

NX series

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** according to their 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: 250V a.c. 0.5A c.).
• When changing the input sensor (default: K Type), first set the input group (G.In), then set the output group (G.Out), then set the other groups. If you change the data of the input group or the output group after setting other groups, the data of other groups that have already been set will be initialized.
• Please supply the rated power voltage, in order to prevent product breakdowns or malfunctions.
• 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, improve, process 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.

CAUTION
• The contents of this manual may be changed without prior notification.
• Make sure that the product specifications are the same as you ordered.
• Make sure that there are no damages or product abnormalities occurred during shipment.
• Use the product within the temperature range from 0 to 50 °C (max. 40 °C for case installation) / humidity range from 35 to 85% RH (without condensation)
• Use the product in places where corrosive gases (especially harmful gases, ammonia, etc.) and flammable gases are not generated.
• Use the product in places where vibrations and impacts are not applied directly to the product body.
• Use the product in places without liquids, oils, chemicals, steam, dust, salt, iron, etc. (pollution degree 1 or 2).
• Do not wipe the product with organic solvents such as alcohol, benzene, etc. (wipe it with neutral detergents).
• 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 the product in places with elevation below 2000 m.
• When fixing the product to a panel, attach the two brackets on the fixing holes and tighten them with a screwdriver.
• The fixing torque is about 14.7 N · cm (1.5kg · cm).
• 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 and 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.

Suffix code

Model	Code	Content	Default
NX1	□ □	Multi Input/Output Temperature Controller. 48(W) X 24(H) mm	
Control method	0	Normal type	
	1	Heating/cooling control (simultaneous control)	
Normal type	Options	Terminal number (4, 5)	Terminal number (6, 7)
	0	RET	OUT1(RLY)
	1	OUT1(SSR/SCR)	OUT1(RLY)
	2	RS485	RET
	3	RS485	OUT1(SSR/SCR)
Heating / cooling type	0	OUT2(SSR/SCR)	OUT1(RLY)
	2	RS485	OUT2(SSR/SCR)

※ OUT1: Heating output, OUT2: Cooling output

Model	Code	Content	Default
NX	□ □	Multi Input/Output Temperature Controller	
Size	2	48(W) X 96(H) mm	
	3	96(W) X 48(H) mm	
	7	72(W) X 72(H) mm	
	9	96(W) X 96(H) mm	
Control method	0	Normal type (heating control)	1
	1	Heating/cooling (simultaneous) control	4
NX9 option	0	None	SSR
	1	RS485, HBA	RET
NX7 option	0	None	SSR
	1	RS485, HBA	RET
NX2, NX3 option	1	HBA	RET
	2	RS485	RET

※ RLY (Relay output), SSR (Voltage pulse output), SCR (Current output, 4-20mA d.c.), RET (Retransmission output)

CAUTION
• Control output wiring
When wiring or removing the control output, shut off the controller and external power supply, because there is a risk of electric shock. Use shielded wires for voltage pulse output (SSR) and current output (SCR) wiring.

Model	Code	Content	Remarks
NX4	□ □	Multi Input/Output Temperature Controller 48(W) X 48(H) mm	
Control method	0	Normal type (heating control)	
	1	Heating/cooling control (simultaneous control)	Default = 1
	2	Heating/cooling control (NX4-20 only)	Default = 4
	3	None	
NX4-0□	0	None	OUT1 (terminals ①~③) applied as AL1. (when selecting SSR / SCR control output)
	1	HBA, AL2	
	2	SV2, SV3	
	3	RET, RS485	
	4	RS485	
	5	AL1, AL2	
	6	AL1, AL2, SV2	OUT1 (terminals ⑥~⑦) applied as SV2 (when selecting RELAY control output)
NX4-1□	0	None	OUT2 (terminals ⑪~⑫) applied as SSR/SCR.
	4	RS485	
NX4-2□	0	AL1	OUT2 (terminals ⑪~⑫) applied as RLY.

