Network Instrumentation Module
Controller Module
Model NX-D15/D25/D35

Overview

Network Instrumentation Modules make optimal distributed configuration a reality. Distributed modules execute cooperative control using Ethernet connectivity. This instrumentation offers an excellent solution for productivity and energy conservation needs.

A variety of input sampling cycles and input accuracy levels are available, depending on the model.

- Sampling cycles: 100 ms, 200 ms, and 500 ms
- Input accuracy: ±0.1 % FS and ±0.3 % FS

Compact digital controllers with advanced functions can execute 2-loop or 4-loop control.

Control output can be selected from among transistor output, DC current, DC voltage output, and motor driver output (available soon).

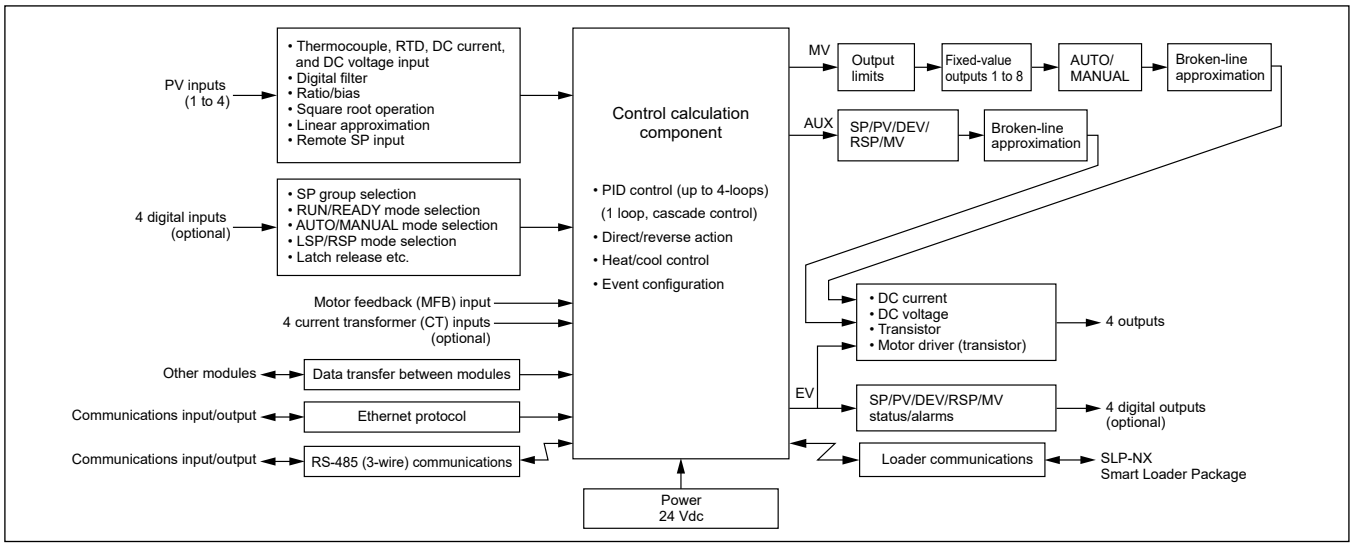
Optionally, 4 current transformer inputs, 4 digital outputs, or 4 digital inputs are also available.

Since the SLP-NX Smart Loader Package can be connected via Ethernet, Network Instrumentation Modules can be set up and monitored over an Ethernet communications network.

Features

- Ethernet and RS-485 as standard features
- Up to 4 control loops per module
- Side connectors for reduced wiring
- Support for reduced wiring daisy-chain connection and distributed layout
- Full multi-range input for thermocouple, RTD, DC current, and DC voltage
- 2-loop control (with RSP) or cascade control (available soon), depending on the control mode
- Heat/cool control using a combination of control outputs
- Control output branching for multiple actuators
- 6 LED indicators (standard), and additional LEDs depending on the model, provide abundant status information
- 3-part structure for easy maintenance
- Equipped with input/output broken line approximation for nonlinear processes.
- 4 additional CT/DI/DO points optionally available
- Logical operation processing for DI/DO and internal events
- Data transfer function allows operation input/output between modules
- Multi-loop cooperative control with supervisor module

Basic function block of model NX-D15/D25/D35



Descriptions

Model No.		NX-D15	NX-D25	NX-D35	
Control channels		4			2
Wiring method		Terminal block or screwless terminal, depending on the model			
PV input	Input type	Thermocouple, RTD, DC current, and DC voltage (see table 1-1, 1-2)			
	Sampling cycle	500 ms	200 ms (The setting can be changed to 400 ms.)	100 ms (The setting can be changed to 200 ms or 400 ms.)	
	Indication accuracy (under standard conditions)	See “Table 1-1. Input types and ranges.”		See “Table 1-2. Input types and ranges.”	
	Input bias current	Thermocouple input: +0.2 μA max. (under standard conditions) DC voltage input (V range) 0 to 1 V range: +0.2 μA max. (under standard conditions) 0 to 5 V and 1 to 5 V ranges: +0.7 μA max. (under standard conditions) 0 to 10 V and 2 to 10 V ranges: +12 μA max. (under standard conditions) DC voltage input (mV range): +0.2 μA max. (under standard conditions)			
	Measuring current	RTD input: 1.0 mA (typical), from terminals A and B			
	Effect of wiring resistance	Thermocouple input: 0.2 μV/Ω max. (wiring resistance: total resistance of all wires) RTD input: 0.05 % FS/Ω max. DC voltage input (V range) 0 to 1 V range: +0.2 μV/Ω max. (under standard conditions) 0 to 5 V and 1 to 5 V ranges: +0.7 μV/Ω max. (under standard conditions) 0 to 10 V and 2 to 10 V ranges: +12 μV/Ω max. (under standard conditions)			
	Allowable parallel connection resistance	Thermocouple input: 1 MΩ min. DC voltage input (mV range): 1 MΩ min. (range 83: 2 MΩ min.)			
	Allowable wiring resistance	RTD: 85 Ω max. (per wire)			
	Allowable input	Thermocouple input, DC voltage input (mV range): ±1 V DC current input: 25 mA Max. (Operation for excessive input starts at 30 mAtyp or more.) -2 to +12 V (Power generator open voltage: 35 V max.) DC voltage input (V range): −2 to +12 V			
	Input impedance	DC current input: 80 Ω max. (with 20 mA input) DC voltage input (V range): 1 MΩ min.			
	Burnout	Depends on the input range. (See “Behavior if a PV input error occurs.”)			
	Cold junction compensation accuracy	±0.5 °C (when ambient temperature is 23 ±2 °C) ±1.5 °C (when ambient temperature is 0 to 50 °C)			
	Cold junction compensation method	Internal/external (0 °C only) compensation selectable			
	Scaling	-19999 to +32000 U (DC voltage input (V range), DC voltage input (mV range), DC current input)			
Configuration and display	Configuration method	Engineering tool (SLP-NX Smart Loader Package) or communications from a host unit			
	SP groups per loop	4 SP groups per loop			
	Memory type	Nonvolatile			
	Station address setup	Softswitch			
	LED operation indicators	Shared LEDs (PWR, RUN, MOD, COM, NST and FAIL) and individual LEDs			

