

NX2, 3, 7, 9

Multi input/Output digital temperature controller

- Fuzzy function, PID auto tuning
- 3 zone PID/ group PID 3 types
- Ramp control function
- Heating/cooling control, HBA
- 3 types of set value selection by the contact input(DI)
- Communication function (RS485/422)



●● Suffix code

Model	Code	Description
NX-	☐ ☐ ☐	Multi input/Output temperature controller
Dimension	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	Universal type (heating control)
	1	Heating/Cooling control (synchronously)
NX9 Optional	0	NONE
	1	RS485, HBA
NX7 Optional	0	NONE
	1	RS485, HBA
	2	SV2, SV3, HBA
NX2,NX3 Optional	0	SV2, SV3
	1	HBA
	2	RS485

(Cautious) Suffix code for NX4 and NX1 are provided separately

Specification



Input

Thermocouple	K, J, E, T, R, B, S, L, N, U, W, PL2
RTD input	KPt 100 Ω , Pt 100 Ω
DC rated voltage	1 – 5 V DC, –10 – 20 mV, 0 – 100 mV, 4 – 20 mA (attach 250 Ω external resistance)
Input sampling time	250 ms
Input resolution	Usually less than the decimal points of "measurement range chart"
Input impedance	Thermocouple and DC rated voltage (mV) : min 1 M Ω , DC voltage input (V) : approx. 1 M Ω
Allowable signal source resistance	Thermocouple (max 250 Ω), DC voltage (Max 2 k Ω)
Allowable wiring resistance	RTD (max 10 Ω , however resistance among 3 wires should be same)
Allowable input voltage	Within ± 10 V (thermocouple, RTD, DC voltage (mV)), within ± 20 V (DC voltage (V))
Scaling	–1999 ~ 9999 (SL–L ~ SL–H within)
Input compensation	–100.0 % ~ 100.0 % of FS
Cold junction compensation error	± 1.5 $^{\circ}\text{C}$ (15 ~ 35 $^{\circ}\text{C}$), ± 2.0 $^{\circ}\text{C}$ (0 ~ 50 $^{\circ}\text{C}$)
Input signal break detection	OFF, UP/DOWN Scale selection (thermocouple). UP Scale (RTD)

Performance

Display accuracy	± 0.5 % of FS ± 1 Digit, thermocouple (K, J, E, T, R, B, S, L, U, W, PL2)
	± 1.0 % of FS ± 1 Digit, thermocouple (N)
	± 0.5 % of FS ± 1 Digit, RTD (KPt100 Ω , Pt100 Ω), DC voltage
External power supply	24 V DC, max. 20 mA (cannot be used when using the retransmission output)
Insulation resistance	Min 20 M Ω (500 V DC), 1st terminal–2nd terminal–between the earth terminal.
Dielectric strength	2,300 V AC, 50 / 60 Hz, for 1 min (1st terminal–2nd terminal–between the earth terminal)
	1,500 V AC, 50 / 60 Hz, for 1 min (2nd terminal–between the F,G)

Communication (optional)

Communication Rating	RS-422 (4-wire type), RS-485 (2-wire type)
Protocol	PC Link with Checksum, MODBUS (RTU), MODBUS (ASCII)
Communication speed	2400, 4800, 9600, 14400, 19200 BPS
Max number of Connection	31 devices (address setting is 1 ~ 99)
Communication distance	1.2 km max

Control function and output

Control type	PID auto tuning
Control operation	a) temporal selection of reverse operation (heating) and direct operation (cooling) (By the selection of the parameter) b) heating / cooling synchronous control
Range setting	Refer to the range and input code
Contact input(DI)	Select the 3 types of set temperatures which had been set in advance as external contact.
Auto tuning 2 types	Target value/low target value auto tuning selection
Proportional band	0.1 ~ 999.9 % (heating/cooling type : 0.0 ~ 999.9 %)
Integral time	OFF, 1 ~ 6,000 sec
Differential time	OFF, 1 ~ 6,000 sec
A.R.W(Anti Reset Wind-up)	Auto, 50.0 ~ 200.0 % (proportional band)
ON/OFF control	Selection of output types by parameter
PID selection	Zone PID / group PID selection
Manual reset	Possible to set as a manual reset when integral time is OFF
Output with input break(OUT1)	-5.0 ~ 105.0 (Universal type), 0.0 ~ 105.0 % (heating/cooling type)
Output with input break(OUT2)	0.0 ~ 105.0 %
Regular type hysteresis	0.0 ~ 100.0 % of FS, ON / OFF control
Heating/cooling type hysteresis	0.0 ~ 100.0 % of FS, ON / OFF control
Heating/cooling dead zone setting	-100.0 ~ 50.0 % (proportional band)
Fuzzy function	Fuzzy operation selection by parameter
Ramp function	Select an amount of output slope regarding the set temperature
Retransmission output	Present value/set value/amount of output/external power supply selection (24 V DC, 20 mA max)
Retransmission output scaling	By the limitation of set range or scaling setting
Alarm set range	Range 0 ~ 100 % (absolute alarm), ± 100 % (deviation alarms)
Alarm hysteresis	0.0 ~ 100.0 % of range
Heater Break Alarm (HBA)	Possible to use it with the output of ON/OFF control and time proportional control. (However it cannot be used with the current output and cooling output and detection impossible with ON/OFF time less than 0.2 sec) allowable current range : 1 ~ 50 A AC (resolving power : 0.5 A, ± 5 % of FS ± 1 Digit) (Cautious) when using the cooling output as relay, alarm output is decreased with 1 contact C.T type for HBA : model CTL-6-S
Alarm type	21 types Set by the Parameters refer to the "alarm type and code"