※ OUT1(①~②~③) can be used for AL1 when AL1 is not selected.
※ OUT1: Heating control, OUT2: Cooling control

Normal type (heating)	Output	Heating side (OUT1)		NX4-00		NX4-01		NX4-02		NX4-03		NX4-04		NX4-07		Default
		Relay (①~②~③)	SSR / SCR (⑥~⑦)	Alarms and transformers (③~④)	Relay (③~④)	Transformer (⑤~⑥)	External input (DI) (⑧~⑨)	Communication and retransmission (⑩~⑪)	Communication (⑫~⑬)	Communication and transformers (⑭~⑮)						
0	RLY(ON/OFF)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1	AL1	SSR	-	AL2	-	CT	-	SV2	SV3	RS485	RET	RS485	-	RS485	CT	
2	AL1	SCR	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	RLY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

※ NX4-01: HBA output is designated as 1-2-3 or 13-14 when selecting 21 for alarm type.

Normal type (heating)	Output	Heating side (OUT1)		NX4-05		Default
		Relay (①~②~③)	SSR / SCR (⑥~⑦)	Alarm 1 & 2 (⑧~⑨)	Alarm 1 & 2 (⑩~⑪)	
0	RLY(ON/OFF)	-	-	-	-	1
1	-	SSR	-	AL1	AL2	
2	-	SCR	-	-	-	
3	RLY	-	-	-	-	

Normal type (heating)	Output	Heating side (OUT1)		NX4-10		NX4-14		NX4-20		default
		Relay (①~②~③)	SSR / SCR (⑥~⑦)	⑧~⑨	SSR/SCR (⑩~⑪)	⑩~⑪	SSR/SCR (⑩~⑪)	⑩~⑪	⑩~⑪	
0	RLY(ON/OFF)	-	-	-	-	-	-	-	-	
1	AL1	SSR	-	-	-	AL2	-	-	-	1
2	AL1	SCR	-	-	-	-	-	-	-	
3	RLY	-	-	-	-	-	-	-	-	
4	AL1	SSR	-	-	-	-	SSR	-	-	
5	AL1	SCR	-	-	-	-	SSR	-	-	
6	RLY	-	-	-	-	-	-	-	-	
7	AL1	SSR	-	-	-	RS485	-	-	-	
8	AL1	SCR	-	-	-	-	SCR	-	-	
9	RLY	-	-	-	-	-	-	-	-	4
10	-	SSR	-	-	-	-	-	-	-	
11	-	SCR	-	-	-	-	-	-	-	
12	RLY	-	-	-	-	-	-	-	-	

※ RLY (Relay output), SSR (Voltage pulse output), SCR (Current output, 4-20mA d.c.)

