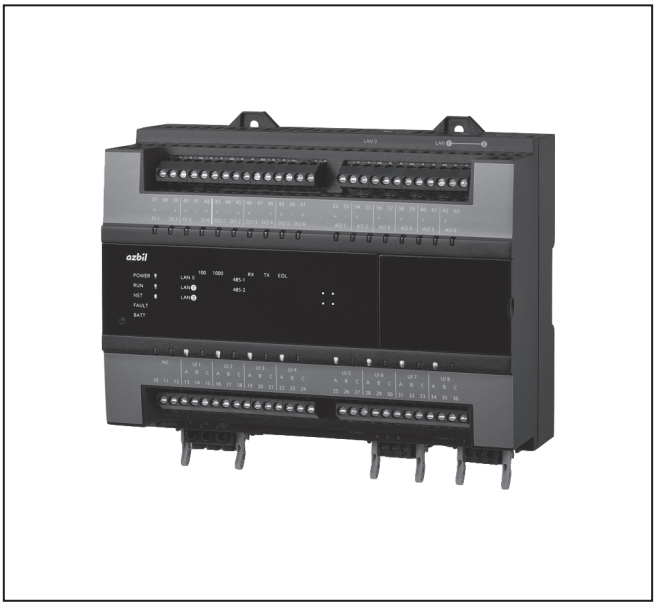
Advanced Controller

■ Overview

This product (Model WJ-1101W0000) is a BACnet controller that controls facility equipment such as building air conditioning equipment and plumbing equipment.
This product uses I/Os that have been built for the instrumentation along with control application programs to realize optimal control.
Furthermore, it has high expandability, including the ability to add Advanced Remote I/O Modules (Model RJ-11_ _W_ _ _ _) and control application programs, allowing it to adapt to operation changes and renovation work.



■ Features

- High connectivity using open protocols
  This product is a BACnet/IP compatible controller. RS-485 communication allows connection of devices that support BACnet MS/TP Modbus™ ASCII, and Modbus™ RTU.
- Flexible I/O configuration
  This product has 24 I/O terminals, including universal inputs.
  Universal inputs support current, voltage, resistance (Pt100 Ω/Pt1000 Ω), and digital input (DI).
  In addition, via Ethernet, they can connect up to 20 Advanced Remote I/O Modules (Model RJ-11_ _W_ _ _ _) in any combination.
- Advanced Remote I/O Modules (Model RJ-11_ _W_ _ _ _) that can be installed anywhere
  Advanced Remote I/O Modules (Model RJ-11_ _W_ _ _ _) can be installed near on-site facilities, away from this product.
- Visualized I/O statuses
  This product uses LEDs for DI (digital input), DO (digital output), and UI (universal input) to indicate the status of feedback inputs from facility equipment and ON/OFF outputs to facility equipment.
- Control suited to the instrumentation
  This product provides energy-saving control for temperature, humidity, CO_2 concentration, cooling using outdoor air, etc., that suit the instrumentation of the building.
- Addition and modification of controls during operation
  Control applications can be added or modified while this product is in operation.
  An operator can add or modify a control without having to stop the operation of the equipment.
- Manual override
  An operator can manually change I/O values by using the manual override function.
  This is used for temporary remedies in the event of an equipment failure and other situations.
- Autonomous distributed control
  This product performs autonomous distributed control. It can perform autonomous control even if the central monitoring device stops. It distributes risks if other parts of the system fail.

Safety Precautions

Please read instructions carefully and use the product as specified in this manual. Be sure to keep this manual nearby for quick reference.

Restrictions on Use

This product was developed, designed, and manufactured for general air conditioning use.
Do not use the product in a situation where human life may be at risk or for nuclear applications in radiation controlled areas. If you wish to use the product in a radiation controlled area, please contact Azbil Corporation.
Particularly when the product is used in the following applications where safety is required, implementation of fail-safe design, redundant design, regular maintenance, etc., should be considered in order to use the product safely and reliably.

- Safety devices for protecting the human body
- Start/stop control devices for transportation machines
- Aeronautical/aerospace machines

For system design, application design, instructions for use, or product applications, please contact Azbil Corporation.
Azbil Corporation bears no responsibility for any result, or lack of result, deriving from the customer's use of the product.

■ Caution for Instrumentation Design

Considering unexpected failures or contingencies, be sure to design and check safety of the system and equipment.

