CB100L

General Description

The CB100L is a family of FM approved high limit or low limit controllers. They have a wide range of options including a variety of inputs, two additional alarms, analog retransmission of variables, waterproof/dustproof, digital inputs, and digital communications. This series is CE marked, UL/cUL, and FM approved.

Features

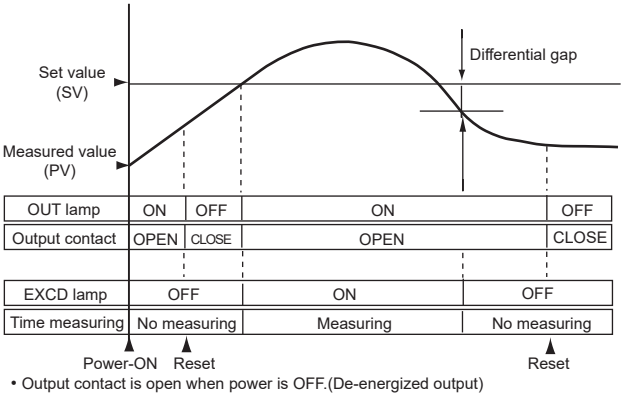
- ☆ Over/Under temperature protection
- ☆ Digital communications
- ☆ Peak temperature measurement
- ☆ Over temperature timer
- ☆ CE marked, UL/cUL and FM approved

Over/Under Temperature Protection

The CB100L provide 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 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 limit actions can also be configured :
Limit output at power-up : ON/OFF
Alarm output : Energized/de-energized
Limit type : High-limit for over-temperature / Low-limit for under-temperature

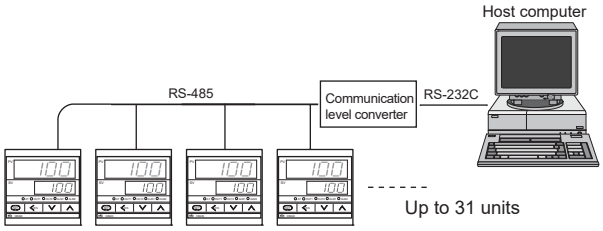
The CB100L measures the time while the measured value goes above/below the set value, and it retains the peak value.



• Output contact is open when power is OFF.(De-energized output)

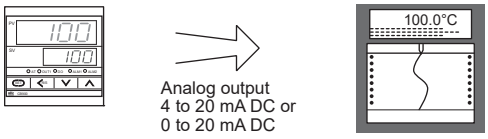
Digital Communications (Optional)

CB100L offer RS-485 communications with ANSI protocol. Up to 31 units can be connected to one RS-485 communication line.



Analog Output (Optional)

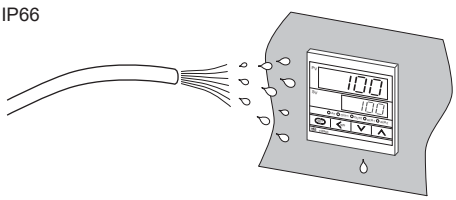
Analog output is available for measured value retransmission. For the set value retransmission, please ask RKC for details.



Waterproof/Dustrpoof (Optional)

For operation in severe environments or when washdown is required, the IP66(65) rating is available for waterproof/dustproof protection.

CB100L: IP66



Close Horizontal Mounting

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

Specifications

Input

Input

a) Thermocouple : K, J, R, S, B, E, T, N (JIS/IEC), PLII (NBS)
W5Re/W26Re (ASTM), U, L (DIN)
- Influence of external resistance : Approx. 0.2μV/Ω
- Input break action : Up-scale

b) RTD : Pt100 (JIS/IEC), JPt100 (JIS)
- Influence of input lead resistance : Approx. 0.01[%/Ω] of reading
- Maximum 10Ω per wire
- Input break action : Up-scale

c) DC voltage : 0 to 5V, 1 to 5V, 0 to 10V (0.0 to 100.0% Default value)
- Input break action : Down-scale

d) DC current : 0 to 20mA, 4 to 20mA (0.0 to 100.0% Default value)
- For DC current input, connect a 250 Ω resister to the input terminals.
- Input break action : Down-scale

Sampling Time

0.5 sec

PV Bias

Temperature input : -1999(-199.9) to 9999(999.9)°C[°F]
DC voltage, DC current : - span to +span

Performance

Measuring Accuracy

a) Thermocouple
±(0.3% of reading + 1 digit) or ±2°C (4°F) 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 between -199.9 and -100.0°C (-199.9 and -158.0°F) for type T and U.