● Output

Control output	Relay	Contact capacity : 1 C, 240 V AC, 3 A, 30 V DC 3 A (resistive load) But NX1 is 1a Contact, 240 V AC, 1 A, 30 V DC 1 A (resistive load) Time resolving power : smaller one between 0.1% and 10 ms
	SSR	More than approx. 12 V DC (Min 600 Ω resistive load), with disconnection, limit within approx. 30 mA, Time resolving power : smaller one between 0.1% and 10 ms
	SCR	4 ~ 20 mA DC (resistive load less than 600 Ω) Accuracy : ± 0.5 % of FS (range 4 ~ 20 mA DC) resolving power : approx. 3,000
Alarm output	AL1, AL2, and HBA common	1a 2 contact (NX2, NX3, NX9) 240 V AC, 1 A, 30 V DC 1 A (resistive load)
Retransmission output	RET	4 ~ 20 mA DC (resistive load less than 600 Ω) Accuracy : ± 0.5 % of FS (4 ~ 20 mA DC) resolving power : approx. 3,000

● Control output composition

Regular type	Output selection	Control output(OUT1)		OUT2	
		Relay output	SSR/SCR output	Relay output	Retransmission output
	0	ON/OFF	—	AL2 (Alarm2 output)	R.E.T (Retransmission output)
	1	—	SSR		
	2	—	SCR (4 – 20 mA)		
	3	Relay	—		

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Heating/ Cooling type	Output selection	Heating side (OUT1)		Cooling side (OUT2)	
		Relay output	SSR/SCR output	Relay output	SSR/SCR/RET
	4		SSR	AL2 (Alarm2 output)	SSR
	5		SCR (4 – 20 mA)		
	6	Relay	R.E.T		SCR (4 – 20 mA)
	7		SSR		
	8		SCR (4 – 20 mA)		
	9	Relay	R.E.T		
	10		SSR	Relay (Control output)	R.E.T
	11		SCR (4 – 20 mA)		
	12	Relay			

Range and input code

Classification	Code	Input	Range	Accuracy	
Thermocouple (TC)	1	K	−200 ~ 1,370 *2	±0.5 % of FS ±1 digit	
	2	K	−199.9 ~ 999.9 *2		
	3	J	−199.9 ~ 999.9 *2		
	4	E	−199.9 ~ 999.9 *2		
	5	T	−199.9 ~ 400.0 *2		
	6	R	0 ~ 1700 *2		
	7	B	0 ~ 1800 *1		
	8	S	0 ~ 1700		*1 (range 0 ~ 400 °C) ±10 % of FS ±1 Digit
	9	L	−199.9 ~ 900.0 *2	*2 (less than 0 °C) ±1.0 % of FS ±1 Digit	
	10	N	−200 ~ 1300	±1.0 % of FS ±1 digit	
	11	U	−199.9 ~ 400.0 *2	±0.5 % of FS ±1 digit	
	12	W	0 ~ 2300		
	13	PL2	0 ~ 1390		*2 (less than 0 °C) ±1.0 % of FS ±1 Digit
RTD	20*	KPt100 Ω	−199.9 ~ 500.0 *3	±0.5 % of FS ±1 digit	
	21*	Pt100 Ω	−199.9 ~ 640.0 *3		
DC voltage	30	1 – 5 V	Scaling set (−1999 ~ 9999)		±0.5 % of FS ±1 digit
	32	−10 – 20 mV			
	33	0 – 100 mV			
DC current	30*	4 – 20 mA			*3 (less than −150.0 ~ 150.0 °C) ±1.0 % of FS ±1 Digit

※ When using 4 – 20 mA DC current input, please select input code #30 and attach resistance 250 Ω
0.1 % at the both terminal of input terminal

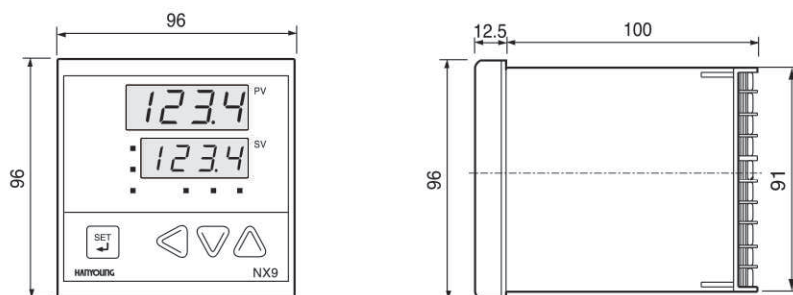
General specification

Power supply	100 – 240 V AC, 50 – 60 Hz
Voltage fluctuation	±10 % of power voltage
Power consumption	10 VA max.
Ambient temperature	0 ~ 50 °C
Ambient humidity	35 ~ 85 % RH (without dew condensation)
Storage temperature	-25 ~ 65 °C
Vibration resistance	10 – 55 Hz, peak amplitude 0.75 mm for 2 hrs each in 3 axis direction
Shock resistance	300 m/s ² , 3 times each in 3 axes direction
Weight	Approx. 472 g (NX9), approx. 344 g (NX7), approx. 340 g (NX3), approx. 342 g (NX2)

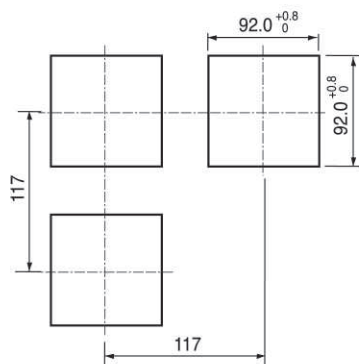
Dimension and panel cutout (Unit : mm)

