Digital temperature controller

ED6

INSTRUCTION MANUAL

Thank you for purchasing Hanyoung Nux products. Please read the instruction manual carefully before using this product, and use the product correctly.
Also, please keep this instruction manual where you can view it any time.

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Safety information

Please read the safety information carefully before the use, and use the product correctly.
The alerts declared in the manual are classified into '**DANGER**', '**WARNING**' and '**CAUTION**' based on its importance

⚠ **DANGER**	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
⚠ **WARNING**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
⚠ **CAUTION**	Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or properties damage

⚠ DANGER

- The input/output terminals are subject to electric shock risk. Never let the input/output terminals come in contact with your body or conductive substances.

⚠ WARNING

- If there is a possibility of a serious accident due to malfunction or abnormality of this product, install an appropriate protection circuit on the outside.
- Since this product is not equipped with a power switch and fuse, install them separately on the outside (fuse rating: 250 Va.c., 0.5 A).
- Please supply the rated power voltage, in order to prevent product breakdowns or malfunctions.
- The power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- To prevent electric shocks and malfunctions, do not supply power until the wiring is completed.
- The product does not have an explosion-proof structure, so avoid using it in places with flammable or explosive gases.
- Never disassemble, modify, process, improve or repair this product, as it may cause abnormal operations, electric shocks or fires.
- Please disassemble the product after turning OFF the power. Failure to do so may result in electric shocks, product abnormal operations or malfunctions.
- Any use of the product other than those specified by the manufacturer may result in personal injury or property damage.
- Please use this product after installing it to a panel, because there is a risk of electric shock.
- When used in equipment with a high risk of personal injury or property damage (examples: medical devices, nuclear control, ships, aircrafts, vehicles, railways, combustion devices, safety devices, crime/disaster prevention equipment etc.) install double safety devices and prevent accidents. Failure to do so may result in fire, personnel accident or property damage.

⚠ CAUTION

- The contents of this manual may be changed without prior notification.
- Please make sure that the product specifications are the same as you ordered.
- Please make sure that there are no damages or product abnormalities occurred during shipment.
- Use this product in the following environments:
  - Do not use outdoors.
  - use it in the ambient temperature and humidity ranges indicated in the instruction manual.
  - use it in locations where corrosive gases (especially harmful gases, ammonia, etc.) and flammable gases are not generated.
  - use it in places where vibrations and impacts are not directly applied to product body.
  - use it in places without liquids, oils, chemicals, steam, dust, salt, iron, etc. (pollution degree 1 or 2).
  - avoid places where large inductive interference, static electricity, magnetic noise are generated.
  - avoid places with heat accumulation caused by direct sunlight, radiant heat, etc.
  - use it in places with elevation below 2000 m.
  - Power input and relay output wires are at least 75 °C of heat resistance and, use copper wires from 18 AWG to 24 AWG.

⚠ CAUTION

- Please do not wipe the product with organic solvents such as alcohol, benzene, etc. (wipe it with neutral detergents).
- When water enters, short circuit or fire may occur, so please inspect the product carefully.
- For thermocouple input, use the predetermined compensating cable (temperature errors occur when using ordinary cable).
- For RTD input, use a cable with small lead wire resistance and without resistance difference among 3 wires (temperature errors occur if the resistance value among 3 wires is different).
- Use the input signal line away from power line and load line to avoid the influence of inductive noise.
- Input signal line and output signal line should be separated from each other. If separation is not possible, use shield wires for input signal line.
- Use a non-grounded sensor for thermocouple (using a grounded sensor may cause malfunctions to the device due to short circuits).
- When there is a lot of noise from the power, we recommend to use insulation transformer and noise filter. Please install the noise filter to a grounded panel or structure, etc. and make the wiring of noise filter output and product power supply terminal as short as possible.
- Tightly twisting the power cables is effective against noise.
- If the alarm function is not set correctly, it will not be output in case of abnormal operation, so please check it before operation.
- When replacing the sensor, be sure to turn off the power.
- Use an extra relay when the frequency of operation (such as proportional operation, etc.) is high, because connecting the load to the output relay rating without any room shortens the service life. In this case, SSR drive output type is recommended.
  * When using electromagnetic switch: set the proportional cycle to at least 20 sec.
  * When using SSR: set the proportional cycle to at least 1 sec.
- Do not wire anything to unused terminals.
- Please wire correctly, after checking the polarity of the terminals.
- When you install this product to a panel, please use switches or circuit breakers compliant with IEC60947-1 or IEC60947-3.
- Please install switches or circuit breakers at close distance for user convenience.
- Please specify on the panel that, since switches or circuit breakers are installed, if the switches or circuit breakers are activated, the power will be cut off.
- We recommend regular maintenance for the continuous safe use of this product.
- Some components of this product may have a lifespan or deteriorate over time.
- The warranty period of this product, is 1 year, including its accessories, under normal conditions of use.
- The preparation period of the contact output is required during power supply. If used as a signal to external interlock circuit, etc. please use a delay relay together.
- If the user changes the product in case of malfunctions, the operation may be different due to set parameters differences even if the model name is the same. So, please check the compatibility.
- Before using the temperature controller, there may be a temperature deviation between the PV value of the temperature controller and the actual temperature, so please use the product after calibrating the temperature deviation.
- The write life of non-volatile memory (EEPROM) is one million times. When configuring the system, please make sure that the number of times that data are written to non-volatile memory does not exceed one million times.

