

Thank you for purchasing this RKC product. In order to achieve maximum performance and ensure proper operation of your new instrument, carefully read all the instructions in this manual. Please place the manual in a convenient location for easy reference.

**WARNING**

- To prevent injury to persons, damage to instrument and equipment, a suitable external protection device shall be required.
- All wiring must be completed before power is turned on to prevent electric shock, fire or damage to instrument and equipment.
- This instrument must be used in accordance with the specifications to prevent fire or damage to instrument and equipment.
- This instrument is not intended for use in locations subject to flammable or explosive gases.
- Do not touch high-voltage connections such as power supply terminals, etc. to avoid electric shock.
- RKC is not responsible if this instrument is repaired, modified or disassembled by other than factory-approved personnel. Malfunction can occur and warranty is void under these conditions.

CAUTION

- This product is intended for use with industrial machines, test and measuring equipment. (It is not designed for use with medical equipment and nuclear energy.)
- This is a Class A instrument. In a domestic environment, this instrument may cause radio interference, in which case the user may be required to take additional measures.
- This instrument is protected from electric shock by reinforced insulation. Provide reinforced insulation between the wire for the input signal and the wires for instrument power supply, source of power and loads.
- Be sure to provide an appropriate surge control circuit respectively for the following:
 - If input/output or signal lines within the building are longer than 30 meters.
 - If input/output or signal lines leave the building, regardless the length.
- This instrument is designed for installation in an enclosed instrumentation panel. All high-voltage connections such as power supply terminals must be enclosed in the instrumentation panel to avoid electric shock by operating personnel.
- All precautions described in this manual should be taken to avoid damage to the instrument or equipment.
- All wiring must be in accordance with local codes and regulations.
- All wiring must be completed before power is turned on to prevent electric shock, instrument failure, or incorrect action. The power must be turned off before repairing work for input break and output failure including replacement of sensor, contactor or SSR, and all wiring must be completed before power is turned on again.
- To prevent instrument damage as a result of failure, protect the power line and the input/output lines from high currents with a suitable overcurrent protection device with adequate breaking capacity such as a fuse, circuit breaker, etc.
- Prevent metal fragments or lead wire scraps from falling inside instrument case to avoid electric shock, fire or malfunction.
- Tighten each terminal screw to the specified torque found in the manual to avoid electric shock, fire or malfunction.
- For proper operation of this instrument, provide adequate ventilation for heat dispensation.
- Do not connect wires to unused terminals as this will interfere with proper operation of the instrument.
- Turn off the power supply before cleaning the instrument.
- Do not use a volatile solvent such as paint thinner to clean the instrument. Deformation or discoloration will occur. Use a soft, dry cloth to remove stains from the instrument.
- To avoid damage to instrument display, do not rub with an abrasive material or push front panel with a hard object.
- When high alarm with hold action is used for Alarm function, alarm does not turn on while hold action is in operation. Take measures to prevent overheating which may occur if the control device fails.

NOTICE

- This manual assumes that the reader has a fundamental knowledge of the principles of electricity, process control, computer technology and communications.
- The figures, diagrams and numeric values used in this manual are only for purpose of illustration.
- RKC is not responsible for any damage or injury that is caused as a result of using this instrument, instrument failure or indirect damage.
- RKC is not responsible for any damage and/or injury resulting from the use of instruments made by imitating this instrument.
- Periodic maintenance is required for safe and proper operation of this instrument. Some components have a limited service life, or characteristics that change over time.
- Every effort has been made to ensure accuracy of all information contained herein. RKC makes no warranty expressed or implied, with respect to the accuracy of the information. The information in this manual is subject to change without prior notice.
- No portion of this document may be reprinted, modified, copied, transmitted, digitized, stored, processed or retrieved through any mechanical, electronic, optical or other means without prior written approval from RKC.

1. PRODUCT CHECK

CB100L □□□-M*□□-□-□□/□
 CB900L (1) (2) (3) (4) (5) (6) (7) (8) (9)

(1) Input type, (2) Range code: Refer to 9. INPUT RANGE TABLE.

(3) Limit output

M: Relay contact

(4) Alarm 1 [ALM1], (5) Alarm 2 [ALM2]

N: No alarm

A: Deviation high alarm

B: Deviation low alarm

C: Deviation high/low alarm

D: Band alarm

E: Deviation high alarm with hold action

F: Deviation low alarm with hold action

G: Deviation high/low alarm with hold action

H: Process high alarm

J: Process low alarm

K: Process high alarm with hold action

L: Process low alarm with hold action

(6) Analog output

N: No analog output

7: Current 0 to 20 mA DC

8: Current 4 to 20 mA DC

(7) Communication function

N: No extended function

5: Communication function RS-485 (2-wire system)

D: Contact input

(8) Waterproof/Dustproof

N: No Waterproof/Dustproof

1: Waterproof/Dustproof

(9) Case color

N: White

A: Black



Check that power supply voltage is also the same as that specified when ordering.

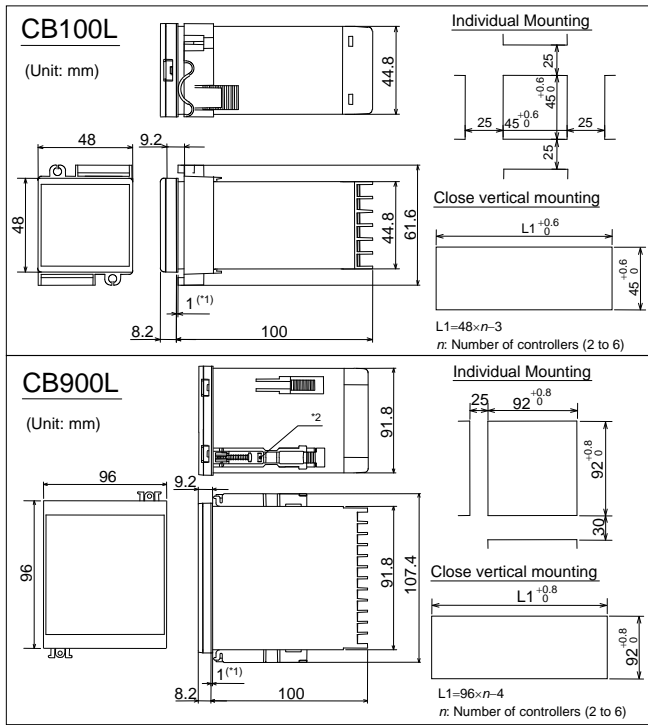
<Accessories>

- Mounting frame (CB100L): 1 (KCA100-526)
 - Mounting brackets (CB900L): 2 * (KCA400-532)
 - Instruction manual (IMCB36-E1): 1
- * For CB900L Waterproof/Dustproof (optional): 4 pieces

