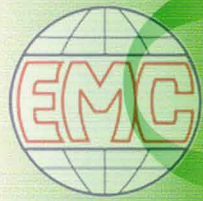


CONTRONIK

# CB SERIES

DIGITAL TEMPERATURE CONTROLLER



EMC SUPPLIES (M) SDN BHD

(Co.No.444081-W)

Experiencing the Quality & Service Difference



CE Marked, UL Recognized,  
CSA Certified

**RKC** RKC INSTRUMENT INC.



# Specifications

## 1. Input

Measured Input

- (1) Input : a) Thermocouple : K,J,E,T,R,S,B (JIS/IEC)  
U,L(DIN), N, PLII (NBS) W5Re/W26Re(ASTM)  
Input impedance : Approx. 1M $\Omega$   
b) RTD : Pt100(JIS/IEC), JPt100(JIS)  
c) DC voltage input : 0 to 5V DC, 1 to 5V DC  
d) DC current input : 0 to 20mA DC, 4 to 20mA DC  
\* A 250 ohm resistor is externally connected at the input terminals for DC current input.  
\* Refer to the Input and Range Code Table for details.
- (2) Sampling time : 0.5 sec.
- (3) Influence of external resistance : Approx. 0.2 $\mu$ V/ $\Omega$  (Thermocouple input)
- (4) Influence of lead resistance : Approx. 0.01[%/ $\Omega$ ] of reading (RTD)  
\* Maximum 10 $\Omega$  per wire
- (5) Input break action : a) Thermocouple : Up-scale  
b) RTD : Up-scale  
c) DC voltage/current input : Down-scale  
\* All alarm outputs are ON.  
\* Control outputs of both heating and cooling side are OFF for heat/cool PID action type.  
\* Reading is around zero for 0 to 5VDC input and 0 to 20mADC input.
- (6) Input short action : Down-scale (RTD)  
\* All alarm outputs are on.
- (7) PV bias : a) Temperature input : -1999 to 9999 $^{\circ}$ C( $^{\circ}$ F) or -199.9 to 999.9 $^{\circ}$ C( $^{\circ}$ F)  
b) Voltage, Current input: -span to +span

## 2. Performance

- (1) Measuring accuracy : a) Thermocouple : +/- (0.3% of reading + 1 digit) or +/- 2 $^{\circ}$ C (4  $^{\circ}$ F)  
(Within the range of whichever is larger)  
Accuracy is not guaranteed between 0 to 399 $^{\circ}$ C (0 to 749 $^{\circ}$ F) for type R, S and B.  
Accuracy is  $\pm$ 3 $^{\circ}$ C between -199.9 to -100.0 $^{\circ}$ C (-199.9 to -158.0 $^{\circ}$ F) for type T and U.  
b) RTD : +/- (0.3% of reading + 1 digit) or +/- 0.8 $^{\circ}$ C (1.6 $^{\circ}$ F)  
(Within the range of whichever is larger)  
c) Voltage, Current input : +/- (0.3% of reading + 1 digit)
- (2) Insulation resistance : More than 20M $\Omega$ (500VDC) between measured terminals and ground  
More than 20M $\Omega$ (500VDC) between power terminals and ground
- (3) Dielectric Voltage : 1000VAC for one minute between measured terminals and ground  
1500VAC for one minute between power terminals and ground

