

# HY series

## INSTRYCTION MANUAL

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MK2101KE220427

Thank you for purchasing HANYOUNG product. please check whether the product is the exactly same as you ordered. before using the product, please read this instruction manual carefully. please keep this manual where you can view at any time.

## Safety information

Before using the product, please read the safety information thoroughly and use it properly. Alerts declared in the manual are classified to danger, warning and caution by their criticality

	<b>DANGER</b>	Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
	<b>WARNING</b>	Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
	<b>CAUTION</b>	Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury

### DANGER

• There is a danger of occurring electric shock in the input/output terminals so please never let you body or conductive substance is touched

### WARNING

- If there is a concern about a serious accident caused by a malfunction or abnormality of this product, please install an external protection circuit and device a scheme for preventing an accident.
- This product does not contain an electric switch or fuse, so the user needs to install a separate electric switch or fuse externally. (Fuse rating : 250 V 0.5 A)
- To prevent deflection or malfunction of this product, apply a proper power voltage in accordance with the rating.
- To prevent electric shock or malfunction of product, do not supply the power until the wiring is completed.

- Since this product is not designed with explosion protective structure, do not use it any place with flammable or explosive gas
- Do not decompose, modify, revise or repair this product. This may be a cause of malfunction, electric shock or fire.
- Reassemble this product while the power is OFF, otherwise, it may be a cause of malfunction or electric shock.
- If you use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
- There is a possibility of occurring electric shock so please use this product after installing it on to a panel while it is operating.

### CAUTION

- The contents of this manual may be changed without prior notification.
- Before using the product you purchased, make sure that it is exactly what you ordered.
- Make sure that there is no damage or abnormality of the product during the delivery.
- Make sure that there is no damage or abnormality of the product during the delivery.
- Use this product within the range of the operating ambient temperature, 0 ~ 50 °C (When it is closely installed max 40°C) and ambient humidity, 35 ~ 85 %RH (No condensation).
- Do not use this product at any place with occurring corrosive (especially noxious gas or ammonia) or flammable gas.
- Do not use this product at any place with direct vibration or impact.
- Do not use this product at any place with liquid, oil, medical substances, dust, salt or iron contents (use at pollution level 1 or 2)
- Do not polish this product with substances such as alcohol or benzene. (use neutral detergent.)
- Do not use this product at any place with a large inductive difficulty or occurring static electricity or magnetic noise.
- Do not use this product at any place with possible thermal accumulation due to direct sunlight or heat radiation.
- Install this product at place under 2,000 m in altitude.
- When the product gets wet, the inspection is essential because there is danger of an electric leakage or fire
- In case of inputting thermocouple, use a compensating cable. (if using a normal wire, there is a possibility of occurring temperature error.)
- For R.T.D input, use a cable which is a lead wire has small resistances and resistances of there wires shall be the same. (if the there wires have different resistances then there will be a temperature error.)
- To avoid an effect of inductive noise to input signal cables, use the product after separating the input signal cables from power, output and load cables.
- Separate an input signal cable from an output signal cable, if separating is not possible, please use the input signal cable after shielding it.
- Use non-earth sensor with thermocouple. (in case of using earth sensor, there is a possibility of occurring malfunction caused by a short circuit.)
- If there is excessive noise from the power supply, using insulating transformer and noise filter is recommended.

- Noise filter must be attached to a panel which is already connected to a ground and the wire between the filter output side and power supply terminal must be short as possible.
- If twisting the power cables closely together then it is effective against noise.
- If the alarm functions are not properly set then it will not be output when the product is malfunctioning, therefore, make sure its movements are properly working before the operation.
- Turn the power OFF when replacing a sensor.
- Use an auxiliary relay in case of high frequent operation such as proportional operation or etc. its life span will be shorter if connecting a load without permissible rating of output relay. in this case, using SSR output type is recommended.
- Using electromagnet switch : proportional cycle : set it above 20 sec
- Life span of contact point output : mechanical life span : above 10 million times (with no load) electrical life span : 100 thousand times (250 V a.c. 3 A : with the rated load)
- Do not connect anything to the unused terminals.
- After checking the polarity of terminal, connect wires at the correct position.
- When this product is connected onto a panel, use a circuit breaker or switch approved with IEC60947-1 or IEC60947-3.
- Install a circuit breaker or switch at near place for convenient use.
- Write down on a label that if the circuit breaker or switch is operating then the power will be disconnected since the circuit breaker or switch is installed.
- For the continuous and safe use of this product, the periodical maintenance is recommended.
- Some parts of this product have limited life span, and others are changed by their usage.
- The warranty period for this product including parts is one year if this product is properly used.
- When the power is on, the preparation period of contact output is required. in case of using signals of external interlock circuit or etc., use it with a delay relay.
- In case of replacing this unit with a spare unit, make sure its compatibility because its operation can be different by different parameter settings even though the model name is the same.
- Before using a temperature controller, there should be a temperature difference between PV of the temperature controller and the actual temperature so please operate the temperature controller after compensating the temperature difference appropriately.

