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Network Instrumentation Modules
Digital Output Modules
Model NX-DY1/DY2

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. You can select a type of output that depends on the module type.
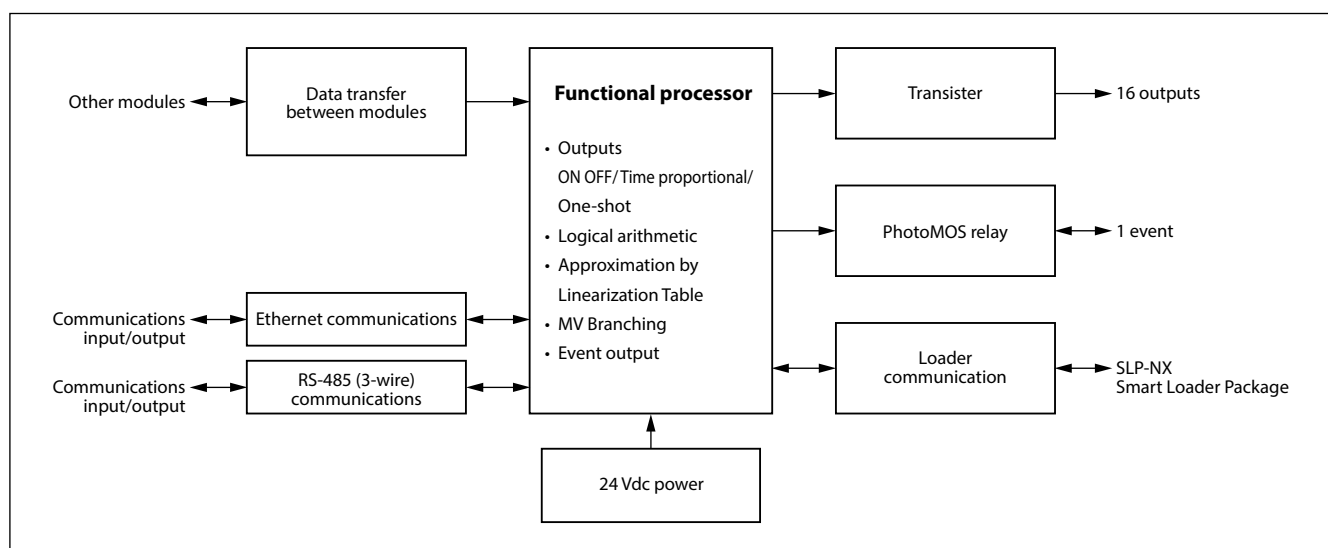- Transister sink type
- Transister source type

Logical arithmetic is available for each output. 32 groups of logical operations are provided. 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 16 digital outputs per module
- Side connectors for reduced wiring
- Support for reduced wiring and distributed layout through daisy-chain connection
- 6 LED indicators (18 LEDs), and additional LEDs depending on the model, provide abundant status information
- 3-part structure for easy maintenance
- Linked modules can make use of input and output from

- 32 groups of logical operations are provided One operation group consists of four inputs and one output
- Time proportional output Assign the MV of another controller module to own output Approximation by Linearization Table
- One-shot pulse output
- Event output using instantaneous values Assign the ON/OFF status of another module to own event

