

Temperature Limit Controller



Over/under-temperature protection

The CB100L/900L provides you the over/under-temperature protection for your equipment or products in process. When the temperature goes above or below the set value (high limit or low limit), the CB100L/900L will interrupt or remove the power from the process. This output can be used for alarm or interrupting power to the heater circuit.

For safety reason, the output will be retained until reset operation is executed even when the measured value goes back to the normal range. Reset operation can be executed by front key operation, communication, or digital input.

The CB100L/900L has various options and functions suitable for wide range of applications that requires two alarms, retransmission output, waterproof and dustproof protection, digital communication, and digital input.

DC current/voltage input type is available as well as thermocouple and RTD input.

The CB100L/900L limit actions can also be configured :

Limit output at power-up : ON/OFF

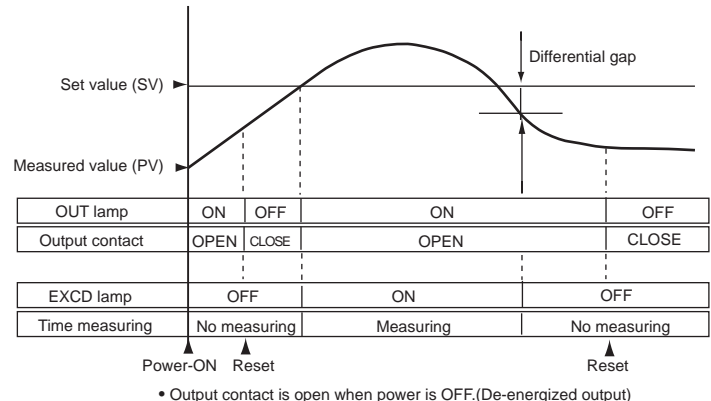
Alarm output : Energized/de-energize

Limit type : High-limit for over-temperature / Low-limit for under-temperature

The CB100L/900L measures the time while the measured value goes above/below the set value, and it retains the peak value.

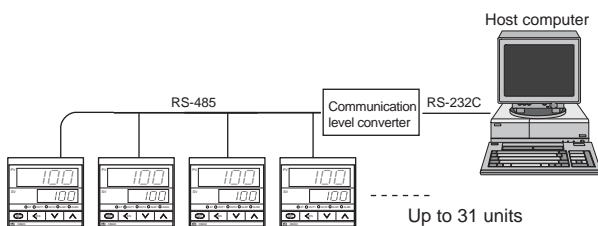
The CB100L/900L is UL, CSA, FM approved, and CE marked.

*High limit type is standard, but low limit type is available by configuration.



Digital communications (Optional)

CB100L/900L offers RS-485 communications with ANSI protocol. Up to 31 units can be connected to one RS-485 communication line.



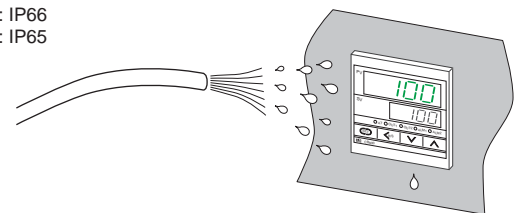
Analog output (Optional)

Analog output is available for measured value retransmission. For the set value retransmission, please ask RKC for details.

Waterproof and dustproof protection (Optional)

The waterproof and dustproof features protect the panel-mounted instrument in severe environments or wash-down conditions and conforms to IP66 (IP65 for CB900L) standards.

CB100L: IP66
CB900L: IP65



Designed for close horizontal mounting

The CB100L/900L allows you to mount horizontally up to 6 units close together to make effective use of control board or panel space.

