

HY-4500S/4700S/5000

Analog indication temperature controller

- Proportional control or ON/OFF control
- Simple temperature setting
- Built-in auxiliary output (HY-4700)
- Plug in type
(convenient repairing, inspecting and exchanging)
- Burn out function (output OFF with sensor break)
- Control action does not get influenced even with the break down of indicator



A
Temperature
Controller

●● Suffix code

Model		Code				Description
HY-	☐	☐	☐	☐	☐	Analog indication temperature controller
Dimension	4500S					96(W) X 96(H)
	4700S					96(W) X 96(H) (auxiliary output: L.M)
	5000					72(W) X 72(H)
Control type		F				ON/OFF control (2 position control)
		P				Proportional control
Input		K				K thermocouple
		J				J thermocouple
		R				R thermocouple
		D				Resistance Temperature Detector(RTD) KPt100 Ω
		P				Resistance Temperature Detector(RTD) Pt100 Ω (IEC)
		V				1 - 5 V DC
		C				4 - 20 mA DC
Control output		M				Relay
		C				Current output (4 - 20 mA DC)
		S				SSR (12 V DC voltage pulse output)
Sub output(L.M) (apply only with the model HY-4700)		N				NONE
		O				Low action
		P				High action
		W				Low/High action
Control operation		R				Reverse action (heating control)
		D				Direct action (cooling control)
Range code						Select the standard range code

Specification

Input

Thermocouple	K, J, R
RTD	Pt100 Ω , K Pt100 Ω (139.6 Ω when temperature is 100 $^{\circ}\text{C}$)
DC voltage input	1 – 5 V DC, 4 – 20 mA DC
Input impedance	Thermocouple and DC voltage input(V) : approx. 1 M Ω
Allowable signal source resistance	Thermocouple (100 Ω max). DC voltage(2 K Ω max)
Allowable wiring resistance	RTD 10 Ω max. (but resistances among 3 wires should be same)
Allowable Input voltage	Within ± 10 V (thermocouple, RTD, DC voltage)
Cold junction compensation error	± 2.0 $^{\circ}\text{C}$ (0 ~ 50 $^{\circ}\text{C}$)

performance

Display accuracy	± 2 % of FS ± 1 Digit
Insulation resistance	20 M Ω min (500 V DC)
Dielectric strength	2,000 V AC, 50/60 Hz, for 1min, (between the different recharging part from each other)

Control function and output

Control type	Proportional control, ON/OFF control (selected by the composition of suffix code)
Control action	Reverse action or direct action (selected by composition of suffix code)
Range setting	Same as the input range chart
Proportional band	1 ~ 10 % of FS (HY-4500 variable) (Model HY-4700, and HY-5000 are fixed with 3 % of FS)
Manual reset (M.R)	± 10 % of M.V(amount of output)
Proportional cycle	Approx. 25 ~ 30 sec(relay output), approx. 2 ~ 4 sec(SSR output)
Hysteresis	Fixed to approx. 2 % of FS, (ON/OFF control)
Input signal break detection	When exceeding 10 $^{\circ}\text{C}$ from the range limit, output becomes OFF.
Auxiliary output (L.M)	Only with the Model HY-4700. High, low, high/low action (refer to suffix code)
Auxiliary output setting range	approx. 50 $^{\circ}\text{C}$ regarding the main setting (400 $^{\circ}\text{C}$ range standard)
Auxiliary output hysteresis	1 $^{\circ}\text{C}$ fixed

● Output

Control output	Relay output	Contact : 1 c, 250 V AC, 3 A (resistive load)
	SSR	Approx. 12 V DC (resistive load min 800 Ω)
	Current	4 – 20 mA DC(resistive load max 600 Ω)
Sub output(L,M)	Relay	Only with Model HY-4700. contact : 1 c, 250 V AC 3 A (resistive load)

