

BR6

INSTRUCTION MANUAL

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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

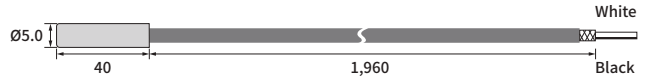
- The contents of this manual may be changed without prior notification.
- Please make sure that the product specifications are the same as you ordered.
- Please make sure that there are no damages or product abnormalities occurred during shipment.
- Use this product in the following environments:
 - 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.

Sensor(Thermistor/NTC)

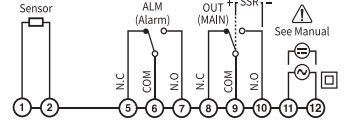
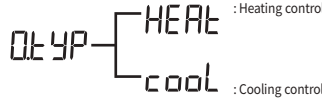
Name	Sensory type	Range(°C)	Accuracy	Remark
TH540N	Thermistor	-40.0 ~ 90.0	± 1.5 °C	Max ± 3.5 °C temperature deviation may be happen (± 1.5 °C sensor deviation & ± 2 °C controller deviation)



- BR6 applies only to this sensor.
- Extension of sensor length or modification will cause malfunction.

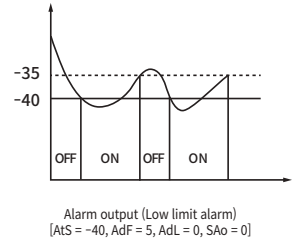
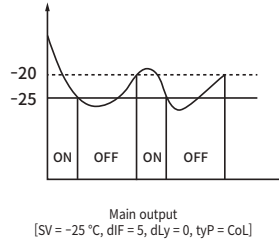
Control method for temperature | Connection diagram

Heating/cooling control selection



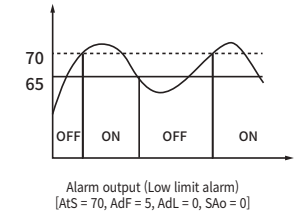
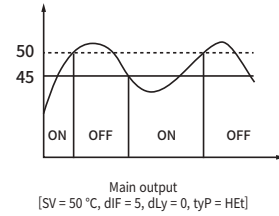
Cooling control(ON/OFF)

• PV > SV → Main output relay "ON" / PV < SV → Main output relay "OFF"

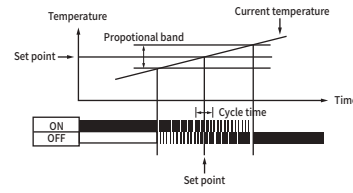


Heating control(ON/OFF)

• PV > SV → Main output relay "OFF" / PV < SV → Main output relay "ON"



Proportional control



• Manipulated variable (output size) of set value operates by proportioning to deviation and this is known as proportional control. Also variation range of manipulated variable from 0 ~ 100 % is known as the proportional band. Therefore, when proportional band is less than the current temperature, the manipulated variable becomes 100 % and when PB is more than the current temperature, the manipulated variable becomes 0 % and when set value and current temperature becomes same, the manipulated variable becomes 50 %.

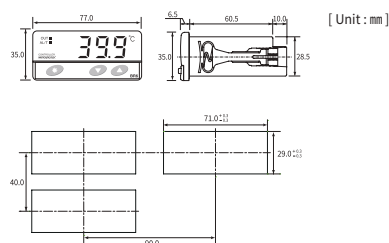
Suffix code

Model	Code	Description
BR6-	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Digital temperature controller
Control method	F	ON / OFF, Proportional control (selection with parameter)
Input	N	Our dedicated sensor (TH-540N) ※Thermistor (NTC)
Control output	M	Relay output (RELAY output)
	S	Voltage pulse output (Voltage pulse output for SSR drive)
Power supply voltage	P3	10 ~ 24 V d.c.
	P4	100 ~ 240 V a.c. 50/60 Hz

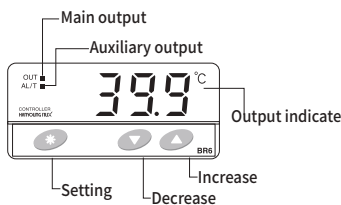
Specification

Input sensor	Company exclusive sensor (TH-540N) ※ Thermistor (NTC)		AC power supply voltage	100 - 240V-50/60Hz
Input range	-40.0 ~ 90.0 °C		DC power supply voltage	10 - 24V Class2
Display accuracy	± 1 % of FS ± 1 Digit		voltage change rate	±10% of supply voltage
Main output	Relay output	Contact composition : 1 c, 250 V a.c., 5 A (Resistance load)	AC power consumption	10.0 VA or less
Alarm/Defrost	SSR	10 - 15 V d.c. (load resistance 500 Ω or more)	DC power consumption	2.0 VA or less
Alarm/Defrost	Relay	Contact composition : 1 c, 250 V a.c., 5 A (Resistive load)	Approval	
Control operation	Selection of reverse action (heating/ direct action (cooling)) with parameters			
Setting method	Digital method by setting, increasing and decreasing keys			
Other function	Defrosting timer, Alarm function			
Ambient temperature	0 ~ 50 °C			
Resistance between wires	Below 10 Ω for each wire			
Ambient humidity	35 ~ 85 % RH (with no condensation)			
Weight	110 g			

