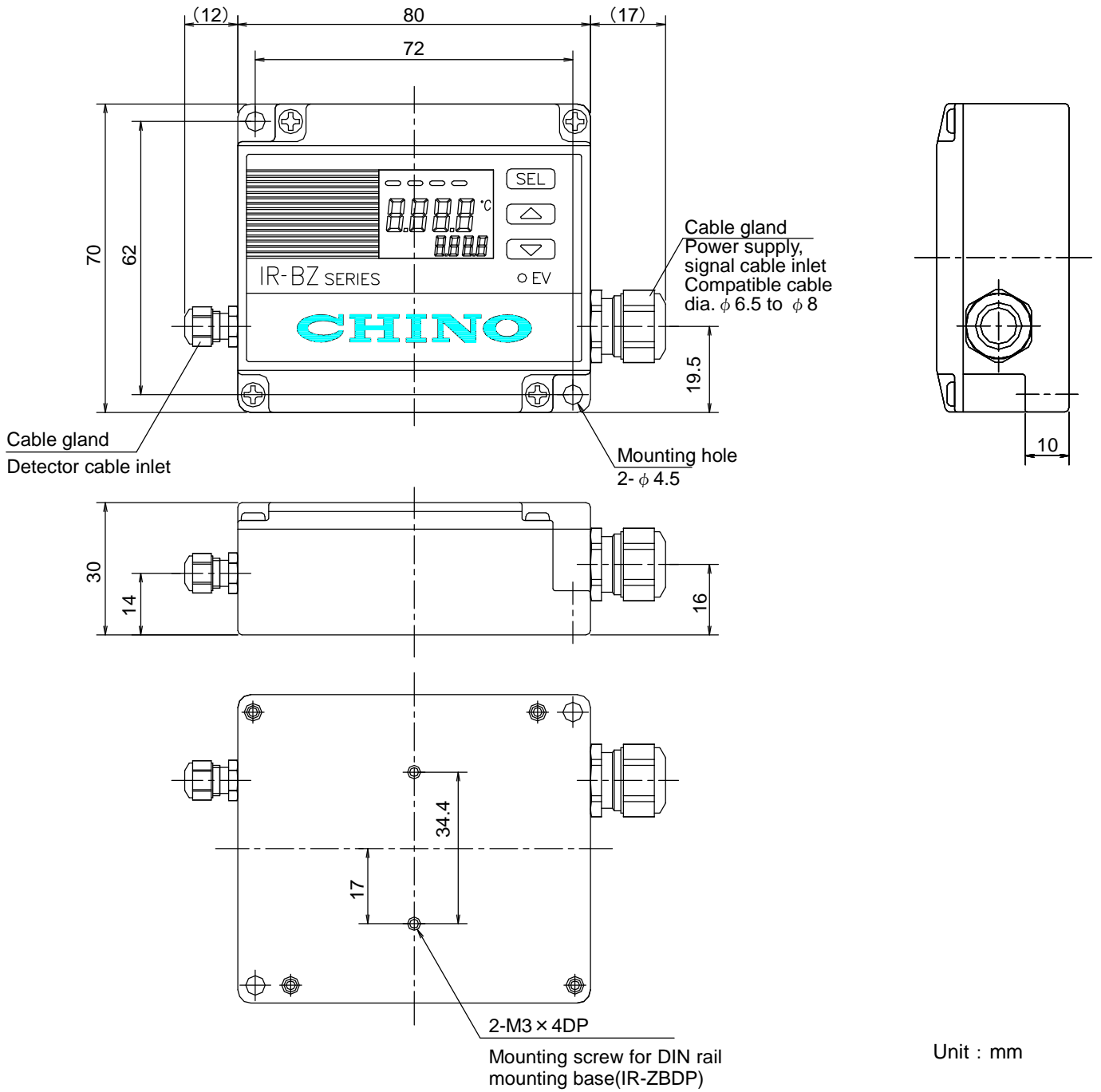
*If keys are released while "init" is blinking, initialization stops.