2. MOUNTING**2.1 Mounting Cautions**

- This instrument is intended to be used under the following environmental conditions. (IEC61010-1)
 [OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2]
- Use this instrument within the following environment conditions:
 - Allowable ambient temperature: 0 to 50 °C
 - Allowable ambient humidity: 5 to 95 % RH
 (Absolute humidity: MAX. W. C 29.3 g/m³ dry air at 101.3 kPa)
 - Installation environment conditions: Indoor use, Altitude up to 2000 m
- Avoid the following conditions when selecting the mounting location:
 - Rapid changes in ambient temperature which may cause condensation.
 - Corrosive or inflammable gases.
 - Direct vibration or shock to the mainframe.
 - Water, oil, chemicals, vapor or steam splashes.
 - Excessive dust, salt or iron particles.
 - Excessive induction noise, static electricity, magnetic fields or noise.
 - Direct air flow from an air conditioner.
 - Exposure to direct sunlight.
 - Excessive heat accumulation.
- Mount this instrument in the panel considering the following conditions:
 - Provide adequate ventilation space so that heat does not build up.
 - Do not mount this instrument directly above equipment that generates large amount of heat (heaters, transformers, semi-conductor functional devices, large-wattage resistors.)
 - If the ambient temperature rises above 50 °C, cool this instrument with a forced air fan, cooler, etc. Cooled air should not blow directly on this instrument.
 - In order to improve safety and the immunity to withstand noise, mount this instrument as far away as possible from high voltage equipment, power lines, and rotating machinery.
 - High voltage equipment: Do not mount within the same panel.
 - Power lines: Separate at least 200 mm.
 - Rotating machinery: Separate as far as possible.
 - For correct functioning mount this instrument in a horizontal position.
- In case this instrument is connected to a supply by means of a permanent connection, a switch or circuit-breaker shall be included in the installation. This shall be in close proximity to the equipment and within easy reach of the operator. It shall be marked as the disconnecting device for the equipment.

2.2 Dimensions



*1 Rubber (optional)

*2 Up to four mounting brackets can be used.

- For mounting of the instrument, panel thickness must be between 1 to 10 mm. (When mounting multiple instruments close together, the panel strength should be checked to ensure proper support.)
- Waterproof and Dustproof are not effective when instruments are closely spaced.

2.3 Mounting Procedures

■ CB100L

<Mounting Procedures>

- Prepare the panel cutout as specified in **2.2 Dimensions**.
- Insert the instrument through the panel cutout.
- Insert the mounting frame into the mounting from the rear of the instrument.
- Push the mounting frame forward until the frame is firmly secured to the panel. (Fig.1)
- Fix the instrument to the panel by using the two screws. (Fig.2)

Fig.1

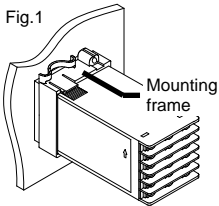
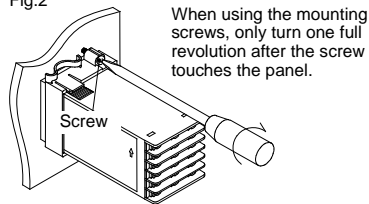


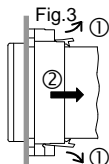
Fig.2



The optional waterproof/dustproof on the front of the instrument conforms to IP66 and NEMA4 when mounted on the panel. For effective waterproof/dustproof, the gasket must be securely placed between instrument and panel without any gap. At the same time, be sure to keep the inside of the control panel from negative pressure. If the gasket is damaged, please contact RKC sales office or the agent.

<Removal Procedures>

- Turn the power OFF.
- Remove the wiring.
- Loosen the screw of the mounting frame.
- Remove the mounting frame from the case. (Fig.3)



■ CB900L

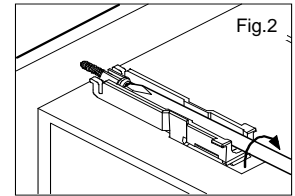
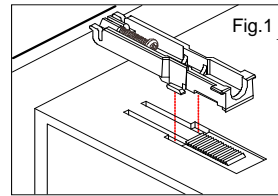
<Mounting Procedures>

- Prepare the panel cutout as specified in **2.2 Dimensions**.
- Insert the instrument through the panel cutout.
- Insert the mounting bracket into the mounting groove of the instrument. Do not push the mounting bracket forward. (Fig. 1)
- Secure the bracket to the instrument by tightening the screw. Take care to refrain from moving the bracket forward.
- Only turn about one full revolution after the screw touches the panel. (Fig. 2)



If the screw has been rotated too tight, the screw may turn idle. In such a case, loosen the screw once and tighten it again until the instrument is firmly fixed.

- The other mounting bracket should be installed in the same way as described in **3. to 5.**



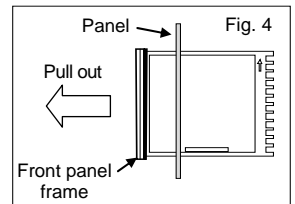
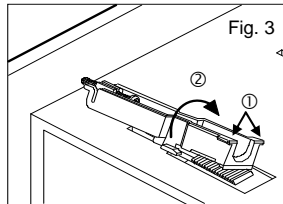
When the instrument is mounted, always secure with two mounting brackets so that upper and lower mounting brackets are positioned diagonally.



The optional waterproof/dustproof (mounting bracket 4 pieces) on the front of the instrument conforms to IP65 and NEMA3 when mounted on the panel. For effective waterproof/dustproof, the gasket must be securely placed between instrument and panel without any gap. At the same time, be sure to keep the inside of the control panel from negative pressure. If gasket is damaged, please contact RKC sales office or the agent.

<Removal Procedures>

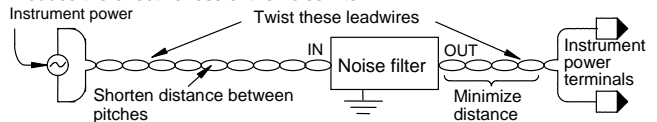
- Turn the power OFF.
- Remove the wiring.
- Loosen the screw of the mounting bracket.
- Hold the mounting bracket by the edge (①) and tilt it (②) to remove from the case. (Fig. 3)
- The other mounting bracket should be removed in the same way as described in **3. and 4.**
- Pull out the instrument from the mounting cutout while holding the front panel frame of this instrument. (Fig. 4)



