

Digital temperature controller

KF series**INSTRUCTION MANUAL**

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

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HEAD OFFICE

Safety information

Alerts declared in the manual are classified to Danger, Warning and Caution by their criticality

	DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
	WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
	CAUTION	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 your 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 devise 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: 250V 0.5A)
- 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 onto a panel while it is operating.
- Since this product is not designed as a safely used device the user must install double safety equipment when this product is used for equipment with possible fatal accident or large property damage.

Caution

- The contents of this manual may be changed without prior notification.
- 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 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 2,000m 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 resistance and resistances of three wires shall be the same. (If the three 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. The 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.
- Turn the power OFF when replacing a sensor.
Life Span of Contact Point Output: above 10 million times (with no load)
- When this product is connected onto a panel, use a circuit breaker or switch approved with IEC947-1 or IEC947-3.
- The warranty period for this product including parts is one year if this product is properly used.
- Before using a temperature controller, there could 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.

Standard Range Code

Code NO.	INPUT	Temp.Range	Code NO.	INPUT	Temp.Range
2	Pt	-99 ~ 99	11	K	0 ~ 999
4	4 - 20 mA	0 ~ 99	12 *	K	0 ~ 1199
	1 ~ 5 V	0 ~ 99	13 *	PR(R)	600 ~ 1699
8	Pt, K, J	0 ~ 399			

* Code No, 12 & 13 are not available for KF2, KF4

Suffix Code

Model	Code	Information	
KF	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Digital temperature controller	
	2	48(W) × 96(H) mm	
	4	48(W) × 48(H) mm	
	7	72(W) × 72(H) mm	
Dimension	9	96(W) × 96(H) mm	
	Control type	P	Proportional control and ON/OFF control (Selectable by internal switch)
		O	Indicator (Only for indicator)
	Input	K	K thermocouple
J		J thermocouple	
R		R thermocouple	
D		RTD KP100 Ω	
P		RTD Pt100 Ω (IEC)	
V		1 - 5 V d.c	
Control output	C	4 - 20 mA d.c	
	M	Relay	
	S	S.S.R (Voltage pulse output, 12 V d.c)	
Alarm output (Model KF4 excluded)	N	None	
	O	High alarm	
	P	Low alarm	
	W	High/Low alarm	
Control action	R	Reverse action (Heating control) ※ Selectable by the internal deep switch	
	D	Direct action (Cooling control) ※ KF4 need separate order	
Range code		Refer to the range and input code	

Specification

Setting Accuracy	Same as display Value.
Display Accuracy	Max. ±1.0 % of Max. range.
Sensitivity(ON/OFF)	1 ~ 20 °C of Max. Range (by PB)
Proportional band	0.1 ~ 1.0 % of Max. Range (Adjustable)
Proportional Cycle	Relay output : about 20 sec. SSR Output : about 2 sec.
Reset range	PB range
Dielectric strength	2000 V a.c 50 Hz for 1 min
Life expectancy	Mechanical : Min.10,000,000 times
	Electrical : Min.100,000 times(250 V a.c 5A resistive load)
Power supply voltage	100 - 240 V a.c (±10 %), 50 - 60 Hz
Tolerable Variation of Power Supply	±10 % of Power Supply.
Power Consumption	about 3 VA
Input	Thermocouple, RTD(Pt100 Ω), 4 - 20 mA d.c
Control method	Proportional Control, ON/OFF
Control Output	Relay : 250 v a.c 5A (Resistive load)SPDT
	SSR : Voltage Pulse 12 V d.c (50 mA max)
	Current : 4 - 20 mA d.c(Resistive load 600Ω max)
External input resistance	T/C : 100 Ω max for both ways, RTD : 10Ω max per wire
Operating ambient temp./humid	0 ~ 50 °C / 35 ~ 85 R.H.
Weight	about 384 g (including fixing unit)

Use of Front Volume control knob

■ Proportional band volume (P.B)

• Proportional Control

: Variable width gets narrower when proportional band gets narrower, ultimately causing offset (variation) to get smaller as controlling temperature reaches the set value faster. However, too much of narrowness could result in overshoot or hunting. KF 90's proportional band can be adjusted between 0.0 ~ 10.0 % and when PB volume is turned clockwise, sensor detecting temperature temporarily disappears from the PV screen and the proportional band value is indicated. When turning the PV volume clockwise is stopped, PV screen once again indicates the sensor detecting temperature.

• ON-OFF Control

: In case of selecting ON-OFF Control, adjustment sensitivity (hysteresis) from PV volume varies between 1 ~ 20 °C.

- **Reset Volume (M,R)**
In proportional control, fixed error (standard deviation) occurs in set values even when stable condition is reached by the heat capacity and heater capacity of controlling object. In order to resolve such error, output quantity is changed with the reset volume.

- **Process Value < Set Value**
: Turn the volume in + direction when the sensor temperature is indicated lower for the process value than the set value. At this moment, the sensor temperature on the PV screen disappears temporarily and the value of MR is indicated between 0 ~ 50 %.
- **Process Value > Set Value**
: Turn the volume in - direction when the sensor temperature is indicated higher for the process value than the set value. At this moment, the sensor temperature on the PV screen disappears temporarily and the value of MR is indicated between -50 ~ 0 %, (+/-50 % value refers to the output quantity indicated on the PV screen of M,R volume.)