General specification

Power Supply Voltage	110/220 V AC 50/60 Hz
Voltage fluctuation	±10 % of power supply voltage
Power consumption	3 VA max
Ambient temperature	0 – 50 °C
Ambient humidity	35 ~ 85 % RH (without dew condensation)
Storage temperature	–25 ~ 65 °C
Vibration resistance	10 – 55 Hz, peak amplitude 0.76 mm, for 1 hr each in 3 axis direction
Shock resistance	300 %, direction to 6 each 3 times
Weight	HY-5000 : 450 g, HY-4500S : 600 g, HY-4700S : 800 g

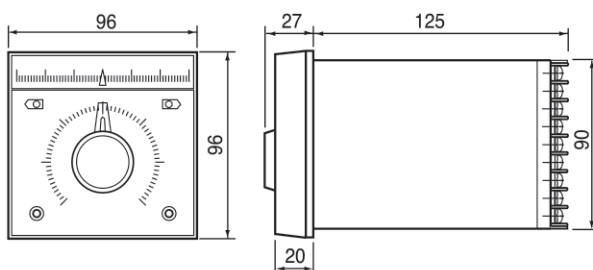
Range and input code chart

Code	HY-4500S, HY-4700S		HY-5000	
	Input	Range(°C)	Input	Range(°C)
1	Pt100 Ω	–50 ~ 50	Pt100 Ω	–50 ~ 50
3	Pt100 Ω	–50 ~ 100	Pt100 Ω	–0 ~ 100
5	Pt100 Ω	0 ~ 100	K, Pt100 Ω	0 ~ 200
6	–	–	K, Pt100 Ω	0 ~ 300
7	K, Pt100 Ω	0 ~ 200	K, Pt100 Ω	0 ~ 400
8	K, Pt100 Ω	0 ~ 300	K	0 ~ 600
9	K, J, Pt100 Ω	0 ~ 400	K	0 ~ 800
10	K	0 ~ 600	K	0 ~ 1200
11	K	0 ~ 800	–	–
13	K	0 ~ 1200	–	–
14	R	0 ~ 1600	–	–

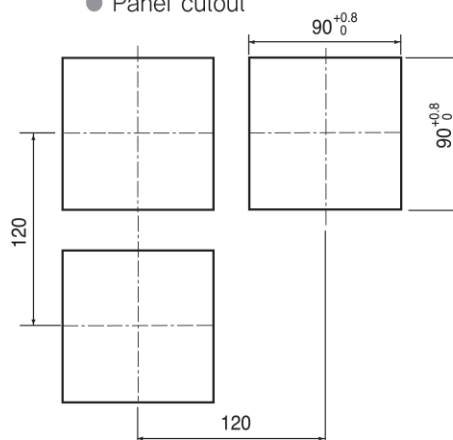
 Dimension and panel cutout (Unit : mm)

HY-4500S, 4700S

● Dimension

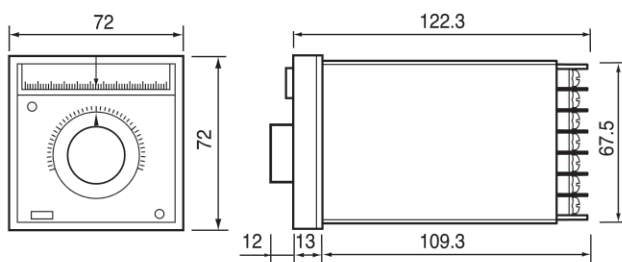


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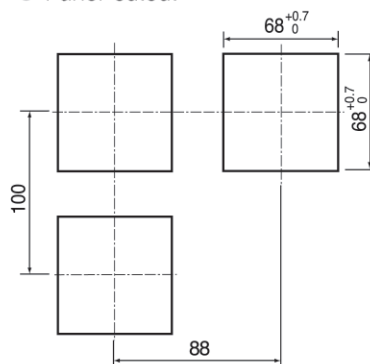