3. WIRING

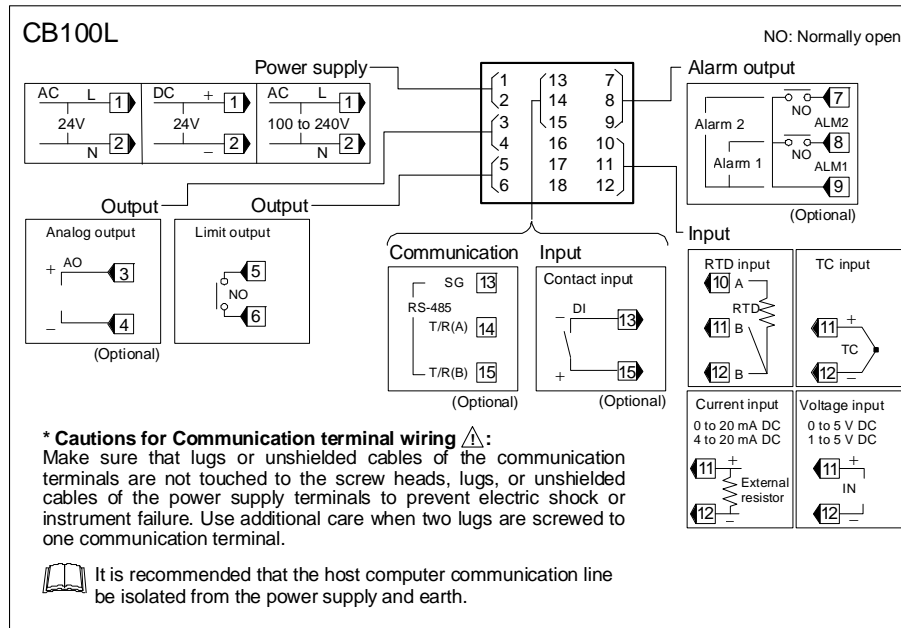
3.1 Wiring Cautions

- For thermocouple input, use the appropriate compensation wire.
- For RTD input, use low resistance lead wire with no difference in resistance between the three lead wires.
- To avoid noise induction, keep input signal wire away from instrument power line, load lines and power lines of other electric equipment.
- For the current input specification, an external resistor ($250 \Omega \pm 0.02 \%$, 0.25 W or more, $\pm 10 \text{ ppm}/^\circ\text{C}$) must be connected between the input terminals. For external resistor (shunt resistor), use the KD100-55: sold separately (RKC product). If this resistor is installed, close horizontal mounting is not possible.
- Signal connected to Voltage input and Current input shall be low voltage defined as "SELV" circuit per IEC 60950-1.
- If there is electrical noise in the vicinity of the instrument that could affect operation, use a noise filter.
 - Shorten the distance between the twisted power supply wire pitches to achieve the most effective noise reduction.
 - Always install the noise filter on a grounded panel. Minimize the wiring distance between the noise filter output and the instrument power supply terminals to achieve the most effective noise reduction.
 - Do not connect fuses or switches to the noise filter output wiring as this will reduce the effectiveness of the noise filter.



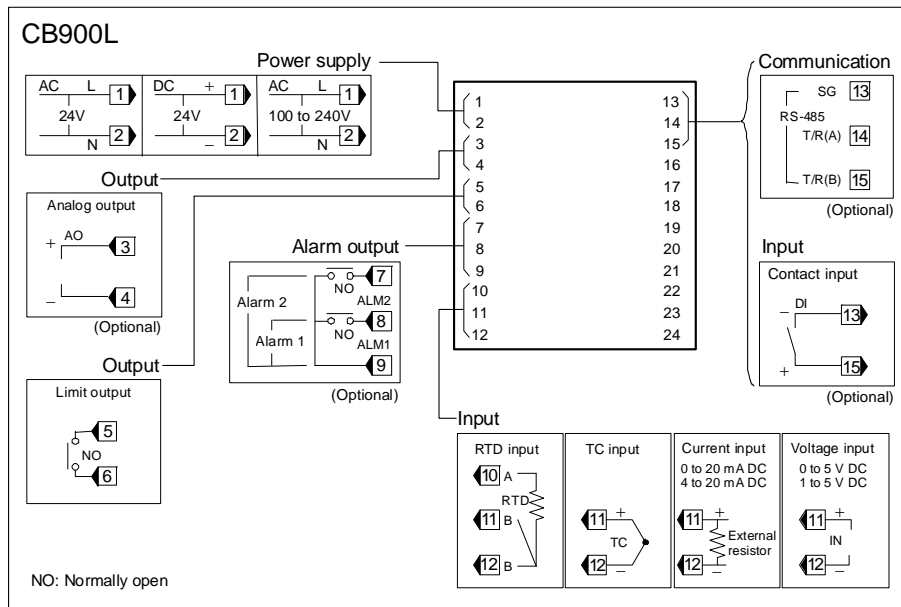
- Allow approximately 5 to 6 seconds for contact output when the instrument is turned on. Use a delay relay when the output line is used for an external interlock circuit.
- Power supply wiring must be twisted and have a low voltage drop.
- This instrument with 24 V power supply is not provided with an overcurrent protection device. For safety install an overcurrent protection device (such as fuse) with adequate breaking capacity close to the instrument.
 - Fuse type: Time-lag fuse (Approved fuse according IEC60127-2 and/or UL248-14)
 - Fuse rating: Rated current: 0.5 A
- For an instrument with 24 V power supply input, supply power from "SELV" circuit defined as IEC 60950-1.
- A suitable power supply should be considered in end-use equipment. The power supply must be in compliance with a limited-energy circuits (maximum available current of 8 A).
- Use the solderless terminal appropriate to the screw size.
 - Screw size: M3 x 6
 - Recommended tightening torque: 0.4 N·m [4 kgf·cm]
 - Specified solderless terminals: With isolation
 - Applicable wire: Solid/twisted wire of 0.25 to 1.65 mm²
- Make sure that during field wiring parts of conductors can not come into contact with adjacent conductive parts.

3.2 Terminal Configuration

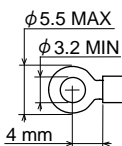


Specifications

Input:
Input type: Thermocouple:
 K, J, R, S, B, E, T, N, PLII, W5Re/W26Re, U, L
 Input impedance: Approx. 1 MΩ
 RTD: Pt100, JPt100
 Voltage: 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC (Z-1010)
 Current: 0 to 20 mA DC, 4 to 20 mA DC
Sampling cycle: 0.5 seconds
Input range: Refer to 9. INPUT RANGE TABLE (P. 8)
Limit output: Relay contact output:
 250 V AC, 3 A (Resistive load)
 1a contact, De-energized output
 Electrical life: 300,000 times or more (Rated load)
Alarm output (Optional): Relay contact output:
 250 V AC, 1 A (Resistive load), 1a contact
 Electrical life: 50,000 times or more (Rated load)
Analog output (Optional): Number of points: 1 point
 Output signal: Current output
 4 to 20 mA DC, 0 to 20 mA DC
 Allowable load resistance: 600 Ω or less
 Output type: Measured value
 Accuracy: ± 0.3 % of span
 Resolution: More than 10 bits
Contact input (Optional): Number of points: 1 point
 Input method: Non-voltage contact input
 Resistance at OPEN: 500 kΩ or more
 Resistance at CLOSE: 10 Ω or less
 Function: Reset function is executed when the mode is changed from OPEN to CLOSE.
Performance:
Display accuracy (at the ambient temperature 23 °C ± 2 °C):
 Thermocouple:
 ± (0.3 % of display value + 1 digit) or
 ± 2 °C [4 °F] Whichever is greater
 R, S and B input: 0 to 399 °C [0 to 799 °F]
 Accuracy is not guaranteed.
 T and U input:
 -199.9 to -100.0 °C [-199.9 to -158.0 °F]
 Accuracy is not guaranteed.
 RTD: ± (0.3 % of display value + 1 digit)
 or ± 0.8 °C [1.6 °F] Whichever is greater
 Voltage/Current: ± (0.3 % of display value + 1 digit)
Memory backup: Backed up by Nonvolatile Memory
 Number of write times: Approx. 1,000,000 times
 Data storage period: Approx. 10 years
Power:
Power supply voltage:
 85 to 264 V AC (Power supply voltage range), 50/60 Hz
 Rating: 100 to 240 V AC
 21.6 to 26.4 V AC (Power supply voltage range), 50/60 Hz
 Rating: 24 V AC
 21.6 to 26.4 V DC (Power supply voltage range)
 Rating: 24 V DC
Power consumption:
 7 VA max. (at 100 V AC), 10 VA max. (at 240 V AC)
 5 VA max. (at 24 V AC), 160 mA max. (at 24 V DC)
Weight:
 CB100L: Approx. 170 g, CB900L: Approx. 340 g