Caution

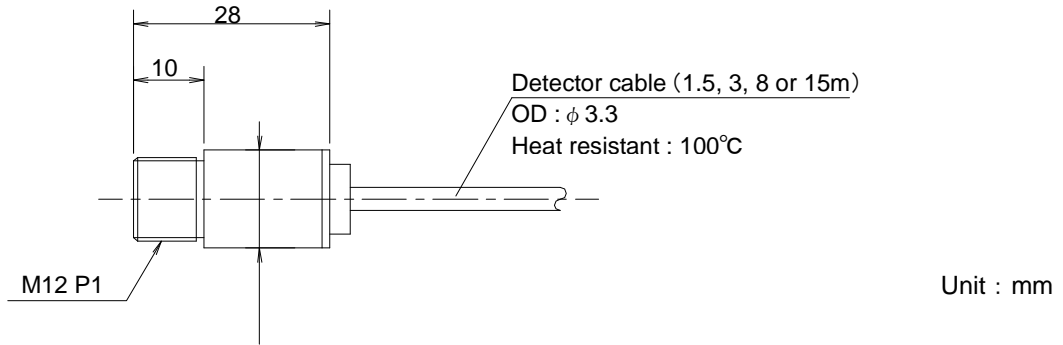
All settings are returned to default setting. Take a note of necessary set value before the initialization.