Specifications

Input type	Input specification	Output specifications
Input sampling cycle	250 ms	Relay contact output Contact capacity: 240V a.c. 3 A, 30V d.c. 3 A (resistive load) Contact configuration: 1C Output operation: time proportion, ON / OFF Proportional period: 1 to 1000 s Output limit: high limit (OH) and low limit (OL) can be set in the range from 0.0 to 100.0%. Valid also for auto-tuning (AT). ON / OFF Hysteresis: 0 to 100% (full scale) Time resolution: smaller between 0.1% or 10 ms
Input display resolution	Basically, below the decimal point of the range	SSR output (voltage pulse output) RTD: max. 10 Ω/wire (conductor resistance among 3 wires should be same) Proportional period: 1 ~ 1000 s Output operation: time proportional Output limit: high limit (OH) and low limit (OL) can be set in the range from 0.0 to 100.0%. Valid also for auto-tuning (AT). Time resolution: smaller between 0.1% or 10 ms
Input impedance	Thermocouple and DC voltage input (mV): min. 1 MΩ, DC voltage input (V): approx. 1 MΩ	Current output (4 ~ 20 mA) Current output range: 4~20mA d.c. Load resistance: max. 600 Ω Accuracy: ±0.5% of max. scale (4~20 mA range), Resolution: approx. 3,000 Output ripple: 0.3% (P-P) or less of the maximum scale (150Hz) Output update cycle: 250 ms Output operation: continuous PID Output limit: high limit (OH) and low limit (OL) can be set in the range from ~5.0 to 105.0%. Valid also for auto-tuning (AT).
Allowable signal source resistance	Thermocouple: max. 250 Ω, DC voltage: max. 2 kΩ	Relay contact output Contact capacity: 240V a.c. 1 A, 30V d.c. 1 A (resistive load). Contact configuration: 1a Output contacts: different according to model specifications (refer to wiring diagram)
Allowable wiring resistance	Thermocouple: max. 250 Ω, DC voltage: max. 2 kΩ	Heater break alarm 1 EA (NX2, NX3, NX4, NX7, NX9) Current measurement range: AC 1~50 A (resolution: 0.5 A, ± 5% of maximum scale ± 1 digit). Alarm output: set and use alarm output. Deadband: 0 ~ 100% of max. range setting Others: available for ON / OFF control or time proportional output (but not for current output and cooling output). When output is ON, the break can not be detected in less than 0.2 sec.
Allowable input voltage	Within ±10 V (thermocouple, RTD, DC voltage: mV d.c.) Within ±20 V (DC voltage: Vd.c.)	Retransmission output Current output range: 0~20mA d.c., 4~20mA d.c. Load resistance: max. 600 Ω Accuracy: ±0.5% of max. 0 mA or 4~20 mA range) Resolution: approx. 3,000 Output ripple: max. 0.3% (P-P) of the max. scale (150Hz) Output update cycle: 250 ms
Noise reduction rate	Standard Thermocouple / RTD (KS/JEC/DIN) RJ.C error ±1.5°C (15 ~ 35 °C), ±2.0°C (0 ~ 50 °C)	Transport and storage conditions Storage temperature: -25 ~ 70 °C Storage humidity: 5 ~ 95 % RH (without condensation) Shock: Max. 1 min packaging
Input break detection (BURN-OUT)	Thermocouple: OFF, UP/DOWN Scale selection RTD: UP Scale (detection current at thermocouple and RTD BURN-OUT: approx. 50 nA)	Power specifications Power voltage: 100~240V a.c. (voltage fluctuation rate: ±10%) Power frequency: 50/60Hz Power consumption: Max. to 6.0 W, max. 10 VA, 8 VA (NX1) Insulation resistance: 1st terminal - 2nd terminal: min. 500Vd.c. 20 MΩ 1st terminal - ground: min. 500Vd.c. 20 MΩ 2nd terminal - ground: min. 500Vd.c. 20 MΩ Dielectric strength: 1st terminal - 2nd terminal: 2,300V a.c. 50/60Hz for 1 min. 1st terminal - ground: 2,300V a.c. 50/60Hz for 1 min. 2nd terminal - FG: 1,500V a.c. 50/60Hz for 1 min. Sensor power supply: 12Vd.c. (20mA d.c., cannot be used with retransmission output)
Measurement accuracy	Refer to "Input Signal and Measurement Range" Thermocouple, RTD: can be changed within the range of input signal and measurement range table. DC voltage: min. and max. voltages can be changed within each range. Scaling possible within the range of the measurement range.	
Input range		

Installation environment	Normal operating conditions	Ambient temperature influence	Power specifications
Continuous vibration (5 ~ 14Hz): peak-to-peak max. 1.2 mm Continuous vibration (4 ~ 150Hz): max. 4.9 mm Shock: 147 ms, max. 11 ms (6 directions each 3 times) Panel cutout: refer to "panel cutout"	Normal type 0 RLY (ON/OFF) 1 ALARM 2 RLY 3 RLY 4 - 5 - 6 RLY 7 - 8 RLY 9 RLY 10 - 11 - 12 RLY	Ambient temperature: 0 ~ 50 °C Ambient humidity: 35 ~ 85% RH (without condensation) Magnetic field effect: max. 400 AT / m Warm-up time: min. 30 minutes	Power voltage: 100~240V a.c. (voltage fluctuation rate: ±10%) Power frequency: 50/60Hz Power consumption: Max. to 6.0 W, max. 10 VA, 8 VA (NX1) Insulation resistance: 1st terminal - 2nd terminal: min. 500Vd.c. 20 MΩ 1st terminal - ground: min. 500Vd.c. 20 MΩ 2nd terminal - ground: min. 500Vd.c. 20 MΩ Dielectric strength: 1st terminal - 2nd terminal: 2,300V a.c. 50/60Hz for 1 min. 1st terminal - ground: 2,300V a.c. 50/60Hz for 1 min. 2nd terminal - FG: 1,500V a.c. 50/60Hz for 1 min. Sensor power supply: 12Vd.c. (20mA d.c., cannot be used with retransmission output)