Basic function block of model NX-DY1/DY2

Specifications

Model No.		NX-DY1	NX-DY2
Wiring method		Regular terminal block or screwless terminal block, screw terminals on base (for power and RS-485 communications)	
Output	No. of outputs	16	
	Common terminal	One for every eight channels	
	Output type	Transistor (sink type)	Transistor (source type)
	Isolation between channels	Channels 1–8 isolated from 9–16	
	Recommended supply voltage	24 Vdc	
	Allowable supply voltage	21.6–26.4 Vdc	
	Allowable output current	100 mAdc max./1 ch	
	Off-state lekage current	1.0 mA max.	
	ON-state maximum voltage drop	1.5 Vmax. (at 24 Vdc 0.1 A)	
	Output refresh cycle	50 ms	
Digital output power supply voltage monitoring	Power interruption detecting voltage	20.4 Vdc max.	
	Detectiong terminals	1–8 ch (VCC1)	
Event output	No. of outputs	1	
	Rated contact voltage	24 Vdc	
	Applicable voltage range	20.4–27.6 Vdc	
	Allowable output current	100 mAdc max.	
	Output type	Photo MOS relay output (non-voltage Form A contact)	
	Polarity	None	
	Protection circuit	Over current protection (self recover type)	
	OFF-state leakage current	100 uA max.	
	ON-state maximum voltage drop	2 V max. (at 24 Vdc 0.1 A)	
	Output refresh cycle	50 ms	
Loader communications	Compatible loader	SLP-NX-J70 or SLP-NX-J70PRO, SLP-NX-J71, SLP-NX-J71PRO	
	Cable	USB loader cable is included with the dedicated loader (SLP-NX-J70/SLP-NX-J70PRO)	
RS-485 communications	Signal level	Conforms to RS-485	
	Network	Multidrop (up to 31 units as slave stations for one host)	
	Communication/ synchronization method	Half-duplex, start/stop synchronization	
	Max. line length	500 m	
	No. of wires	3-wire system	
	Transmission speed	4800, 9600, 19200, 38400, 57600, or 115200 bps	
	Terminating resistor	External (150 Ω 1/2 W min.)	
	Data length	7 or 8 bits	
	Stop bit	1 or 2 bits	
	Parity bit	Even, odd, or none	
	Protocol	Selectable from CPL, Modbus™/ASCII, and Modbus/RTU	
Ethernet communications (When using a communications adapter)	Transmission path type	IEEE802.3u 100BASE-TXIEEE 802.3u 100BASE-TX (With full duplex and auto MDI/MDI-X functions. The auto negotiation function must be activated on connected modules.)	
	Connector	RJ-45	
	Cable	UTP cable (4P) Cat 5e (straight) (ANSI/TIA/EIA-568-B both ends)	
	Protocol	CPL/TCP, Modbus/TCP	

| Model No.			NX-DY1	NX-DY2
General specifications	Standard conditions	Ambient temperature	23±2	
		Ambient humidity	60 ±5 % RH (without condensation)	
		Supply power	24 Vdc	
		Vibration	0 m/s^2	
		Shock	0 m/s^2	
		Installation angle	Reference plane ±3°	
	Operating conditions	Ambient temperature	0 to 50℃ (under installed unit)	
		Ambient humidity	10–90 % RH (without condensation)	
		Allowable operating power voltage	21.6–26.4 Vdc	
		Vibration	0 to 3.2 m/s^2 (10 to 150 Hz for 2 h each in x, y, and z directions)	
		Shock	0–9.8 m/s^2	
		Installation angle	Reference plane ±3°	
		Dust	0.3 mg/m^3 max.	
		Corrosive gas	None	
		Altitude	2000 m max.	
		Pollution degree	2 (equivalent to a normal office environment)	
	Transportation conditions	Ambient temperature	-20 to +70℃	
		Ambient humidity	5–95 % RH (without condensation)	
		Vibration	0–9.8 m/s^2 (10 to 150 Hz for 2 h each in x, y, and z directions)	
		Shock	0–300 m/s^2 (vertically 3 times while on DIN rail)	
		Package drop test	60 cm drop height (free drop on 1 corner, 3 edges, and 6 planes)	
	others	Memory backup	Nonvolatile memory (EEPROM)	
		EEPROM erase/write cycles	Up to 100,000	
		Insulation resistance	500 Vdc, 20 MΩ or more (between power terminals 1 and 2, and between power terminals and isolated I/O terminals)	
		Dielectric strength	500 Vac for 1 min (between power terminals 1 and 2, and between power terminals and isolated I/O terminals)	
		Power consumption	4 W max. (under operating conditions)	
		Operation after power-on	Warmup time is approx. 10 s (time until normal operation, under standard conditions)	
		Inrush current	Max. 20 A (under operating conditions)	
		External dimensions	30 × 100 × 100 mm (for details, see the external dimensions drawing)	
		Case material	Modified PPO resin	
		Case color	Black	
		Mass	200 g max.	
		Mounting method	DIN rail	
		Included accessories	Manual No. CP-UM-5564JE	
		Terminal screw tightening torque	0.6 ±0.1 N•m	
		Compliance	EN61326-1 (For use in industrial locations), UL61010-1, CAN/CSA C22.2 No.61010-1	

Model Number

Basic model No.	Type	Ring connection	Wiring method	Channels	Option	Addition	Description
NX-							Network Instrumentation module
	DY1						Digital output (Transistor output sink type)
	DY2						Digital output (Transistor output source type)
		N			4		Non-ring connection
		R					Ring connection
			T				Screw terminal block
			S				Screwless terminal block
				16			16 channels
					0		None
						0	None
						D	Inspection certificate
						T	Tropicalization treatment
						K	Anti-sulfide treatment
						B	Tropicalization treatment + Inspection certificate
						L	Anti-sulfide treatment + Inspection certificate