CB100L and 900L Lineup (Black and White)



Specifications

Inputs

- Input :
- a) Thermocouple : K, J, E, T, R, S, B, N (JIS/IEC)
U, L (DIN), PLII (NBS)
W5Re/W26Re (ASTM)
 - b) RTD : Pt100 (JIS/IEC)
JPt100 (JIS)
 - c) DC voltage : 0 to 5VDC, 1 to 5VDC, 0 to 10VDC
 - d) DC current : 0 to 20mADC, 4 to 20mADC
 - For current input, connect a 250Ω resistor to the input terminals.
 - Refer to the Input and Range Code Table for details.
- Sampling time : 0.5 second
- Influence of external resistance : Approx. 0.25μV/Ω (Thermocouple input)
- Influence of lead resistance : Approx. 0.01[%/Ω] of reading (RTD input)
- Maximum 10Ω/wire
- Input break action :
- a) Thermocouple : Up-scale
 - b) RTD : Up-scale
 - c) Voltage/current : Down-scale
 - Reading is around zero for 0 to 5VDC, 0 to 10VDC, and 0 to 20mA input.
- Input short action : Down-scale (RTD input)
- PV bias : -span to +span

Performance

- Measuring accuracy :
- a) Thermocouple : ±(0.3% of reading + 1 digit) or ±2°C (4°F)
(Within either range, whichever is larger)
 - Accuracy is not guaranteed between 0 and 399°C (0 and 799°F) for type R, S, and B.
 - Accuracy is not guaranteed less than -100°C (-158.0°F) for type T and U. (± 3°C)
 - b) RTD : ±(0.3% of reading + 1 digit) or ±0.8°C (1.6°F)
(Within either range, whichever is larger)
 - c) Voltage/current: ±(0.3% of reading + 1 digit)
- Insulation resistance : More than 20MΩ (500VDC) between measured terminals and ground
More than 20MΩ (500VDC) between power terminals and ground
- Dielectric voltage : 1000VAC for one minute between measured terminals and ground
1500VAC for one minute between power terminals and ground

Action

- Limit action :
- High limit control
- De-energized or energized output can be selected
 - Low limit control is available.
 - The control output contact goes OPEN (CLOSED when set to energized) when measured value exceeds the set value, and it is retained until reset operation is executed. The reset can be made by front key operation, communication, or digital input.
 - The state of control output contact when power-up can be configured. The output contact is OPEN when power-up for standard de-energized type.
- Limit action output : Relay contact output, Form A contact, 250VAC, 3A (resistive load)
- Electrical life: 300,000 times or more (rated load)

Other standard functions

- Peak hold :
- Memorizes the maximum value during the measured value exceeds the set value (when high limit control).
- Peak hold value can be reset by front key operation, communication, or digital input.
 - Peak hold value is reset when the controller is turned off.
 - "—" is displayed before the measured value exceeds the set value for the first time.
- Integrated time measuring :
- Counts up the time during the measured value exceeds the set value (when high limit control).
- Integrated time can be reset by front key operation, communication, or digital input.
 - Integrated time is reset when the controller is turned off.

Optional functions

- Temperature alarm:
- a) Number of points : 2 points
 - b) Type : Deviation high, Deviation low, Deviation high/low, Band, Process high, Process low (Hold action is available)
 - c) Differential gap : 2°C or 2.0°C (temperature input)
0.2% of span (DC voltage/current input)
 - d) Output: Relay contact output, Form A contact, 250VAC, 1A (resistive load)
 - Electrical life: 50,000 times or more (rated load)
- Communication :
- a) Communication method : Based on RS-485 (two-wire)
 - b) Synchronous method : Half-duplex multi-drop connection
 - c) Protocol: ANSI X3.28 (1976) 2.5 A4
 - d) Communication speed : 2400, 4800, 9600, 19200bps
 - e) Bit configuration : Start bit : 1
Data bit : 7 or 8
Parity bit: Without, Odd, or Even
Stop bit : 1 or 2
 - f) Maximum connection : 31 (Address can be set from 1 to 99.)
- Contact input :
- a) Number of points : 1 point
 - b) Input method : Non-voltage contact input
 - Resistance at OPEN : 500KΩ or more
 - Resistance at CLOSE : 10Ω or less
 - c) Function : Reset function is executed when the mode is changed from OPEN to CLOSE.
- Analog output :
- a) Number of points : 1 point
 - b) Output signal : 4 to 20mADC, 0 to 20mADC
 - c) Allowable load resistance : 600Ω or less
 - d) Output type : Measured value
 - e) Accuracy : ±0.3% of span
 - f) Resolution : More than 10 bits
- Waterproof and dustproof : CB100L : IP66
CB900L : IP65
- Dustproof and waterproof protection are effective only from the front direction when installed on a panel.
 - Dustproof and waterproof protection are not effective when controllers are closely mounted.