Suffix code

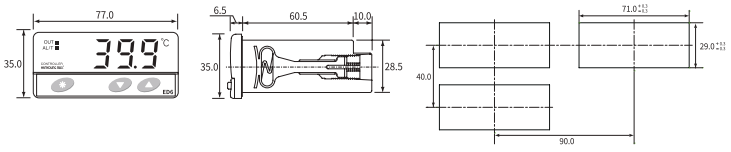
Model	Code							Description
ED6-	□	□	□	□	□	□	□	Digital temperature controller
Control type	F							Proportional or ON/OFF control (use parameter setting)
Input		K						Thermocouple K
		P						RTD Pt 100 Ω (IEC)
		C						4 - 20 mA d.c. (As external resistance 250Ω attached), 1 - 5 V d.c.
Control output			M					Relay
			S					SSR (voltage pulse output 10 V d.c. and more than)
Option				A				Alarm or defrost timer
				N				NONE
Power supply voltage					P3			10 ~ 24 V d.c.
					P4			100 ~ 240 V a.c. 50/60 Hz

Specification

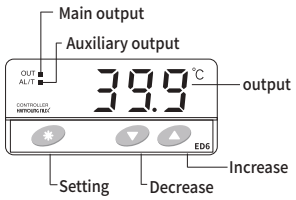
everyone Voltage	AC power type	00 - 240V~ 50/60Hz
	DC power type	10 - 24V⎓, Class2
voltage change rate		±10% of supply voltage
Consumption power	AC power type	10.0 VA or less
	DC power type	2.0 VA or less
Input		K, Pt 100 Ω, 4 ~ 20 mA d.c., 1 ~ 5 V d.c.
Indicate accuracy		±0.5 % of FS ± 1 Digit
Control output	Relay	Contact setup : 1 c, 250 V a.c., 5 A (resistive load)
	SSR	10 - 15 V d.c. (Load resistance 500Ω or more), Approx. 20 mA V d.c. Max
Alarm/Defrost	Relay	Contact setup : 1 c, 250 V a.c., 5 A (resistive load)
Control acting		Reverse acting(heating) or direct acting(cooling)
Setting method		Digital type manipulated by setting, increase and decrease buttons
Additional features		Alarm & Defrost
Wire resistance	Thermocouple	Below 100 Ω round trip.
	R.T.D	Below 10 Ω for each wire (Resistance of 3 wires should be the same.)
Ambient temperature/humidity		0 °C ~ 50 °C / 35 ~ 85 % RH (condensation)
Approval		CE
Weight		116 g

Dimension and panel cutout

[Unit : mm]

