

MC9

Multi channels digital temperature controller

- 4 channel / 8 channel control function
- Multi memory function (max 8 X 8)
- Heating / cooling control (4 channels)
- Contact input
- Communication function (RS485/422)



A
Temperature
Controller

●● Suffix code (4 channel)

Model	Code				Description
MC9-4	☐	☐	☐	☐	4 channels digital temperature controller dimension : 96(W) X 96(H) mm
Control type	D				Universal type
	R				Direct action (cooling action)
	W				Reverse action (heating action)
Input type	☐				Heating/Cooling control
Heating output (output 1~4)					Heating/Cooling (synchronous output)
		M			Refer to the input type code
		S			Relay contact output
		T			SSR operation output
		4			Triac operation output
Cooling output (output 5~8) (Only for MC9-4W mode)		5			4 - 20 mA DC (Current output)
			N		0 - 20 mA DC (Current output)
			M		NONE (Only control type D&R)
			S		Relay contact output
			T		SSR operation output
Optional			4		Triac operation output
			5		4 - 20 mA DC (Current output)
				N	0 - 20 mA DC (Current output)
			1		NONE
			2		AL2, AL3
Power supply voltage			3		AL2, AL3 + RS232 + contact input
			4		AL2, AL3 + RS485 / 422 + contact input
				4	AL2, AL3 + heater break
Power supply voltage				2	100 - 240 V AC 50 / 60 Hz

Suffix code (8 channel)

Model	Code	Description
MC9-8	☐ ☐ ☐ ☐ ☐ ☐	8 channel digital temperature controller. Dimension : 96(W) X 96(H) X 100(D)
Control type	D	Direct action (cooling action)
	R	Reverse action (heating action)
Input type	☐	Refer to "code" of the range and input code chart
Output 1 ~ 4	M	Relay contact output
	S	SSR operation output
	T	Triac operation output
	4	4 – 20 mA DC (Current output)
	5	0 – 20 mA DC (Current output)
Output 5 ~ 8	N	NONE (when selected, input channels 5 ~ 8 are for indication)
	M	Relay contact output
	S	SSR operation output
	T	Triac operation output
	4	4 – 20 mA DC (Current output)
Optional	5	0 – 20 mA DC (Current output)
	N	None
	2	RS232 + contact input
	3	RS485 / 422 + contact input
Power supply voltage	4	Heater break
	2	100 – 240 V AC 50/60 Hz

Specification

Input

Thermocouple	K, J, R, S, B, E, N, T, W, PL2, U, L
RTD	Pt100 Ω , KPt100 Ω
DC voltage	0 – 5 V, 1 – 5 V, 0 – 10 V, 4 – 20 mA (attach 250 Ω external resistance)
Sampling time	1 sec.
Input display resolution	Usually less than decimal points of the range
Input impedance	Min 1 M Ω (thermocouple, DC voltage input)
Effect of Allowable input resistance	Approx. 0.2 μ V/ Ω
Allowable input leading wire resistance	RTD (max 10, but resistance among 3 wires should be same)
Allowable input voltage	–2 – 5 V (thermocouple, RTD), –5 – 12 V (DC voltage)
Scaling	0.0 % ~ 100.0 % of FS
Input compensation	$\pm$ 100 % of FS
Cold junction compensation error	$\pm$ 1.5 $^{\circ}$ C (between 0 ~ 50 $^{\circ}$ C)
Input signal break detection	UP SCALE(reverse action), DOWN SCALE(forward action)

Performance

Display accuracy	Thermocouple	Bigger one between the (± 0.3 % of FS ± 1 Digit) or ± 2 °C
	RTD	Bigger one between the (± 0.3 % of FS ± 1 Digit) or ± 0.8 °C
	DC voltage	Bigger one between the ± 0.3 % of FS ± 1 Digit
Insulation resistance	Min 20 M Ω (500 V DC), measurement terminal – power terminal,	
Dielectric strength	2,300 V AC, 50 / 60 Hz, for 1 min measurement terminal – power terminal	

Control function and output

Control type	PID auto tuning
Setting all channels synchronously	Set the same value of 4 channel and 8 channel at the same time
Control operation	a) reverse action (heating)/forward action (cooling). by the "Suffix code". B) heating/cooling synchronous control (only with 4 channel)
Range setting	Same as range and input code
Contact input(DI)	Selection of RUN/STOP by contact input or control zone
Auto tuning	Auto tuning by parameter selection
Proportional band	0 (0.0) ~ max value of range
Integral time	1 ~ 3,600 sec
Differential time	1 ~ 3,600 sec
Anti Reset Wind-up	Auto, 0 ~ 100 % (Proportional band)
Slope setting	0(0.0) ~ max value of range/1min (set the slope regarding the target value)
Scan function	Display the measured value and set value depending on the channel in order
ON/OFF function	Set proportional band to "0"
Multi memory zone	Select among 8 zones within each channel
H.B.A(Heater Break Alarm)	0.0 ~ 100.0 A (possible to use with ON/OFF control and time proportional control output)
H.B.A dead zone setting	0 ~ 100 sec
LBA (Loop Break Alarm)	0.1 ~ 200.0 minute (Dead zone : 0 ~ 100 sec)
Alarm output	Max 3 contacts, parallel operation regarding all channels (Optional)
Alarm type	Selection by the parameters