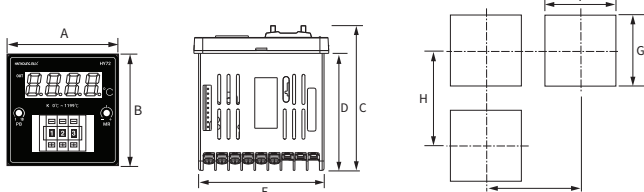
## Suffix code

Model	Code	Description
HY-	<input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Digital temperature controller
Description	48	48(W) X 48(H) mm
	72	72(W) X 72(H) mm
	8000	96(W) X 96(H) mm
	8200	96(W) X 96(H) mm
Input	K	K thermocouple
	P	RTD, Pt 100 Ω (IEC)
Control output	M	Relay contact output
Alarm output	N	None
	O	High alarm (Only for HY-8200 model)
Control direction	R	Reverse action (Heating control)
Power supply voltage	A	100 - 240 V a.c. 50 - 60 Hz
Range code	<input type="checkbox"/>	Refer to the range and input code

※ Alarm output is available only for HY-8200 model  
 ※ Default set by Proportional control.

(Unit : mm)

## Dimension and panel output



Model	A	B	C	D	E	F	G	H	I
HY-48	48	48	109.6	100	44.8	45 <sup>+0.5</sup> <sub>-0</sub>	45 <sup>+0.5</sup> <sub>-0</sub>	Above 60	Above 60
HY-72	72	72	77.4	62.5	67	67.5 <sup>+0.5</sup> <sub>-0</sub>	67.5 <sup>+0.5</sup> <sub>-0</sub>	Above 100	Above 83
HY-8000	96	96	77.4	62.5	91.6	92 <sup>+0.5</sup> <sub>-0</sub>	92 <sup>+0.5</sup> <sub>-0</sub>	Above 117	Above 117
HY-8200	96	96	75.1	62.5	91.6	92 <sup>+0.5</sup> <sub>-0</sub>	92 <sup>+0.5</sup> <sub>-0</sub>	Above 117	Above 117

## Specification

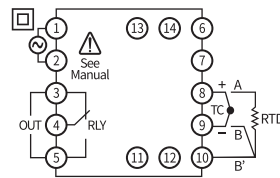
Model	HY-48	HY-72	HY-8000	HY-8200
Input	Thermocouple input	TC-K		
	Reference junction compensation accuracy	±1.5 °C (within -10 ~ 50 °C)		
	RTD input	Pt100 Ω		
	Allowable wiring resistance	10 Ω or less, but the resistance between 3 wires should be the same)		
Input sampling cycle	500 ms			
Control output	Output type	Relay : 1C, 250 V a.c. 5A		
	Control type	ON/OFF control, Proportional control (Selectable by internal DIP switch)		
	Proportional band	1 ~ 10 °C		
	Manual reset (MR)	0 ~ 100 %		
	Control cycle	20 sec		
	Hysteresis	2 °C		
Alarm output	Output acting	Reverse acting(heating)		
	Alarm type	Model HY-8200 only. High limit alarm		
	Output type	Relay : 1C, 250 V a.c. 5A		
Power supply	Hysteresis	2 °C		
	Power supply voltage	100 - 240V a.c. 50 - 60Hz		
	Voltage fluctuation rate	± 10% of power supply voltage		
	Insulation Resistance	Min. 20 MΩ, 500 V d.c.		
	Dielectric strength	3,000 V a.c., 50/60 Hz for 1 minute (between 1st and 2nd terminal)		
Power consumption	2.1VA	2.5VA	2.6VA	3.6VA
Display accuracy	±1% of FS ±1 Digit			
Ambient temperature/humidity	0 ~ 50 °C, 35 ~ 85 % RH (without condensation)			
Storage temperature	-25 ~ 65 °C			
Weight (g)	156	164	222	232