External Dimensions
■ External dimensions

- Regular terminal block model

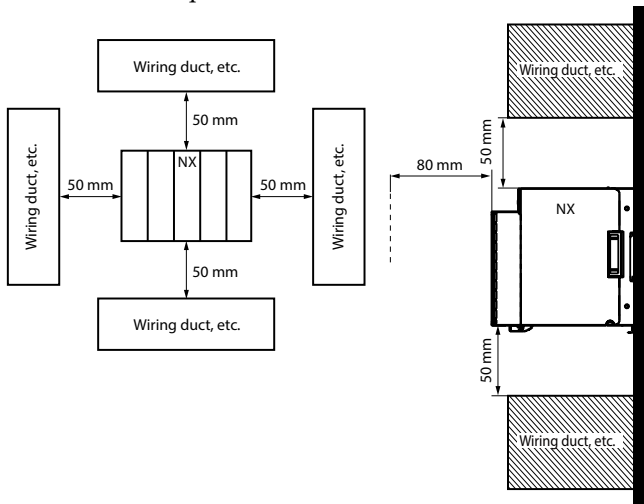| 30	8		104*

100

32.3

(10)
5
LOCK

(25)

* 98 for screwless terminal block models
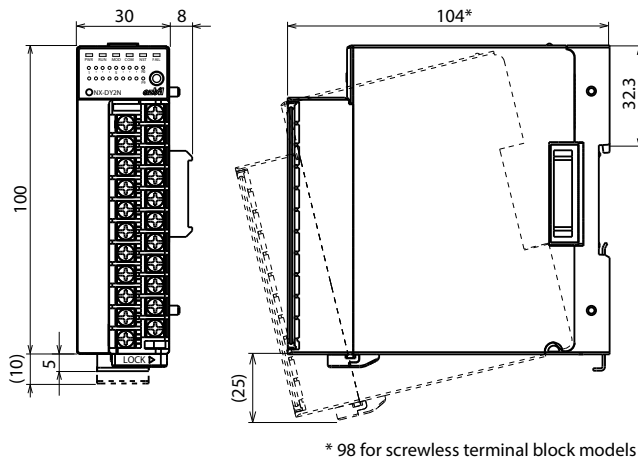
Mounting
■ Location

The minimum required clearances are shown below.

Do not install in a location having any of the following characteristics:

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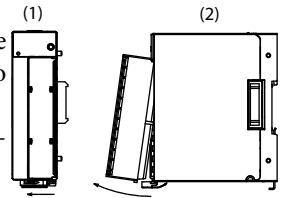
■ Terminal block mounting and removal

⚠ Handling Precautions
- Do not remove the terminal block other than for work, such as:
 - When wiring before installing the unit
  - During maintenance

- Removal method
  (1) Slide the lock lever of the terminal block to the left to unlock the terminal block.
  (2) Pull the bottom of the terminal block out towards you.

- Mounting method
  (1) Tilt the terminal block and insert the upper part of the terminal block into the groove in the case.
  (2) Install by pushing in the lower side of the terminal block.
  (3) Slide the lock lever of the terminal block to the right to lock the terminal block.
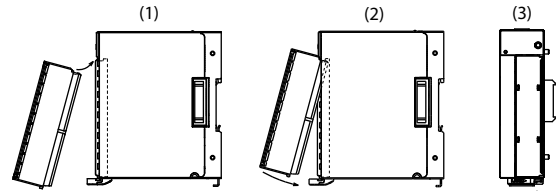
■ Module connection

Connect this module to other modules using the connectors on the left and right sides of the base.

Connect modules together before installing them on the DIN rail. Connecting the modules connects the power and communication of each module, reducing the amount of wiring that is required. With RS-485 communication, the module on the right side can be disconnected using the RS-485 cutoff switch on the base.

■ Mounting method

Use this unit after securing it to a DIN rail.

After mounting the DIN rail, pull open the locking tab an adequate amount and then attach the base to the rail. Next, push in the DIN rail locking tab upwards until it clicks into place.
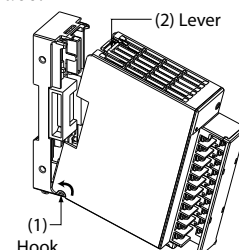
⚠ Handling Precautions
- Mount the unit so that it is vertical with the DIN rail locking tab at the bottom.
- Link this unit before installing it on the DIN rail.