■ Recommended Design Life

It is recommended that this product be used within the recommended design life.
The recommended design life is the period during which you can use the product safely and reliably based on the design specifications.
If the product is used beyond this period, its failure ratio may increase due to time-related deterioration of parts, etc.
The recommended design life during which the product can operate reliably with the lowest failure ratio and least deterioration over time is estimated scientifically based on acceleration tests, endurance tests, etc., taking into consideration the operating environment, conditions, and frequency of use as basic parameters.
The recommended design life of this product is 10 years.
The recommended design life assumes that maintenance, such as replacement of the limited life parts, is carried out properly.
Refer to the section on maintenance in this manual.

■ Caution for Transporting

Lithium batteries are used in this product.
When this product, which uses lithium batteries, is transported by air or sea, ship it in accordance with IATA-DGR/IMDG-Code regulations.
Please inform your shipping company that lithium batteries are included in the product, and follow the necessary procedures according to the company's instructions.
If the product is shipped by air or sea without the necessary labels, etc., specified by the ordinances, you may be in violation of aviation or maritime safety laws and be subject to punishment.

■ Warnings and Cautions

 WARNING	Alerts users that improper handling may cause death or serious injury.
 CAUTION	Alerts users that improper handling may cause minor injury or material loss.

■ Signs

	Alerts users to possible hazardous conditions caused by erroneous operation or erroneous use. The symbol inside △ indicates the specific type of danger. (For example, the sign on the left warns of the risk of electric shock.)
	Notifies users that specific actions are prohibited to prevent possible danger. The symbol inside ⃠ graphically indicates the prohibited action. (For example, the sign on the left notifies that disassembly is prohibited.)
	Instructs users to carry out a specific obligatory action to prevent possible danger. The symbol inside ● graphically indicates the actual action to be carried out. (For example, the sign on the left indicates general instructions.)

⚠ WARNING

Install this product in a location out of reach of unauthorized people. (e.g. Inside of the control panel with a lock)
Failure to do so might cause electric shock.

Be sure to ground this product with a ground resistance of less than 100 Ω. Improper grounding may cause electric shock or malfunction.

Before wiring or maintenance, be sure to turn off the power to this product.
Failure to do so may result in electric shock or device failure.

Do not insert conductive objects through product ventilation holes.
Doing so may cause electric shock.

Do not touch electrically charged parts.
Doing so may cause electric shock.

⚠ CAUTION

Take anti-lightning surge measures based on regional and building characteristics.
Lightning may cause fire or critical damage to this product if protective measures are not taken.

Keep the products in package for storage.
Failure to do so may damage or stain the products.

Use this product under the operating conditions (for temperature, humidity, power, vibration, shock, mounting direction, atmosphere, etc.) listed in the specifications.
Failure to do so may cause fire or device failure.

Take anti-noise measures if this product is installed in a location near source of electric noise.
Failure to do so may cause malfunction or device failure.

Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
Failure to do so may cause fire or electric shock.

All wiring must comply with applicable codes and ordinances.
Failure to do so may cause fire.

For wiring, strip the insulation from cables as specified in this manual.
If the length of exposed wire is longer than specified, it may cause electric shock or short circuit between adjacent terminals. If it is too short, it may not make any proper contact.

⚠ CAUTION

Firmly tighten the terminal screws with the specified torque as listed in the specifications.
Insufficient tightening of the terminal screws may cause overheating or fire.

Do not block the ventilation holes of this product. Doing so may cause device failure.

Do not allow wire clippings, chips, and other refuses to enter into the product.
Doing so may cause fire or product damage.

If more than the rated power voltage is accidentally applied to this product, replace the product with a new one for your safety.
Failure to do so may cause device failure or cause fire.

Do not disassemble this product.
Doing so may cause device failure.

Before cleaning the product or retorquing the terminal screws, be sure to turn off the power to the product.
Failure to do so may cause electric shock, device failure, or malfunction.

Dispose of used lithium batteries in accordance with local regulations. Do not throw them in the fire or dispose of them with ordinary garbage.
Doing so may cause the batteries to burst or ignite.