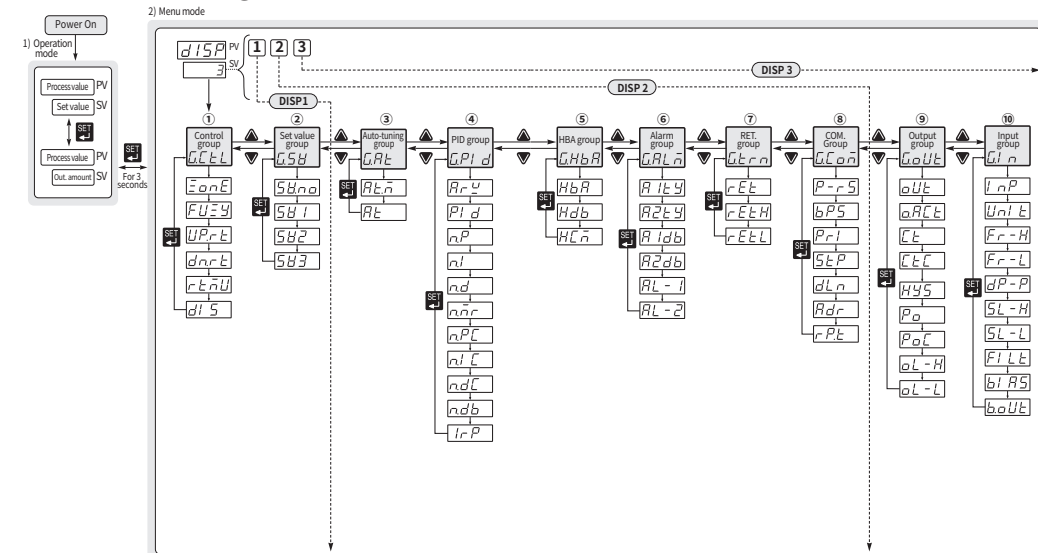
Input signal and measuring range

CAUTION

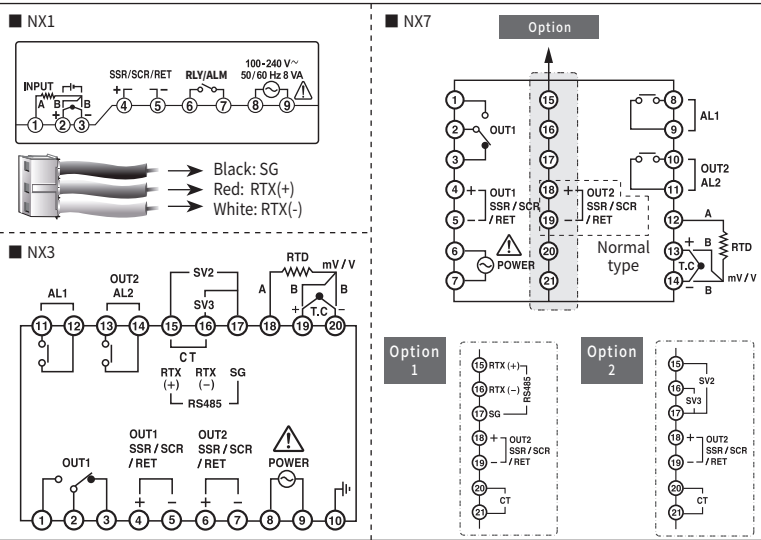
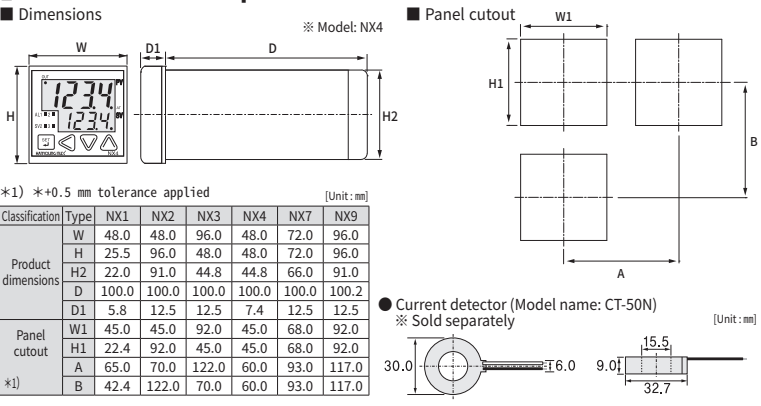
• Measuring input wiring
• When wiring the measuring input line, disconnect the controller body and external power supply to avoid a danger of electric shock.
• Pay attention to the polarity of the input before connecting. Wrong connection may result in malfunction.
• Use shielded wires for input wiring. The shield must be grounded at single-point.
• For measuring input signal, wire after leaving room between the power supply circuit and the ground circuit, if possible.