Model No.		NX-D15	NX-D25	NX-D35	
Control channels		4			2
Control output	Control output type	Output type T: Transistor output			Output type T: Transistor output M: Transistor output (position proportional control models)
		Outputs: 4			Outputs: Output type T: 4 Output type M: Two sets of OPEN + CLOSE
		Output type: Transistor output (sink type)			
		External power source rated voltage: 5 to 24 Vdc			
		External power source allowable voltage: 4.5 to 26.4 Vdc			
		Allowable output current: 100 mA max.			
		OFF-state leakage current: 100 μA max.			
		ON-state residual voltage: 0.5 V max.			
		Output type C: Analog current output			Output type C: Analog current output S: Isolated analog current output
		Outputs: 4			Output type: Output type C: 4 Output type S: 2
		Output type: DC current			
		Output current: 4 to 20 mAdc,0 to 20 mAdc			
		Allowable load resistance:300 Ω max. (6.6 V max.)			Allowable load resistance: Output type C: 300 Ω max. (6.6 V max.) Output type S: 600 Ω max. (13.2 V max.)
		Output accuracy: ±0.3 % FS max. However, 1 % FS max. between 0.0 and 0.2 mA		Output accuracy: ±0.1 % FS max. However, 1 % FS max. between 0.0 and 0.2 mA	
		Output resolution: 1/10000 (for 4 to 20 mA range), 1/12500 (for 0 to 20 mA range)			
		Open voltage: 10 Vdc ±10 %			Open voltage: Output type C: 10 Vdc ±10 % Output type S: 18.5 Vdc ±10 %
		Output type D: Analog voltage output			Output type D:Analog voltage output G:Isolated analog voltage output
		Outputs: 4			Outputs: Output type D: 4 Output type G: 2
		Output type: DC voltage			
		Output voltage: 0 to 5 Vdc (0.0 to 5.5 Vdc) 1 to 5 Vdc (0.0 to 5.5 Vdc) 0 to 10 Vdc (0.0 to 5.5 Vdc) 2 to 10 Vdc (0.0 to 5.5 Vdc)			
		Allowable load resistance: 4 kΩ min.			
		Output accuracy: ±0.3 % FS max. However, ±1 % FS between 0.0 and 0.1 V		Output accuracy:±0.1 % FS max. However, ±1 % FS between 0.0 and 0.1 V	
		Output resolution: 1/8000 (1 to 5 V range) 1/10000 (0 to 5 V range) 1/16000 (2 to 10 V range) 1/20000 (0 to 10 V range)			
Motor feedback (MFB) input (Output type: M) (Optional: 4)	Allowable resistance range	–			100 to 1000 Ω 1000 to 5000 Ω (Depends on the parameter settings)

Model No.		NX-D15	NX-D25	NX-D35	
Control channels		4			2
Current transformer input (Optional: 1)	Inputs	4			
	Detection function	When control output is ON: detection of heater line break or overcurrent When control output is OFF: detection of actuator short circuit			
	Recommended current transformer	Current transformer QN212 A (sold separately): 12 mm dia. hole, 800 turns QN206 A (sold separately): 5.8 mm dia. hole, 800 turns			
	Allowable maximum current	AC60 A (rms) (peak current: 85 A max., No. of turns: 800,No. of power line passes: 1)			
	Current measurement range	0.4 to 50.0 A ac(rms) (peak current: 71 A max., No. of power line passes: 1)			
	Indication accuracy	±5 % FS ± 1digit			
	Indication resolution	0.1 A			
Digital output (Optional: 2)	Outputs	4			
	Output rating	Output type: transistor output (sink type) External power source rated voltage: 5 to 24 Vdc External power source allowable voltage: 4.5 to 26.4 Vdc Allowable output current: 100 mA max. OFF-state leakage current: 100 μA max. ON-state residual voltage: 0.5 V max.			
Digital input (Optional: 3)	Inputs	4			
	Input rating	Compatible output type: non-voltage contacts or transistor (sink type) Parallel connectable device: Azbil Corporation's SDC series Open terminal voltage: 5 Vdc ±10 % Terminal current (when shorted): 5.6 mA (typical) Allowable ON resistance: 250 Ω max. Allowable OFF resistance: 100 KΩ min. Allowable ON residual voltage: 1 V max. OFF-state leakage current: 100 μA max. Minimum hold time: Twice the cycle period			
Control function	Control type	ON/OFF control, Continuous proportional PID, Time proportional PID			ON/OFF control, Continuous proportional PID, Time proportional PID, Position proportional PID.
	Control algorithm	PID-A (deviation-derivative type)	PID-A (deviation-derivative type) and PID-B (PV-derivative type)		
	Control action	Reverse action, direct action, heat/cool control, reverse on-off action, and direct on-off action			
	Proportional band (P)	0.1 to 3200.0 %			
	Integral time (I)	0 to 32000 s, 0.0 to 3200.0 s, and 0.00 to 320.00 s (no integral operation when I = 0)			
	Derivative time (D)	0 to 32000 s, 0.0 to 3200.0 s, and 0.00 to 320.00 s (no derivative operation when D = 0)			
	MV limits	Low limit: -10.0 to high limit % High limit: low limit to +110.0 %			
	Manual reset	-10.0 to +110.0 %			
	Number of PID groups	4 groups per loop (Set a PID group for each SP group or use the internal contact input bank for the setting.)			
	Number of SP groups	Selection of 1 to 4 groups per loop			
	SP ramp-up	0: (integer)/s, 1: (integer)/min, 2: (integer)/h, 3: 0.1/s, 4: 0.1/min, 5: 0.1/h, 6: 0.01/s, 7: 0.01/min, 8: 0.01/h, 9: 0.001/s, 10: 0.001/min, 11: 0.001/h			
	MV change limit	–	0.0 to 320.0 % per control update cycle. No limit if set to 0.0 %		
	Auto-tuning type	PID calculation using limit cycle method Any of 3 types can be selected: • Normal (regular control characteristics) • Fast response (quick reaction to disturbance) • Stable (minimal up/down PV fluctuation)			
	ON/OFF control differential	0 to 32000 U			
	Heat/cool dead zone	-100.0 to +100.0 %			
	Broken-line approximation	–	8 groups		
	Zone PID	–	0: Do not use, 1: SP-based selection, 2: PV-based selection		
	Multi-loop cooperative control	–	When connected to the supervisor module		