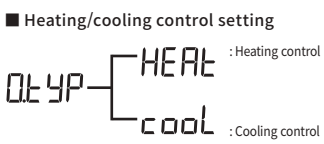


Part name

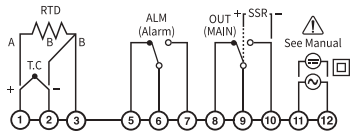


Temperature control setting

■ Heating/cooling control setting

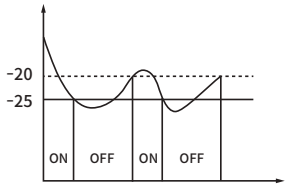


Connection diagram

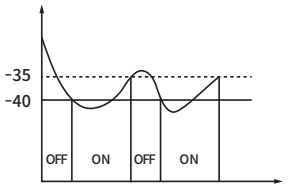


■ Cooling control(ON/OFF)

• PV 〉 SV → Main output relay "ON" / PV 〈 SV → Main output relay "OFF"



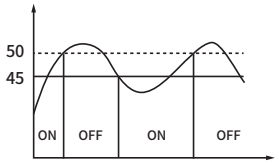
Main output
[SV = -25 °C, dIF = 5, dLy = 0, tyP = CoL]



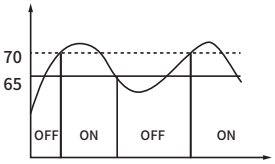
Alarm output (Low limit alarm)
[AtS = -40, AdF = 5, AdL = 0, SAo = 0]

■ Heating control(ON/OFF)

• PV 〉 SV → Main output relay "OFF" / PV 〈 SV → Main output relay "ON"

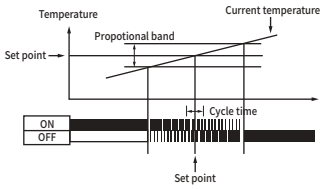


Main output
[SV = 50 °C, dIF = 5, dLy = 0, tyP = HEt]



Alarm output (Low limit alarm)
[AtS = 70, AdF = 5, AdL = 0, SAo = 0]

Proportional control

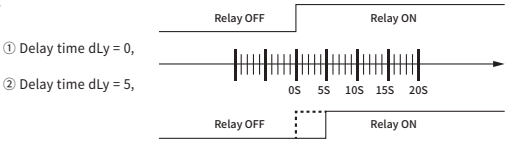


• "Proportional control",
when the manipulated value(MV, output amount) for the set value operates in proportion to the deviation and the range that MV varies from 0-100% is "proportional band".
Therefore, in case current temperature is lower than the proportional band, MV should be 100%, otherwise, 0%.
If SV matches current temperature, MV(output) should be 50%.

Delay Timer Setting

• In current temperature condition, press key for 3sec, move key to 2dLY. and then change the setting to key. lastly, save them with key.
• [0tYP] → [Id IF] → [2dLY] (0 ~ 240 sec)

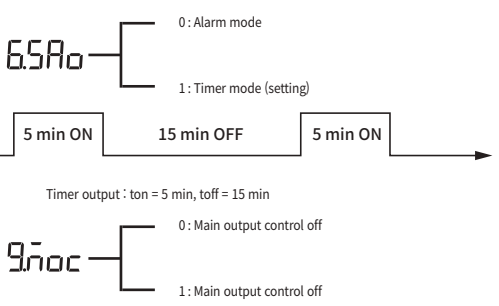
■ Operating by delay-timer



※ ① As Delay time=0, When output signal occurs, Relay is immediately turend on.
② As Delay time=5, After output signal occuring, Relay should be turend on in 5 sec while delay-timer operating, output display is flackering.
※ This function works only under ON/OFF control

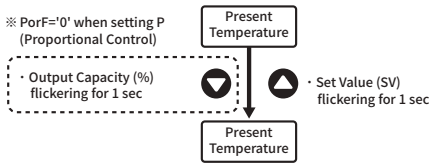
Auxiliary output(Timer-mode) setting and operating description

• It is available to use time-mode as defrost function with freezer.



• Under MOC"1" setting, main output automatically turns OFF if timer is turned ON.
• Using MOC function, you can effectively use timer output as a defrost function.
※ This function works only under ON/OFF control.

Output capacity and set value verification mode



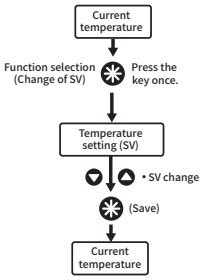
※ As proportional control operating, it displays current output capacity (0 ~ 100%).
• Once Offset occuring, Eliminate M.R. value reffering to current output capacity.