NX9

Dimension

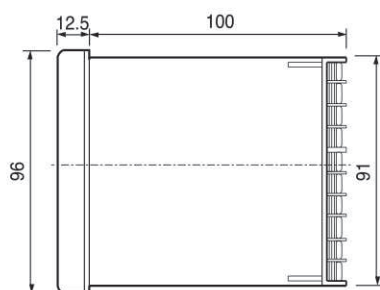
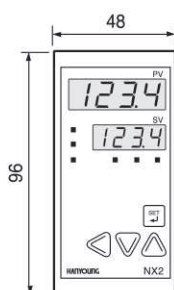


Panel cutout

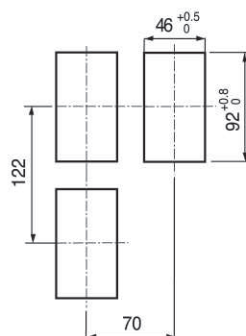


NX2

● Dimension

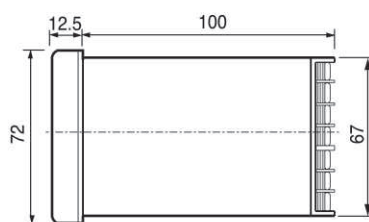
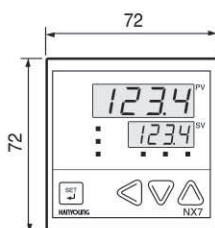


● Panel cutout

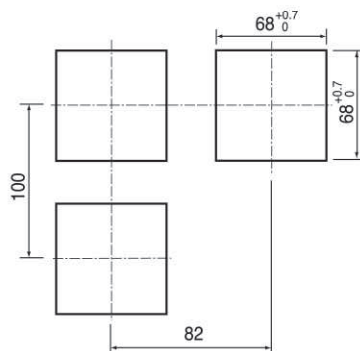


NX7

● Dimension

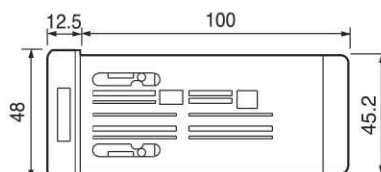


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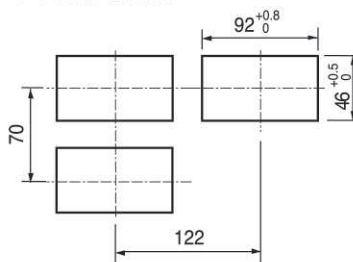


NX3

● Dimension

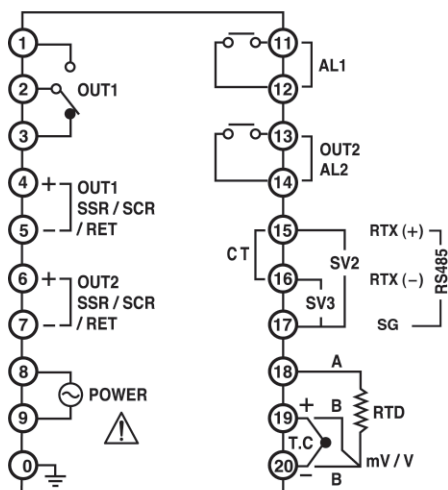


● Panel cutout

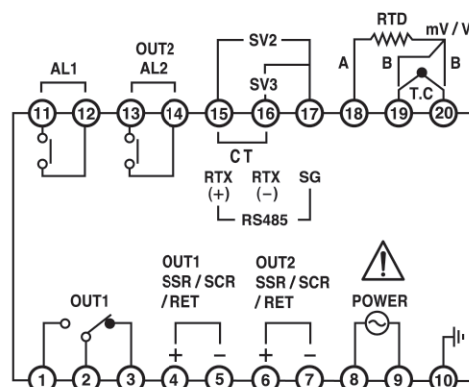


Connection diagram

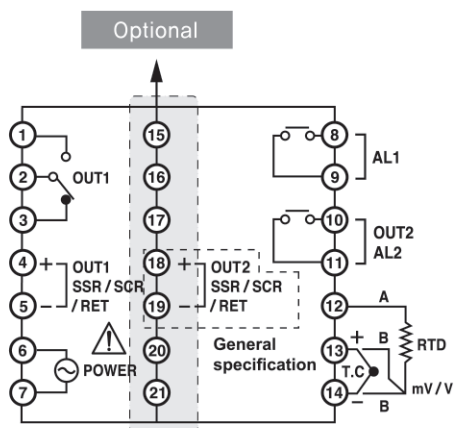
● NX 2 (48 × 96)



● NX 3 (96 × 48)



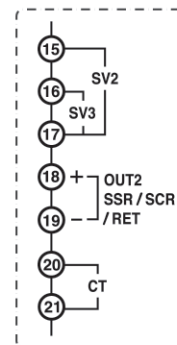
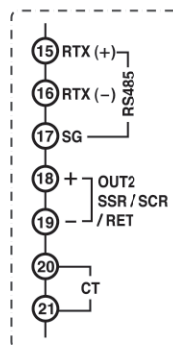
● NX 7 (72 × 72)



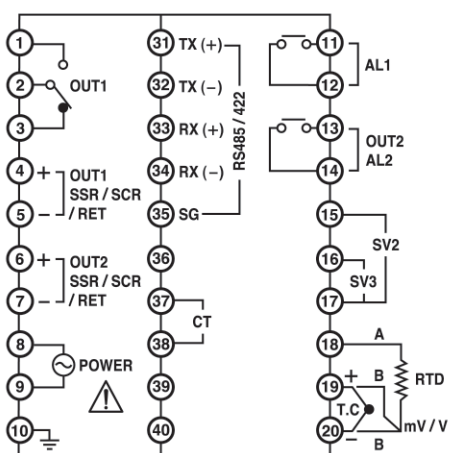
Optional

Optional 1

Optional 2

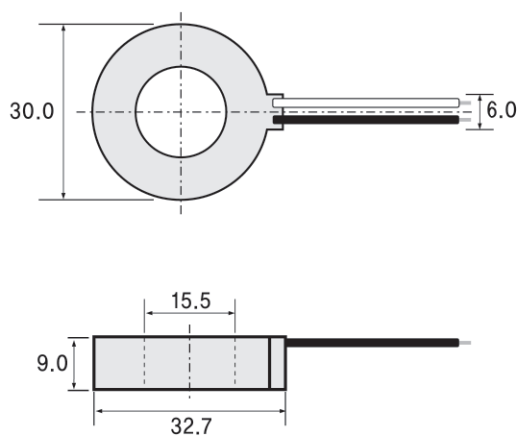


● NX 9 (96 × 96)



●● Current detector (Unit : mm)

● CT-50N



Alarm type and code

(Cautious) : Display lamp will be ON when output becomes OFF in inverted type.