Model No.		NX-D15	NX-D25	NX-D35
Control channels		4		2
Communications (Loader)	Dedicated loader	SLP-NX-J70 or SLP-NX-J70PRO or SLP-NX-J71 or SLP-NX-J71PRO		
	Cable	USB loader cable, included with the SLP-NX-J70 or SLP-NX-J70PRO		
Communications (RS-485)	Signal level	RS-485 compliant		
	Network	Multidrop (up to 31 slave stations for 1 host station)		
	Communications/synchronization type	Half-duplex, start/stop synchronization		
	Maximum cable length	500 m		
	Number of wires	3 wires for data sending/reception		
	Transmission speed	Selectable from 4800, 9600, 19200, 38400, 57600 and 115, 200 bps max.		
	Terminating resistor	External (150 Ω 0.5 W min.)		
	Data length	7 or 8 bits		
	Stop bits	1 or 2 bits		
	Parity	Even parity, odd parity and no parity		
	Protocol	Selectable from CPL, Modbus™/ASCII, Modbus/RTU		
Ethernet (using communications adapter)	Communication path type	IEEE 802.3u 100BASE-TX (with full duplex and Auto MDI/MDI-X functions)		
	Connector	RJ-45		
	Cable	UTP cable (4P) Cat 5e min. (straight) (ANSI/TIA/EIA-568-B both ends.)		
	Protocol	CPL/TCP and Modbus/TCP (2 connections max.)		
General descriptions	Standard conditions	Ambient temperature	23 ± 2 °C	
		Ambient humidity	60 ± 5 % RH (without condensation)	
		Rated voltage	24 Vdc	
		Vibration resistance	0 m/s^2	
		Shock	0 m/s^2	
		Mounting angle	Reference plane ± 3°	
	Operating conditions	Ambient temperature	0 to 50 °C (below the installed NX)	
		Ambient humidity	10 to 90 % RH (without condensation)	
		Allowable operating voltage	21.6 to 26.4 Vdc	
		Vibration	0 to 3.2 m/s^2 (10 to 150 Hz for 2 h each in x, y, and z directions)	
		Shock	0 to 9.8 m/s^2	
		Mounting angle	Reference plane ±3°	
		Dust	0.3 mg/m^3 max.	
		Corrosive gas	None	
		Altitude	2000 m max.	
		Pollution degree	2 (equivalent to normal office environments)	
	Transport and storage conditions	Ambient temperature	-20 to +70 °C	
		Ambient humidity	5 to 95 % RH (without condensation)	
		Vibration	0 to 9.8 m/s^2 (10 to 150 Hz for 2 h each in x, y, and z directions)	
		Shock	0 to 300 m/s^2 (vertically 3 times while on DIN rail)	
		Package drop test	Drop height 60 cm (free fall on 1 corner, 3 edges, 6 sides)	
	Memory storage system	Non-volatile (EEPROM)		
	Number of EEPROM writing cycles	100,000 cycles		
	Power consumption	4 W max. (under operating conditions)		
	Inrush current	20 A max. (under operating conditions)		
	Power ON operation delay	Reset time: 10 s min. (required until normal operation begins under standard conditions)		
	Insulation resistance	20 MΩ min. (between power terminals 1 and 2 and I/O terminals isolated from the power terminals, with a 500 Vdc megger)		
	Dielectric strength	500 Vac for 1 min (between power terminals 1 and 2 and I/O terminals isolated from the power terminals)		
	Case material, color	Modified PPO resin, black		
	Standards compliance	EN61326-1 (For use in industrial locations), UL61010-1, CAN/CSA C22.2 No.61010-1		
	Mounting method	DIN rail		
	Terminal screw tightening torque	0.6±0.1N·m		
	Mass	200 g max.		
	Accessories	User's manual (CP-UM-5561JE)		

Table 1-1. Input types and ranges

Indication accuracy (for the NX-D15/D25, under standard conditions)

