Digital temperature controller

BR6A

HANYOUNG NUX

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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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

The electric shock may occur in the input/output terminal so please never let your body and/ or conductive substance to be contacted by the input/output terminal.

⚠ WARNING

- If the user use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
- If there is a possibility of an accident caused by errors or malfunctions of this product, install external protection circuit to prevent the accident.
- To prevent defection or malfunction of this product, apply a proper power voltage in accordance with the rating.
- Since this product is not designed with explosion-protective structure, do not use it any place with flammable or explosive gas.
- Reassemble this product while the power is OFF. Otherwise, it may be a cause of malfunction or electric shock.
- There is a possibility of occurring electric shock so please use this product after installing it to a panel while it is operating.

⚠ CAUTION

- The contents of the instruction manual are subjective to change without prior notice.
- Please make sure that the product is not damaged during shipping.
- Please use this product in a place where there is no direct vibration and a large physical impact to the product.
- Please use this product in a place where there is no water, oil, chemicals, steam, dust, salt, iron or others.
- Please avoid places where excessive amounts of inductive interference and electrostatic and magnetic noise occur.
- For thermocouple (TC) input, please use a prescribed compensation lead wire. (There is a temperature error if a general lead is used.)
- If there is a lot of noise from the power line, installing an insulated transformer or a noise filter is recommended. The noise filter should be grounded on the panel and the lead wire between the output of the noise filter and the power terminal of the instrument should be as short as possible.
- Please use a switch or breaker (IEC60947-1 or IEC60947-3 approved) when the product is mounted on a panel.
- The warranty of this product (including accessories) is 1 year only when it is used for the purpose it was intended under normal condition.
- When the power is being supplied there should be a preparation time for the contact output. Please use a delay relay together when it is used as a signal on the outside of interlock circuit or others.
- 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 correcting the temperature difference appropriately.

Suffix Code

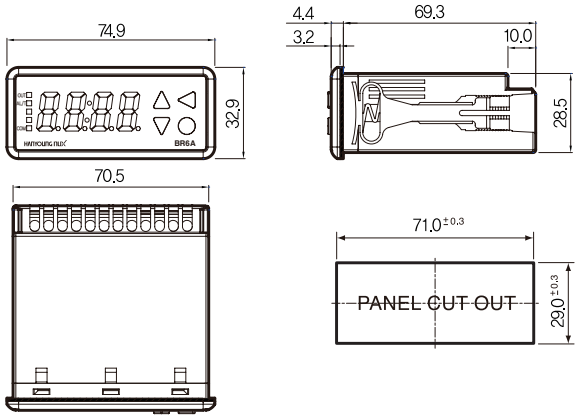
Model	Code						Description
BR6A –	□	□	□	□	–	□	Digital temperature controller (Selective control type in parameter (Proportional or ON/OFF control))
Input	N						Company exclusive sensor (TH-570N) ※ Thermistor
Control output		M					Relay connect output
		S					SSR output (Voltage pulse 12 V d.c.)
Option			0				None
			1				Communication (RS-485, MODBUS ASCII / RTU)
Power supply voltage				P4			100 – 240 V a.c., 50 – 60 Hz
LED color						W	White LED display
						R	Red LED display

Specification

Power consumption	5 VA max (220 V AC 60 Hz)	
Input sensor	Company exclusive sensor (TH-570N) ※ Thermistor	
Display accuracy	±1 % of FS ±1 Digit	
Control output (Main Output)	Relay output	Contact composition : 1c, 250 V AC, 5 A (Resistive load)
	SSR	10 V DC more than (Resistive load 500 Ω min)
Alarm/Defrost	Relay	Contact composition : 1c, 250 V AC, 5 A (Resistive load)
Control action	Proportional control (P control), ON/OFF control	
Setting method	Digital setting with operation buttons	
Other function	Deforsting Timer, Alarm function, Heating/cooling control	
Ambient temperature	0 ~ 50 ℃	
Resistance between wires	Below 10 Ω for each wire	
Ambient humidity	35 – 85 % RH (With no condenssation))	
Weight	112 g	

Dimension and panel cutout

[Unit : mm]

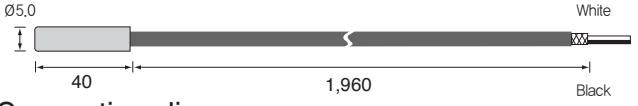


■ SENSOR (Thermistor/NTC)