■ System Configuration

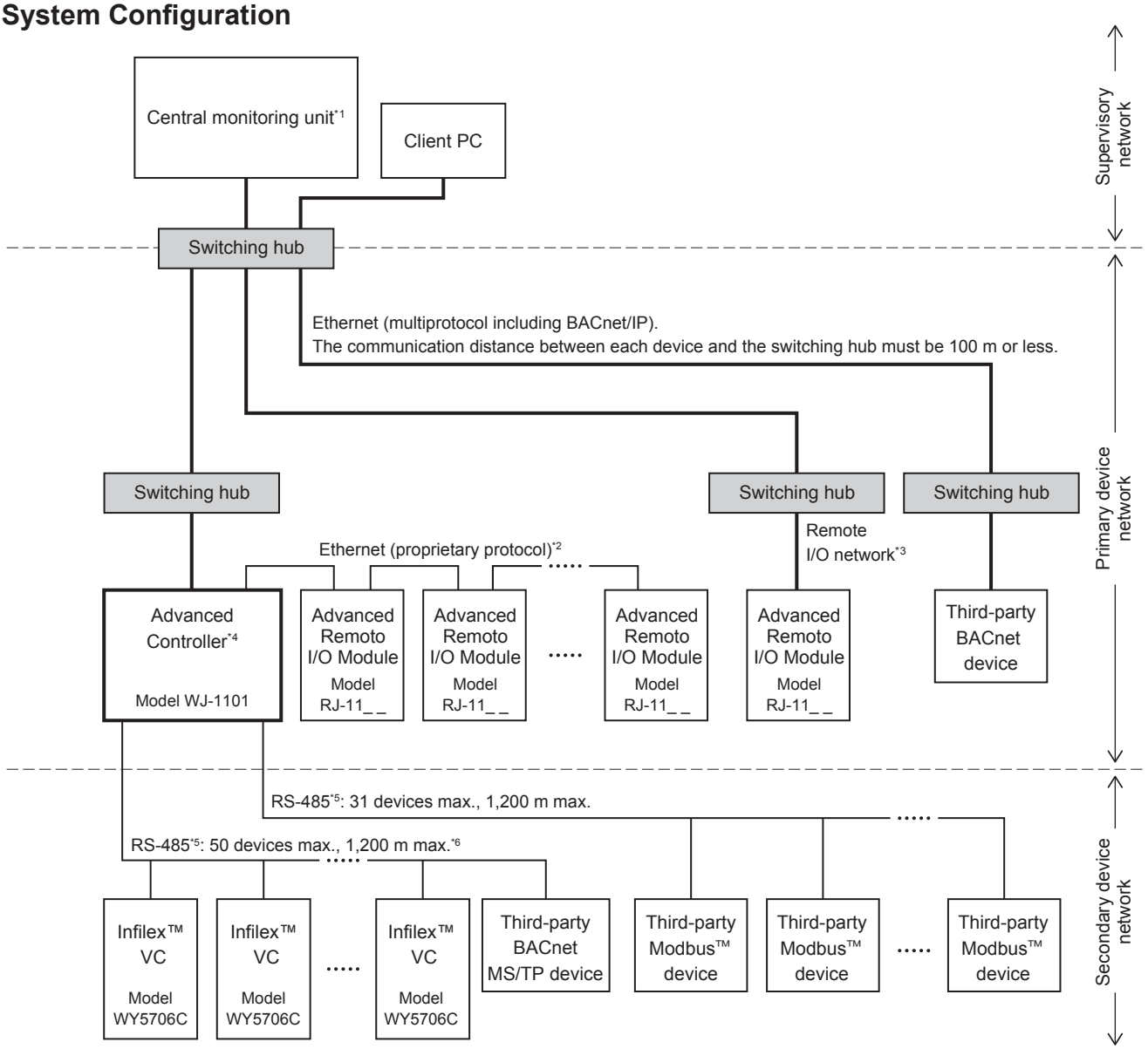


Figure 1. Example system configuration

Notes *1 The system can be connected to Azbil Corporation's Supervisory Device (Model BH-101G0W0000) or a third-party central monitoring unit for BACnet/IP communications.

*2 A network that connects this product with the Advanced Remote I/O Modules under its control is referred to as a local I/O network.
A switching hub is not required for the local I/O network since a daisy chain Ethernet is used between this product and the I/O modules under its control, as well as between the Advanced Remote I/O Modules.
The maximum communication distance between primary devices is 100 m. If the distance between primary devices exceeds 100 m, install a switching hub between them. The maximum communication distance between a primary device and a switching hub is 100 m.

*3 A network that connects this product to a host network is referred to as a remote I/O network.
Advanced Remote I/O Modules that are connected to a remote I/O network require a switching hub.
This product communicates with Advanced Remote I/O Modules by using Azbil Corporation's proprietary protocol.