Heating Control MODE	Cooling Control MODE
PV < SV : Increase M.R value	PV > SV: Increase M.R value
PV > SV : Decrease M.R value	PV < SV: Decrease M.R value

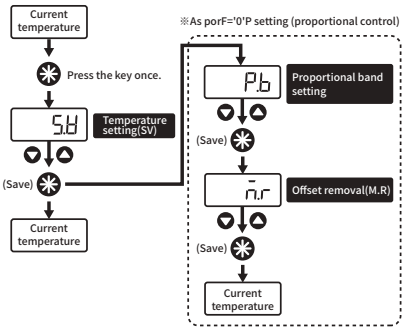
※ PV : Present Value ※SV : Setting Value ※M.R : Offset Elimination

User setting mode

■ ON/OFF control (ProF : 1)

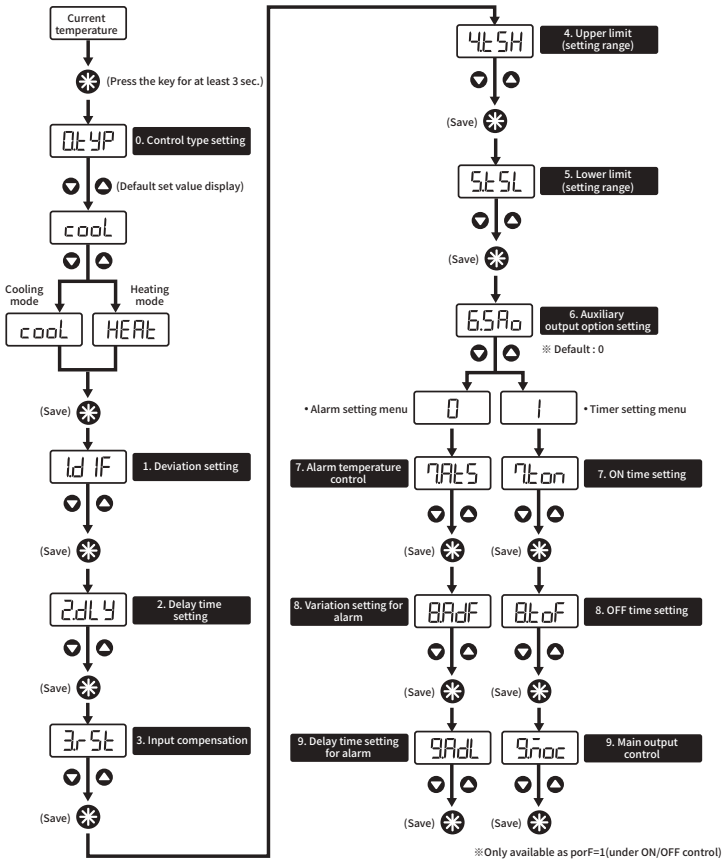


■ Proportional control (ProF : 0)



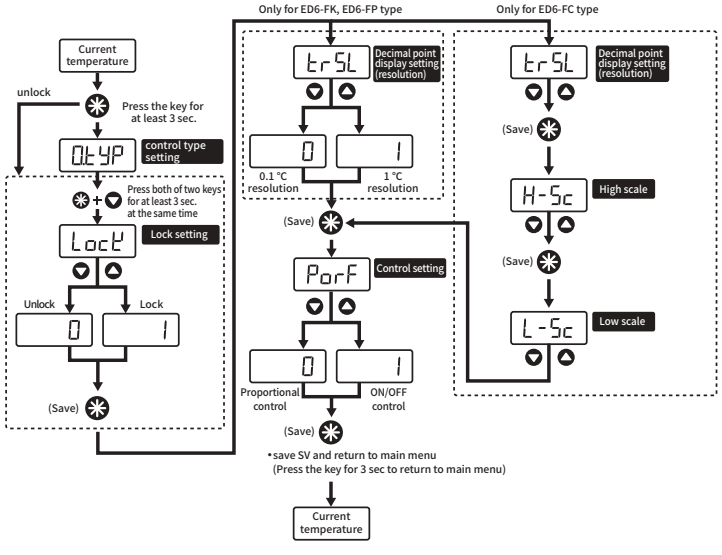
Symbol (PV)	category	Description		Display	Default
SV	Setting Temperature	TSL (lower limit) to TSH (High limit)		Always	25.0 ℃
Pb	Proportional band setting	K, Pt 100	1 ~ 100 ℃	PORF = 0	10 ℃
		1 — 5 V	1 ~ (H—SC — L—SC)		
MR	manual reset	0 ~ 100		PORF = 0	50 %