HY-5000

● Dimension

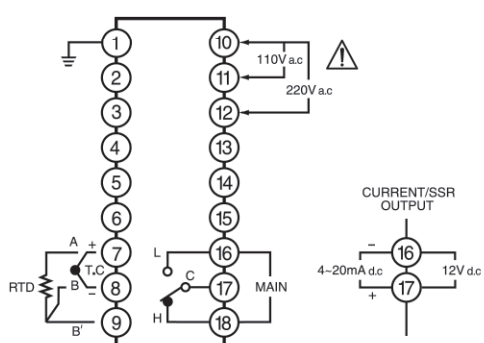


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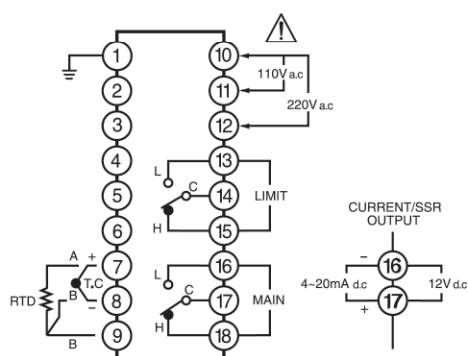


●● Connection diagram

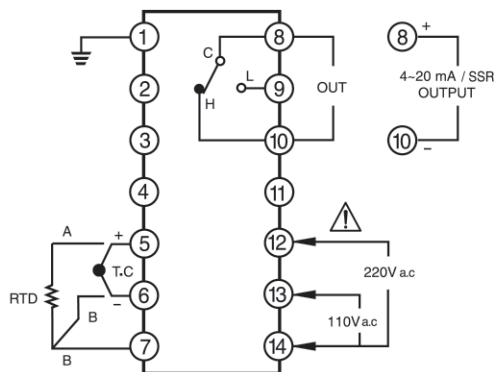
HY-4500S



HY-4700S



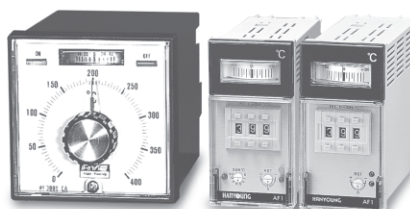
HY-5000



HY-3000 / AF1

Deviation indicating temperature controller

- Proportional control or ON/OFF control
- Simple temperature setting
- Burn out function
(output OFF with sensor break)
- Control action does not get influenced
by the break down of indicator



A
Temperature
Controller

● Suffix code

Model		Code				Description		
Dimension	HY-3000	☐	☐	☐	☐	☐	96X96	Deviation indicating temperature controller
	AF1-						48X96	
Control type		F					ON/OFF control (2 position control)	
		P					Proportional control	
Input		K					K thermocouple	
		J					J thermocouple	
		P					Resistance Temperature Detector(RTD) Pt100 Ω (IEC)	
		V					1 – 5 V DC	
		C					4 – 20 mA DC	
Control output		M					※ Relay	
		C					※ Current output (4 – 20 mA DC)	
		S					SSR (12 V DC voltage pulse output)	
Sub output(SUB) (only with model AF1)		N					※ NONE	
		O					※ High action	
		P					Low action	
		W					※ High/Low action	
Control operation		R					※ Reverse action (heating control)	
		D					※ Direct action (cooling control)	
Range code							Select the standard range code	

※ Applied only to the AF1

Specification

Input

Thermocouple	K, J
RTD	Pt100 Ω , KPt100 Ω (139.6 Ω when temperature is 100 $^{\circ}\text{C}$)
DC voltage input	1 – 5 V DC 4 – 20 mA DC (only with AF1)
Input impedance	Thermocouple and DC voltage input approx. 1 M Ω
Allowable signal source resistance	Thermocouple (100 Ω max). DC voltage (2 k Ω max)
Allowable wiring resistance	RTD 10 Ω max. (but resistances among 3 wires should be same)
Allowable input voltage	Within ± 10 V (thermocouple, RTD, DC voltage).
Cold junction compensation error	± 2.0 $^{\circ}\text{C}$ (0 ~ 50 $^{\circ}\text{C}$)

Performance

Display accuracy	± 2.5 % of FS (HY-3000), ± 1.0 % of FS (AF1)
Insulation resistance	20 M Ω min (500 V DC)
Dielectric strength	2,000 V AC 50/60 Hz, for 1min, (between the different recharging part from each other)