## Range and input code

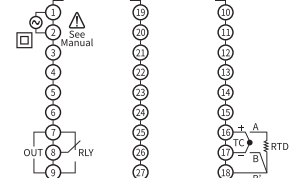
Classification	Code	Input	Range (°C)			
			HY-48	HY-72	HY-8000	HY-8200
Thermocouple	04	TC-K	0 ~ 399			
	12		0 ~ 1199			
RTD	02	Pt100 Ω	0 ~ 199			
	03		0 ~ 399			
	04		0 ~ 399			

## Connection diagram

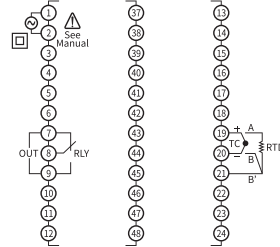
### HY-48



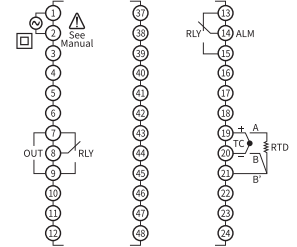
### HY-72



### HY-8000



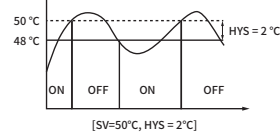
### HY-8200(Built-in alarm output)



## Terminology & function explanation

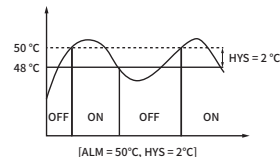
### Heating control (ON/OFF)

- If the current temperature is lower than SV (Set Value), the main output relay is 'ON', and if it is high, it is 'OFF'
- The HYS value of heating control is fixed at 2 °C



### High limit alarm output

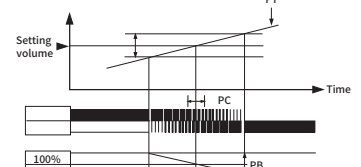
- If the current temperature is higher than the ALM set temperature, the alarm output relay turns 'ON', and if it is low, it turns 'OFF'.
- HYS value of high limit alarm output is fixed at 2 °C.



### Proportional control(PB)

- For proportional control : if the proportional band (PB) is narrow, then the output's variable width will become smaller so that the time which the controlling temperature (PT) is approaching to SV is fast. also, OFF-set (deviation) becomes small. however, if PB is too narrow, then there is overshoot or hunting. PB can be set within the max range of 1 ~ 10 °C. if turn the PB volume in clockwise then PB gets larger. if turn the PB volume in counterclockwise then PB gets smaller.

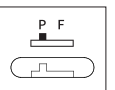
### Proportional control



- Proportional control is that an output capacity regarding a setting value (SV) is proportionally operated by a deviation. the width which the output is varied within 0-100% is called proportional band(PB). therefore, for reverse action, if PT = present (process) temperature, PB = proportional band
- PT < PB → Output capacity 100 %
- PT > PB → Output capacity 0 %, PT = PB → Output capacity 50 %
- ※ PT : Present(process) temperature, PC : Proportional cycle, SV : Setting value(temperature), PB : Proportional band

### Control output selection

- Control output can be selected by the switch on the left side of the product.
- The switch operates is P: proportional control, F: ON OFF control.
- ※ Even if you change the control output selection switch after turning on the product, The output operation is not changed.



### Manual Reset (MR)

- For proportional control, when the controlling temperature (PT) and SV are the same, it generates 50 % of output so that there is constant error(normal deviation) by heat capacity or etc. of a controlling target. To eliminate this matter, change the output
- Display value < setting value : turn the volume in clockwise.
- Display value > setting value : turn the volume in counterclockwise.