■ Attaching the main unit to the base

⚠ Handling Precautions
- Use the base and main unit from the same package together as a pair.
- First attach the hook at the bottom of the main unit to the base. Not doing so might cause damage.
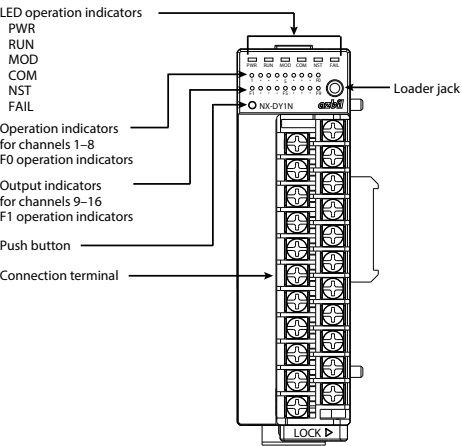
(1) Attach the hook at the bottom of the main unit to the base.
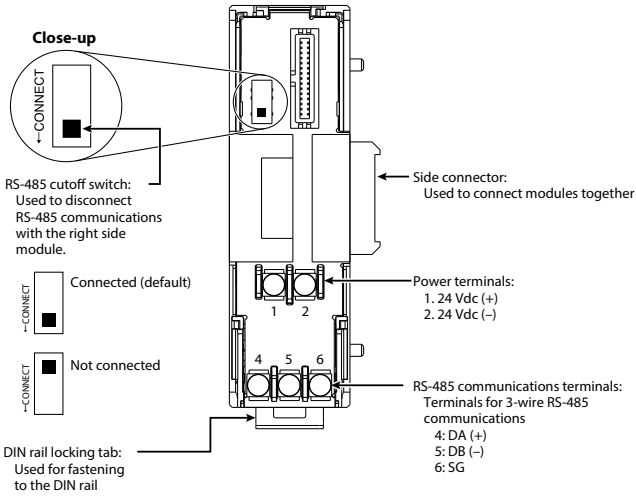(2) Insert the upper part of the main unit until the lever clicks into place.

To remove, press the lever on the top and pull the unit towards you.
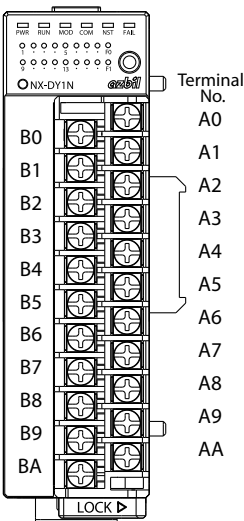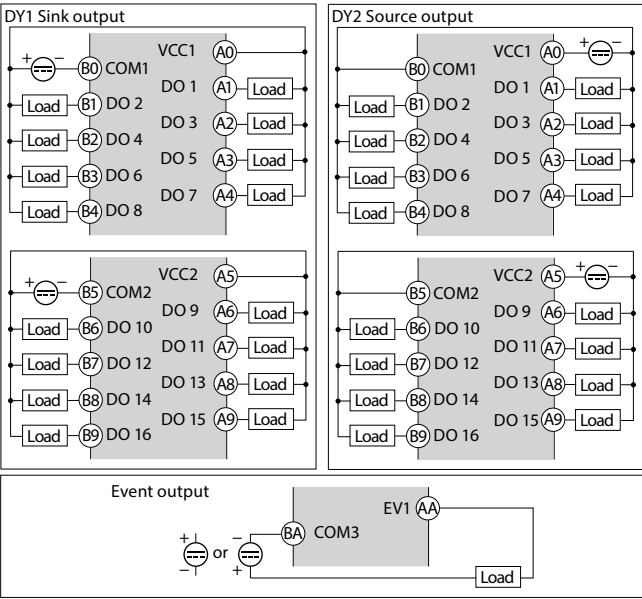
Names and Functions of Parts

■ Main unit

LED operation indicators
 PWR
 RUN
 MOD
 COM
 NST
 FAIL

Operation indicators
for channels 1–8
F0 operation indicators

Output indicators
for channels 9–16
F1 operation indicators

Push button

Connection terminal

Loader jack

NX-DY1N

■ Base

Close-up

RS-485 cutoff switch:
Used to disconnect
RS-485 communications
with the right side
module.