Input type	Range No.	Sensor	Range		Effective resolution	Accuracy
			°C	°F		
Thermo-couple	1	K	-200 to +1200 °C	-300 to +2200 °F	1	±0.3 % FS (±0.6 % FS below 0 °C) ±1 digit
	2	K	0 to 1200 °C	0 to 2200 °F	1	±0.3 % FS ±1 digit
	3	K	0.0 to 800.0 °C	0 to 1500 °F	1, 0.1	±0.3 % FS ±1 digit
	4	K	0.0 to 600.0 °C	0 to 1100 °F	1, 0.1	±0.3 % FS ±1 digit
	5	K	0.0 to 400.0 °C	0 to 700 °F	1, 0.1	±0.3 % FS ±1 digit
	6	K	-200.0 to +400.0 °C	-300 to +700 °F	1, 0.1	±0.3 % FS (±0.6 % FS below 0 °C) ±1 digit
	7	K	-200.0 to +200.0 °C	-300 to +400 °F	1, 0.1	±0.3 % FS (±0.6 % FS below 0 °C) ±1 digit
	8	J	0 to 1200 °C	0 to 2200 °F	1	±0.3 % FS ±1 digit
	9	J	0.0 to 800.0 °C	0 to 1500 °F	1, 0.1	±0.3 % FS ±1 digit
	10	J	0.0 to 600.0 °C	0 to 1100 °F	1, 0.1	±0.3 % FS ±1 digit
	11	J	-200.0 to +400.0 °C	-300 to +700 °F	1, 0.1	±0.3 % FS (±0.6 % FS below 0 °C) ±1 digit
	12	E	0.0 to 800.0 °C	0 to 1500 °F	1, 0.1	±0.3 % FS ±1 digit
	13	E	0.0 to 600.0 °C	0 to 1100 °F	1, 0.1	±0.3 % FS ±1 digit
	14	T	-200.0 to +400.0 °C	-300 to +700 °F	1, 0.1	±0.3 % FS (±0.6 % FS below 0 °C) ±1 digit
	15	R	0 to 1600 °C	0 to 3000 °F	1	±0.4 % FS (±6.4 °C) ±1 digit
	16	S	0 to 1600 °C	0 to 3000 °F	1	±0.4 % FS (±6.4 °C) ±1 digit
	17	B	0 to 1800 °C	0 to 3300 °F	1	800 to 1800 °C: ±0.4 % FS (±7.2 °C) ±1 digit 260 to 800 °C: ±0.8 % FS (±14.4 °C) ±1 digit 0 to 260 °C: ±4 % FS (±72 °C) ±1 digit Low limit for indication: 20 °C ±1 digit
	18	N	0 to 1300 °C	0 to 2300 °F	1	±0.3 % FS ±1 digit
	19	PL II	0 to 1300 °C	0 to 2200 °F	1	±0.3 % FS ±1 digit
	20	Wre5-26	0 to 1400 °C	0 to 2400 °F	1	±0.3 % FS ±1 digit
	21	Wre5-26	0 to 2300 °C	0 to 4200 °F	1	±0.3 % FS ±1 digit
	22	Ni-Ni • Mo	0 to 1300 °C	0 to 2300 °F	1	±0.3 % FS ±1 digit
	23	PR40-20	0 to 1900 °C	0 to 3400 °F	1	800 to 1900 °C: ±1.0 % FS (±19.0 °C) ±1 digit 300 to 800 °C: ±2 % FS (±38 °C) ±1 digit 0 to 300 °C: ±4 % FS (±76 °C) ±1 digi
	24	DIN U	-200.0 to +400.0 °C	-300 to +700 °F	1, 0.1	±0.3 % FS (±0.6 % FS below 0 °C) ±1 digit
	25	DIN L	-1000 to +800.0 °C	-150 to +1500 °F	1, 0.1	±0.3 % FS (±0.6 % FS below 0 °C) ±1 digit
	26	Gold-iron Chromel	0.1 to 360.1 K	-450 to +180 °F	1, 0.1	280.1 to 360.1 K: no specification (linear interpolation is performed) 0.1 to 280.1 K: ±3.0 K ±1 digit

Input type	Range No.	Sensor	Range		Effective resolution	Accuracy
			°C	°F		
RTD	41	Pt100	-200.0 to +500.0 °C	-328 to +932 °F	1, 0.1	±0.3 % FS ±1 digit
	42	JPt100	-200.0 to +500.0 °C	-328 to +932 °F	1, 0.1	
	43	Pt100	-200.0 to +850.0 °C	-328 to +1562 °F	1, 0.1	
	44	JPt100	-200.0 to +640.0 °C	-328 to +1184 °F	1, 0.1	
	45	Pt100	-100.0 to +300.0 °C	-148 to +572 °F	1, 0.1	
	46	JPt100	-100.0 to +300.0 °C	-148 to +572 °F	1, 0.1	
	47	Pt100	-100.0 to +200.0 °C	-148 to +392 °F	1, 0.1	
	48	JPt100	-100.0 to +200.0 °C	-148 to +392 °F	1, 0.1	
	49	Pt100	-50.0 to +100.0 °C	-58 to +212 °F	1, 0.1	
	50	JPt100	-50.0 to +100.0 °C	-58 to +212 °F	1, 0.1	
	51	Pt100	-20.00 to +60.00 °C	-4 to +140 °F	1, 0.1, 0.01	
	52	JPt100	-20.00 to +60.00 °C	-4 to +140 °F	1, 0.1, 0.01	

Input type	Range No.	Sensor	Range	Effective resolution	Accuracy
Linear	81	DC voltage	0 to 10 mV	according to the controller setting	±0.3 % FS ±1 digit
	82		-10 to +10 mV		
	83		0 to 100 mV		
	84		0 to 1 V		
	85		-1 to +1 V		
	86		1 to 5 V		
	87		0 to 5 V		
	88		0 to 10 V		
	89		2 to 10 V		
	90	DC current	0 to 20 mA		
	91		4 to 20 mA		

Table 1-2. Input types and ranges

Indication accuracy (for the NX-D35, under standard conditions)