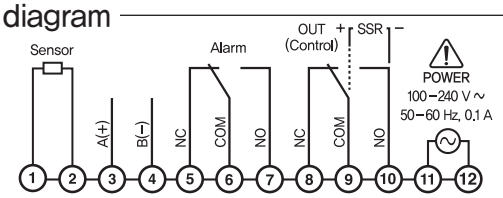
• This sensor is only for the BR6A

Name	Sensory type	Range(℃)	Accuracy	Remark
TH570N	Thermistor	–50.0 ~ 150.0	±1.5 ℃	max ±3.5 ℃ temperature deviation may be happen (±1.5 ℃ Sensor deviation & ±2 ℃ controller deviation)

※ Extension of sensor length or modification of sensor will be cause of malfunction.



Connection diagram

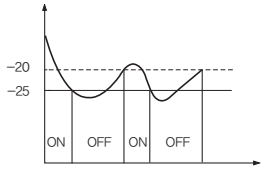


Control method for temperature

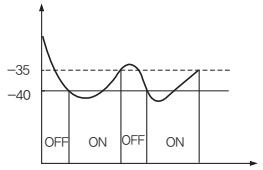
■ Heating / Cooling Control Selection

[0.typ] — HEAt : Heating control
cooL : Cooling control

● Cooling control (ON/OFF)
PV 〉 SV → Main output relay "ON" / PV 〈 SV → Main output relay "OFF"

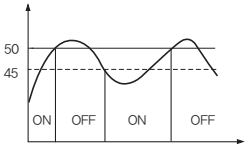


Main output
[SV=–25 ℃, dIf=5, dLy=0, typ=CoL]

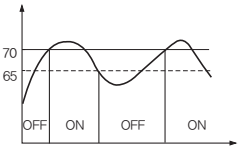


Alarm output (low limit alarm)
[AtS=–40, AdF=5, AdL=0, SAo=0]

● Heating Control (ON/OFF)
PV 〉 SV → Main output relay "OFF" / PV 〈 SV → Main output relay "ON"



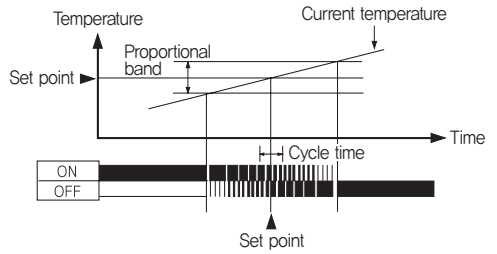
Main output
[SV=50 ℃, dIf=5, dLy=0, typ=HEt]



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

■ 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 %.



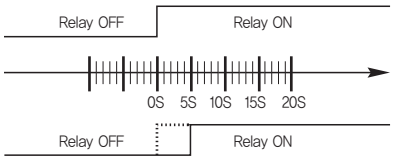
■ Delay timer set

Press ✱ Key continuously for 3sec. And then, press ✱ Key until getting " 2dLY ".
Change a set point by ▲ / ▼ Key, and preservation it by ✱ Key
[0tYP] → [tdLF] → [2dLY] (0 ~ 240 sec)

● Operating description by delay-timer

① Delay time dLy = 0,

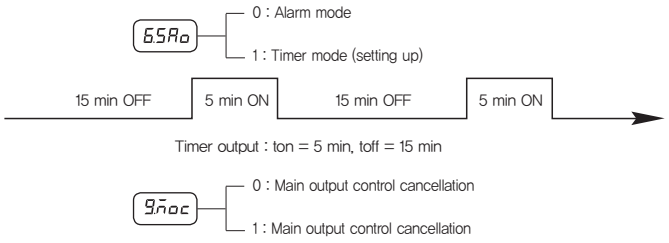
② Delay time dLy = 5,



※ 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.