Connected (default)

Not connected

DIN rail locking tab:
Used for fastening
to the DIN rail

Side connector:
Used to connect modules together

Power terminals:
1. 24 Vdc (+)
2. 24 Vdc (–)

RS-485 communications terminals:
Terminals for 3-wire RS-485
communications
 4: DA (+)
 5: DB (–)
 6: SG

Terminal Wiring Diagram

■ Wiring diagram

• Screw terminal block

• Screwless terminal block

Terminal No.: A0, A1, A2, A3, A4, A5, A6, A7, A8, A9, AA
B0, B1, B2, B3, B4, B5, B6, B7, B8, B9, BA

NX-DY1N

DY1 Sink output

VCC1 (A0)
(B0) COM1
(B1) DO 2 DO 1 (A1) Load
(B2) DO 4 DO 3 (A2) Load
(B3) DO 6 DO 5 (A3) Load
(B4) DO 8 DO 7 (A4) Load
Load

VCC2 (A5)
(B5) COM2
(B6) DO 10 DO 9 (A6) Load
(B7) DO 12 DO 11 (A7) Load
(B8) DO 14 DO 13 (A8) Load
(B9) DO 16 DO 15 (A9) Load
Load

DY2 Source output

VCC1 (A0)
(B0) COM1
Load (B1) DO 2 DO 1 (A1) Load
Load (B2) DO 4 DO 3 (A2) Load
Load (B3) DO 6 DO 5 (A3) Load
Load (B4) DO 8 DO 7 (A4) Load

VCC2 (A5)
(B5) COM2
Load (B6) DO 10 DO 9 (A6) Load
Load (B7) DO 12 DO 11 (A7) Load
Load (B8) DO 14 DO 13 (A8) Load
Load (B9) DO 16 DO 15 (A9) Load

Event output

EV1 (AA)
(BA) COM3
+ — or — +
Load

6

■ Wiring precautions

- Make sure that the wiring follows regulations for indoor wiring and technical standards for electrical equipment.
- To avoid damage caused by lightning, do not run wiring outdoors.
- When connecting wires to the power terminals, use crimp terminals with insulating sleeves.
- Before wiring the unit, verify the device's model No. and terminal Nos. written on the wiring diagram on the side of the main unit.
- Use M3 crimp terminal lugs for wiring to regular (screw) terminal blocks.
- Make sure that no crimp terminal lugs touch adjacent terminals.
- Leave a distance of at least 60 cm between I/O wires and communications wires or power wires. Also, do not pass such wires through the same conduit or wiring duct.
- When connecting the unit to another device in parallel, check its connection requirements carefully before instrumentation.
- To ensure stability, the unit is designed so that after the power is turned ON, it will not operate for about 10 seconds.
- After wiring, check that there are no wiring mistakes before turning the power ON.

■ Power connections

Connect the power terminals as shown below.

Instrument power supply 24 V DC
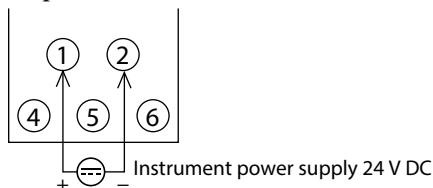
The power supply unit must be a UL Class 2 power supply unit.

⚠ Handling Precautions

- Linked modules supply power to each other. Supply power to one of the linked modules.
- I/O wiring to the terminal block or elsewhere should be connected directly to the power supply for I/O, not connected via 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.

■ RS-485 communication connections

Connect CPL and Modbus (RS-485 communication) as shown below.
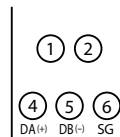
⚠ Handling Precautions

- Attach a 0.5 W or greater terminating resistor of 150 Ω ± 5 % at each end of the communications lines. If a device does not allow terminating resistor to be placed in the same line, follow the instructions for that device.
- Be sure to connect the SG terminals together. Failure to do so might cause unstable communications.
- Use twisted pair cable for communication wiring.

■ I/O isolation

The solid lines in the diagram below indicate isolation from the rest of the circuit.

Power supply (including side connector)[1]	Digital output channels 1–8
Logic circuits Loader jack RS-485 Ethernet communications through side connector[1] Displays (led, switch, etc.)	Digital output channels 9–16
Ring communication through side connector[1]	Event output 1

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

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Azbil Corporation
Advanced Automation Company

1-12-2 Kawana, Fujisawa
Kanagawa 251-8522 Japan
URL: https://www.azbil.com/