## 3. Control

- (1) Control method : a) PID control (with autotuning and Active-tuning (self-tuning) function)  
• Reverse and direct action are available. (Specify when ordering.)  
• ON/OFF, P, PI and PD control is also settable.  
ON/OFF action differential gap : 2 $^{\circ}$ C( $^{\circ}$ F) (Temperature input)  
0.2% (Voltage, current input)  
b) Heat/Cool PID control (with autotuning function)  
Air cooling and water cooling type are available.  
(Specify when ordering.)
- (2) Setting range : a) Set value (SV) : Same as input range.  
b) Heat side proportional band (P)  
: 1 to span or 0.1 to span (Temperature input)  
(ON/OFF action when P=0)  
(When 0.1 $^{\circ}$ C( $^{\circ}$ F) resolution, within 999.9 $^{\circ}$ C( $^{\circ}$ F))  
0.1 to 100.0% of span (voltage, current input)  
c) Cool side proportional band (Pc)  
: 1 to 1000% of heat side proportional band (P)  
d) Integral time (I) : 1 to 3600 sec. (PD action when I=0)  
e) Derivative time (D) : 1 to 3600 sec. (PI action when D=0)  
f) Anti-reset windup (ARW)  
: 1 to 100% of heat side proportional band (P)  
(Integral action is OFF when ARW=0)  
g) Heat side proportional cycle : 1 to 100 sec.  
(No cycle setting for current output)  
h) Cool side proportional cycle : 1 to 100 sec.  
(No cycle setting for current output)  
i) Deadband/Overlap : -10 to 10 or -10.0 to +10.0 $^{\circ}$ C( $^{\circ}$ F)  
(Temperature input)  
-10.0 to +10.0% of span (Voltage, current input)  
\* Deadband is set below zero for overlap.
- (3) Control output : a) Relay contact output : 250VAC 3A (resistive load), Form C contact  
\* Both heat output and cool output are Form A contact for heat/cool PID action.  
\* Electrical life : 300,000 cycles or more (rated load)  
b) Voltage pulse output : 0/12V DC  
(Load resistance : more than 600 $\Omega$ )  
c) Current output : 4 to 20mA DC  
(Load resistance : less than 600 $\Omega$ )  
d) Triac trigger output : Zero-cross method for medium capacity triac drive (less than 100A)  
1) Load voltage : 100VAC type 200VAC type  
2) Load : Resistive load  
e) Triac output : rating : 0.5A (ambient temperature is less than 40 $^{\circ}$ C)  
\* Triac trigger output is not available for heat/cool PID control type.

## 4. Alarm (Up to 2 points) (Option)

- (1) Temperature alarm : a) Type : Deviation (High, Low, High/Low, Band)  
Process (High, Low), Set Value (High, Low)  
\* Hold action can be added to any type except set value alarm.  
b) Differential gap : 2 $^{\circ}$ C( $^{\circ}$ F) or 2.0 $^{\circ}$ C( $^{\circ}$ F) (Temperature input)  
0.2% (Voltage, current input)  
c) Output : Relay contact output 250VAC 1A (resistive load) Form A contact
- (2) Control loop break alarm (LBA)  
: a) LBA setting time : 0.1 to 200.0 min.  
\* 0.0 min. can not be set.  
b) LBA deadband : 0 to 9999 $^{\circ}$ C( $^{\circ}$ F) (Temperature input)  
0 to 100% of span (Voltage, current input)  
c) Output : Relay contact output 250VAC 1A (resistive load) Form A contact  
\* Output of control loop break alarm is output from Alarm 1 or Alarm 2 terminals.
- (3) Heater break alarm (HBA) (For single phase)  
: a) Input : Current transformer output  
CTL-6-P-N (0 to 30A)  
CTL-12-S56-10L-N (0 to 100A)  
(Specify when ordering)  
b) Heater current display range : 0.0 to 100.0A  
c) Heater current display accuracy : +/- 5% of input value or +/- 2A  
(within the range of whichever is larger)  
d) Output : Relay contact output  
250VAC 1A (resistive load) Form A contact  
\* Output of heater break alarm is output from Alarm 2 terminals.  
\* Heater break alarm is not available, when control output is a current output.

## 5. Communications Function (Option)

- (1) Communication method : RS-485 (two-wire)  
(2) Synchronous method : Start/stop synchronous type  
(3) Communication speed : 2400bps, 4800bps, 9600bps, 19200bps  
(4) Bit format : Start bit : 1  
Data bit : 7 or 8  
Parity bit : "with", or "without", even or odd in case of "with" parity  
Stop bit : 1 or 2  
(5) Maximum connection : 31 ( Address can be set from 0 to 99.)

## 6. Dustproof and waterproof (Option)

- Dustproof and waterproof protection  
CB 100 : IP 66  
CB 400/500/700/900 : IP 65  
\* Dustproof and waterproof are effective only to the front direction when installed on a panel.  
\* Dustproof and waterproof are not effective when controllers are closely spaced.