■ Auxiliary output(Timer-mode) set and operating description

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



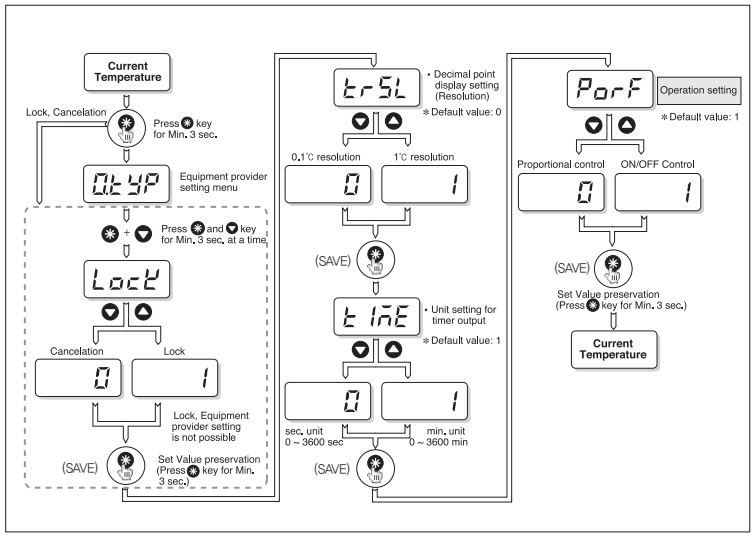
When using MOC '1', main output will be OFF automatically as timer is ON.
If using MOC function, you can effectively use timer output as a defrosting function.
※When auxiliary output is timer mode, time unit is selective between "sec" or "min".

Setting up menu

■ Set Value lock function and decimal point function

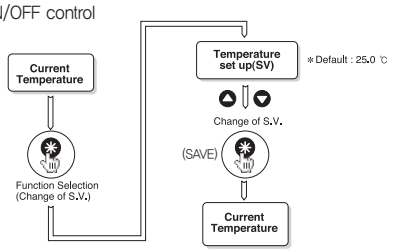
Function	SV	Description
Lock	0	Cancellation of lock function
	1	Operation of lock function
trSL	0	Decimal point 0.1 ℃
	1	No decimal point 1 ℃
Time	0	"sec." setting in Timer (0 ~ 3,600 sec)
	1	"min." setting in Timer (0 ~ 3,600 min)
PorF	0	P.I.D control (P.B value/M.R value setting isavailable)
	1	ON / OFF control

※ When changing value, ◀ shift key moves digit.