Control function and output

Control type	Proportional control, ON/OFF control (selected by composition of suffix code)
Control action	Reverse action or direct action (selected by composition of suffix code)
Range setting	Same as the input range chart
Proportional band	HY-3000 : ± 2.5 % of FS (Fixed), AF1 : ± 3 % of FS (Fixed)
Manual reset(M.R)	± 10 % of M.V (amount of output). only with Model AF1
Proportional cycle	Approx. 25 ~ 30 sec (relay output), approx. 2 ~ 4 sec (SSR output)
Hysteresis	Fixed to approx. 2 % of FS, (ON/OFF control, 400 $^{\circ}\text{C}$ standard)
Input signal break detection	When exceeding the range limit, output becomes OFF.
Sub output (SUB)	Only with Model AF1. High, low, high/low action (refer to suffix code)
Sub output setting range	Approx. 50 $^{\circ}\text{C}$ regarding main setting (400 $^{\circ}\text{C}$ range standard)
Sub output hysteresis	1 $^{\circ}\text{C}$ fixed

Output

Control output	Relay output	Contact : 1 a, 1 b, 250 V AC. 3 A(resistive load) (HY-3000), 5A (AF1)
	SSR	Approx. 12 V DC (resistive load min 800 Ω)
	Current	4 – 20 mA DC (resistive load max 600 Ω)
Sub output	Relay	Only with Model AF1. contact : 1a, 250 V AC. 3 A (resistive load)

General specification

Power Supply Voltage	110/220 V AC 60 Hz
Voltage fluctuation	±10 % of the power supply voltage
Power consumption	3 VA max
Ambient temperature	0 ~ 50 °C
Ambient humidity	35 ~ 85 % RH (without dew condensation)
Storage temperature	-25 ~ 65 °C
Vibration resistance	10 ~ 55 Hz, peak amplitude 0.76 mm, for 1hr each in 3 axis direction
Shock resistance	300 %g
Weight	400 g (HY-3000), 350 g (AF1)

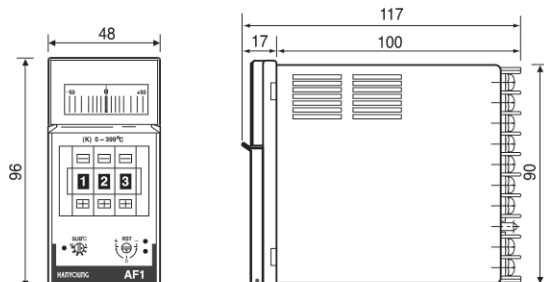
Range and input code chart

Code	HY-3000		AF1	
	Input	Range(°C)	Input	Range(°C)
1	—	—	Pt100 Ω	-99 ~ 99
3	Pt100 Ω	-50 ~ 100	—	—
4	K, J, Pt100 Ω	0 ~ 100	Pt100 Ω	0 ~ 99
5	K, J, Pt100 Ω	0 ~ 200	K, Pt100 Ω	0 ~ 199
6	K, J, Pt100 Ω	0 ~ 300	K, Pt100 Ω	0 ~ 299
7	K, J, Pt100 Ω	0 ~ 400	K, Pt100 Ω	0 ~ 399
8	K	0 ~ 600	—	—
9	K	0 ~ 800	—	—
11	K	0 ~ 1200	—	—

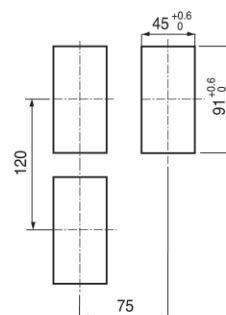
 Dimension and panel cutout (Unit : mm)