Dimension and panel cutout



Part name

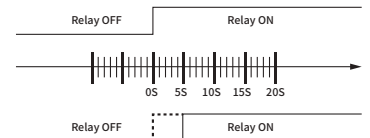


Delay Timer Setting

- Press key continuously for 3 sec, and then, press key until getting "2dL 4". change a set point by / key, and preservation it by key.
- [0t 4P] → [dL F] → [2dL 4] (0 ~ 240 sec)

Operating description by delay-timer

- Delay time dLy = 0,
- Delay time dLy = 5,

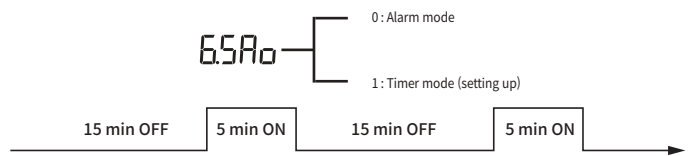


※ In case of Delay Time = 0, Relay is immediately ON when output signal is generating. In case of delay time = 5, Relay is ON after 5 sec. when output signal is generating. In the interval of 5 sec, the output indicator is flickering during delay timer operation. After the delay time, the output indicator lights as the relay is on.

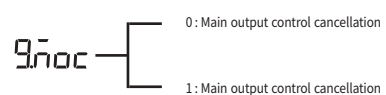
※ Delay operation is executed only in ON/OFF control.

Auxiliary output(Timer-mode) set and operating description

• It is possible to use timer-mode as defrosting function in case of freezer.



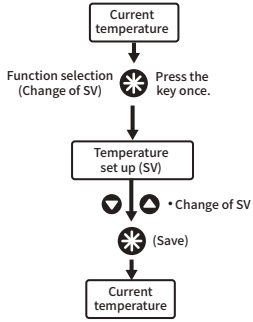
Timer output : ton = 5 min, toff = 15 min



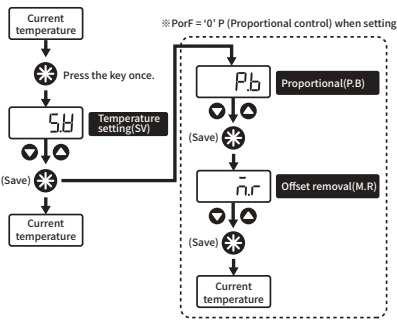
- When using MOC '1', main output will be OFF automatically as timer is ON.
- If using MOC function, you can effectively use timer output as a defrosting function.
- ※ When auxiliary output is timer mode, time unit is selective between "sec" or "min".

Set mode for normal users

ON/OFF control (ProF : 1)



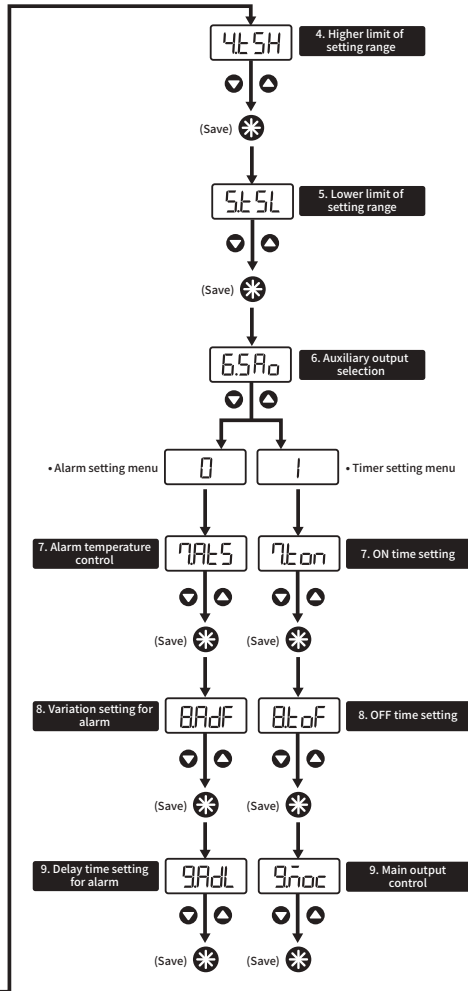
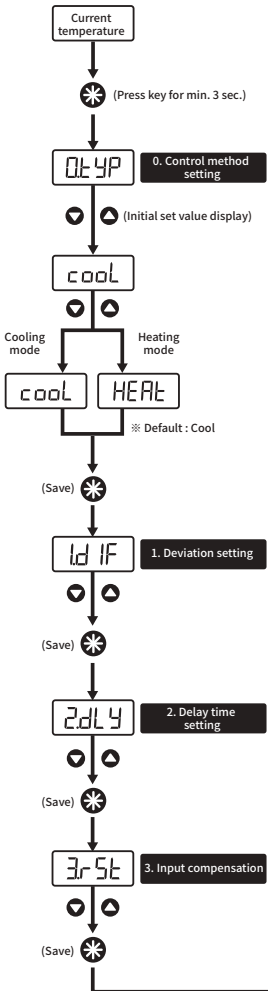
PID control (ProF : 0)