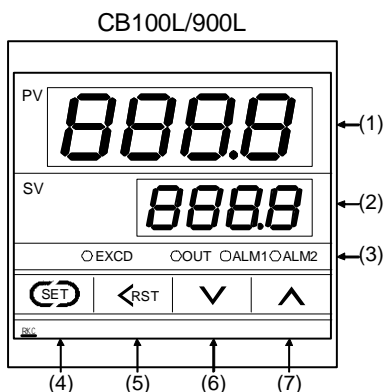


Solderless terminal



Recommended tightening torque:
0.4 N·m [4 kgf·cm]

4. PARTS DESCRIPTION

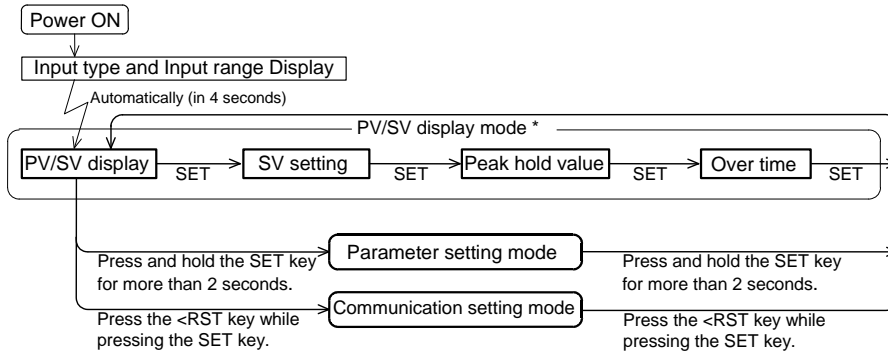


- (1) **Measured value (PV) display [Green]**
Displays PV or various parameter symbols.
- (2) **Set value (SV) display [Orange]**
Displays Limit set value (SV) and various set values.
- (3) **Indication lamps**
EXCD lamp [Red]
Lights while a Measured value (PV) exceeds the Set value (SV).
OUT lamp (Limit output lamp) [Red]
Lights when limit output is turned on
Alarm output lamps (ALM1, ALM2) [Red]
ALM1: Lights when alarm 1 output is turned on.
ALM2: Lights when alarm 2 output is turned on.
- (4) **SET (Set key)**
Used for parameter calling up and set value registration.

- (5) **RST (Shift & Reset key)**
Shift digits when settings are changed.
The limit output is released (reset).
Reset can occur after momentarily pressing <RST key or by pressing for one or more seconds as determined by SL9.
- (6) **DOWN key**
Decrease numerals.
- (7) **UP key**
Increase numerals.
- ⚠️ **To avoid damage to the instrument, never use a sharp object to press keys.**

5. SETTING

5.1 Operation Menu

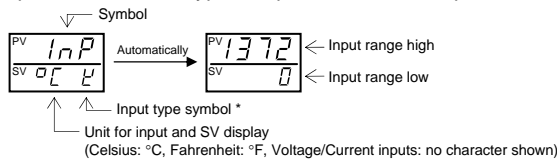


* Pressing the <RST key (1 second or more) in PV/SV display mode resets the peak hold value or time exceeding the time limit. Reset can occur after momentarily pressing <RST key or by pressing for one or more seconds as determined by SL9. However, the instrument cannot be reset while a Measured value (PV) exceeds the Limit set value (SV) [while the EXCD lamp lights].

This instrument returns to the PV/SV display mode if no key operation is performed within 1 minute.

Input type and input range display

This instrument immediately confirms the input type symbol and input range following power ON. Example: When sensor type of input is K thermocouple.



* Input Type Symbol Table

Symbol	U	V	r	S	b	E	r	n	P	ū	U	L	JP	Pt	U
Input type	K	J	R	S	B	E	T	N	PL II	W5Re/W26Re	U	L	JPt 100	Pt 100	Voltage (Current)

5.2 Detail of Each Mode

PV/SV display mode

Displays a Measured value (PV) on the PV display unit and the Limit set value (SV), on the SV display unit. In addition, the Limit set value (SV) can be set, and the peak hold value and time exceeding the time limit can be checked. Every time, the SET key is pressed, the set and displayed items are changed.

Symbol	Name	Setting (display) range	Description	Factory set value
—	PV/SV display	Within input range [Display only]	Displays a Measured value (PV) on the PV display unit and the Limit set value (SV), on the SV display unit.	—
—	SV setting	Within input range	Sets the Limit set value (SV).	0
PHLd (PHLd)	Peak hold value ¹	Within input range [Display only]	Displays the maximum Measured value (PV) while a Measured value (PV) exceeds the Limit set value (SV).	—
TIME (TIME)	Over time ²	0.00 to 99.59 [0:00 to 99:59 (min.: sec)] 100 to 999.5 [100:0 to 999:59 (min.: sec)] [Display only]	The total time when a Measured value (PV) exceeded the Limit set value (SV) is integrated, then displayed.	—

¹ Pressing the <RST key resets the peak hold value. At this time, the display unit shows "----".

² The display unit shows "----" if time exceeds 1000 minutes. In addition, pressing the <RST key resets the time exceeding the time limit. At this time, the display unit shows "0.00".

Parameter setting mode

This is the mode used to set the various parameters such as alarms, differential gap, etc. The following parameter symbols are displayed one by one every time the SET key is pressed.

Symbol	Name	Setting range	Description	Factory set value
AL1 (AL1)	Alarm 1 setting ¹	Process alarm: Within input range Deviation alarm: -Input span to +Input span However, TC/RTD inputs: -1999 (-199.9) to +9999 (+999.9)°C [°F]	Sets the alarm 1 set value and alarm 2 set value. Alarm differential gap: TC/RTD inputs: 2 (2.0) °C [°F] Voltage/Current inputs: 0.2 % of Input span	TC/RTD inputs: 50 (50.0) Voltage/Current inputs: 5.0
AL2 (AL2)	Alarm 2 setting ²			
oH (oH)	Limit action differential gap	TC/RTD inputs: 0 (0.0) to 100 (100.0)°C [°F] Voltage/Current inputs: 0.0 to 10.0 % of Input span	Set the differential gap during limit action.	TC/RTD inputs: 2 (2.0) Voltage/Current inputs: 0.2
dF (dF)	Digital filter	0 to 100 seconds (0: Digital filter OFF)	Sets the digital filter.	1
Pb (Pb)	PV bias	-Input span to +Input span However, TC/RTD inputs: -1999 (-199.9) to +9999 (+999.9)°C [°F]	Sensor correction is made by adding bias value to Measured value (PV).	0 (0.0)

¹ Not displayed when there is no alarm 1 [ALM1].