*4 The maximum number of Advanced Remote I/O Modules that can be connected to this product is 20, which is the sum of the modules connected to a local I/O network and the modules connected to a remote I/O network.

*5 BACnet MS/TP, Modbus™ RTU, or Modbus™ ASCII protocol can be selected for RS-485 via software settings.

*6 A single BACnet MS/TP line can connect up to 50 BACnet MS/TP devices.
Of these 50 devices, the maximum number of third-party BACnet MS/TP devices that can be connected is 20.
When only third-party BACnet MS/TP devices are connected, up to 31 devices can be connected per line.

■ Model Numbers

Model number	Description
WJ-1101W0000	Advanced Controller • Ethernet (BACnet/IP) communication • 100 V AC–240 V AC power supply

● Items Provided Separately

Model number	Description
83104567-001	DIN rail clamp
83172137-001	RS-485 terminating resistor (× 10)
83173763-001	4–20 mA 250 Ω resistor (× 8)

● Replacement Parts

Model number	Description	Remarks
83173707-001	Power connector (× 1)	
83173708-001	RS-485 connectors (connector for RS-485-1 × 1, connector for RS-485-2 × 1)	
83170639-001	Lithium battery (× 1)	Replacement cycle: 5 years
83170639-005	Lithium battery (× 5)	
83170639-010	Lithium battery (× 10)	

DIN: Deutsches Institut für Normung (German Institute for Standardization)

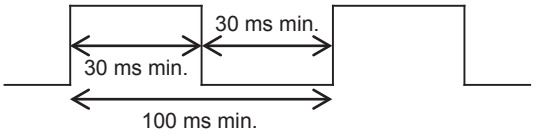
■ Specifications

● Basic Specifications

Item			Specification
Power supply specifications		Rated voltage	100 V AC–240 V AC, 50 Hz/60 Hz
		Operating power supply voltage	85 V AC–264 V AC, 50 Hz/60 Hz ± 3 Hz
		Inrush current	20 A max. (100 V AC), 40 A max. (240 V AC)
		Power consumption	30 VA max.
		Leakage current	0.2 mA max. (100 V AC), 0.5 mA max. (240 V AC)
RAM and RTC backup			Powered by lithium batteries (not chargeable)
CPU			32-bit
Storage capacity			SDRAM 256 MB, Flash ROM 32 MB, SRAM 2 MB
Communications	Ethernet (LAN0)	Protocol	BACnet/IP
		Communication speed	100 Mbps/1000 Mbps
		Communication method	Autonegotiation, Auto MDI/MDI-X
	Ethernet (LAN1, LAN2)	Protocol	Proprietary protocol
		Communication speed	100 Mbps
		Communication method	Auto MDI/MDI-X
		Number of connectable devices	Advanced remote I/O modules: 20 max. (per unit)
	RS-485	Protocol	BACnet MS/TP or Modbus™ Note: Selectable via software settings.
		Number of lines	2 lines
		Communication speed	• BACnet MS/TP 9.6 kbps/19.2 kbps/38.4 kbps/76.8 kbps • Modbus™ 4.8 kbps/9.6 kbps/19.2 kbps/38.4 kbps/76.8 kbps Note: Selectable via software settings.
		Number of connectable devices	• BACnet MS/TP 50 devices max. per line Note: When there are both Azbil devices and third-party devices, up to 20 third-party devices out of the 50-device maximum can be connected. When only third-party devices are connected, up to 31 devices can be connected. • Modbus™ 31 devices max. per line
Material and color of main parts		Case, cover	Modified PPE, black
		DIN holder	Polyacetal resin molding compound
Weight			1.1 kg
Environmental conditions	Rated operating conditions	Ambient temperature	0 °C–50 °C
		Ambient humidity	10 % RH–90 % RH (without condensation)
		Altitude	2,000 m max.
		Vibration	5.9 m/s^2 max. (10 Hz–150 Hz)
	Transport and storage conditions	Ambient temperature	-20 °C–60 °C
		Ambient humidity	5 % RH–95 % RH (without condensation)
		Vibration (transportation)	9.8 m/s^2 max. (10 Hz–150 Hz)
		Vibration (storage)	5.9 m/s^2 max. (10 Hz–150 Hz)
	Other		• No detectable corrosive gas • The product must not be exposed to direct sunlight. • Do not let the product get wet.
Installation location			In the control panel
Installation			Installed on a DIN rail or with screws