AF1

● Dimension

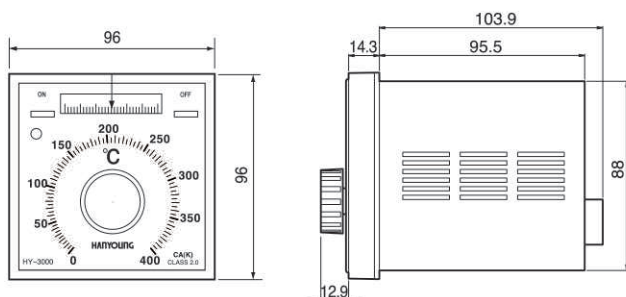


● Panel cutout

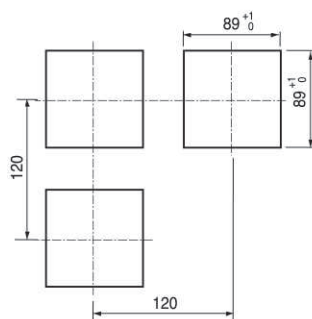


HY-3000

● Dimension

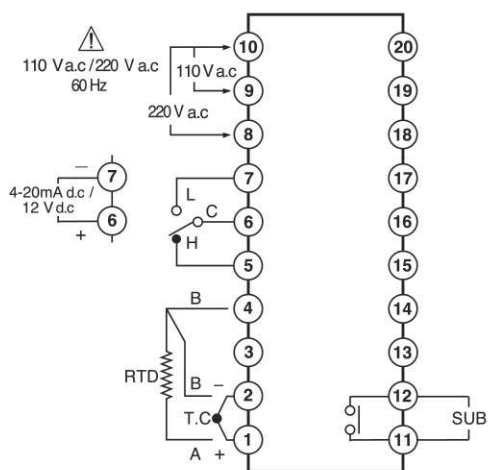


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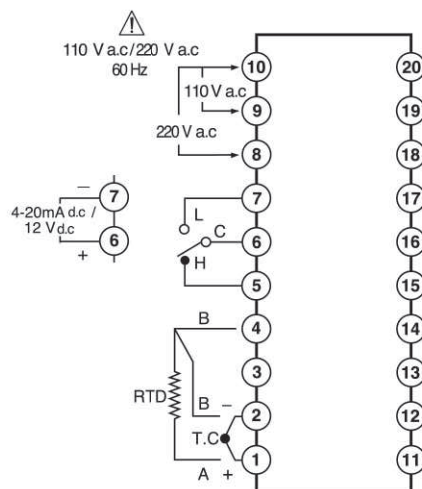


● Connection diagram

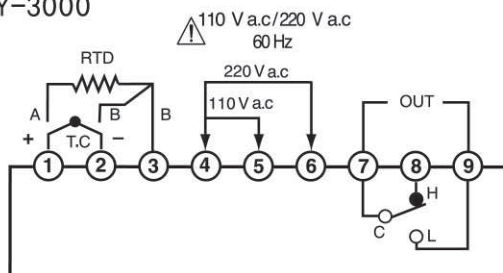
AF1(built in alarm output)



AF1



HY-3000



HY-1000/2000/ND4

Non-indicating temperature controller

- Proportional control or ON/OFF control
- Simple temperature setting
- Plug in type
(convenient repairing, inspecting and exchanging)
- Burn out function (output OFF with sensor break)
- Strong durability from the vibration and shock so possible to install directly to the machine



A
Temperature
Controller

●● Suffix code

Model	Code						Description
HY-1000	☐	☐	☐	☐	☐	☐	72(W) X 72(H) mm
HY-2000							96(W) X 96(H) mm
ND4							48(W) X 48(H) mm
Control type	F						ON/OFF control (2 position control)
	P						Proportional control
Input	K						K thermocouple
	J						J thermocouple
	P						Resistance Temperature Detector (RTD) Pt100 Ω (IEC751)
Control output	M						Relay
Alarm output	N						None (*.Model ND4 does not display)
Control action	R						Reverse action (heating control)
	D						Direct action (cooling control)
Range code							Select the standard range code
Terminal						T	ND4 terminal type

※ ND4 : Please select power voltage (110 V AC or 220 V AC)