Input type	Range No.	Sensor	Range		Effective resolution	Accuracy
			°C	°F		
Thermo-couple	1	K	-200 to +1200 °C	-300 to +2200 °F	1	±0.3 % FS (load range ±0.6 % FS) ±1 digit
	2	K	0 to 1200 °C	0 to 2200 °F	1	±0.1 % FS±1 digit
	3	K	0.0 to 800.0 °C	0 to 1500 °F	1, 0.1	±0.1 % FS±1 digit
	4	K	0.0 to 600.0 °C	0 to 1100 °F	1, 0.1	±0.1 % FS±1 digit
	5	K	0.0 to 400.0 °C	0 to 700 °F	1, 0.1	±0.1 % FS±1 digit
	6	K	-200.0 to +400.0 °C	-300 to +700 °F	1, 0.1	±0.3 % FS (load range ±0.6 % FS) ±1 digit ±2 °C ±1digit (below −100 °C)
	7	K	-200.0 to +200.0 °C	-300 to +400 °F	1, 0.1	±0.3 % FS (load range ±0.6 % FS) ±1 digit ±2 °C ±1digit (below −100 °C)
	8	J	0 to 1200 °C	0 to 2200 °F	1	±0.1 % FS±1 digit
	9	J	0.0 to 800.0 °C	0 to 1500 °F	1, 0.1	±0.1 % FS±1 digit
	10	J	0.0 to 600.0 °C	0 to 1100 °F	1, 0.1	±0.1 % FS±1 digit
	11	J	-200.0 to +400.0 °C	-300 to +700 °F	1, 0.1	±0.3 % FS (load range ±0.6 % FS) ±1 digit ±2 °C ±1digit (below −100 °C)
	12	E	0.0 to 800.0 °C	0 to 1500 °F	1, 0.1	±0.1 % FS±1 digit
	13	E	0.0 to 600.0 °C	0 to 1100 °F	1, 0.1	±0.1 % FS±1 digit
	14	T	-200.0 to +400.0 °C	-300 to +700 °F	1, 0.1	±0.3 % FS (load range ±0.6 % FS) ±1 digit ±2 °C ±1digit (below −100 °C)
	15	R	0 to 1600 °C	0 to 3000 °F	1	100 to 1600 °C: ±1.0 % FS (±2.4°C) ±1 digit 0 to 100 °C: ±2 % FS (±3.2°C) ±1 digit
	16	S	0 to 1600 °C	0 to 3000 °F	1	100 to 1600 °C: ±1.0 % FS (±2.4 °C) ±1 digit 0 to 100 °C: ±2 % FS (±3.2 °C) ±1 digit
	17	B	0 to 1800 °C	0 to 3300 °F	1	800 to 1800 °C: ±1.0 % FS (±3.6 °C) ±1 digit 260 to 800 °C: ±2 % FS (±7.2 °C) ±1 digit 0 to 260 °C: ±2 % FS (±72 °C) ±1 digit Minimum reading: 20 °C ±1 digit
	18	N	0 to 1300 °C	0 to 2300 °F	1	±0.1 % FS±1 digit
	19	PL II	0 to 1300 °C	0 to 2200 °F	1	±0.1 % FS±1 digit
	20	Wre5-26	0 to 1400 °C	0 to 2400 °F	1	±0.1 % FS±1 digit
	21	Wre5-26	0 to 2300 °C	0 to 4200 °F	1	±0.1 % FS±1 digit
	22	Ni-Ni • Mo	0 to 1300 °C	0 to 2300 °F	1	±0.1 % FS±1 digit
	23	PR40-20	0 to 1900 °C	0 to 3400 °F	1	800 to 1900 °C: ±1.0 % FS (±9.5 °C) ±1 digit 300 to 800 °C: ±2 % FS (±28.5 °C) ±1 digit 0 to 300 °C: ±2 % FS (±47.5 °C) ±1 digit
	24	DIN U	-200.0 to +400.0 °C	-300 to +700 °F	1, 0.1	±0.3 % FS (load range ±0.6 % FS) ±1 digit
	25	DIN L	-1000 to +800.0 °C	-150 to +1500 °F	1, 0.1	±0.3 % FS (load range ±0.6 % FS) ±1 digit
	26	Gold-iron Chromel	0.1 to 360.1K	-450 to +180 °F	1, 0.1	280.1 to 360.1 K: no specification (linear interpolation is performed) 0.1 to 280.1 K: ±1.5 K ±1 digit

Input type	Range No.	Sensor	Range		Effective resolution	Accuracy
			°C	°F		
RTD	41	Pt100	-200.0 to +500.0 °C	-328 to +932 °F	1, 0.1	±0.1 % FS±1 digit ±0.15 % FS±1 digit (-20.00 °C to +60.00 °C/Pt) ±0.2 % FS±1 digit (-20.00 °C to +60.00 °C/JPt)
	42	JPt100	-200.0 to +500.0 °C	-328 to +932 °F	1, 0.1	
	43	Pt100	-200.0 to +850.0 °C	-328 to +1562 °F	1, 0.1	
	44	JPt100	-200.0 to +640.0 °C	-328 to +1184 °F	1, 0.1	
	45	Pt100	-100.0 to +300.0 °C	-148 to +572 °F	1, 0.1	
	46	JPt100	-100.0 to +300.0 °C	-148 to +572 °F	1, 0.1	
	47	Pt100	-100.0 to +200.0 °C	-148 to +392 °F	1, 0.1	
	48	JPt100	-100.0 to +200.0 °C	-148 to +392 °F	1, 0.1	
	49	Pt100	-50.0 to +100.0 °C	-58 to +212 °F	1, 0.1	
	50	JPt100	-50.0 to +100.0 °C	-58 to +212 °F	1, 0.1	
	51	Pt100	-20.00 to +60.00 °C	-4 to +140 °F	1, 0.1, 0.01	
	52	JPt100	-20.00 to +60.00 °C	-4 to +140 °F	1, 0.1, 0.01	

Input type	Range No.	Sensor	Range	Effective resolution	Accuracy
Linear	81	DC voltage	0 to 10 mV	according to the controller setting	±0.1 % FS±1 digit ±0.15 % FS±1 digit (0 mV to +10 mV)
	82		-10 to +10 mV		
	83		0 to 100 mV		
	84		0 to 1 V		
	85		-1 to +1 V		
	86		1 to 5 V		
	87		0 to 5 V		
	88		0 to 10 V		
	89		2 to 10 V		
	90	DC current	0 to 20 mA		
	91		4 to 20 mA		

■ Input sensor standards

• Thermocouple

K, E, J, T, B, R, S, N (JIS C 1602-1995), WRe5-26 (ASTM E988-96 (reapproved 2002)), PR40-20 (ASTM E1751-00), Ni-Ni · Mo (ASTM E1751-00), PL II (ASTM E1751-00), DIN U, DIN L (DIN 43710-1985), Gold-iron Chromel (ASTM E1751-00)

• RTD

Pt100 (JIS C 1604-1997), JPt100 (JIS C 1604-1989)