Hysteresis



(Δ : Set value, $-\Delta$: minus alarm set value, $\blacktriangle$: alarm set value)

Code number	Alarm type	Operation diagram
1	high absolute (proper)	
2	low absolute (proper)	
3	high deviation (proper)	
4	low deviation (proper)	
5	high deviation (Inverted)	
6	low deviation (Inverted)	
7	high/low deviation	
8	within high/low deviation	
9	high absolute (Inverted)	
10	low absolute (Inverted)	
11	high absolute (proper, hold function)	
12	low absolute (proper, hold function)	
13	high deviation (proper, hold function)	
14	low deviation (proper, hold function)	
15	high deviation (Inverted, hold function)	
16	low deviation (Inverted, hold function)	
17	high/low deviation (hold function)	
18	within high/low deviation (Hold function)	
19	high absolute (Inverted, hold function)	
20	low absolute (Inverted, hold function)	
21	heater break alarm 1 (HBA 1)	

NX4

Multi input/Output digital temperature controller

- Fuzzy function, PID auto tuning
- 3 zone PID / group PID 3 types
- Ramp control function
- Heating / cooling control, HBA
- 3 types of set value selection due to the contact input
- Communication function (RS485 / 422)



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●● Suffix code

Model	Code	Description
NX4-	☐ ☐	Multi input / output temperature controller, 48(W) X 48(H)
Control type	0	Universal type (heating control)
	1	Heating / cooling control (synchronous control)
	2	Heating / cooling control (only for NX4-20)
NX4 option	0	NONE
	1	HBA, AL2
	2	SV2, SV3
	3	RET, RS485
	4	RS485, SSR / SCR
	5	AL1, AL2
	6	AL1, AL2, SV2
	7	RS485, HBA

(Cautious) Option 1: OUT1 (terminal ①-②-③) is applied as AL1 But, only with control output SSR/SCR selection

Option 3: OUT2 (terminal ⑪-⑫) is applied as RET

Option 4: OUT2 (terminal ⑪-⑫) is applied as SSR / SCR

Option 5: OUT1 (terminal ⑥-⑦) is impossible to apply as SV2

Option 6: OUT1 (terminal ⑥-⑦) is applied as SV2 but only with relay control output.


Temperature
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Specification

Input

Thermocouple	K, J, E, T, R, B, S, L, N, U, W, PL2
RTD input	KPt 100 Ω , Pt 100 Ω
DC rated voltage	1 – 5 V DC, –10 – 20 mV, 0 – 100 mV, 4 – 20 mA (attach 250 Ω external resistance)
Input sampling time	250 ms
Input display resolution	Usually less than the decimal points of “measurement range chart”
Input impedance	Thermocouple and DC rated voltage (mV) : min 1 M Ω , DC rated voltage (V) : approx 1 M Ω
Allowable signal source resistance	Thermocouple (max 250 Ω), DC voltage (Max 2 k Ω)
Allowable wiring resistance	RTD (max 10 Ω , however resistance among 3 wires should be same)
Allowable input voltage	Within ± 10 V(thermocouple, RTD, DC voltage (mV)), within ± 20 V (DC voltage (V))
Scaling	–1999 ~ 9999 (within SL–L ~ SL–H)
Input compensation	–100.0 % ~ 100.0 % of FS
Cold junction compensation error	± 1.5 °C (15 ~ 35 °C), ± 2.0 °C (0 ~ 50 °C)
Input signal break detection	OFF, UP/DOWN Scale selection (thermocouple). UP Scale (RTD)

Performance

Display accuracy	± 0.5 % of FS ± 1 Digit, thermocouple (K, J, E, T, R, B, S, L, U, W, PL2)
	± 1.0 % of FS ± 1 Digit, thermocouple (N)
	± 0.5 % of FS ± 1 Digit, RTD (KPt100 Ω , Pt100 Ω), DV voltage
External power supply	12 V DC, 20 mA max. (cannot be used when using the Retransmission output)
Insulation resistance	Min 20 M Ω (500 V DC), between 1st terminal–2nd terminal–earth terminal
Dielectric strength	2,300 V AC, 50 / 60 Hz, for 1 min (between 1st terminal–2nd terminal–earth terminal)
	1,500 V AC, 50 / 60 Hz, for 1 min (between 2nd terminal–F.G)

Communication (optional)

Communication Rating	RS-422 (4–wire type), RS-485 (2–wire type)
Protocol	PC Link with Checksum, MODBUS (RTU), MODBUS (ASCII)
Communication speed	2400, 4800, 9600, 14400, 19200 BPS
Max number of Connection	31 devices (address setting is 1 ~ 99)
Communication distance	1.2 km max