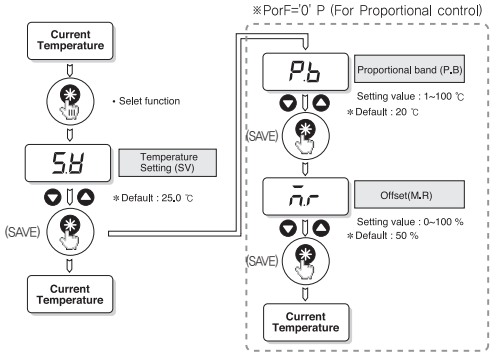


■ Set mode for normal users

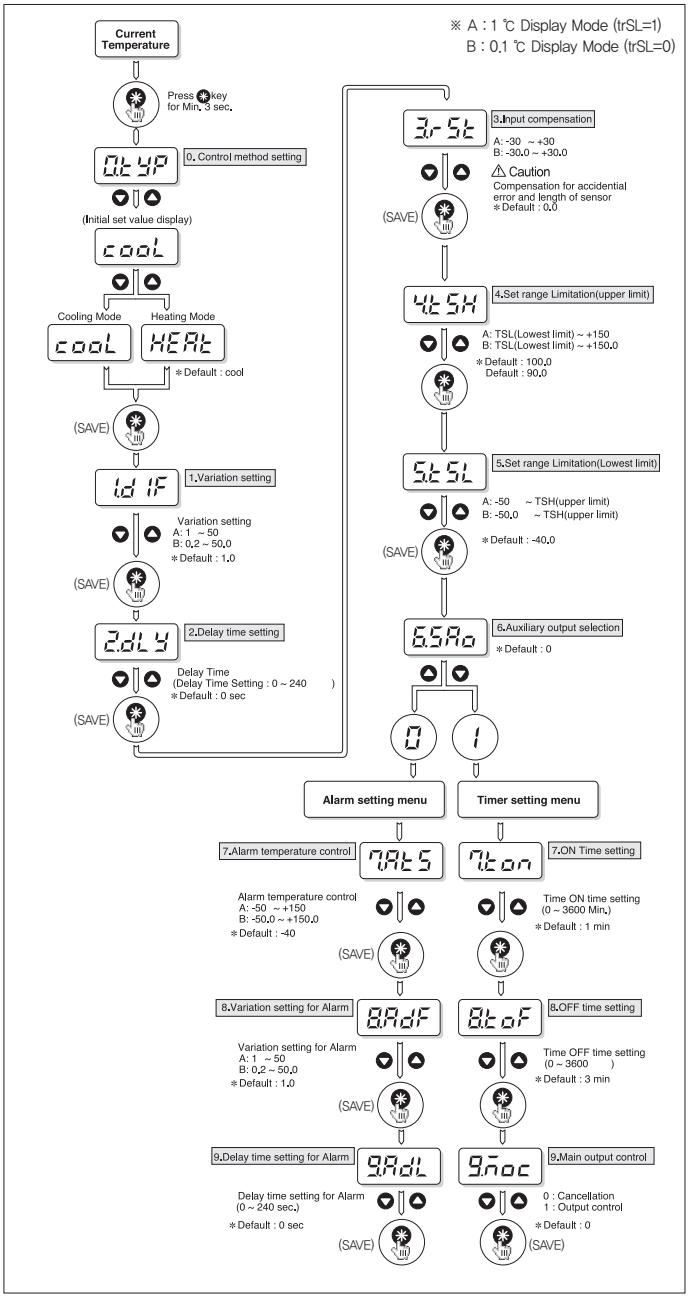
● F control (ProF:1) : ON/OFF control



● P control (ProF:0) : PID control



■ Set mode for equipment provider



※ Error Message: When input is more than +5 %, oUr . When input is less than -5%, -oUr .

Administrator setting mode

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 display setting	0	Decimal display(0.1 ℃)	0	–
		1	Non decimal display(1 ℃)		
Time	Time unit setting	0	Timer: second setting(0 ~ 3600 sec)	1	–
		1	Timer: minute setting(0 ~ 3600 min)		
PorF	Control setting	0	Proportional control (P.B / M.R value set up available)	1	–
		1	ON/OFF control		
G.COM	Communication setting		Click the Shift Key to enter the communication setting		

■ Communication setting

	Submanu	Description	Setting range	Default	Unit
G.COM	PrS	Protocol	ASCII / RTU	RTU	–
	bPS	Baud Rate	4800 / 9600 / 19200	9600	bps
	Prl	Parity	None / EVEN / ODD	None	bit
	StP	Stop Bit	1 or 2	1	bit
	dLn	Data Length	7 or 8	8	bit
	Adr	Address	1 ~ 31	1	–
	rP.t	Response Time	0 ~ 10	0	–

Engineer setting mode

A : 1 ℃ display mode (trSL = 1)

B : 0.1 ℃ 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	1.0	℃
		B : 0.2 ~ 50.0		
2.dLy	Delay time setting	0 ~ 240	0	Sec
3.rSt	Input compensation	A : –30 ~ +30	0.0	℃
		B : –30.0 ~ +30.0		
4.tSH	Higher limit of setting range	A : TSL(min) ~ 150	150.0	℃
		B : TSL(min) ~ 150.0		
5.tSL	Lower limit of setting range	A : –50 ~ TSH(max)	–50.0	℃
		B : –50.0 ~ TSH(max)		
6.SAo	Selection of auxiliary output function	0: Alarm setting	0	–
		1: Timer setting		
Menu of setting alarm				
7.AtS	Setting alarm temperature	A : –50 ~ 150	–40.0	℃
		B : –50.0 ~ 150.0		
8.AdF	Deviation settings for the alarm	A : 1 ~ 50	1.0	℃
		B : 0.2 ~ 50.0		
9.AdL	Delay time setting for alarm	0 ~ 240	0	Sec
Menu for timer setting				
7.ton	On time setting	0 ~ 3600	3	*1
8.toF	Off time setting	0 ~ 3600	3	
9.Moc	Main output control	0: Releasing output control	0	–
		0: Releasing output		

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

Operator setting mode

Item	Description	Setting range	Default	Unit
SV	Setting value (SV)	TSL(min) ~ TSH(max)	25.0	℃
Pb	Proportional band setting (P.B)	1 ~ 100	20	℃
Mr	Remove offset (M.R)	0 ~ 100	50	%

BIT Information

	ERR.STS
BIT	0x0008
0	–Over
1	Over
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Description per address