●● Specification

Input	
Thermocouple	K, J (J type only for HY-2000)
RTD	Pt100 Ω (IEC751)
Input impedance	Approx. 1 M Ω (thermocouple input)
Allowable signal source resistance	100 Ω max (thermocouple input)
Allowable wiring resistance	RTD 10 Ω max. (but resistances among 3 wires should be same)
Allowable input voltage	Within ± 10 V (thermocouple, RTD, DC voltage)
Cold junction compensation error	± 2.0 $^{\circ}\text{C}$ (0 ~ 50 $^{\circ}\text{C}$)

Control function and output

Control type	Proportional control, ON/OFF control (selected by the composition of suffix code)
Control action	Reverse action or direct action (selected by composition of suffix code)
Range setting	Same as the input range chart
Proportional band	3 % of FS (Fixed)
Proportional cycle	Approx. 25 ~ 30 sec (relay output), approx. 2 ~ 4 sec (SSR output)
Hysteresis	Fixed to approx. 2 % of FS, (ON/OFF control, 400 °C Standard)
Input signal break detection	When exceeding the range limit, output becomes OFF.
Control output	Relay (1 c, 250 V AC 3 A resistive load)

General specification

Power supply voltage	110 / 220 V AC 60 Hz (ND4 : 110 V AC or 220 V AC).
Voltage fluctuation	±10 % of power voltage
Power consumption	3 VA max
Insulation resistance	Min 20 M Ω (500 V DC)
Dielectric strength	2,000 V AC 50/60 Hz, for 1 min (between the different recharging part from each other)
Ambient temperature	0 ~ 50 °C
Ambient humidity	35 ~ 85 % RH (without dew condensation)
Storage temperature	-25 ~ 65 °C
Vibration resistance	10 ~ 55 Hz, peak amplitude 0.76 mm, for 1hr each in 3 axis direction
Shock resistance	300 m/s ²
Weight	HY-1000 : 400 g, HY-2000 : 400 g, ND4 : 200 g

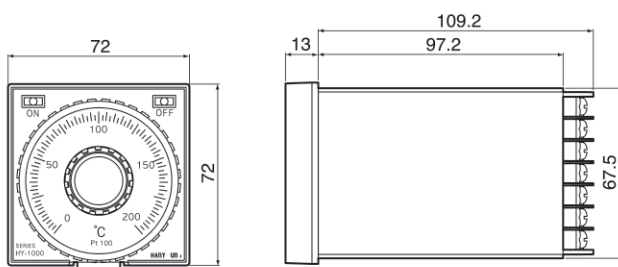
Range and input code chart

Code	HY-2000		HY-1000		ND4	
	Input	Range(°C)	Input	Range(°C)	Input	Range(°C)
1	—	—	Pt100 Ω	-50 ~ 50	Pt100 Ω	-50 ~ 50
2	Pt100 Ω	-50 ~ 100	—	—	Pt100 Ω	-100 ~ 100
3	—	—	Pt100 Ω	0 ~ 100	Pt100 Ω	0 ~ 100
4	K, J, Pt100 Ω	0 ~ 100	—	—	—	—
5	K, J, Pt100 Ω	0 ~ 200	K, Pt100 Ω	0 ~ 200	K, Pt100 Ω	0 ~ 200
6	K, J, Pt100 Ω	0 ~ 300	K, Pt100 Ω	0 ~ 300	K, Pt100 Ω	0 ~ 300
7	K, J, Pt100 Ω	0 ~ 400	K, Pt100 Ω	0 ~ 400	K, Pt100 Ω	0 ~ 400
8	K	0 ~ 600	K	0 ~ 600	—	—
9	K	0 ~ 800	K	0 ~ 800	—	—
10	—	—	K	0 ~ 1200	—	—
11	K	0 ~ 1200	—	—	—	—

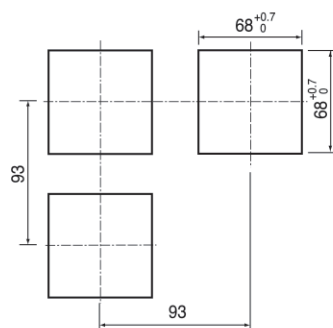
Dimension and panel cutout (Unit : mm)