b) RTD
±(0.3% of reading + 1 digit) or ±0.8°C (1.6°F) whichever is larger

c) DC voltage and DC current
±(0.3% of span + 1 digit)

Insulation Resistance

More than 20MΩ (500V DC) between measured terminals and ground
More than 20MΩ (500V DC) between power terminals and ground

Dielectric Strength

1000V AC for one minute between measured terminals and ground
1500V AC 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 ergized) 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, 250V AC, 3A (resistive 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 Alarms

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)

Communications

a) Communication method : RS-485 (2-wire)
b) Communication speed : 1200, 2400, 4800, 9600, 19200 BPS
c) Bit format
Start bit : 1
Data bit : 7 or 8
Parity bit : Even, odd or without parity
Stop bit : 1 or 2
d) Communication code : ASCII(JIS) 7-bit code
e) Maximum connection : 31 (Address can be set from 0 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 20mA DC, 0 to 20mA DC
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/Dustproof

IP66
- Waterproof/dustproof protection only effective from the front in panel mounted installations.
- Waterproof/dustproof protection is not available for close horizontal mounting installations.

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

Power Failure Effect

Not affected by power failure shorter than 20msec, otherwise reset to the 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

Approx. 170g

External Dimensions (W x H x D)

48 x 48 x 100mm

Compliance with Standards

- CE Mark
- UL/cUL Recognized
- FM Approved

Model and Suffix Code

Specifications	Model and Suffix Code
Size	CB100 (1/16 DIN size) □ □ □ – M ✳ □ □ – □ – □ □ / □
Type	Temperature Limit controller L
Input type	See Range and Input Code Table □
Range	See Range and Input Code Table □
Output	Relay output M
Alarm 1	No alarm N See Alarm Code Table □
Alarm 2	No alarm N See Alarm Code Table □
Analog output	Not supplied N 0 to 20mA DC 7 4 to 20mA DC 8
Digital communications [1] Contact input [1]	Not supplied N Digital communications : RS-485 (2-wire system) 5 Contact input D
Waterproof/Dustproof	Not supplied N Waterproof/Dustproof protection 1 • Body color is only available in black.
Body color	Black A

[1] Either communications or contact input can be selected.

Range and Input Code Table

Thermocouple (Field-programmable)

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 17	0 – 450°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
R [1]	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
S [1]	S 01	0 – 1600°C
	S 02	0 – 1769°C
	S A1	0 – 3200°F
	S A2	0 – 3216°F
B [1]	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 – 1000°C
	E A1	0 – 1600°F
	E A2	0 – 1832°F
N	N 01	0 – 1200°C
	N 02	0 – 1300°C
	N A1	0 – 2300°F
	N A2	0 – 2372°F
T [2]	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
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
U [2]	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 (Field-programmable)

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 – 100.0°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 [3] (Field-programmable)

Input	Code	Range
0 – 5V DC	4 01	0.0 – 100.0 (Default)
0 – 10V DC	5 01	0.0 – 100.0 (Default)
1 – 5V DC	6 01	0.0 – 100.0 (Default)
0 – 20mA DC	7 01	0.0 – 100.0 (Default)
4 – 20mA DC	8 01	0.0 – 100.0 (Default)

[1] Type R, S and B input : Accuracy is not guaranteed between 0 and 399°C (0 and 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 input terminals.

Alarm Code Table

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

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

Supply Voltage

100 - 240V AC	24V AC	24V DC

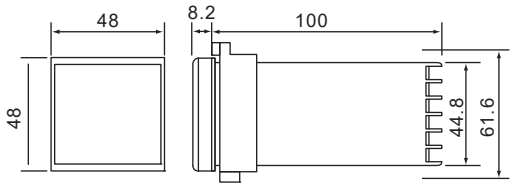
Accessories

Shunt resistor for DC current input
KD100-55

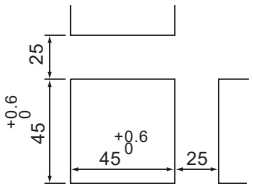
Terminal cover
KCA100-517 (CB100L) KCA900-58 (CB900L)

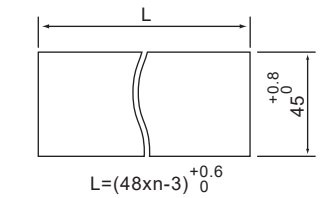
External Dimensions and Rear Terminals

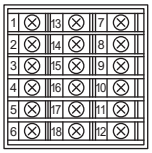
Unit : mm



Panel cutouts







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

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

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