Control function and output

Control type	PID auto tuning control type
Control action	a) temporal selection of reverse action (heating) and direct action (cooling) (due to the selection of parameter) b) heating/cooling synchronous control
Range setting	Same as input range chart
Contact input (DI)	Select 3 types of set temperatures which had been set in advance as external contact.
Auto tuning 2 types	Target value/low target value auto tuning selection
Proportional band	0.1 ~ 999.9 % (heating/cooling type : 0.0 ~ 999.9 %)
Integral time	OFF, 1 ~ 6,000 sec
Differential time	OFF, 1 ~ 6,000 sec
A.R.W(Anti Reset Wind-up)	Auto, 50.0 ~ 200.0 % (Proportional band)
ON/OFF control	Select the output types by parameter
PID selection	Zone PID/group PID selection
Manual reset	Possible to set as manual reset when integral time is OFF
Output with input break(OUT1)	-5.0 ~ 105.0 (regular type), 0.0 ~ 105.0 % (heating/cooling type)
Output with input break(OUT2)	0.0 ~ 105.0 %
Regular type hysteresis	0.0 ~ 100.0 % of FS. but, ON/OFF control
Heating/cooling type hysteresis	0.0 ~ 100.0 % of FS. but, ON/OFF control
Heating/cooling dead zone setting	-100.0 ~ 50.0 % (proportional band)
Fuzzy function	Fuzzy function selected by parameter
Ramp function	Select the amount of output slope regarding the set temperature (set value(°C)/time(min.))
Retransmission output	Present value/set value/amount of output/external power supply (12 V DC, 20 mA max) selection
Retransmission output scaling	By the limitation of set range or scaling setting
alarm set range	0 ~ 100 % of range (absolute alarm), ± 100 % (deviation alarm)
Alarm hysteresis	0.0 ~ 100.0 % of range
Heater Break Alarm(HBA)	Possible to use it with the output of ON/OFF control and time proportional control. (However it cannot be used with the current output and cooling output (detection is impossible when output ON/OFF time is less than 0.2sec) measurement current range : 1 ~ 50 A AC (resolving power : 0.5 A, ± 5 % of FS ± 1 Digit) (Cautious) when using the cooling output as relay, alarm output is decreased with 1 contact C.T type for HBA : model CT-50N
Alarm type	Select by parameter of 21 types, refer to "alarm type and code"

● Output

Control output	Relay	Contact capacity : 1 C, 240 V AC, 3 A, 30 V DC 3 A (resistive load) But NX1 is 1 a Contact, 240 V AC, 1 A, 30 V DC 1 A (resistive load) Time resolving power : smaller one between 0.1 % and 10 ms
	SSR	Approx. more than 12 V DC (min 600 Ω resistive load) with disconnection, limit within approx 30 mA Time resolving power : smaller one between 0.1 % and 10 ms
	SCR	4 – 20 mA DC (resistive load less than 600 Ω) Accuracy : ± 0.5 % of FS (range 4 – 20 mA), time resolving power : Approx. 3,000
Alarm output	AL1, AL2, and HBA common	1a 2 contacts 240 V AC, 1 A, 30 V DC 1 A (resistive load)
Retransmission output	RET	4 – 20 mA DC (resistive load less than 600 Ω) Accuracy : ± 0.5 % of FS (4 – 20 mA range), resolving power : Approx. 3,000

● Regular type control output composition

Regular type (heating)	Output selection	OUT1 (heating side)		Alarm and current transformer	
		Relay ①–②–③	SSR/SCR ⑥–⑦	Relay ⑬–⑭	⑪–⑫
NX4–00	0	Relay (ON/OFF)	–	–	–
	1	AL1	SSR	–	–
	2		SCR (4 – 20 mA)	–	–
	3	Relay (PID)	–	–	–

Regular type (heating)	Output selection	OUT1 (heating side)		Alarm and current transformer	
		Relay ①–②–③	SSR/SCR ⑥–⑦	Relay ⑬–⑭	⑪–⑫
NX4–01	0	Relay (ON/OFF)	–	AL2	–
	1	AL1	SSR		CT
	2		SCR (4 – 20 mA)		–
	3	Relay (PID)	–		CT

※ Selecting number 21 in alarm type will assign HBA output will be designated as ①–②–③ terminal or ⑬–⑭ terminal

Regular type (heating)	Output selection	OUT1 (heating side)		External input (DI)	
		Relay ①–②–③	SSR/SCR ⑥–⑦	Relay ⑬–⑭	Relay ⑪–⑫
NX4–02	0	Relay (ON/OFF)	–	SV2	SV3
	1	AL1	SSR		
	2		SCR (4 – 20 mA)		
	3	Relay (PID)	–		

Regular type (heating)	Output selection	OUT1 (heating side)		Communication and Retransmission	
		Relay ①–②–③	SSR/SCR ⑥–⑦	Relay ⑬–⑭	Relay ⑪–⑫
NX4–03	0	Relay (ON/OFF)	–	Communication function (RS 485)	Retransmission output (RET)
	1	AL1	SSR		
	2		SCR (4 – 20 mA)		
	3	Relay (PID)	–		

Regular type (heating)	Output selection	OUT1 (heating side)		Communication	
		Relay ①-②-③	SSR/SCR ⑥-⑦	Relay ⑬-⑭	Relay ⑪-⑫
NX4-04	0	Relay (ON/OFF)	—	communication function (RS485)	—
	1	AL1	SSR		
	2		SCR (4 – 20 mA)		
	3	Relay (PID)	—		

Regular type (heating)	Output selection	OUT1 (heating side)		Alarm output	
		Relay ①-②-③	SSR/SCR ⑥-⑦	Relay ⑬-⑭	Relay ⑪-⑫
NX4-05	0	Relay (ON/OFF)	—	AL1	AL2
	1	—	SSR		
	2		SCR (4 – 20 mA)		
	3	Relay (PID)	—		