General specifications

- Supply voltage :
- a) 85 to 264V AC (Including supply voltage variation)
[Rating : 100 to 240V AC] (50/60Hz common)
 - b) 21.6 to 26.4V AC (Including supply voltage variation)
[Rating : 24V AC] (50/60Hz common)
 - c) 21.6 to 26.4V DC (Ripple rate 10% p-p or less)
[Rating : 24V DC]
- Power consumption : Less than 10VA for standard AC type
Less than 5VA for 24V AC type
Less than 160mA for 24V DC type
- Effect by power failure : Not affected by power failure shorter than 20msec, otherwise reset to initial state.
- Operating environments : 0 to 50°C [32 to 122°F] , 45 to 85% RH
Memory backup : Backed up by non-volatile memory.
- Net weight : CB100L : Approx. 170g,
CB900L : Approx. 340g
- External dimensions : CB100L : 48 x 48 x 100mm (W x H x D)
CB900L : 96 x 96 x 100mm (W x H x D)

Compliance with standards

- CE marked
- UL recognized (UL61010-1) File No. E172270
- cUL recognized (CAN/CSA-C22.2 No. 61010-1) File No. E172270
- FM approved (FM3545)

Model and Suffix Code

Specifications	Model and Suffix Code	
Model	CB100 CB900	L □□□ - M * □ □ - □ - □ □ / □
Type	Temperature Limit controller	L
Input and range	See input and range code table	□□□
Output	Relay contact output	M
Alarm 1	No alarm See alarm code table	N □
Alarm 2	No alarm See alarm code table	N □
Analog output	Not supplied 0 to 20mA DC 4 to 20mA DC	N 7 8
Communications *1 Contact input *1	Not supplied Digital communications : RS-485 Contact input	N 5 D
Waterproof and dustproof	Not supplied Waterproof and dustproof protection	N 1
Body color	Black White	A N

*1: Either communications or contact input can be selected

Input and Range Code Table

Thermocouple Input

Input	Code	Range
K	K 01	0 - 200°C
	K 02	0 - 400°C
	K 03	0 - 600°C
	K 04	0 - 800°C
	K 05	0 - 1000°C
	K 06	0 - 1200°C
	K 07	0 - 1372°C
	K 13	0 - 100°C
	K 14	0 - 300°C
	K 20	0 - 500°C
	K A1	0 - 800°F
	K A2	0 - 1600°F
	K A3	0 - 2502°F
	K A9	20 - 70°F
J	J 01	0 - 200°C
	J 02	0 - 400°C
	J 03	0 - 600°C
	J 04	0 - 800°C
	J 05	0 - 1000°C
	J 06	0 - 1200°C
	J A1	0 - 800°F
J A2	0 - 1600°F	
J A3	0 - 2192°F	
J A6	0 - 400°F	
*1 R	R 01	0 - 1600°C
	R 02	0 - 1769°C
	R 04	0 - 1350°C
	R A1	0 - 3200°F
	R A2	0 - 3216°F
*1 S	S 01	0 - 1600°C
	S 02	0 - 1769°C
	S A1	0 - 3200°F
*1 B	S A2	0 - 3216°F
	B 01	400 - 1800°C
	B 02	0 - 1820°C
B A1	800 - 3200°F	
B A2	0 - 3308°F	