■ Behavior if a PV input error occurs

Type	Range No.	Cause	Indication	Alarm*4
Thermocouple DC voltage	1 to 26 81 to 83	Line break	Upscale, 110 % FS	PV high limit error
Resistance temperature detector (RTD)	41 to 52	Line A break	Upscale, 110 % FS	PV high limit error*3
		G line break		
		G line break		
		2 or 3 line beak		
		Short circuit, lines A and B	Downscale, -10 or 0 % FS*2	PV low limit error
		Short circuit, lines A and C		
DC voltage (V)	84, 87, 88	Line break	About 0 % FS	None
	85	Line break	About 0 % FS	None
	86 to 89	Line break	Downscale, about -10 % FS	PV low limit error
DC current*1	90	Line break	About 0 % FS	None
	91	Line break	Downscale, about -10 % FS	PV low limit error

*1 If a current is detected in DC current that exceeds the specification for maxim permissible input, and intermittent current patch cutoff may operate to protect the circuit.
*2 Whether downscale is shown as –10 % FS or 0 % FS depends on the range No. (Upscale may be displayed in ROM version 1.00 [1_0_0] .)
*3 In the case of B line break, before a PV high limit error occurs, a PV low limit error may occur for about 1 second.
*4 Alarms operate as shown here when the default alarm high and low limits for each range type are used.

■ Behavior if an MFB input error occurs

Type	Range No.	Cause	Indication	Alarm
MFB1	75 to 76	PV2 input high limit error	Upscale	AL21 and AL05
		PV2 input low limit error	Downscale	AL21 and AL06
		G line break G line break G line break Multiline break	Upscale	AL21 and AL05*1
MFB2	75 to 76	PV2 input high limit error	Upscale	AL23 and AL07
		PV2 input low limit error	Downscale	AL23 and AL08
		G line break G line break G line break Multiline break	Upscale	AL23 and AL07*2

*1 In the case of Y line break, before AL 21 and AL05 occur, AL06 may occur for about 1 second.
*2 In the case of Y line break, before AL 23 and AL07 occur, AL08 may occur for about 1 second.

Model Selection

■ Controller module

Basic model No.	Type	Ring connection	Wiring method	Channels	Output type	Options	Add'l proc.	Description
NX-								Network Instrumentation Modules
	D15							Controller module, ±0.3 % FS, 500 ms sampling*1
	D25							Controller module, ±0.3 % FS, 200 ms sampling
	D35							Controller module, ±0.1 % FS, 100 ms sampling
		N						Non-ring communication
		R						Ring communication
			T					Screw terminal block
			S					Screwless terminal block
				2				2 channels*2
				4				4 channels*3
					T			Transistor output
					C			Analog current output
					D			Analog voltage output
					M			Transistor output (for position proportional control)*3
					S			Isolated analog current output (channel-channel and channel-power)*3
					G			Isolated analog voltage output (channel-channel and channel-power)*3
						0		None
						1		4 current transformer (CT) inputs
						2		4 digital outputs
						3		4 digital inputs
						4		4 digital outputs (for position proportional control)*3 *4
							0	None
							D	With inspection report
							Y	With traceability certificate
							T	Tropicalization treatment
							K	Anti-sulfuration treatment
							B	Tropicalization treatment + inspection report
							L	Anti-sulfuration treatment + inspection report

*1. The NX-D15 cannot be used for multi-loop cooperative control.
*2. 2 channels are not available on the D15/25.
*3. Output types M, S, and G as well as option 4 are not available when there are four channels.
*4. If the output type is T or M, option 4 is not available.

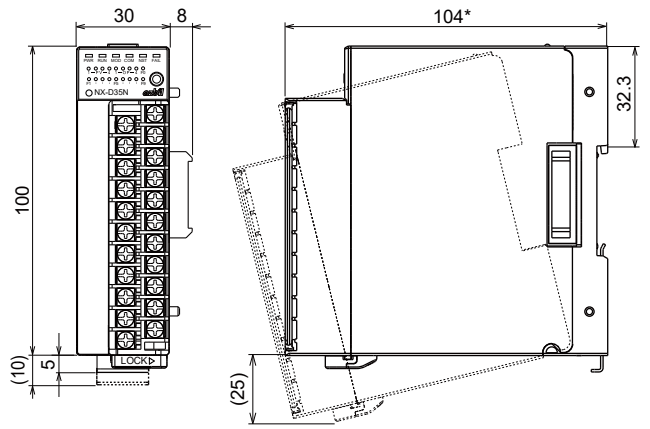
External Dimensions

■ External dimensions

The following figure shows a screw terminal block.

• Screw terminal block

(Unit: mm)

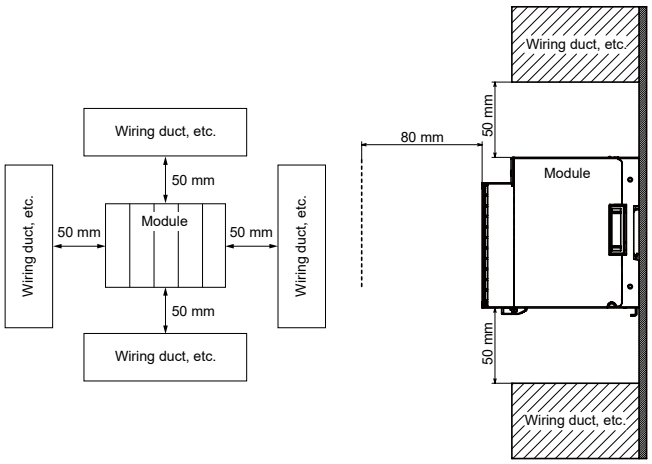


* 98 for screwless terminal block models

Mounting

■ Location

The minimum required clearances are shown below.



Install the controller in a location that meets the following criteria:

- No high/low temperature/humidity.
- Free from sulfide gas or corrosive gas.
- Not dusty or sooty.
- Protected from direct sunlight, wind, and rain.
- Little mechanical vibration or shock.
- Not close to high voltage line, welding machine or other electrical noise generating source.
- At least 15 meters away from the high voltage ignition device for a boiler.
- No strong magnetic fields.
- Indoors
- I/O common mode voltages: voltage to ground is 30 Vrms max., 42.4 V peak max., and 60 Vdc max. (not in a wet location).