Regular type (heating)	Output selection	OUT1 (heating side)		Alarm output	
		Relay ①-②-③	⑥-⑦	Relay ⑬-⑭	Relay ⑪-⑫
NX4-06 (AL1, AL2) (SV2)	0	Relay (ON/OFF)	SV2	AL1	AL2
	1	—	—		
	2		—		
	3	Relay (PID)	SV2		

Regular type (heating)	Output selection	OUT1 (heating side)		Communication and current transformer	
		Relay ①-②-③	SSR/SCR ⑥-⑦	⑬-⑭	⑪-⑫
NX4-07 (RS485) (HBA)	0	Relay (ON/OFF)	—	communication function (RS485)	—
	1	AL1	SSR		CT
	2		SCR		—
	3	Relay (PID)	—		CT

● Heating/Cooling type control output composition

Heating/ cooling	Output selection	heating side (OUT1)		cooling side (OUT2)	
		Relay ①-②-③	SSR/SCR ⑥-⑦	Relay ⑬-⑭	Relay ⑪-⑫
NX4-10	4	AL1	SSR	—	SSR
	5		SCR		
	6	Relay	—		
	7	AL1	SSR	—	SCR
	8		SCR		
	9	Relay	—		

Heating/ cooling	Output selection	Heating side (OUT1)		Communication	Cooling side (OUT2)
		Relay ①-②-③	SSR/SCR ⑥-⑦	⑬-⑭	⑪-⑫
NX4-14	4	AL1	SSR	Communication function (RS485)	SSR
	5		SCR (4 - 20 mA)		
	6	Relay	-		SCR (4 - 20 mA)
	7	AL1	SSR		
	8		SCR (4 - 20 mA)		
	9	Relay	-		

※ Limits only with heating / cooling control

Heating/ cooling	Output selection	Heating side (OUT1)		Cooling side (OUT2)	
		Relay ①-②-③	SSR/SCR ⑥-⑦	Relay ⑬-⑭	Relay ⑪-⑫
NX4-20	10	AL1	SSR	AL1	Relay
	11		SCR (4 - 20 mA)		
	12	Relay	-		

Range and input code

Classification	Code	Input	Range	Accuracy
Thermocouple (TC)	1	K	−200 ~ 1,370 *2	±0.5 % of FS ±1 digit
	2	K	−199.9 ~ 999.9 *2	
	3	J	−199.9 ~ 999.9 *2	
	4	E	−199.9 ~ 999.9 *2	
	5	T	−199.9 ~ 400.0 *2	
	6	R	0 ~ 1700 *2	
	7	B	0 ~ 1800 *1	
	8	S	0 ~ 1700	
	9	L	−199.9 ~ 900.0 *2	
	10	N	−200 ~ 1300	±1.0 % of FS ±1 digit
	11	U	−199.9 ~ 400.0 *2	±0.5 % of FS ±1 digit
	12	W	0 ~ 2300	
	13	PL2	0 ~ 1390	
RTD	20	KPt100 Ω	−199.9 ~ 500.0 *3	±0.5 % of FS ±1 digit
	21	Pt100 Ω	−199.9 ~ 640.0 *3	
DC voltage	30	1 – 5 V	scaling set (−1999 ~ 9999)	
	32	−10 – 20 mV		
	33	0 – 100 mV		
DC current	30	4 – 20 mA		

*1 range 0 ~ 400 °C : ±10 % of FS ±1 Digit

*2 less than 0 °C : ±1.0 % of FS ±1 Digit

*3 less than -150.0 ~ 150.0 °C : ±1.0 % of FS ±1 Digit

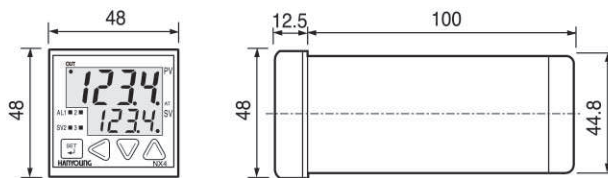
※ When using 4 - 20 mA DC current input, please select input code #30 and attach resistance 250 Ω 0.1% at the both terminal of input terminal

General specification

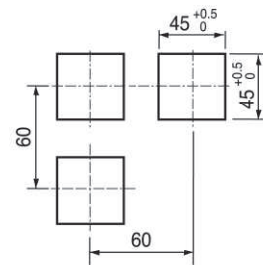
Power supply voltage	100 – 240 V AC, 50 – 60 Hz
Voltage fluctuation	±10 % of power supply voltage
Power consumption	10 VA max.
Ambient temperature	0 ~ 50 °C
Ambient humidity	35 – 85 % RH (without dew condensation)
Storage temperature	-25 ~ 65 °C
Vibration resistance	10 – 55 Hz, Peak amplitude 0.75 mm for 2 hrs each in 3 axis direction
Shock resistance	300 $\frac{m}{s^2}$, 3 times each in 3 axes direction
Weight	342 g

Dimension and panel cutout (Unit : mm)