Installer setting mode



Symbol (PV)	category	Description		Display	Default
0.TYP	Current Temperature	cooling,heating		Always	HEAT
1.DIF	Deviation setting	K, Pt 100	0.2 ~ 50.0℃ (TRSL = 0) 1 ~ 50℃ (TRSL = 1)	Always	K, Pt100 : 1.0℃ 1 - 5 V : 1
		1 — 5 V	1 ~ 500		
2.DLY	Delay-time setting	0 ~ 240 sec		Always	0 sec
3.RST	manual reset	K, Pt 100	— 30.0 ~ 30.0 ℃ (TRSL = 0) — 30 ~ 30 ℃ (TRSL = 1)	Always	K, Pt100 : 0.0℃ 1-5V : 0
		1 — 5 V	— 300 ~ 300		
4.TSH	Upper limit (setting range)	K	TSL ~ 999.9 ℃ (TRSL = 0) TSL ~ 999 ℃ (TRSL = 1)	Always	K : 999.9 ℃ Pt 100 : 400.0 ℃ 1 — 5 V : 5000
		Pt 100	TSL ~ 400.0 ℃ (TRSL = 0) TSL ~ 400 ℃ (TRSL = 1)		
		1 — 5 V	TSL ~ H—SC		
5.TSL	Lower limit (setting range)	K	— 80.0 ℃ ~ TSH (TRSL = 0) — 80 ℃ ~ TSH (TRSL = 1)	Always	K : -80.0 ℃ Pt100 : -100.0 ℃ 1 - 5V : -1000
		Pt 100	— 100.0 ℃ ~ TSH (TRSL = 0) — 100 ℃ ~ TSH (TRSL = 1)		
		1 — 5 V	L—SH ~ TSH		
6.SAO	Auxiliary output option	0 : Alarm setting, 1 : Timer setting		Always	0
7.ATS	Alarm temperature setting	K	— 80.0 ~ 999.9 ℃ (TRSL = 0) — 80 ~ 999 ℃ (TRSL = 1)	SAO = 0	K : 999.9 ℃ Pt 100 : 400.0 ℃ 1 — 5 V : 5000
		Pt 100	— 100.0 ~ 400.0 ℃ (TRSL = 0) — 100 ~ 400 ℃ (TRSL = 1)		
		1 — 5 V	L—SH ~ H—SC		
8.ADF	Alarm-deviation time setting	K, Pt 100	0.2 ~ 50.0 ℃ (TRSL = 0) 1 ~ 50 ℃ (TRSL = 1)	SAO = 0	K, Pt100 : 1.0 ℃ 1 - 5 V : 1
		1 — 5 V	1 ~ 500		
9.ADL	Alarm-delay time setting	0 ~ 240 sec		SAO = 0	0 sec
7.TON	Timer-on setting	0 ~ 3600 min		SAO = 1	1 min
8.TOF	Timer-off setting	0 ~ 3600 min		SAO = 1	3 min
9.MOC	Main output control	0 : output control release, 1 : Output control		SAO = 1	0

Administrator setting mode



Symbol (PV)	category	Description		Display	Default
LOCK	SV lock setting	0 : Unlock, 1 : Lock		Always	0
TRSL	Decimal point setting	K, Pt 100	0 ~ 1 (0 : Decimal point display, 1 : No Decimal point display X)	Always	0
		1 — 5 V	0 ~ 2 (0 : decimal point location) Ex) 0 : 200, 1 : 20.0, 2 : 2.00		
H—SC	High scale	L—SC ~ 5000		1 — 5 V (ED6-FC type)	5000
L—SC	Low scale	—1000 ~ H—SC		1 — 5 V (ED6-FC type)	—1000
PORF	Control type setting	0 : Proportional control 1 : ON/OFF control		Always	1