CPU: central processing unit
MDI: medium dependent interface
MDI-X: medium dependent interface crossover
PPE: polyphenylene ether
RAM: random-access memory
ROM: read-only memory
RTC: real-time clock
SDRAM: synchronous dynamic random-access memory
SRAM: static random-access memory

● Specifications for Inputs and Outputs

Item			Specification
Digital input	Number of input terminals		4
	Voltage		24 V DC typ.
	Current		5 mA DC typ.
	Connected device output method		Non-voltage contact or open collector
	Rated non-voltage contact values		Allowable ON contact resistance 100 Ω max. Allowable OFF contact resistance 100 kΩ min.
	Rated open collector values		Allowable ON residual voltage 2 V max. Allowable OFF leakage current 500 μA max.
	Pulse integration		10 Hz max. Note: Digital input pulse integration requires a pulse width and a pulse interval that satisfy the conditions shown in the following figure. 
Universal input	Number of input terminals		8
	Voltage input	Input range	0 V DC–10 V DC, 2 V DC–10 V DC, 0 V DC–5 V DC, 1 V DC–5 V DC
		Input impedance	1 MΩ typ.
	Current input	Input range	4 mA–20 mA
		Input impedance	100 Ω typ.
	Resistance temperature detector input	Connected sensor output method	Pt100, Pt1000
		Pt100 sensor measurement range	0 °C–50 °C, 0 °C–100 °C, 0 °C–200 °C, -20 °C–80 °C, -20 °C–30 °C, -50 °C–100 °C, -100 °C–50 °C
		Pt1000 sensor measurement range	0 °C–50 °C, 0 °C–100 °C, -20 °C–80 °C, -20 °C–30 °C, -50 °C–100 °C
	Digital input	Voltage	5 V DC typ.
		Current	1.5 mA DC typ.
		Connected device output method	Non-voltage contact or open collector
		Rated non-voltage contact values	Allowable ON contact resistance 100 Ω max. Allowable OFF contact resistance 100 kΩ min.
		Rated open collector values	Allowable ON residual voltage 2 V max. Allowable OFF leakage current 100 μA max.
Digital output	Number of output terminals		6
	Relay output	Output method	Relay N.O. (normally open) contact
		Rated contact voltage	24 V AC, 0.5 A max. (Max. inductive load: cosϕ = 0.4) 24 V DC, 0.5 A max.
		Minimum applied load	5 V DC, 10 mA
Analog output	Number of output terminals		6
	Voltage output	Output range	0 V DC–10 V DC, 2 V DC–10 V DC, 0 V DC–5 V DC, 1 V DC–5 V DC
		Load resistance	10 kΩ min.
	Current output	Output range	4 mA–20 mA
		Load resistance	500 Ω max.

■ Specifications for Wiring

Item	Wire type	Maximum cable length	Remarks
Power supply	600 V PVC-insulated cable (IEC 60227-3)/CVV equivalent, stranded cable, 1.25 mm^2–2.0 mm^2 May be jointly fastened (however, only where the equivalent cross section is 1.25 mm^2–1.5 mm^2)	-	
Ground	600 V PVC-insulated cable (IEC 60227-3)/CVV equivalent, stranded cable, 1.25 mm^2–2.0 mm^2 May be jointly fastened (however, only where the equivalent cross section is 1.25 mm^2–1.5 mm^2)	-	Ground the product with resistance less than 100 Ω.
Ethernet (LAN0)	EIA/TIA-568 category 5e or higher	100 m	
Ethernet (LAN1/LAN2)	EIA/TIA-568 category 5e or higher	100 m	
RS-485	Equivalent to Belden 3106A/3107A/9842, shielded twisted-pair cable, 0.2 mm^2–0.3 mm^2 May be jointly fastened (however, only the equivalent cross section)	1,200 m	Use the cable that satisfies the following specifications: - Impedance: 100–130 Ω - Inter-conductor capacitance: 100 pF/m max. - Conductor-shield capacitance: 200 pF/m max.
Digital input	600 V PVC-insulated cable (IEC 60227-3)/CVV equivalent, stranded cable, 0.5 mm^2–1.25 mm^2 May be jointly fastened (however, only the equivalent cross section)	100 m	
Digital output	600 V PVC-insulated cable (IEC 60227-3)/CVV equivalent, stranded cable, 0.5 mm^2–1.25 mm^2 May be jointly fastened (however, only the equivalent cross section)	100 m	
Universal input (Resistance temperature detector input)	600 V PVC-insulated cable (IEC 60227-3)/CVV equivalent, stranded cable, 0.5 mm^2–1.25 mm^2	100 m	The resistance temperature detector input causes an error because of the resistance of the wires. Therefore, the use of a cable with a cross-sectional area of 1.25 mm^2 is recommended.
Universal input (Voltage/current/digital input)	600 V PVC-insulated cable (IEC 60227-3)/CVV equivalent, stranded cable, 0.5 mm^2–1.25 mm^2	100 m	
Analog output	600 V PVC-insulated cable (IEC 60227-3)/CVV equivalent, stranded cable, 0.5 mm^2–1.25 mm^2	100 m	