² Not displayed when there is no alarm 2 [ALM2].

Symbol	Name	Setting range	Description	Factory set value
AHS (AHS)	Analog output scale high	Analog output scale low to Input range high	Sets the scale high of analog output range. Not displayed when there is no analog output.	Input range high
ALS (ALS)	Analog output scale low	Input range low to Analog output scale high	Sets the scale low of analog output range. Not displayed when there is no analog output.	Input range low
LCK (LCK)	Set data lock	Refer to "Details of set data lock level selection"	Sets the lock level of the set data lock.	0000

Table: Details of set data lock level selection

– : Unsettable (Data locked) X : Settable (Data unlocked)

Set data	Limit set value (SV)	Alarm set value (ALM1, ALM2)	Other setting items #
0000	X	X	X
0001	X	X	–
0010	X	–	X
0100	–	X	X

Set data	Limit set value (SV)	Alarm set value (ALM1, ALM2)	Other setting items #
0011	X	–	–
0101	–	X	–
0110	–	–	X
0111	–	–	–

: All setting items other than Limit set value and Alarm settings (Alarm 1 and Alarm 2).

■ Communication setting mode

This mode is used to set the communication parameters when specified. For details on protocol, identifiers and communication setting mode, refer to the **CB100L/CB900L Communication Instruction Manual (IMCB09-EC)**.

5.3 Changing Parameter Settings

Procedures to change parameter settings are shown below.

To store a new value for the parameter, always press the SET key. The display changes to the next parameter and the new value will be stored.

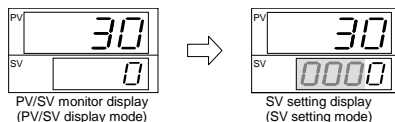
- A new value will not be stored without pressing SET key after the new value is displayed on the display.
- After a new value has been displayed by using the UP and DOWN keys, the SET key must be pressed within 1 minute, or the new value is not stored and the display will return to the PV/SV monitor screen.

● Change the Limit set value (SV)

Change the Limit set value (SV) from 0 °C to 200 °C

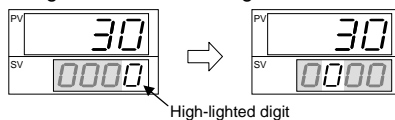
1. Select the SV setting mode

Press the SET key at PV/SV monitor screen until SV setting screen is displayed.



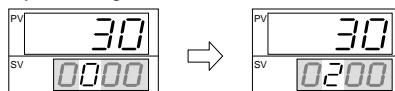
2. Shift the high-lighted digit

Press the <RST key to high-light the hundreds digit. The high-lighted digit indicates which digit can be set.



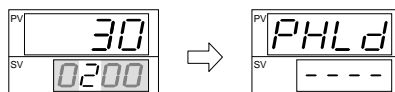
3. Change the set value

Press the UP key to change the number to 2.



4. Store the set value

Press the SET key to store the new set value. The display goes to the next parameter.



● Change parameters other than the Limit set value (SV)

The changing procedures are the same as those of example 2 to 4 in the above "● Change the Limit set value (SV)." Pressing the SET key after the setting end shifts to the next parameter. When no parameter setting is required, return the instrument to the PV/SV display mode.

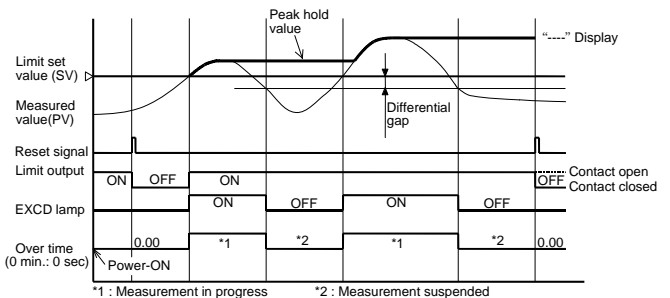
6. OPERATIONS

CAUTIONS

- All mounting and wiring must be completed before the power is turned on. If the input signal wiring is disconnected or short-circuited (RTD input only), the instrument determines that burnout has occurred.
 - Displays:
 - Upscale: Thermocouple input (specify when ordering), RTD input (when input break)
 - Downscale: Thermocouple input (specify when ordering), RTD input (when short-circuited), Voltage input (1 to 5 V DC), Current input (4 to 20 mA DC)
 - For the voltage (0 to 5 V DC, 0 to 10 V DC*) or current (0 to 20 mA DC) input, the display becomes indefinite (display of about zero value).
 - * Z-1010 specification
 - Outputs:
 - Limit output: OFF
 - Alarm output: Both of the Alarm 1 and Alarm 2 outputs of this instrument are turned on when burnout occurs regardless of any of the following actions taken (High alarm, low alarm, etc.). In addition, when used for any purposes other than these alarms (event, etc.), specify the Z-124 specification (not to be forcibly turned on).
 - A power failure of 20 ms or less will not affect the control action. When a power failure of more than 20 ms occurs, the instrument assumes that the power has been turned off. When power returns, the controller will retain the conditions that existed prior to shut down.
 - The alarm hold action is activated when not only the power is turned on, but also the SV is changed.

6.1 Operation Procedures

1. Prior to starting operation, check that the mounting and wiring have been finished, and that the Limit set value (SV) and various parameters have been set.
2. This instrument does not have a power supply switch.
3. If the power is turned ON, the limit signal continues to be output until the <RST key is pressed regardless of a measured value. First, press the <RST key briefly for one or more seconds depending on the setting in SL9, then start operation.



The "peak hold value" and "over time" are reset even when the power is turned OFF.

6.2 Set Data Lock (LCK) Function

The set data lock restricts parameter setting changes by key operation. This function prevents the operator from making errors during operation. There are 8 set data lock levels.

Parameters protected by Set data lock function are still displayed for monitoring.

7. INITIAL SETTING

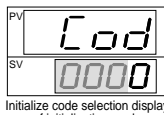
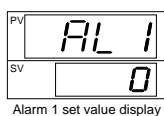
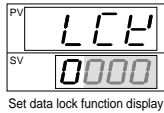


Parameters in the Initialization mode should be set according to the application before setting any parameter related to operation. Once the Parameters in the Initialization mode are set correctly, no further changes need to be made to parameters for the same application under normal conditions. If they are changed unnecessarily, it may result in malfunction or failure of the instrument. RKC will not bear any responsibility for malfunction or failure as a result of improper changes in the Initialization mode.