Input	Code	Range
E	E 01	0 - 800°C
	E 02	0 - 1769°C
	E A1	0 - 1600°F
	E A2	0 - 1832°F
	E A3	0 - 2300°F
N	N 01	0 - 1200°C
	N 02	0 - 1300°C
	N A1	0 - 2300°F
	N A2	0 - 2372°F
	N A3	0 - 2372°F
*2 T	T 01	-199.9 - 400.0°C
	T 02	-199.9 - 100.0°C
	T 03	-100.0 - 200.0°C
	T 04	0.0 - 350.0°C
	T A1	-199.9 - 752.0°F
	T A2	-100.0 - 200.0°F
	T A3	-100.0 - 400.0°F
	T A4	0.0 - 450.0°F
	T A5	0.0 - 752.0°F
	T A6	0.0 - 752.0°F
W5Re /W26Re	W 01	0 - 2000°C
	W 02	0 - 2320°C
	W A1	0 - 4000°F
PL II	A 01	0 - 1300°C
	A 02	0 - 1390°C
	A 03	0 - 1200°C
	A A1	0 - 2400°F
	A A2	0 - 2534°F
*2 U	U 01	-199.9 - 600.0°C
	U 02	-199.9 - 100.0°C
	U 03	0.0 - 400.0°C
	U A1	-199.9 - 999.9°F
	U A2	-100.0 - 200.0°F
	U A3	0.0 - 999.9°F
L	L 01	0 - 400°C
	L 02	0 - 800°C
	L A1	0 - 800°F
L A2	0 - 1600°F	

RTD Input

Input	Code	Range
Pt100	D 01	-199.9 - 649.0°C
	D 02	-199.9 - 200.0°C
	D 03	-100.0 - 50.0°C
	D 04	-100.0 - 100.0°C
	D 05	-100.0 - 200.0°C
	D 06	0.0 - 50.0°C
	D 07	0.0 - 100.0°C
	D 08	0.0 - 200.0°C
	D 09	0.0 - 300.0°C
	D 10	0.0 - 500.0°C
	D A1	-199.9 - 999.9°F
	D A2	-199.9 - 400.0°F
	D A3	-199.9 - 200.0°F
	D A4	-199.9 - 100.0°F
D A5	-100.0 - 300.0°F	
D A6	0.0 - 100.0°F	
D A7	0.0 - 200.0°F	
D A8	0.0 - 400.0°F	
D A9	0.0 - 500.0°F	
JPt100	P 01	-199.9 - 649.0°C
	P 02	-199.9 - 200.0°C
	P 03	-100.0 - 50.0°C
	P 04	-100.0 - 100.0°C
	P 05	-100.0 - 200.0°C
	P 06	0.0 - 50.0°C
	P 07	0.0 - 100.0°C
	P 08	0.0 - 200.0°C
	P 09	0.0 - 300.0°C
	P 10	0.0 - 500.0°C

Voltage and Current Input

Input	Code	Range
0 - 5V DC	4 01	0.0 - 100.0
1 - 5V DC	6 02	0.0 - 100.0
0 - 20mA DC *3	7 03	0.0 - 100.0
4 - 20mA DC *3	8 04	0.0 - 100.0

*1 : Type R, S and B input : Accuracy is not guaranteed between 0 and 399°C (0 to 799°F)

*2 : Type T and U input : Accuracy is not guaranteed between -199.9 and -100.0°C (-199.9 and -158.0°F)

*3 : DC current input : A 250 Ω resistor is externally connected to the input terminals.

Alarm Code Table

Code	Type
A	Deviation High
B	Deviation Low
C	Deviation High/Low
D	Band Alarm
E	Deviation High with Alarm Hold
F	Deviation Low with Alarm Hold
G	Deviation High/Low with Alarm Hold

Code	Type
H	Process High
J	Process Low
K	Process High with Alarm Hold
L	Process Low with Alarm Hold

Supply voltage

100 - 240V AC	24V AC	24V DC
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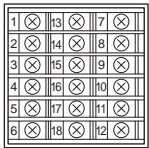
Accessory

Shunt resistor for DC current input
KD100-55

Terminal cover
KCA100-517 (CB100L) KCA900-58 (CB900L)