CVV: control-use vinyl insulated vinyl sheathed cable

■ External Dimensions

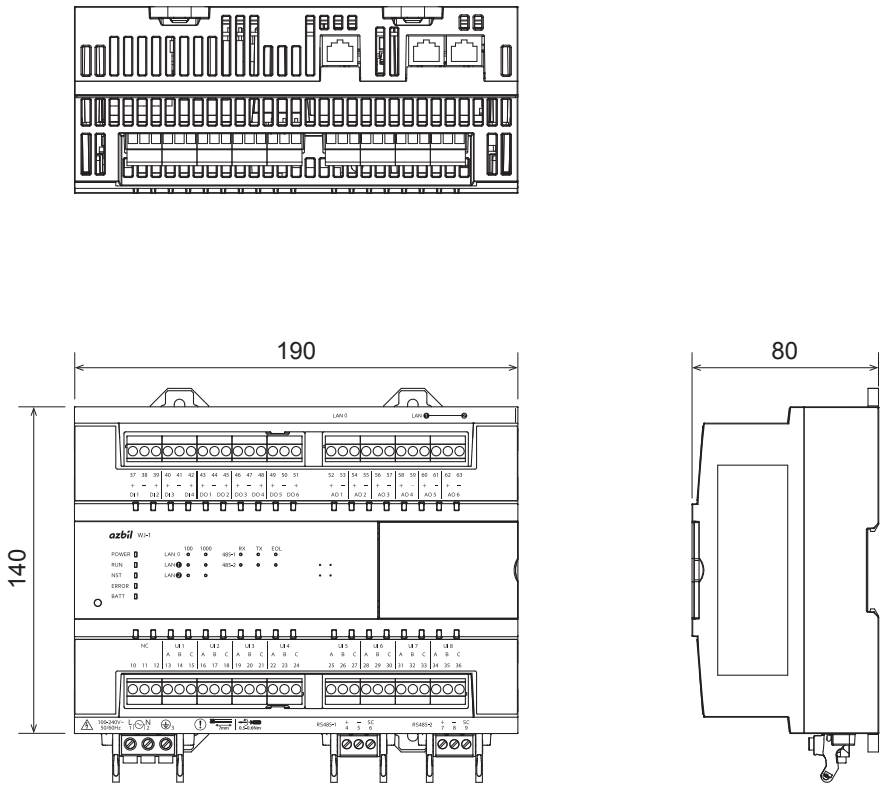


Figure 2. External dimensions (mm)