7.1 Go to Initialization Mode

- Turn on the power to this controller. The instrument goes to the PV/SV display after confirming input type symbol and input range.
- Press and hold the SET key for 2 seconds to go to the Parameter Setting Mode from the PV/SV display.
- Press the SET key until "LCK" (Set Data Lock display) will be displayed.
- The high-lighted digit indicates which digit can be set. Press <RST> key to high-light the thousands digit. (The section in each image of the controller shows the digits which are not high-lighted.)
- Press the UP key to change 0 to 1.

Set value	0: Initialization mode locked
	1: Initialization mode unlocked
- Press the SET key to store the new set value. The display goes to the next parameter, and the Initialization mode is unlocked. (The parameter displayed varies on the instrument specification.)
- Press the <RST> key for 2 seconds while pressing the SET key to go to the Initialization Mode. When the controller goes to the Initialization Mode, "Cod" will be displayed.

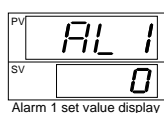
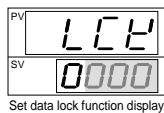


Cod 0000	SL1 (Input type selection)	Refer to P. 6
	SL2 (Temperature unit selection)	Refer to P. 6
	SL4 (Alarm 1 type selection)	Refer to P. 7
	SL5 (Alarm 2 type selection)	Refer to P. 7
	SL6 (Limit action type selection)	Refer to P. 7
	SL9 (Reset action selection)	Refer to P. 7
Cod 0001	SLH (Setting limiter (high))	Refer to P. 7
	SLL (Setting limiter (low))	Refer to P. 7
	PGdP (Decimal point position)	Refer to P. 7

7.2 Exit Initialization Mode

When any parameter setting is changed in the Initialization mode, check all parameter set values in SV setting mode and Parameter setting mode.

- Press the <RST> key for 2 seconds while pressing the SET key from any display in the Initialization mode. The controller goes back to the operation mode and the PV/SV display will be displayed.
- Press and hold the SET key for 2 seconds in the PV/SV display.
- Press the SET key until "LCK" (Set data lock display) will be displayed.
- The high-lighted digit indicates which digit can be set. Press <RST> key to high-light the thousands digit.
- Press the DOWN key to change 1 to 0.

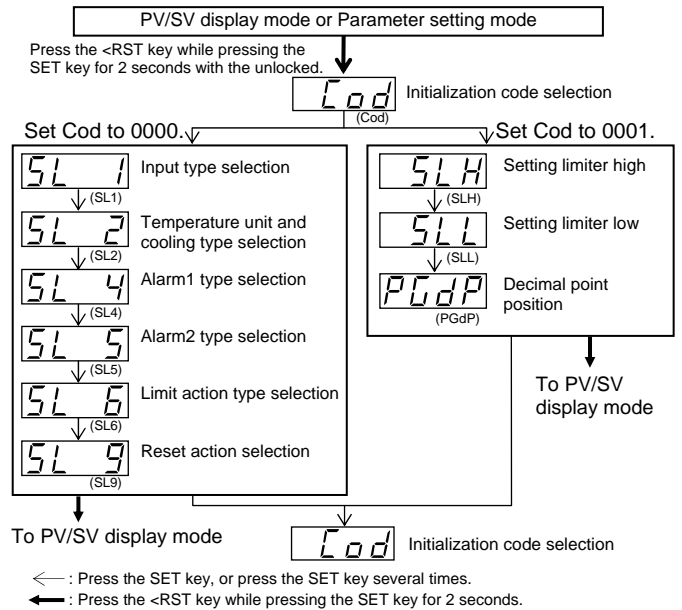


- Press the SET key to store the new set value. The display goes to the next parameter, and the Initialization mode is locked. (The parameter displayed varies on the instrument specification.)

7.3 Initial Setting Menu

The "Cod" display will be displayed when the controller goes to the Initialization mode.

Do not change to any parameter in the Initialization mode which is not described in the initial setting menu above. It may result in malfunction or failure of the instrument.



7.4 Input Type Selection (SL1)

When any parameter setting is changed in the Initialization mode, check all parameter set values in SV setting mode and Parameter setting mode.

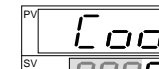
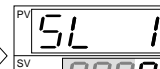
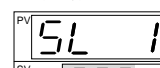
Factory set value varies depending on the input type.

Set value	Input type	Set value	Input type
0000	K	0101	T
0001	J	0110	U
0010	L	1100	Pt100 Ω (JIS/IEC)
0011	E	1101	JPt100 Ω (JIS)
0100	N	1110	0 to 5 V DC
0111	R	1110	0 to 10 V DC ²
1000	S	1111	1 to 5 V DC
1001	B	1110	0 to 20 mA DC
1010	W5Re/W26Re	1111	4 to 20 mA DC
1011	PL II	—	—

- Any input change in TC&RTD group is possible. Any input change in Voltage & Current group except for 0 to 10 V DC input is possible. No input change between TC&RTD group and Voltage & Current group is possible.
- The input type of Z-1010 specification is fixed to 0 to 10 V DC due to the hardware difference.
- For the current input specification, a resistor of 250 Ω must be connected between the input terminals.

Change Settings

Example: Change the input type from "K (0000)" to "J (0001)"

- Set "Cod" to 0000, and press the SET key. The display will go to SL1.
 

- Press the UP key to change the number to 1.
 
- Press the SET key to store the new set value. The display goes to the next parameter.

7.5 Temperature Unit Selection (SL2)


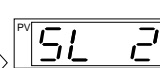
Inappropriate settings may result in malfunction.

Factory set value varies depending on the instrument specification.

Set value	Description	Set value	Description
0000	°C	0001	°F

Change Settings

Example: Change the temperature unit from "°C (0000)" to "°F (0001)"

- Press the SET key until SL2 is displayed.
- Press the UP key to change the number to 1.
 

- Press the SET key to store the new set value. The display goes to the next parameter.

7.6 Alarm 1 [ALM1] Type Selection (SL4) Alarm 2 [ALM2] Type Selection (SL5)

If the alarm function is not provided with the instrument when shipped from the factory, no alarm output is available by changing SL4 and/or SL5.



SL4 is set to 0000 in the following cases.

- When the instrument does not have ALM1 output



SL5 is set to 0000 in the following cases.

- When the instrument does not have ALM2 output

Factory set value varies depending on the instrument specification.

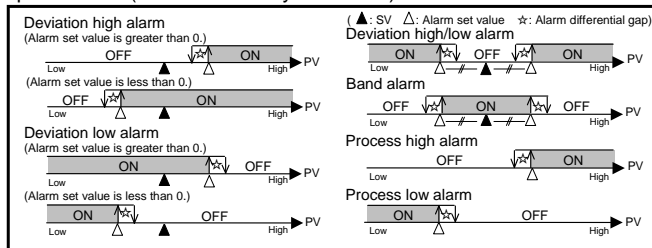
Set value	Details of setting	Set value	Details of setting
0000	No alarm	0111	Process low alarm
0001	Deviation high alarm	1001	Deviation high alarm with hold action *
0101	Deviation low alarm	1101	Deviation low alarm with hold action *
0010	Deviation high/low alarm	1010	Deviation high/low alarm with hold action *
0110	Band alarm	1011	Process high alarm with hold action *
0011	Process high alarm	1111	Process low alarm with hold action *

* Hold action:

When Hold action is ON, the alarm action is suppressed at start-up or the limit set value change until the measured value enters the non-alarm range.