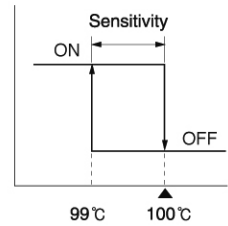
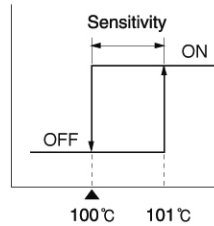
Explanation on Terminology & Functions

■ Selection of Proportional Control and ON/OFF Control

Adjustment action P mode of Type KF Series allows the selection between time-sharing proportional control and On/Off control method using an internal deep switch.

• Switch Location :

Facing the product from the front side
Switch of KF2 and KF9 is located on the top part of left PCB.
Switch of KF4 and KF7 is located on the lower part of left PCB.



Ex.) In the temperature controller of temperature range between 0 ~ 400 °C, if the set up is 100 °C with the adjustment sensitivity is 1 °C, it is Off at 100 °C and On at 101 °C.

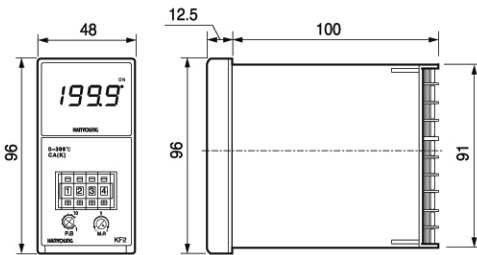
Ex.) In the temperature controller of temperature range between 0 ~ 400 °C, if the set up is 100 °C with the adjustment sensitivity is 1 °C, it is Off at 100 °C and On at 99°C.

Dimension and panel cutout, connection diagram

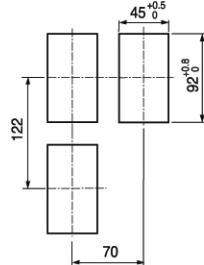
CAUTION Confirm a proper power Voltage [unit : mm]

KF2

● Dimension

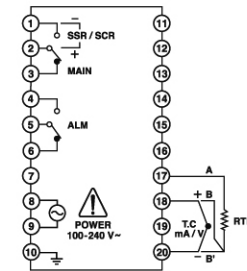


● Panel cutout

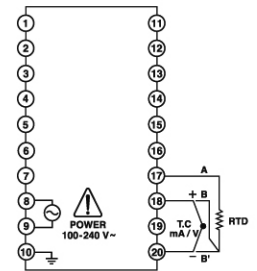


● Connection diagram

■ KF2

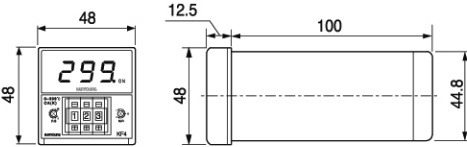


■ KF20

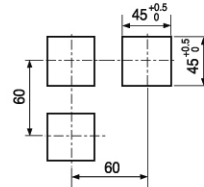


KF4

● Dimension

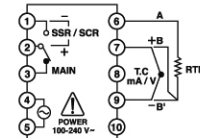


● Panel cutout

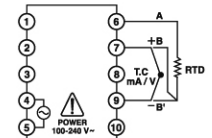


● Connection diagram

■ KF4

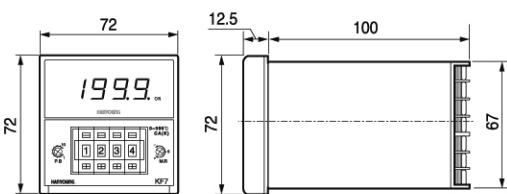


■ KF40

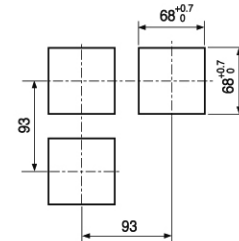


KF7

● Dimension

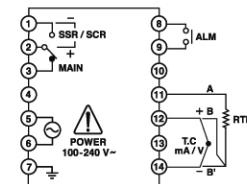


● Panel cutout

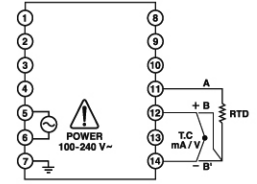


● Connection diagram

■ KF7

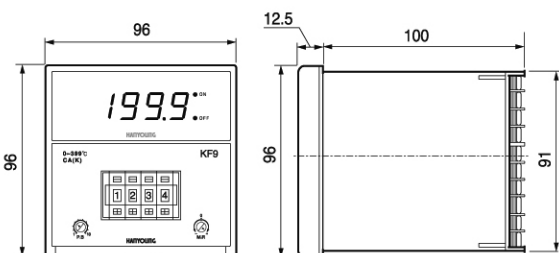


■ KF70

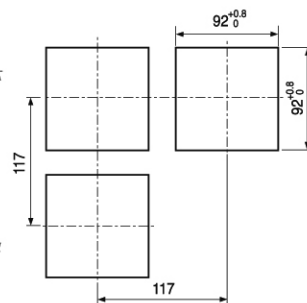


KF9

● Dimension

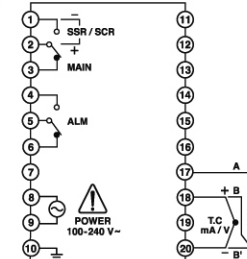


● Panel cutout



● Connection diagram

■ KF9



■ KF90