HY-1000

Dimension

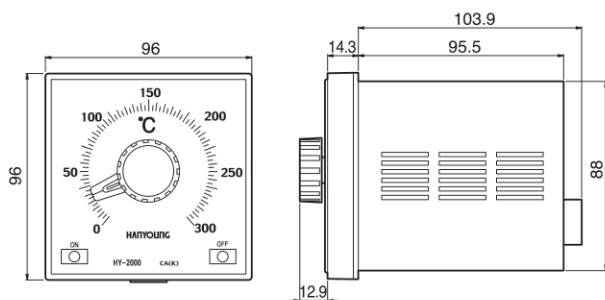


Panel cutout

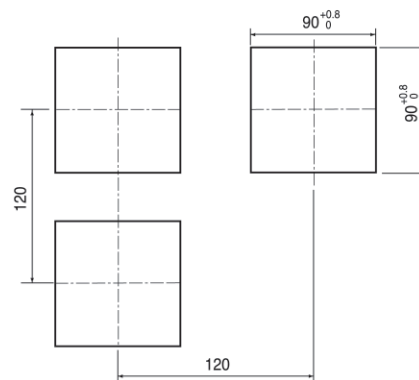


HY-2000

Dimension

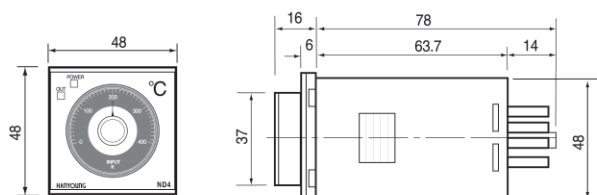


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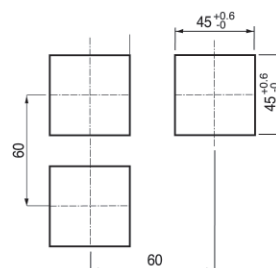


ND4 (Socket type)

Dimension

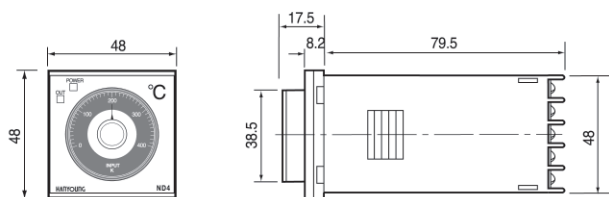


Panel cutout

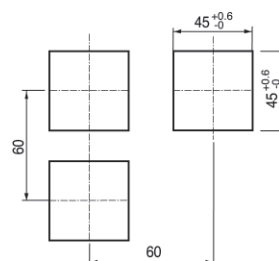


ND4 (Terminal type)

● Dimension

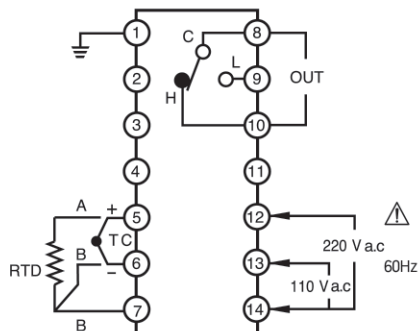


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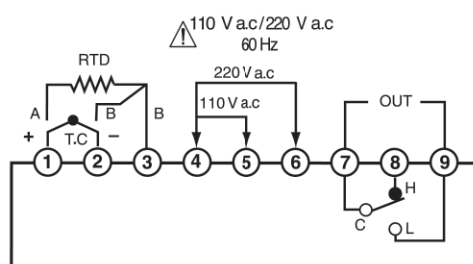


●● Connection diagram

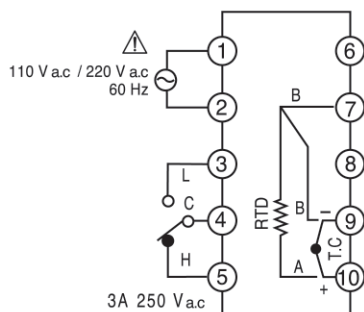
HY-1000



HY-2000



ND4 (Terminal type)



ND4 (Socket type)