● Alarm action type

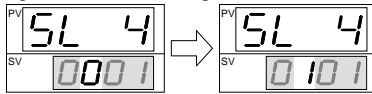
Both of the Alarm 1 and Alarm 2 outputs of this instrument are turned on when burnout occurs regardless of any of the following actions taken (High alarm, low alarm, etc.). In addition, when used for any purposes other than these alarms (event, etc.), specify the Z-124 specification (not to be forcibly turned on).



■ Change Settings

Example: Change the ALM1 type from “Deviation high alarm (0001)” to “Deviation low alarm (0101)”

1. Press the SET key three times at SL1 until SL4 is displayed.
2. Press the shift key to high-light the hundreds digit.
3. Press the UP key to change the number to 1.



4. Press the SET key to store the new set value. The display goes to the next parameter.

7.7 Limit Action Type Selection (SL6)

Selects the limit action type and hold action.



The units digit is not used. As malfunction may result, do not change this digit.

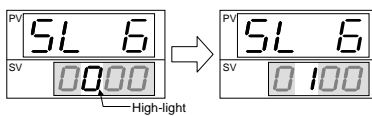
Factory set value “0000”

Set value	Details of setting
0	Fixed (Do not change this one.)
0	Limit action output turned ON at the time of power ON
1	Limit action output turned OFF at the time of power ON
0	Limit action (high)
1	Limit action (low)
0	Without alarm hold action
1	With alarm hold action

■ Change Settings

Example: Change the Limit action from “high (0000)” to “low (0100)”

1. Press the SET key five times at SL1 until SL6 is displayed.
2. Press the <RST key to high-light the hundreds digit. Next, press the UP key to change the number to 1.
3. Press the SET key to store the new set value. The display goes to the initialize code parameter.



7.8 Reset Action Selection (SL9)

Select the <RST key operation for reset.

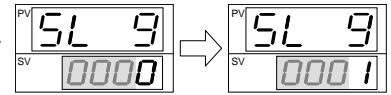
Factory set value varies depending on the instrument specification.

Set value	Description
0000	Press for 1 second.
0001	Press once. [Factory set value for ZK-1152 spec.]

■ Change Settings

Example: Change the <RST key operation type from “0000” to “0001”

1. Press the SET key eight times at SLH until SL9 is displayed.
2. Press the UP key to change the number to 0.
3. Press the SET key to store the new set value. The display goes to the next parameter.



7.9 Setting Limiter High (SLH) Setting Limiter Low (SLL)

For voltage or current input, set scaling within the input range.



When the Setting limiter (SLH, SLL) is changed:

- $SLH \geq \text{Limit set value (SV)} \geq SLL$
- $SLH \geq \text{Analog output scale (AHS)} \geq \text{Analog output scale (AHL)} \geq SLL$



Refer to Input range table (P. 8)

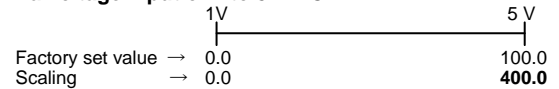
Factory set value varies depending on the instrument specification.

Input type	Setting range				
	Setting limiter high		Setting limiter low		
TC	K	SLL to 1372 °C	SLL to 2502 °F	0 to SLH °C	0 to SLH °F
	J	SLL to 1200 °C	SLL to 2192 °F	0 to SLH °C	0 to SLH °F
	R	SLL to 1769 °C	SLL to 3216 °F	0 to SLH °C	0 to SLH °F
	S	SLL to 1769 °C	SLL to 3216 °F	0 to SLH °C	0 to SLH °F
	B	SLL to 1820 °C	SLL to 3308 °F	0 to SLH °C	0 to SLH °F
	E	SLL to 1000 °C	SLL to 1832 °F	0 to SLH °C	0 to SLH °F
	N	SLL to 1300 °C	SLL to 2372 °F	0 to SLH °C	0 to SLH °F
	T	SLL to 400.0 °C	SLL to 752.0 °F	-199.9 to SLH °C	-199.9 to SLH °F
	W5Re/W26Re	SLL to 2320 °C	SLL to 4208 °F	0 to SLH °C	0 to SLH °F
	PL11	SLL to 1390 °C	SLL to 2534 °F	0 to SLH °C	0 to SLH °F
	U	SLL to 600.0 °C	SLL to 999.9 °F	-199.9 to SLH °C	-199.9 to SLH °F
L	SLL to 900 °C	SLL to 1652 °F	0 to SLH °C	0 to SLH °F	
RTD	Pt100	SLL to 649.0 °C	SLL to 999.9 °F	-199.9 to SLH °C	-199.9 to SLH °F
	JPt100				
Voltage	0 to 5 V DC	SLL to 9999 (Programmable scale)		-1999 to SLH (Programmable scale)	
	0 to 10 V DC * 1 to 5 V DC				
Current	0 to 20 mA DC				
	4 to 20 mA DC				

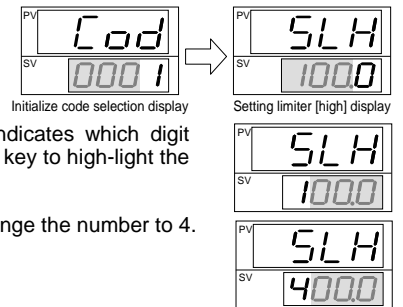
* Z-1010 specification

■ Change Settings

Example: When the display range is scaled to 0.0 to 400.0 for a voltage input of 1 to 5 V DC.



1. Set Cod to 0001, and press the SET key. The display will go to SLH.
2. The high-lighted digit indicates which digit can be set. Press <RST key to high-light the first digit from the left.
3. Press the UP key to change the number to 4.
4. Press the SET key to store the new set value. The display goes to SLL.
5. Set SLL to 0.0.
6. Press the SET key to store the new set value. The display goes to the next parameter.



7.10 Decimal Point Position (PGdP)

Use to select a Decimal point position of the input range (voltage input and current input). PGdP is displayed only for voltage or current input.



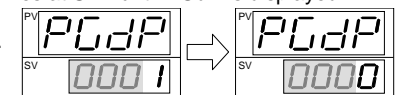
Inappropriate settings may result in malfunction.

Set value	Description
0000	No decimal place (□□□□)
0001	One decimal place (□□□.□) [Factory set value]
0002	Two decimal places (□□.□□)
0003	Three decimal places (□.□□□)

■ Change Settings

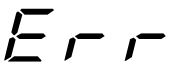
Example: Change the Decimal point position from “One decimal place (0001)” to “No decimal place (0000)”

1. Press the SET key two times at SLH until PGdP is displayed.
2. Press the DOWN key to change the number to 0.
3. Press the SET key to store the new set value. The display goes to the next parameter.