■ Mounting/removing the terminal block

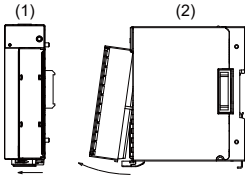
! Handling Precautions

- Do not remove the terminal block except during wiring for installation, or during maintenance.

• Removal procedures

(1) To unlock the terminal block, slide its lock lever to the left.

(2) Remove the terminal block by pulling the bottom part toward you.

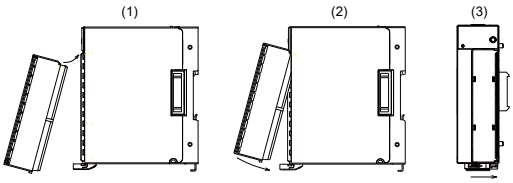


• Mounting procedures

(1) Tilt the terminal block and insert its upper part into the groove on the case.

(2) Push the bottom part of the terminal block into the case.

(3) To lock the terminal block in place, slide its lock lever to the right.



■ Linking modules

The NX-D15/D25 can be linked to other modules using the connectors on the left and right of the base. Modules must be linked before the NX-D15/D25 is mounted on the DIN rail. When linked, modules share the power supply and RS-485 connection, eliminating the need for wiring. RS-485 communications can be disabled using the communications cutoff switch on the base.

■ Mounting procedure

The NX-D15/D25 is used while mounted on a DIN rail. After mounting the DIN rail and pulling the locking tab completely off, hook the base onto the DIN rail. Then, push the DIN rail locking tab upwards firmly until it clicks into place.

! Handling Precautions

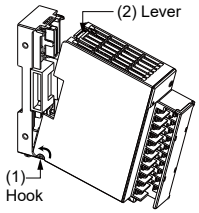
- Mount the unit so that it is vertical with the DIN rail locking tab at the bottom.
- Link this unit before installing it on the DIN rail.

■ Attaching the main unit to the base

Handling Precautions

- The included base and main unit must be used as a pair.
- Be sure to fit the hook on the main unit into the base first. If this is not done, the hook might be broken during mounting.

(1) Fit the hook on the main unit into the base.
(2) Push the main unit onto the base until it clicks into place.



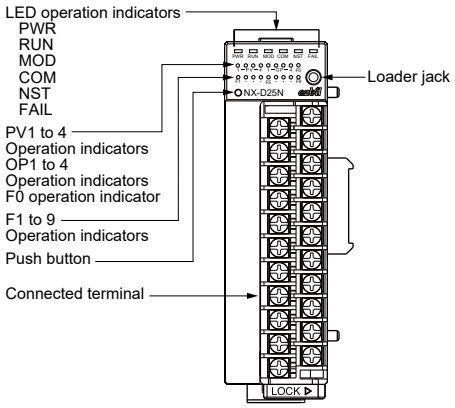
To remove the main unit from the base, pull it towards you while pressing down on the lever.

Part Names and Functions

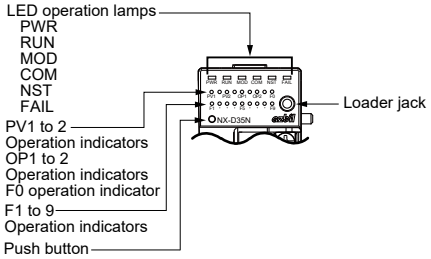
■ Body

Indicators on Network Instrumentation Modules vary depending on the model No. (functions). In the diagram below, a screw terminal block is shown as an example.

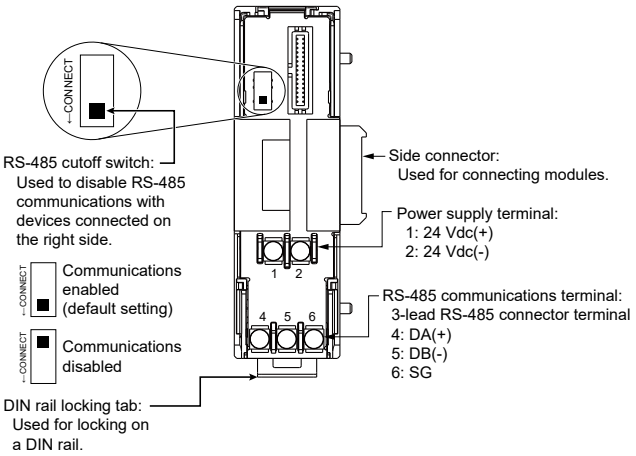
• 4-ch. model (NX-D15/D25/D35)



• 2-ch. model (NX-D35)