● Output

Control output	Relay	Contact capacity : 1 a, 250 V AC, 3 A (Load resistance) Proportional cycle : 1 ~ 1,000 sec Time resolving power : smaller one between 0.1 % and 10 ms
	SSR	Voltage pulse : approx. more than 12 V DC (Load resistance min 600 Ω) Proportional cycle : 1 ~ 1,000 sec Time resolving power : smaller one between 0.1 % and 10 ms
	SCR	Current : 4 – 20 mA DC, 0 – 20 mA (Load resistance max 600 Ω) Accuracy : ±1.0 % of FS (4 – 20 mA range)
	Triac	200 V AC, 0.5 A (ambient temperature less than 40°C), has Zero crossing function
Alarm output (relay)	Temperature alarm (AL1,2,3)	1 a, 250 V AC, 1 A, 30 V DC 1 A (Load resistance) output point : max 3 contacts (Varies depends on optional spec)
	HBA (Heater Break Alarm)	1 a 1 contact, 250 V AC, 1 A, 30 V DC 1 A (load resistance) Measurement current : 1 – 100 A AC (Resolving power : 0.5 A, ± 5 % of FS ± 1 Digit) Heater break detection C.T : model JS81L (J&D Electronic,Co,Ltd) Accuracy : bigger one between the ±5 % of FS and ±2 A
	LBA (Loop Break Alarm)	1 a 1 contact, 250 V AC, 1 A, 30 V DC 1 A (Load resistance) Proportional cycle : 1 ~ 1,000 sec

General specification

Power Supply Voltage	100 – 240 V AC, 50 – 60 Hz
Voltage fluctuation	±10 % of the Power Supply Voltage
Power consumption	12 VA
Ambient temperature	0 ~ 50 °C
Ambient humidity	35 ~ 85 % RH (without dew condensation)
Storage temperature	-25 ~ 65 °C
Vibration	10 – 55 Hz, peak amplitude 0.75 mm for 2 hrs each in 3 axis direction
Shock	300 m/s ² , 3 times each in 3 axes direction
Weight	Approx. 700 g

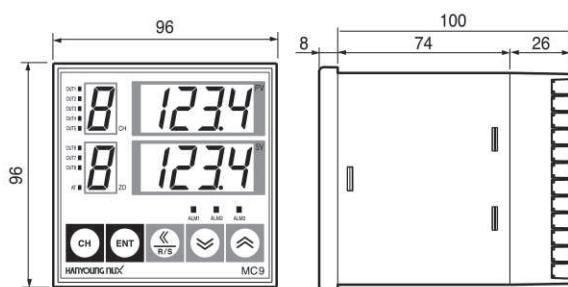
Range and input code chart

Classification	Code	Input type	Range (°C)	Accuracy
Thermocouple	K0	K	-200 ~ 1,370	Bigger one between the $\pm(0.3 \% \text{ of FS } \pm 1 \text{ Digit})$ or $\pm 2 ^\circ\text{C}$
	K1	K	-199.9 ~ 999.9	
	J0	J	-200 ~ 1200	
	J1	J	-199.9 ~ 999.9	
	E0	E	-199.9 ~ 999.9	
	E1	E	-199.9 ~ 999.9	
	T0	T	-199.9 ~ 400.0	
	R0	R	0 ~ 1700	
	R1	R	0.0 ~ 999.9	
	B0	B	0 ~ 1800	
	B1	B	0.0 ~ 999.9	
	S0	S	0 ~ 1700	
	S1	S	0.0 ~ 999.9	
	L0	L	-199.9 ~ 900.0	
	N0	N	-200 ~ 1300	
	N1	N	-199.9 ~ 999.9	
	U0	U	-199.9 ~ 400.0	
	W0	W	0 ~ 2300	
	A0	PL2	0 ~ 1390	
RTD	P0	Kpt100 Ω	-199.9 ~ 500.0	Bigger one between the $\pm(0.3 \% \text{ of FS } \pm 1 \text{ Digit})$ or $\pm 0.8 ^\circ\text{C}$
	D0	Pt100 Ω	-199.9 ~ 600.0	
DC voltage	V0	0 - 5 V	-199.9 ~ 999.9	$\pm (0.3 \% \text{ of FS } \pm 1 \text{ Digit})$
	V1	1 - 5 V	-199.9 ~ 999.9	
	V2	0 - 10 V	-199.9 ~ 999.9	

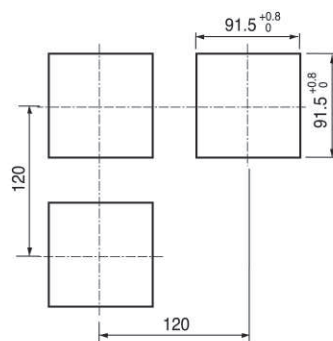
Dimension and panel cutout (unit : mm)