8. ERROR DISPLAYS

■ Error display

	RAM failure (Incorrect set data write, etc.)	Turn off the power at once. If an error occurs after the power is turned on again, please contact RKC sales office or the agent.
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■ Over-scale and Underscale

Measured value (PV) [Flashing]	PV is outside of input range.	 WARNING To prevent electric shock, always turn off the power before replacing the sensor.
0000 [Flashing]	Over-scale: PV is above the high input display range limit.	
UUUU [Flashing]	Underscale: PV is below the low input display range limit.	
		Check Input type, Input range and connecting state of sensor. Confirm that the sensor or wire is not broken.

9. INPUT RANGE TABLE

Input type	Model Code	Input type	Model Code	Input type	Model Code	Input type	Model Code	Input type	Model Code
0 to 200 °C	K 01	0 to 800 °F	J A1	0 to 1200 °C	N 01	*2 -199.9 to +100.0 °C	U 02	-100.0 to +100.0 °F	D A4
0 to 400 °C	K 02	0 to 1600 °F	J A2	0 to 1300 °C	N 02	0.0 to 400.0 °C	U 03	-100.0 to +300.0 °F	D A5
0 to 600 °C	K 03	0 to 2192 °F	J A3	0 to 2300 °F	N A1	-199.9 to +999.9 °F	U A1	0.0 to 100.0 °F	D A6
0 to 800 °C	K 04	0 to 400 °F	J A6	0 to 2372 °F	N A2	-100.0 to +200.0 °F	U A2	0.0 to 200.0 °F	D A7
0 to 1000 °C	K 05	0 to 300 °F	J A7	*2 -199.9 to +400.0 °C	T 01	0.0 to 999.9 °F	U A3	0.0 to 400.0 °F	D A8
0 to 1200 °C	K 06	0 to 1600 °C	R 01	*2 -199.9 to +100.0 °C	T 02	0 to 400 °C	L 01	0.0 to 500.0 °F	D A9
0 to 1372 °C	K 07	0 to 1769 °C	R 02	-100.0 to +200.0 °C	T 03	0 to 800 °C	L 02	-199.9 to +649.0 °C	P 01
0 to 100 °C	K 13	0 to 1350 °C	R 04	0.0 to 350.0 °C	T 04	0 to 800 °F	L A1	-199.9 to +200.0 °C	P 02
0 to 300 °C	K 14	0 to 3200 °F	R A1	T *2 -199.9 to +752.0 °F	T A1	0 to 1600 °F	L A2	-100.0 to +50.0 °C	P 03
0 to 450 °C	K 17	*1 0 to 3216 °F	R A2	-100.0 to +200.0 °F	T A2	-199.9 to +649.0 °C	D 01	-100.0 to +100.0 °C	P 04
0 to 500 °C	K 20	*1 0 to 1600 °C	S 01	-100.0 to +400.0 °F	T A3	-199.9 to +200.0 °C	D 02	-100.0 to +200.0 °C	P 05
0 to 800 °F	K A1	*1 0 to 1769 °C	S 02	0.0 to 450.0 °F	T A4	-100.0 to +50.0 °C	D 03	0.0 to 50.0 °C	P 06
0 to 1600 °F	K A2	*1 0 to 3200 °F	S A1	0.0 to 752.0 °F	T A5	-100.0 to +100.0 °C	D 04	0.0 to 100.0 °C	P 07
0 to 2502 °F	K A3	*1 0 to 3216 °F	S A2	W5Re/	W 01	-100.0 to +200.0 °C	D 05	0.0 to 200.0 °C	P 08
20 to 70 °F	K A9	*1 400 to 1800 °C	B 01	W26Re	W 02	0.0 to 50.0 °C	D 06	0.0 to 300.0 °C	P 09
0 to 200 °C	J 01	*1 0 to 1820 °C	B 02	0 to 4000 °F	W A1	0 to 100.0 °C	D 07	0.0 to 500.0 °C	P 10
0 to 400 °C	J 02	800 to 3200 °F	B A1	PLII	A 01	0.0 to 200.0 °C	D 08	0 to 5 V DC	4 01
0 to 600 °C	J 03	*1 0 to 3308 °F	B A2	0 to 1300 °C	A 02	0 to 300.0 °C	D 09	0 to 10 V DC **	5 01
0 to 800 °C	J 04	0 to 800 °C	E 01	0 to 1200 °C	A 03	0.0 to 500.0 °C	D 10	1 to 5 V DC	6 01
0 to 1000 °C	J 05	0 to 1000 °C	E 02	0 to 2400 °F	A A1	-199.9 to +999.9 °F	D A1	0 to 20 mA DC	7 01
0 to 1200 °C	J 06	0 to 1600 °F	E A1	0 to 2534 °F	A A2	-199.9 to +400.0 °F	D A2	4 to 20 mA DC	8 01
0 to 450 °C	J 10	0 to 1832 °F	E A2	U *2 -199.9 to +600.0 °C	U 01	-199.9 to +200.0 °F	D A3		

*1 0 to 399 °C/0 to 799 °F: Accuracy is not guaranteed.

*2 -199.9 to -100.0 °C/-199.9 to -158.0 °F: Accuracy is not guaranteed.

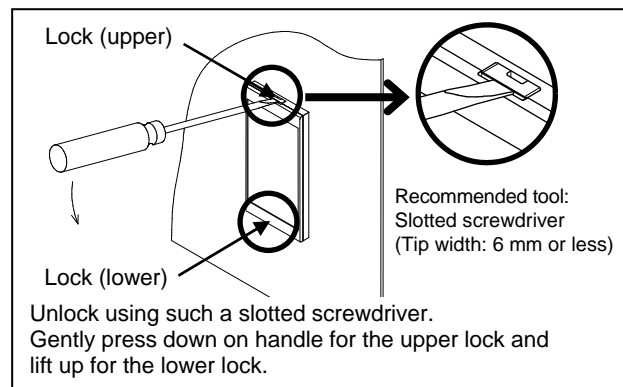
** Z-1010 specification.




10. REMOVING THE INTERNAL ASSEMBLY

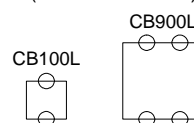
Usually, this instrument is not necessary to remove the internal assembly from the case. When removing the internal assembly without disconnecting the external wiring, take the following steps.

! WARNING

- To prevent electric shock or instrument failure, only qualified personnel should be allowed to pull out the internal assembly.
- To prevent electric shock or instrument failure, always turn off the power before pulling out the internal assembly.
- To prevent injury or instrument failure, do not touch the internal printed wiring board.



-  Apply pressure very carefully when removing internal assembly to avoid damage to the frame.
-  To conform to IEC61010-1 requirements for protection from electric shock, the internal assembly of this instrument can only be removed with an appropriate tool.
-  Unlocking points (marked with "O") depend on the model as follows:



The first edition: DEC. 2012 [IMQ00]