## 7. General Specifications

- (1) Supply voltage : a) AC type : 85 to 264VAC (50/60Hz common)  
(Including supply voltage variation)  
(Rating : 100 to 240VAC)  
b) 24VAC type : 21.6 to 26.4VAC  
(Including supply voltage variation)  
(Rating : 24VAC)  
c) 24VDC type : 21.6 to 26.4V DC  
(Including supply voltage variation)  
(Rating : 24VDC)
- (2) Power consumption : a) AC type : Maximum 7VA at 100VAC  
Maximum 10VA at 240VAC  
b) 24VAC type : Maximum 5VA  
c) 24VDC type : Maximum 160mA
- (3) Effect of power failure : Not affected by power failure less than 20 msec., otherwise reset to the initial status.
- (4) Memory backup : Backed up by non-volatile memory.  
Data retaining period : Approx. 10 years
- (5) Ambient temperature : 0 to 50 $^{\circ}$ C (32 to 122 $^{\circ}$ F)
- (6) Ambient humidity : 45 to 85%RH
- (7) Weight and external dimensions  
CB 900 : Approx. 340g, 96(H) X 96(W) X 100(D)mm (1/4 DIN)  
CB 700 : Approx. 290g, 72(H) X 72(W) X 100(D)mm (3/16 DIN)  
CB 500 : Approx. 250g, 48(H) X 96(W) X 100(D)mm (1/8 DIN)  
CB 400 : Approx. 250g, 96(H) X 48(W) X 100(D)mm (1/8 DIN)  
CB 100 : Approx. 170g, 48(H) X 48(W) X 100(D)mm (1/16 DIN)
- (8) Operating environment : Free from corrosive and flammable gas and dust.
- (9) Other conditions : Free from external noise, vibration, shock and exposure to direct sunlight.

## 8. Compliance with standards

- CE marked • UL recognized • CSA certified  
\* Triac trigger output type and triac output type are not CE marked, UL recognized and CSA certified.







## ■ Rear terminal layout

## ■ Rear terminal configuration

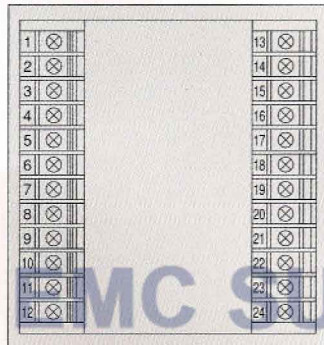
**CB 400**



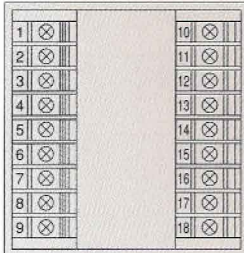
**CB 500**



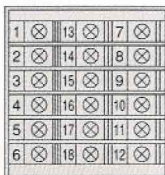
**CB 900**



**CB 700**



**CB 100**



No.	Description
1	AC 100 to 240V
2	AC 24V
	DC + 24V
Power Supply	
PID Control	
Heat/cool PID control	
Control Output	
3	(OUT1) (1) Relay contact output
4	(2) Voltage DC /Current DC output
5	(3) Triac output
6	(4) Triac trigger output
7	Alarm2
8	Alarm1
9	Alarm output
10	Measured input (1) Thermocouple
11	(2) RTD
12	(3) Voltage /Current

No.	Description
13	SG
14	T/R(A)
15	T/R(B)
RS-485 Communications	
16	
17	
18	
19	
20	
21	
22	
23	CT input for heater break alarm
24	Current transformer input

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No.	Description
1	AC 100 to 240V
2	AC 24V
	DC + 24V
Power Supply	
PID Control	
Heat/cool PID control	
Control Output	
3	(OUT1) (1) Relay contact output
4	(2) Voltage DC /Current DC output
5	(3) Triac output
6	(4) Triac trigger output
7	SG
8	T/R(A)
9	T/R(B)
RS-485 Communications	

No.	Description
10	Alarm2
11	Alarm1
12	Alarm output
13	Relay contact output
14	CT input for heater break alarm
15	Current transformer input
16	Measured input (1) Thermocouple
17	(2) RTD
18	(3) Voltage /Current

No.	Description
1	AC 100 to 240V
2	AC 24V
	DC + 24V
Power Supply	
PID Control	
Heat/cool PID control	
Control Output	
3	(OUT1) (1) Relay contact output
4	(2) Voltage DC /Current DC output
5	(3) Triac output
6	(4) Triac trigger output
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8	Alarm1
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10	Measured input (1) Thermocouple
11	(2) RTD
12	(3) Voltage /Current

No.	Description
13	SG
14	T/R(A)
15	T/R(B)
RS-485 Communications	
16	
17	CT input for heater break alarm
18	Current transformer input