MC9

● Dimension

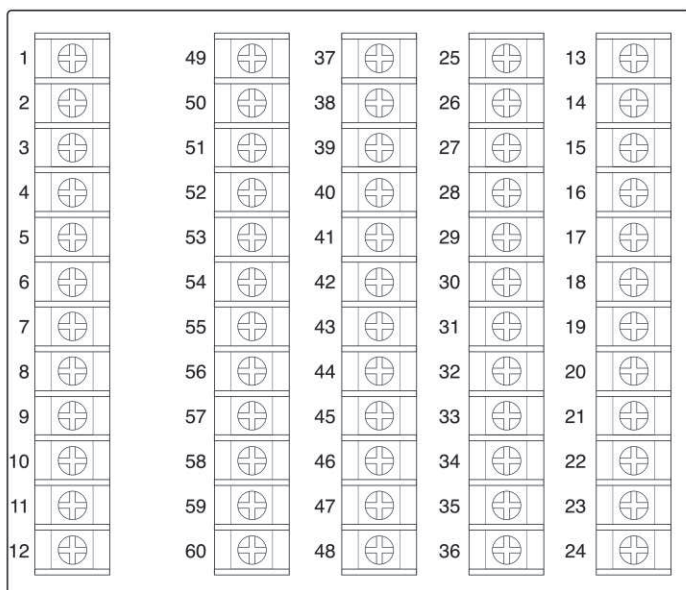


● Panel cutout



Connection diagram

■ Terminal arrangement plan



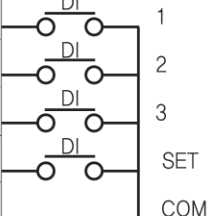
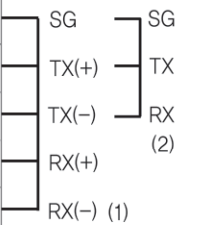
■ Output 1 ~ 4

Terminal number	Description	
1	 100 – 240 V AC	Power input
2		
3		Alarm 1 output
4		
5	 (1) (2) (3)	Output 1 (1) relay (2)SSR/current output (3)Triac
6		
7	 (1) (2) (3)	Output 2 (1) relay (2)SSR/current output (3)Triac
8		
9	 (1) (2) (3)	Output 3 (1) relay (2)SSR/current output (3)Triac
10		
11	 (1) (2) (3)	Output 4 (1) relay (2)SSR/current output (3)Triac
12		

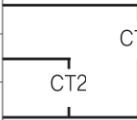
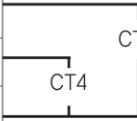
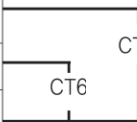
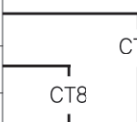
■ Output 5 ~ 8

Terminal number	Description	
49		Alarm 2 output
50		
51		Alarm 3 output
52		
53	 (1) (2) (3)	Output 5 (1) relay (2)SSR/current output (3)Triac
54		
55	 (1) (2) (3)	Output 6 (1) relay (2)SSR/current output (3)Triac
56		
57	 (1) (2) (3)	Output 7 (1) relay (2)SSR/current output (3)Triac
58		
59	 (1) (2) (3)	Output 8 (1) relay (2)SSR/current output (3)Triac
60		

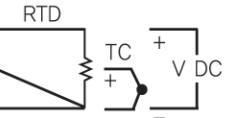
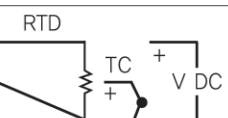
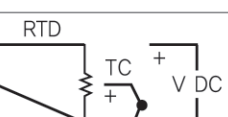
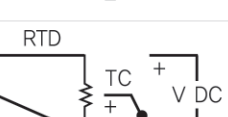
■ Option 1 (1)–DI/COM

Terminal number	Description	
37		Contact input (Run/Stop)
38		
39		Contact input (Memory Zone)
40		
41		
42		
43		COM
44		Communication (1)RS-422A /485 (2)RS-232C
45		
46		
47		
48		

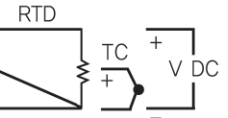
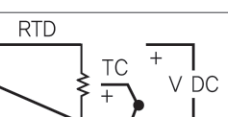
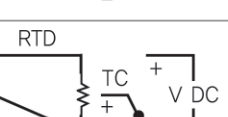
■ Option 2 (2)–HBA

Terminal number	Description	
37		CT input
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		

■ Input 1 ~ 4 channel

Terminal number	Description	
13		Channel 1 RTD TC : Thermocouple V DC : voltage
14		
15		
16		Channel 2 RTD TC : Thermocouple V DC : voltage
17		
18		
19		Channel 3 RTD TC : Thermocouple V DC : voltage
20		
21		
22		Channel 4 RTD TC : Thermocouple V DC : voltage
23		
24		

■ Input 5 ~ 8 channel

Terminal number	Description	
25		Channel 5 RTD TC : Thermocouple V DC : voltage
26		
27		
28		Channel 6 RTD TC : Thermocouple V DC : voltage
29		
30		
31		Channel 7 RTD TC : Thermocouple V DC : voltage
32		
33		
34		Channel 8 RTD TC : Thermocouple V DC : voltage
35		
36		