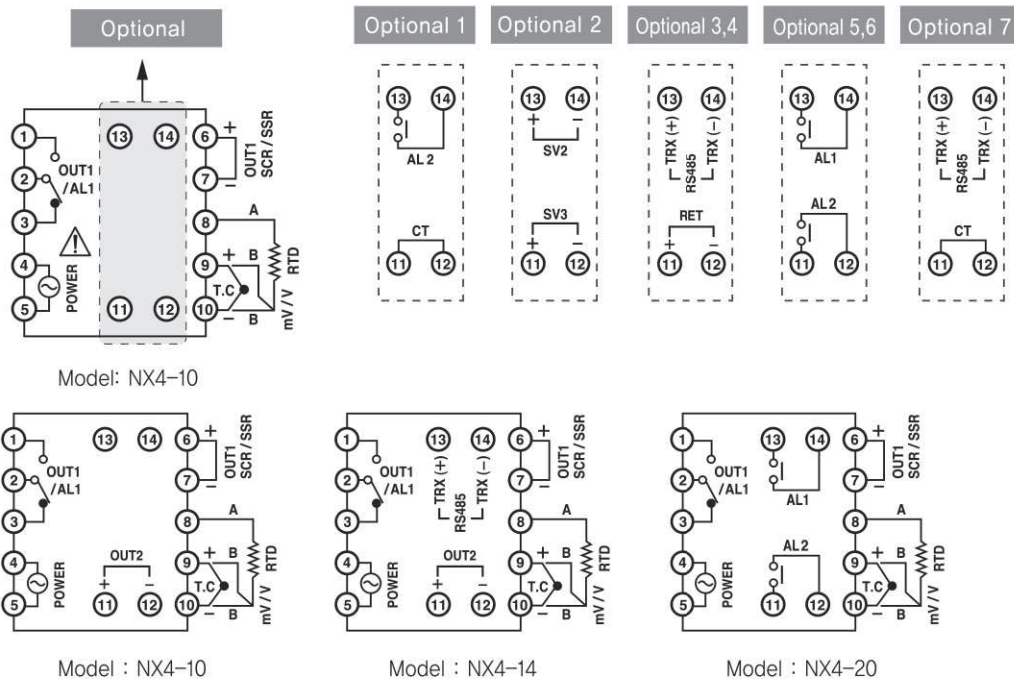
● Dimension



● Panel cutout



Connection diagram



Alarm type and code

Cautious) : Display lamp will be ON when output becomes OFF in inverted type.

Hysteresis



(Δ : Set value, $-\Delta$: minus alarm set value, $\blacktriangle$: alarm set value)

Code number	Alarm type	Operation diagram
1	high absolute (proper)	
2	low absolute (proper)	
3	high deviation (proper)	
4	low deviation (proper)	
5	high deviation (Inverted)	
6	low deviation (Inverted)	
7	high/low deviation	
8	within high/low deviation	
9	high absolute (Inverted)	
10	low absolute (Inverted)	
11	high absolute (Proper, Hold function)	
12	low absolute (Proper, Hold function)	
13	high deviation (Proper, Hold function)	
14	low deviation (Proper, Hold function)	
15	high deviation (Inverted, hold function)	
16	low deviation (Inverted, hold function)	
17	high/low deviation (hold function)	
18	within high/low deviation (Hold function)	
19	high absolute (Inverted, hold function)	
20	low absolute (Inverted, hold function)	
21	heater break alarm 1 (HBA 1)	

NX1

Multi input/Output digital temperature controller

- Fuzzy function, PID auto tuning
- 3 zone PID / group PID 3 types
- Ramp control function
- Heating / cooling, control
- Communication function(RS485 / 422)



A
Temperature
Controller

●● Suffix code

Model	Code	Description		
NX1 –	☐ ☐	Multi input/Output temperature controller, 48(W) X 24(H) mm		
Control type	0	Universal type		
	1	Heating/Cooling control (synchronously)		
Regular type options		Type options	Heating output	Cooling output
	0	RET	Relay	–
	1	None	SSR/SCR	–
	2	RS485/RET	Relay	–
	3	RS485	SSR/SCR	–
	4	ALM	SSR/SCR	–
	5	ALM/RS485	SSR/SCR	–
Heating/cooling type options	0	None	Relay	SSR/SCR
	1	None	SSR/SCR	Relay
	2	RS485	Relay	SSR/SCR

(Cautious) Product NX1–□ is able to select the control output among 6, 9, 10 and 11 outputs

Specification

Input

Thermocouple	K, J, E, T, R, B, S, L, N, U, W, PL2
RTD input	KPt 100 Ω , Pt 100 Ω
DC rated voltage	1 – 5 V DC, –10 – 20 mV, 0 – 100 mV, 4 – 20 mA (attach 250 Ω external resistance)
Input sampling time	250 ms
Input display resolution	Usually less than decimal points of the range
Input impedance	Min 1 M Ω (thermocouple, DC rated voltage)
Allowable Signal source resistance	Max 250 Ω (thermocouple input), Max 2 k Ω (DC voltage input)
Allowable wiring resistance	Max 10 Ω (RTD input)
Allowable input voltage	Within ± 10 V (thermocouple, RTD, DC voltage : mV), ± 20 V (DC voltage : V)
Scaling	–1999 ~ 9999 (within, SL–H > SL–L)
Cold junction compensation error	± 1.5 $^{\circ}\text{C}$ (15 ~ 35 $^{\circ}\text{C}$), ± 2.0 $^{\circ}\text{C}$ (0 ~ 50 $^{\circ}\text{C}$)
Input signal break detection	UP Scale/DOWN Scale selection (thermocouple input), UP Scale (RTD input)

Performance

Display accuracy	± 0.5 % of FS ± 1 Digit, thermocouple (K, J, E, T, L, U, W, PL2) ± 1.0 % of FS ± 1 Digit, thermocouple (N) ± 0.5 % of FS ± 1 Digit, RTD(KPt100 Ω , Pt100 Ω), DV voltage
External power supply	12 V DC, 20 mA max. (cannot be used when using the retransmitting output)
Insulation resistance	Min 20 M Ω (500 V DC) 1st terminal–2nd terminal–between the earth terminal
Dielectric strength	Between 2,300 V AC, 50 / 60 Hz, for 1 min (1st terminal–2nd terminal–earth terminal) 1,500 V AC, 50 / 60 Hz, for 1 min (between 2nd terminal–F.G)