• A : 1 °C display mode (trSL = 1)
• B : 0.1 °C display mode (trSL = 0)

Item	Description	Setting range	Default	Unit
SV	Set value	TSL (min) ~ TSH (max)	25.0	°C
Pb	Proportional band setting	A : 6 ~ 60	20.0	
		B : 6.0 ~ 60.0		
Mr	Remove offset	0 ~ 100	50	%

Engineer setting mode



• A : 1 °C display mode (trSL = 1)
• B : 0.1 °C display mode (trSL = 0)

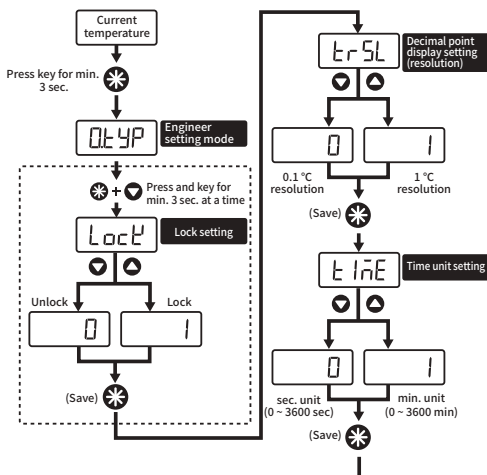
Item	Description	Setting range	Default	Unit
0.typ	Control method setting	Cool/Heat	Cool	—
1.dIF	Deviation setting	A : 1 ~ 50, B : 0.2 ~ 50.0	1.0	°C
2.dLY	Delay time setting	0 ~ 240	0	Sec
3.rST	Input compensation	A : -30 ~ 30	0.0	°C
		B : -30.0 ~ 30.0		
4.tSH	Higher limit of setting range	A : TSL (min) ~ 90	90.0	°C
		B : TSL (min) ~ 90.0		
5.tSL	Lower limit of setting range	A : -40 ~ TSH (max)	-40.0	°C
		B : -40.0 ~ TSH (max)		
6.SAo	Selection of auxiliary output function	0 : Alarm setting	0	—
		1 : Timer setting		
Menu of setting alarm				
7.tATs	Setting alarm temperature	A : -40 ~ 90, B : -40.0 ~ 90.0	-40.0	°C
8.AdF	Deviation settings for the alarm	A : 1 ~ 50, B : 0.2 ~ 50.0	1.0	°C
9.AdL	Delay time setting for alarm	0 ~ 240	0	Sec
Menu for timer setting				
7.ton	On time setting	0 ~ 3600	1	※1
8.toF	Off time setting	0 ~ 3600	3	※1
9.Moc	Main output control	0 : Releasing output control, 1 : Releasing output	0	—

※Error message : When input is more than +5%, odr when input is less than -5%, -odr

※1 : when time = 0 in administrator setting mode, it is Sec. when time = 1 in administrator setting mode, it is Min.

Administrator setting mode

Set Value lock function and decimal point function



Item	Description	Setting value	Setting range	Default	Unit
Lock	Lock setting	0	Unlock, engineer set up available	0	—
		1	Lock, engineer set up unavailable		
trSL	Decimal point display setting	0	Decimal point display (0.1 °C)	0	—
		1	No Decimal point display (1 °C)		
Time	Time unit setting	0	Timer: second setting (0 ~ 3600 sec)	1	—
		1	Timer: minute setting (0 ~ 3600 min)		
ProF	Control setting	0	Proportional control (P.B / M.R value set up available)	1	—
		1	ON/OFF control		