15.External dimensions

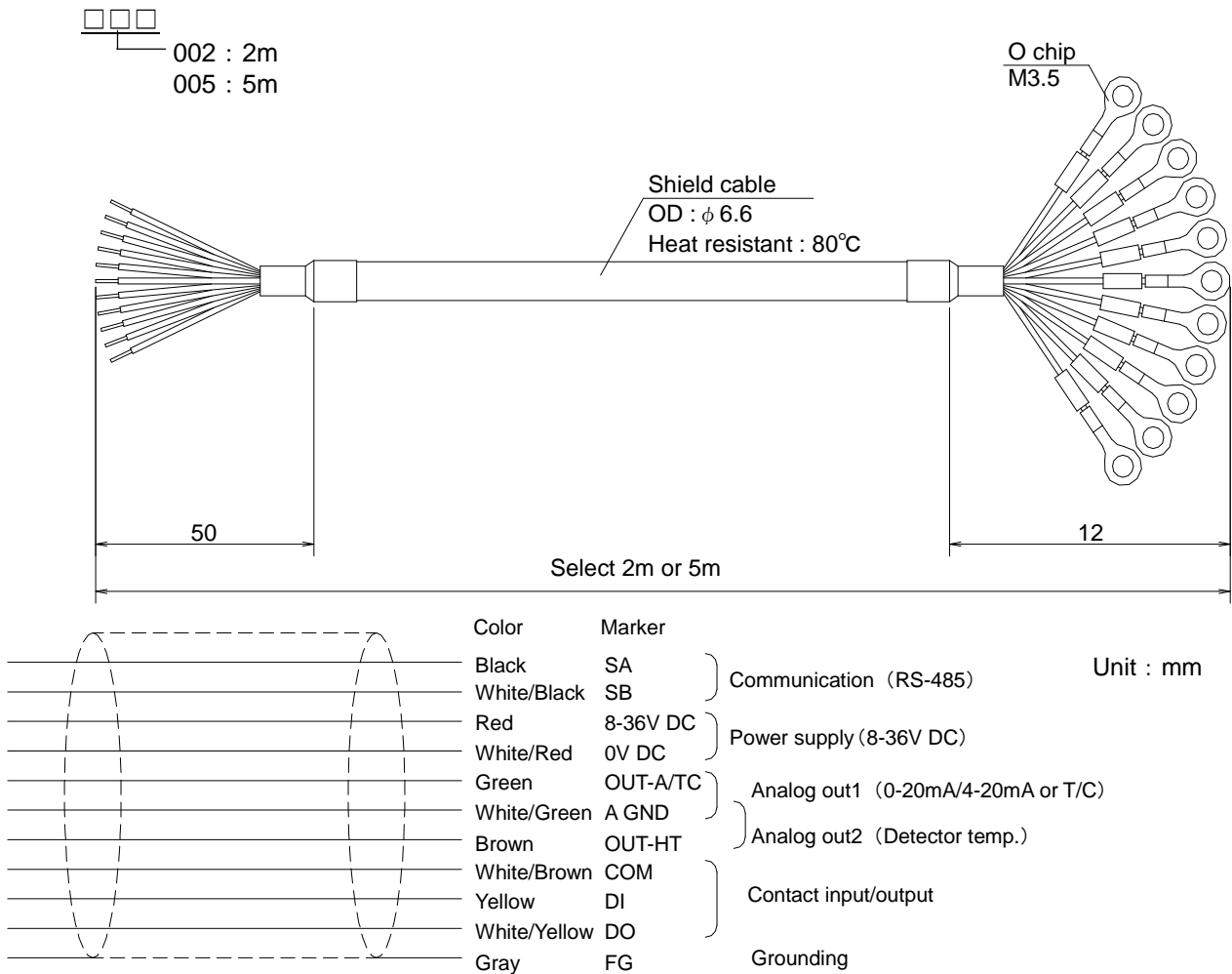
15.1 IR-BZP Main unit



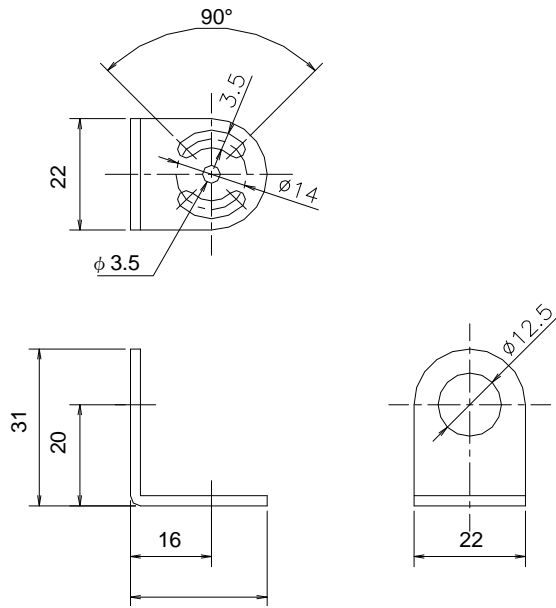
15.2 IR-BZP Detector



15.3 Connecting cable IR-ZBP □ □ □

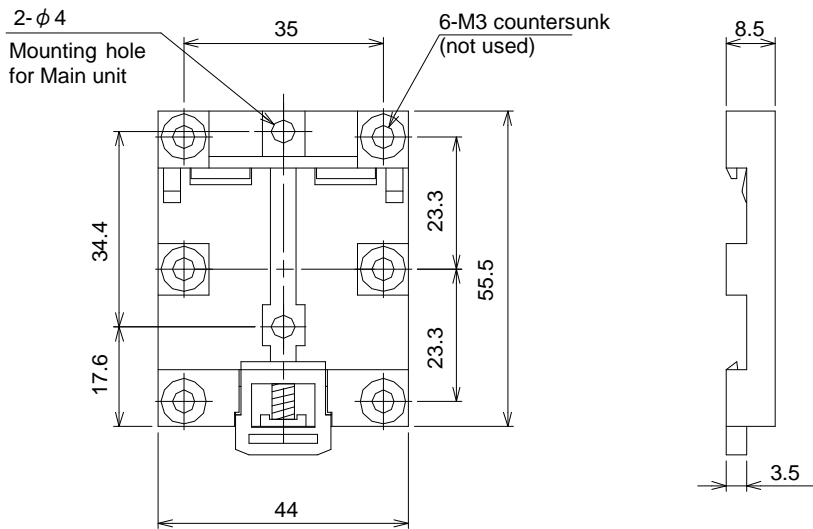


15.4 Mounting bracket for Detector IR-ZBMP



Unit : mm

15.5 DIN-rail mounting base for Main unit IR-ZBDP



Unit : mm

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