Rear Terminal Layout and External Dimensions

CB100L

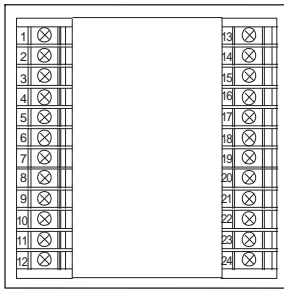


No.	Description
1	AC 100 to 240V, AC 24V, DC+ 24V Power supply
2	
3	AO Analog output
4	
5	Limit output
6	Relay contact output

No.	Description
7	Alarm 2 Alarm output
8	Alarm 1 Relay contact output
9	
10	Measured input (1) Thermocouple (2) RTD (3) Voltage/Current
11	
12	

No.	Description
13	SG
14	T/R(A) Communications
15	T/R(B) Contact input
16	
17	
18	

CB900L



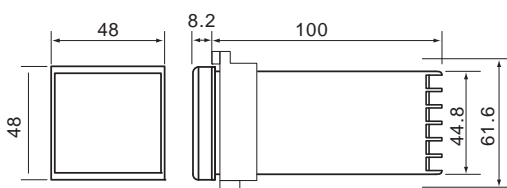
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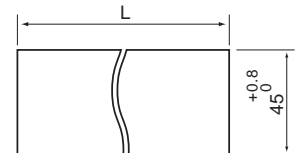
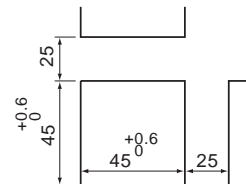
External Dimensions

Units : mm

CB100L



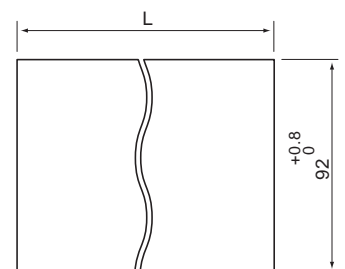
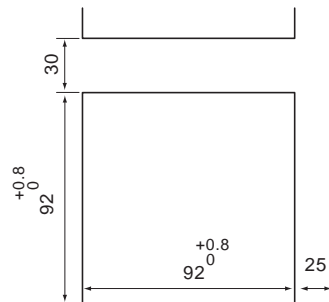
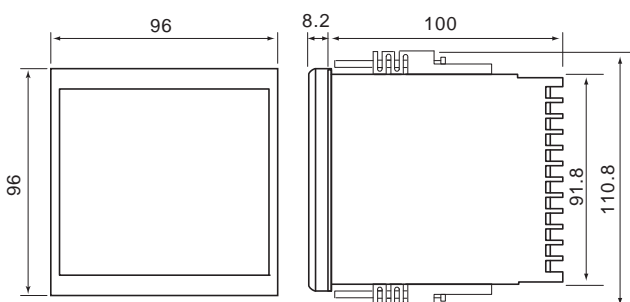
Panel cutouts



$$L = (48 \times n - 3) \begin{matrix} +0.6 \\ 0 \end{matrix}$$

n : Number of controllers (2= n <=6)

CB900L



$$L = (96 \times n - 4) \begin{matrix} +0.8 \\ 0 \end{matrix}$$

n : Number of controllers (2= n <=6)



- Before operating this product, read the instruction manual carefully to avoid incorrect operation.
- This product is intended for use with industrial machines, test and measuring equipment. It is not designed for use with medical equipment.
- If it is possible that an accident may occur as a result of the failure of the product or some other abnormality, an appropriate independent protection device must be installed.
- When installing this product, avoid the following:
 - Direct exposure to sunlight.

- An ambient temperature lower than 0°C or higher than 50°C
- Areas subject to high humidity. Ambient humidity should not be lower than 45% or higher than 85%RH
- Direct contact with water.
- Corrosive environments.
- Hazardous areas containing explosive or flammable gases.
- Vibration or shock.
- Areas subject to electrical noise caused by inductive interference, static electricity or magnetic fields.

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