Control function and output

Control type	PID auto tuning
Control action	a) temporal selection of reverse action (heating) and direct action (cooling) (due to the selection of parameter) b) heating/cooling synchronous control
Range setting	Same as the input range chart
Contact input (DI)	Select 3 types of set temperature which had been set in advance as an external contact.
Auto tuning 2 types	Target value/low target value auto tuning selection
Proportional band	0.1 ~ 999.9 % (heating/cooling type : 0.0 ~ 999.9 %)
Integral time	OFF, 1 ~ 6,000 sec
Differential time	OFF, 1 ~ 6,000 sec
ARW(Anti Reset Windup)	Auto, 50.0 ~ 200.0 %(Proportional band)
ON/OFF control	Select the output types by parameter

PID selection	Zone PID/group PID selection
Manual reset	Possible to set as manual reset when integral time is OFF
Output with input break	Set an amount of output when input breaks
Regular type hysteresis	0.0 ~ 100.0 % of FS (ON/OFF control output, alarm output, HBA output)
Heating/cooling type hysteresis	0.0 ~ 100.0 % of FS (ON/OFF control output)
Heating/cooling dead zone setting	-100.0 ~ 50.0 % (proportional band)

● Control output composition

Types	Output selection	Heating control output		Cooling control output	
		⑥-⑦ terminal	④-⑤ terminal	⑥-⑦ terminal	④-⑤ terminal
Regular type	0	Relay (ON/OFF)	RET	—	—
	1	Alarm output	SSR	—	—
	2		SCR(4 - 20 mA)		
	3	Relay (PID)	RET	—	—
Heating/ Cooling type	6	Relay	—	—	SSR
	9				SCR(4 - 20 mA)
	10	—	SSR	Relay	—
	11		SCR(4 - 20 mA)		

Caution) NX1-1* model : Can select Output from 6, 9, 10, 11 of output selection.

General specification

Power supply voltage	100 - 240 V AC 50 - 60 Hz
Voltage fluctuation	±10 % of power supply voltage
Power consumption	8 VA max.
Ambient temperature	0 ~ 50 °C
Ambient humidity	35 ~ 85 % RH (without dew condensation)
Storage temperature	-25 ~ 65 °C
Vibration resistance	10 - 55 Hz, peak amplitude 0.75 mm for 2 hrs each in 3 axis direction
Shock resistance	300 m/s ² , 3 times each in 3 axes direction
Weight	94 g

Range and input code

Classification	Code	Input	Range(°C)	Accuracy	
Thermocouple (TC)	1	K	−200 ~ 1,370 *2	±0.5 % of FS ±1 digit	
	2	K	−199.9 ~ 999.9 *2		
	3	J	−199.9 ~ 999.9 *2		
	4	E	−199.9 ~ 999.9 *2		
	5	T	−199.9 ~ 400.0 *2		
	6	R	0 ~ 1700 *2		
	7	B	0 ~ 1800 *1		
	8	S	0 ~ 1700		
	9	L	−199.9 ~ 900.0 *2		
	10	N	−200 ~ 1300	±1.0 % of FS ±1 digit	
	11	U	−199.9 ~ 400.0 *2	±0.5 % of FS ±1 digit	
	12	W	0 ~ 2300		
	13	PL2	0 ~1 390		
RTD	20*	KPt100 Ω	−199.9 ~ 500.0 *3	±0.5 % of FS ±1 digit	
	21*	Pt100 Ω	−199.9 ~ 640.0 *3		
DC voltage	30	1 – 5 V	scaling set (−1999 ~ 9999)		
	32	−10 – 20 mV			
	33	0 – 100 mV			
DC current	30*	4 – 20 mA			

*1 : range 0 ~ 400 °C : ±10 % of FS ±1 Digit

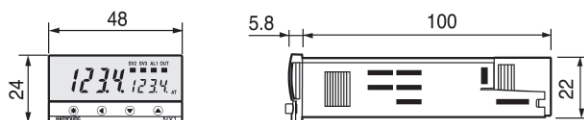
*2 : less than 0 °C : ±1.0 % of FS ±1 Digit

*3 : less than -150.0 ~ 150.0 °C : ±1.0 % of FS ±1 Digit

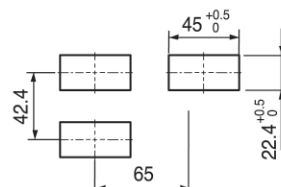
※ When using 4 - 20 mA DC current input, please select input code #30 and attach resistance 250 Ω 0.1% at the both terminal of input terminal

Dimension and panel cutout (Unit : mm)

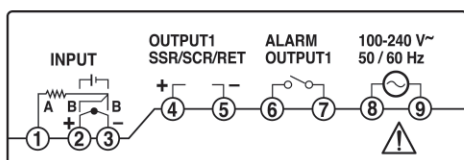
Dimension



Panel cutout



Connection diagram



※ RS485/422 communication(wiring length : 300 mm)



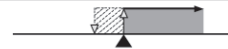
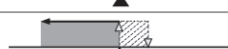
Alarm type and code

(Cautious): Display lamp will be ON when output becomes OFF in inverted type.

Hysteresis



(Δ : Set value, $-\Delta$: minus alarm set value, Δ : alarm set value)

Code number	Alarm type	Operation diagram
1	high absolute (Proper)	
2	low absolute (Proper)	
3	high deviation (Proper)	
4	low deviation (Proper)	
5	high deviation (Inverted)	
6	low deviation (Inverted)	
7	high/low deviation	
8	within high/low deviation	
9	high absolute (Inverted)	
10	low absolute (Inverted)	
11	high absolute (Proper, Hold function)	
12	low absolute (Proper, Hold function)	
13	high deviation (Proper, Hold function)	
14	low deviation (Proper, Hold function)	
15	high deviation (Inverted, hold function)	
16	low deviation (Inverted, hold function)	
17	high/low deviation (hold function)	
18	within high/low deviation (Hold function)	
19	high absolute (Inverted, hold function)	
20	low absolute (Inverted, hold function)	