■ Base

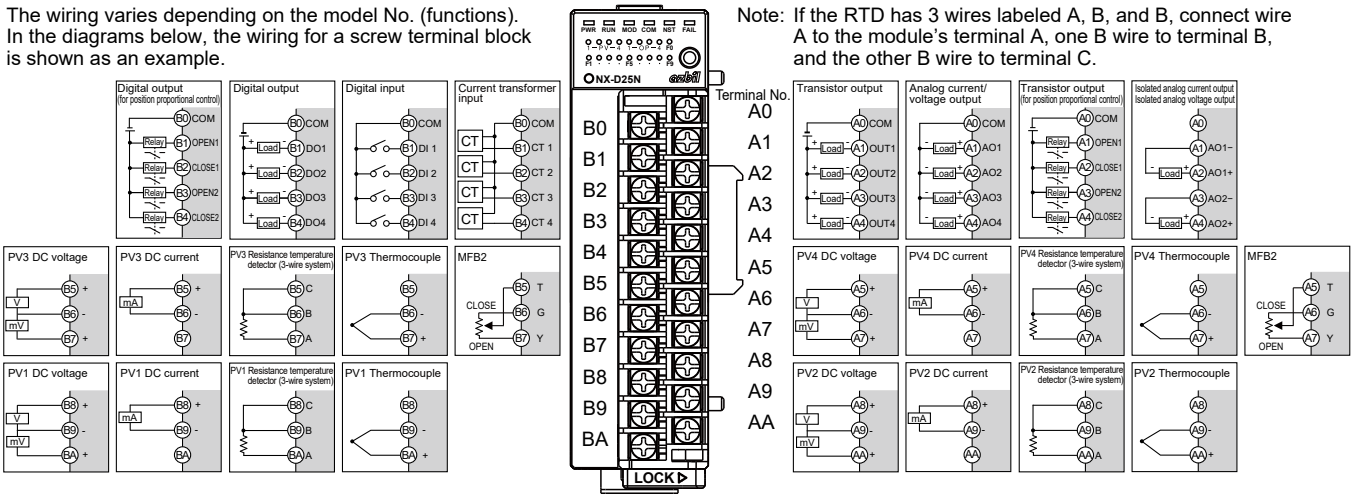


Terminal Connections

■ Wiring diagram

The wiring varies depending on the model No. (functions). In the diagrams below, the wiring for a screw terminal block is shown as an example.

Note: If the RTD has 3 wires labeled A, B, and B, connect wire A to the module's terminal A, one B wire to terminal B, and the other B wire to terminal C.



■ Wiring Precautions

- All wiring must comply with applicable codes and ordinances.
- Do not run wires outside. The equipment could be damaged in the event of lightning.
- When connecting wires to the power terminals, use crimp terminals with insulating sleeves.
- Check the model number of the controller and the terminal numbers on the wiring diagram on the side of the module to prevent any wiring errors.
- For screw terminal connections, use crimp terminals that are the correct size for M3 screws.
- Be careful not to allow crimp terminals, ferrules, etc., to touch adjacent terminals.
- The signal wires and power wires of the module should be at least 60 cm away from other power wires or power sources. Also, do not pass these wires through the same conduit or wiring duct.
- Before connecting the NX-D15/D25/D35 to other devices in parallel, check their connection conditions carefully.
- Pass a lead wire for carrying the heater current through the current transformer. Do not use a heater current that exceeds the amount of allowable current stated in the specifications. Doing so might damage the NX-D15/D25/D35.
- To ensure stable operation, the NX-D15/D25/D35 is designed not to operate for about ten seconds after the power is turned ON. It then enters Run mode. However, for satisfaction of the accuracy specifications, allow at least 30 minutes of warm-up time.
- After wiring, check that there are no mistakes before turning the power ON.

■ Wiring precautions (screwless terminal block model)

- Be sure to use ferrules when wiring the screwless terminal block.
- Check that the ferrules are inserted all the way in, and pull them lightly to check that they do not come off.
- If UL certification is necessary, use UL-certified ferrules and crimping tools. Use ferrules whose metal section is 12 mm long (for 22 to 16 AWG) or 8 mm long (for 24 AWG).
- Recommended ferrules

Wire size	Osada Co. model No.
AWG16	E1512
AWG18	E1012
AWG20	E7512
AWG22	E0512
AWG24	E0308

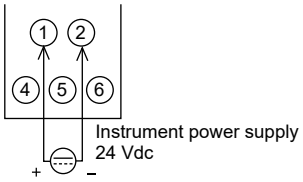
Note: Press E0308 all the way in until the entire insulation sleeve is under the surface of the screwless terminal block.

- For wiring of the screwless terminal block, use a crimping tool that can crimp all four sides of the metal part of the ferrules.
  Recommended crimping tool: Variocrimp 4 (model No.: 206-204) made by WAGO Company of Japan, Ltd.
- To remove a ferrule, press the button on the side of the hole for the ferrule with a screwdriver, and pull the ferrule out. Use a screwdriver with the following dimensions.

  Head width 2.0 to 3.5 mm, head thickness 0.4 to 0.6 mm

■ Connecting the power supply

Connect the power terminals as shown below.

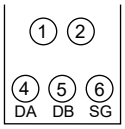


Handling Precautions

- Linked modules supply power to each other. Supply power to one of the linked modules.
- Wiring to the terminal block or elsewhere for I/O power should be connected directly to the power supply for I/O, not connected across the base unit.
- If there are multiple wires to the power supply or some other wiring difficulty, add a relay terminal or the like.
- Use a power supply that can supply the total power requirement of the linked modules.

■ Connecting the RS-485 communications

Connect the RS-485 wiring for CPL or Modbus as shown below.



Handling Precautions

- 0.5 W or greater terminating resistor of 150 Ω ±5 % at each end of the communications lines. However, if any device that does not allow a terminating resistor is connected to the same communications line, follow the instructions on that device.
- Be sure to connect the SG terminals to each other. Failure to do so might cause unstable communications.
- For communications wiring, use twisted pair cables.

■ I/O isolation

The solid line indicates isolation from the rest of the circuit.

Power supply (Including side connector*1)	
Logic circuit Loader jack RS-485, side connector, Ethernet communication*1 Display (LEDs, switches, etc.) Current transformer input (ch1 to 4)	Transistor output (ch1 to 4)*2 Analog current output (ch1 to 4) Analog voltage output (ch1 to 4) Digital output (ch1 to 4)*2 Digital input (ch1 to 4)
PV input (ch1)	
PV input (ch2)	
PV input (ch3), MFB (ch1)	
PV input (ch4), MFB (ch2)	
Side connector ring communication*1	

• Output type “S”, “G”

Power supply (including side connector)*1	
Logic circuits Loader jack RS-485, Ethernet communications through side connector*1 Displays (led, switch, etc) Current transformer inputs (ch1 to 4)	Digital outputs (ch1 to 4) Digital inputs (ch1 to 4)
PV input (ch1)	Analog current/voltage outputs (ch1)
PV input (ch2)	
PV input (ch3), MFB (ch1)	Analog current/voltage outputs (ch2)
PV input (ch4), MFB (ch2)	
Ring communications through side connector*1	

*1 Power, side-connector ring communications, and RS-485/ side-connector Ethernet communications are isolated from each other.

*2 Position proportional control models are included.

- Ethernet is a trademark of FUJIFILM Business Innovation Corp.
- Modbus is a trademark and the property of Schneider Electric SE, its subsidiaries and affiliated companies.

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