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)

Suffix code (4 channel)

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

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 ㎃ DC (Current output)
			5				0 – 20 ㎃ 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 ㎃ DC (Current output)
				5			0 – 20 ㎃ DC (Current output)
Optional					N		None
					2		RS232 + contact input
					3		RS485 / 422 + contact input
					4		Heater break
Power supply voltage						2	100 – 240 V AC 50/60 ㎐

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 ㎃ (attach 250 Ω external resistance)
Sampling time	1 sec.
Input display resolution	Usually less than decimal points of the range
Input impedance	Min 1 ㏁ (thermocouple, DC voltage input)
Effect of Allowable input resistance	Approx. 0.2 ㎶/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	±100 % of FS
Cold junction compensation error	±1.5 ℃ (between 0 ~ 50 ℃)
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 ℃
	RTD	Bigger one between the (±0.3 % of FS ±1 Digit) or ±0.8 ℃
	DC voltage	Bigger one between the ±0.3 % of FS ±1 Digit
Insulation resistance	Min 20 MΩ (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 ㎳
	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 ㎳
	SCR	Current : 4 – 20 ㎃ DC, 0 – 20 ㎃ (Load resistance max 600 Ω) Accuracy : ±1.0 % of FS (4 – 20 ㎃ range)
	Triac	200 V AC. 0.5 A (ambient temperature less than 40C), 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 ㎐
Voltage fluctuation	±10 % of the Power Supply Voltage
Power consumption	12 VA
Ambient temperature	0 ~ 50 ℃
Ambient humidity	35 ~ 85 % RH (without dew condensation)
Storage temperature	–25 ~ 65 ℃
Vibration	10 – 55 ㎐, peak amplitude 0.75 ㎜ for 2 hrs each in 3 axis direction
Shock	300 ㎨, 3 times each in 3 axes direction
Weight	Approx. 700 g

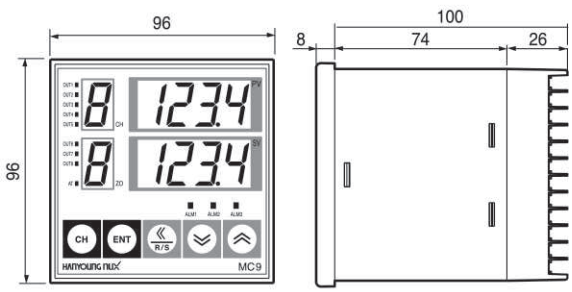
Range and input code chart

Classification	Code	Input type	Range (℃)	Accuracy
Thermocouple	K0	K	−200 ~ 1,370	Bigger one between the ±(0.3 % of FS ±1 Digit) or ±2 ℃
	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 ±(0.3 % of FS ±1 Digit) or ±0.8 ℃
	D0	Pt100 Ω	−199.9 ~ 600.0	
DC voltage	V0	0 – 5 V	−199.9 ~ 999.9	± (0.3 % of FS ± 1 Digit)
	V1	1 – 5 V	−199.9 ~ 999.9	
	V2	0 – 10 V	−199.9 ~ 999.9	

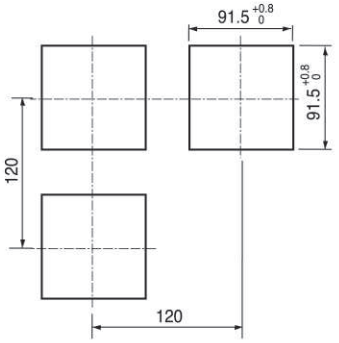
Dimension and panel cutout (unit : ㎜)

MC9

● Dimension

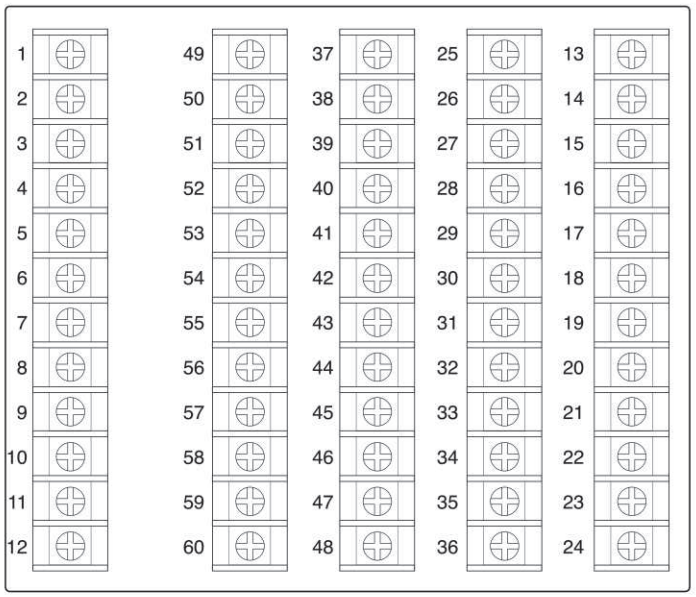


● Panel cutout

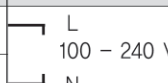
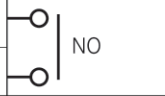
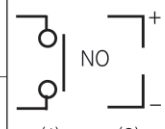
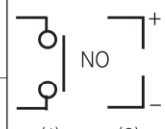
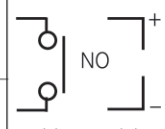
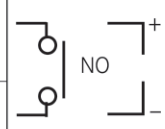


Connection diagram

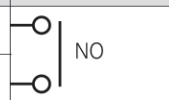
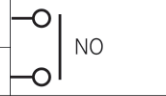
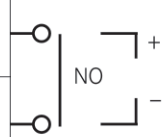
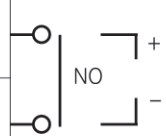
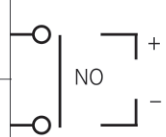
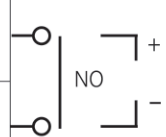
■ Terminal arrangement plan



■ Output 1 ~ 4

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

■ Output 5 ~ 8

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

■ Option 1 (1)-DI/COM

Terminal number	Description	
37	DI	Contact input
38		(Run/Stop)
39	DI 1	Contact input
40	DI 2	(Memory Zone)
41	DI 3	
42	DI SET	
43	COM	
44	SG — SG	Communication
45	TX(+) — TX	(1)RS-422A
46	TX(−) — RX	/485
47	RX(+) (2)	(2)RS-232C
48	RX(−) (1)	

■ Option 2 (2)-HBA

Terminal number	Description	
37	CT1	CT input
38	CT2	
39	COM	
40	CT3	
41	CT4	
42	COM	
43	CT5	
44	CT6	
45	COM	
46	CT7	
47	CT8	
48	COM	

■ Input 1 ~ 4 channel

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

■ Input 5 ~ 8 channel

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