Process (0x0000 ~)					
Addr	Parameter	Description	Setting range	Remark	R/W
0x0001	PV	Current value	–60.0 ~ 160.0	x10 (℃)*2	R
0x0002	SV	Current value	–50.0 ~ 150.0	x10 (℃)*2	R
0x0003	MV OUT	Output quantity	0 ~ 100	(%)	R
0x0004	OUT	OUTPUT1	0 or 1	0: Releasing output	R
				1 : Output	
0x0005	ALM	ALARM1	0 or 1	0: Releasing output	R
				1 : Output	
0x0006	ON TIME	Remaining ON Time	0 ~ 3600	(Sec or Min)*1	R
0x0007	OFF TIME	Remaining OFF Time	0 ~ 3600	(Sec or Min)*1	R
0x0008	ERR.STS	Error status	Error status information	Refer to BIT INFORMAITION	R
Information (0x0100 ~)					
Addr	Parameter	Description	Setting range	Remark	R/W
0x0100	SYSTEM	System information	0 x 0001 ~ 0 x FFFF	0x0001 : BR6A	R
0x0101	OPTION	Offset information		0x0000 : NM0P4 0x0001 : NM1P4	R
0x0102	SPECIAL_1	Additional information 1		0x0000 : N/A	R
0x0103	SPECIAL_2	Additional information 2		0x0000 : N/A	R
0x0104	H/W Ver	Hardware version		0x0001 : Ver 0.1	R
0x0105	F/W Ver	Firmware version		0x0001 : Ver 0.1	R
0x0106	F.INIT	Setting initialzation	0 or 1	1 : Flash init	R/W
Control (0x0200 ~)					
Addr	Parameter	Description	Setting range	Remark	R/W
0x0200	LOCK	Lock setting	0 or 1	0: Unlock	R/W
				1 : Lock setting	
0x0201	TRSL	Decimal display setting	0 or 1	0: Decimal display	R/W
				1: Non decimal display	
0x0202	TIME	Time unit setting	0 or 1	0: Sec setting in timer	R/W
				1: Min setting in timer	
0x0203	PORF	Control setting	0 or 1	0: Proportional control	R/W
				1: ON/OFF control	
0x0204	TYP	Control method setting	0 or 1	0 : Cool	R/W
				1 : Heat	
0x0205	DIF	Deviation setting	0.2 ~ 50.0	x10 (℃)*2	R/W
0x0206	DLY	Delay time setting	0 ~ 240	(Sec)	R/W
0x0207	RST	Input compensation	–30.0 ~ +30.0	x10 (℃)*2	R/W
0x0208	TSH	Higher limit of setting range	TSL(min) ~ 150.0	x10 (℃)*2	R/W
0x0209	TSL	Lower limit of setting range	–50.0 ~ TSH(max)	x10 (℃)*2	R/W
0x0210	SAO	Selection of auxiliary output function	0 or 1	0: Alarm setting	R/W
				1: Timer setting	
0x0211	ATS	Setting alarm temperature	–50.0 ~ 150.0	x10 (℃)*2	R/W
0x0212	ADF	Deviation settings for the alarm	0.2 ~ 50.0	x10 (℃)*2	R/W
0x0213	ADL	Delay time for alarm	0 ~ 240	(Sec)	R/W
0x0214	TON	On time setting	0 ~ 3600	(Sec or Min)*1	R/W
0x0215	TOF	Off time setting	0 ~ 3600	(Sec or Min)*1	R/W
0x0216	MOC	Main output control	0 or 1	0: Releasing output control	R/W
				1: Output control	
SV (0x0300 ~)					
Addr	Parameter	Description	Setting range	Remark	R/W
0x0300	SV	Setting value	–50.0 ~ +150.0	x10 (℃)*2	R/W
0x0301	PB	Proportional band setting	1 ~ 100	x10 (℃)*2	R/W
0x0302	MR	Remove offset	0 ~ 100	(%)	R/W
Communcation (0x0500 ~)					
Addr	Parameter	Description	Setting range	Remark	R/W
0x0510	PRS	Protocol	2 ~ 3	2 : ModBus ASCII	R
				3 : ModBus RTU	
0x0511	BPS	Baud rate	3 ~ 6	3 : 4800 bps	R
				4 : 9600 bps	
				5 : 19200 bps	
0x0512	PRI	Parity	0 ~ 2	0 : None	R
				1 : Even	
				2 : Odd	
0x0513	STP	Stop bit	1 ~ 2	1 or 2	R
0x0514	DLN	Data Length	7 ~ 8	7 or 8	R
0x0515	ADR	Address	1 ~ 31	1 ~ 31	R
0x0516	RPT	Response Time	0 ~ 10	0 ~ 10	R

*1 : when time(0x0202) = 0, it is Sec. when time(0x0202) = 1, it is Min.

*2 : Communicated data is displayed as actual value x 10.
(Ex, when 100.0 ℃ or 100 ℃, 100.0 x 10 = "1000" displays.)