Input signal	Selection number	Input type	Range (°C)	Accuracy	Remarks
Thermocouple (TC)	1	K	*2 -200 ~ 1370	±0.5 % of FS ±1 digit	• FS is from the minimum to the maximum value of each measurable range. • Digit is the minimum display value ※ 1 0 ~ 400 °C range: ± 1.0% of FS ± 1 digit
	2	K	*2 -199.9 ~ 999.9		
	3	J	*2 -199.9 ~ 999.9		
	4	E	*2 -199.9 ~ 999.9		
	5	T	*2 -199.9 ~ 400.0		
	6	R	*2 0 ~ 1700		
	7	B	*1 0 ~ 1800		
	8	S	*1 0 ~ 1700		
	9	L	*2 -199.9 ~ 900.0		
	10	N	*2 -200 ~ 1300		
	11	U	*2 -199.9 ~ 400.0		
	12	W	*2 0 ~ 2300		
	RTD (RTD)	13	Platinum II		
20		KSP100 Ω	*3 -199.9 ~ 500.0		
21		Pt100 Ω	*3 -199.9 ~ 640.0		
22		Pt100 Ω	*3 -200 ~ 640		
30		1-5Vd.c.	-1999 ~ 9999 (Using the scaling function (SL-H / SL-L))		
31		0-10Vd.c.			
DC voltage (Vd.c./mVd.c.)	32	-10~20 mV d.c.		±0.5 % of FS ±1 digit	When current input is used, attach a 2500 0.1% resistor to the input signal terminal.
	33	0~100 mV d.c.			
	30	4~20mA d.c.	*4		
	30	4~20mA d.c.	*4		

Parameter configuration



Dimensions and panel cutout



Part names and functions

Part name	Function
① Present value (PV) display	Displays present value (PV)
② Set value (SV) / Parameter display	Displays set values, various setting parts, setting modes and codes
③ ④ Set value (SV) indicator	Turns on when set value 2 or 3 is displayed
⑤ Output (OUT) lamp	Turns on during output operation
⑥ Auto-tuning display lamp	Blinks during auto-tuning / lights up during manual output
⑦ Alarm 1 indicator	Turns on during alarm 1 operation
⑧ Alarm 2 indicator	Turns on during alarm 2 operation

No.	Name	Content
⑨	Set Key	Move among parameters and data settings, select automatic output amount display. Press and hold for more than 3 sec. to enter simple menu
⑩	Shift Key	Change the digit position to be set
⑪	Down Key	Decrease set value, select data of each setting mode
⑫	Up Key	Increase set value, select data of each setting mode

Alarm types and codes

Code	Alarm type	Operation
1	High absolute (NO)	
2	Low absolute (NO)	
3	High deviation (NO)	
4	Low deviation (NO)	
5	High deviation (NC)	
6	Low deviation (NC)	
7	High-Low deviation	
8	High-Low deviation range	
9	High absolute (NC)	
10	Low absolute (NC)	
11	High absolute (NO, hold function)	
12	Low absolute (NO, hold function)	
13	High deviation (NO, hold function)	
14	Low deviation (NO, hold function)	
15	High deviation (NC, hold function)	
16	Low deviation (NC, hold function)	
17	High-Low deviation (hold function)	
18	High-Low deviat. range (hold function)	
19	High absolute (NC, hold function)	
20	Low absolute (NC, hold function)	
21	Heater break alarm 1 (HBA1)	

Connection diagrams

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