NX series

Digital temperature controller

- Fuzzy function, PID auto tuning
- 3Zone 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)

Specification

■ Input specification

Input type	Thermocouple : K, J, E, T, R, B, S, L, N, U, W, PL2 (refer to input signal and measurement range) RTD : Pt 100 Ω , KPt 100 Ω DC voltage input : 1-5 V d.c., -10-20 ㎷, 0-100 ㎷ d.c., 4-20 ㎃ d.c.(250 Ω with external resistor)
Input sampling cycle	250 ms
Input display resolution	Basically, below the decimal point of the range
Input impedance	Thermocouple and DC voltage input (㎷) : min. 1 MΩ, DC voltage input (V) : approx. 1 MΩ
Allowable signal source resistance	Thermocouple : max. 250 Ω , DC voltage : max. 2 kΩ
Allowable wiring resistance	RTD : max. 10 Ω /wire (conductor resistance among 3 wires should be the same)
Allowable input voltage	Within ±10 V (thermocouple, RTD, DC voltage : ㎷ d.c.) Within ±20 V (DC voltage: V d.c.)
Noise reduction rate	NMRR (normal mode) : min. 40 dB (50/60Hz ±1 %) CMRR (common mode) : min. 120 dB (50/60Hz ±1 %)
Standard	Thermocouple / RTD (KS/IEC/DIN)
RJC error	±1.5 °C (15 ~ 35 °C), ±2.0 °C (0 ~ 50 °C)
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)
Measurement accuracy	±0.5 % (FULL SCALE)
Input range	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.

■ Output specification

① Control output (output type can be selected from relay, current, SSR, heating / cooling type can be set individually.)

Relay contact output	Contact capacity : 240 V a.c. 3 A, 30 V 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

SSR output (voltage pulse output)	ON voltage : NX2, 3, 4, 7, 9 approx. min. 12 V d.c. (load resistance min. 600 Ω , limited to 30 ㎃ in short circuit) OFF voltage : max. 0.1 V d.c. 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
Current output (4 - 20 ㎃)	Current output range : 4-20 ㎃ d.c. Load resistance : max. 600 Ω Accuracy : ±0.5 % of max. scale (4-20 ㎃ range), Resolution : approx. 3,000 Output ripple : 0.3 % (P-P) or less of the maximum scale (150 Hz) Output update cycle : 250 ㎳ 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).

② Alarm output (HBA common)

Relay contact output	Contact capacity : 240 V a.c. 1 A, 30 V d.c. 1 A (resistive load). Contact configuration : 1a Output contacts : different according to model specifications (refer to wiring diagram)
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.

③ Retransmission output

Current output	Current output range : 0-20 ㎃ d.c., 4-20 ㎃ d.c. Load resistance : max. 600 Ω Accuracy : ±0.5 % of max 0 ㎃ or 4-20 ㎃ range Resolution : approx. 3,000 Output ripple : max. 0.3 % (P-P) of the max. scale (150 Hz) Output update cycle : 250 ㎳

■ Operating environment

Installation environment	Continuous vibration (5 - 14 Hz) : peak-to-peak max. 1.2 mm Continuous vibration (4 - 150 Hz) : max. 4.9 m/s^2 Short-time vibration : 14.7 m/s^2, max. 15 seconds (3 directions each) Shock : 147 m/s^2, max. 11 ms (6 directions each 3 times) Panel cutout : refer to "panel cutout"
Normal operating conditions	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
Ambient temperature influence	Thermocouple, voltage input : ± 1 μV / °C or ± 0.01 % / °C of max. range RTD input : max. ± 0.05 Ω / °C Analog output : max. ± 0.05 % / °C of max. range (continuous output)

■ Power specification

Power voltage	100-240 V a.c. (voltage fluctuation rate : ±10 %)
Power frequency	50 / 60 Hz
Power consumption	Max. to 6.0 W, max. 10 VA, 8 VA (NX1)
Insulation resistance	1st terminal - 2nd terminal : min. 500 V d.c. 20 MΩ 1st terminal - ground : min. 500 V d.c. 20 MΩ 2nd terminal - ground : min. 500 V d.c. 20 MΩ
Dielectric strength	1st terminal - 2nd terminal : 2,300 V a.c. 50/60 Hz for 1 min. 1st terminal - ground : 2,300 V a.c. 50/60 Hz for 1 min. 2nd terminal - F•G : 1,500 V a.c. 50/60 Hz for 1 min.
Sensor power supply	12 V d.c.(20 ㎃ d.c., cannot be used with retransmission output)

■ Transport and storage conditions

Storage temperature	-25 ~ 70 °C
Storage humidity	5 ~ 95 % RH (without condensation)
Shock	Max. 1 min packaging

■ 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 ± 1digit	• FS is from the minimum to the maximum value of each measurable range. • Digit is the minimum display value ※1 0 ~ 400 °C range: ± 10.0 % of FS ± 1 digit ※2 Below 0 °C: ± 1.0% of FS ± 1 digit ※3 20 → KPt100 Ω (C1603) ※3 21, 22 → Pt100 Ω (IEC751) ※4 When current input is used, attach a 250Ω 0.1 % resistor to the input signal terminal.
	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		0 ~ 1700		
	7	B	*1	0 ~ 1800		
	8	S		0 ~ 1700		
	9	L	*2	-199.9 ~ 900.0		
	10	N		-200 ~1300	±1.0 % of FS ± 1 digit	
	11	U	*2	-199.9 ~ 400.0	±0.5 % of FS ±1 digit	
	12	W		0 ~ 2300		
	13	Platinel II		0 ~ 1390		
RTD (RTD)	20	KSPt100 Ω	*3	-199.9 ~ 500.0	±0.5 % of FS ±1 digit	
	21	Pt100 Ω	*3	-199.9 ~ 640.0		
	22	Pt100 Ω	*3	-200~640		
DC voltage (V d.c./㎷ d.c.)	30	1-5V d.c.		-1999 ~ 9999 (Using the scaling	±0.5 % of FS ±1 digit	
	31	0-10 V d.c.				

	32	-10-20 mV d.c.		function (SL-H / SL-L))		
	33	0-100 mV d.c.				
Direct current	30	4-20 mA d.c.	*4			