■ Name of Parts

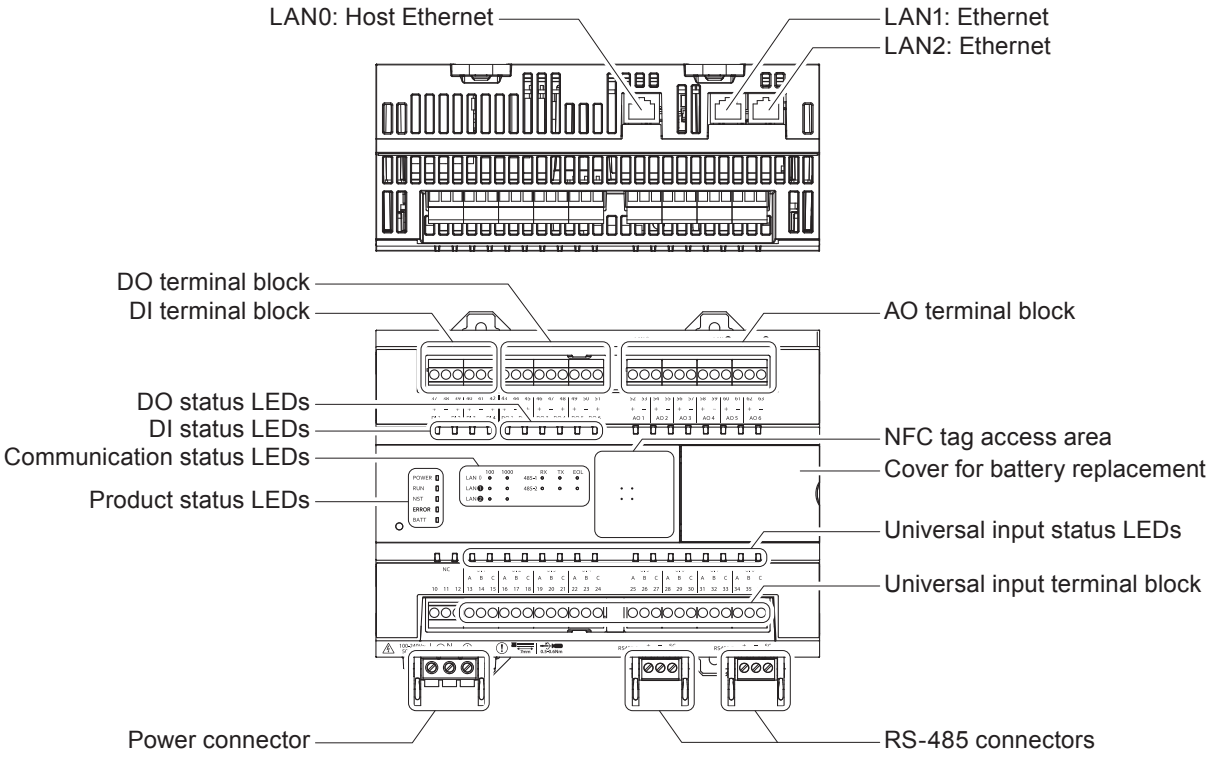


Figure 3

■ Installation

⚠ WARNING
Install this product in a location out of reach of unauthorized people. (e.g. Inside of the control panel with a lock) Failure to do so might cause electric shock.

⚠ CAUTION
Use this product under the operating conditions (for temperature, humidity, power, vibration, shock, mounting direction, atmosphere, etc.) listed in the specifications. Failure to do so may cause fire or device failure.
Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards. Failure to do so may cause fire or electric shock.

● Installation Location

The panel should be installed in a place that satisfies the following:

- An indoor place that is not exposed to direct sunlight
- A place that is not near water
  Note: The product is not waterproof.

This product should be installed in a panel.
The following space (the hatched area) should be secured around the product:

- The horizontal dimension depends on the number of I/O modules connected.

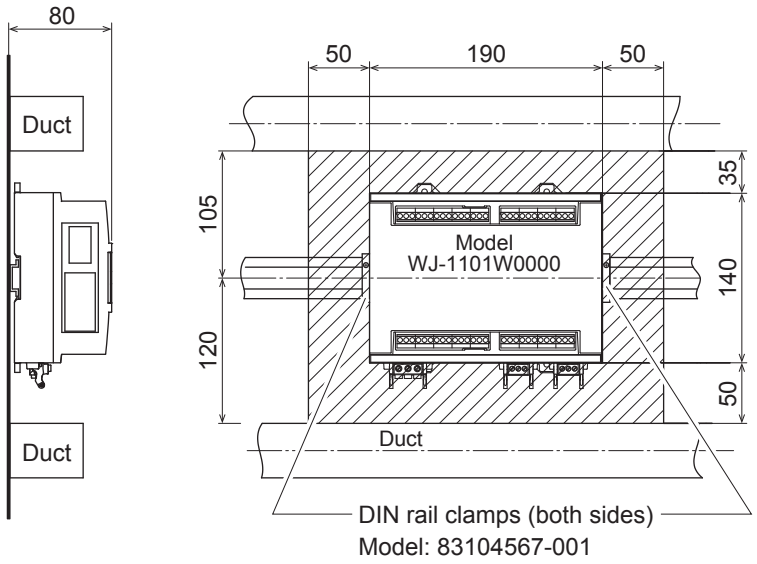


Figure 4. When the product is installed on a DIN rail (single unit)

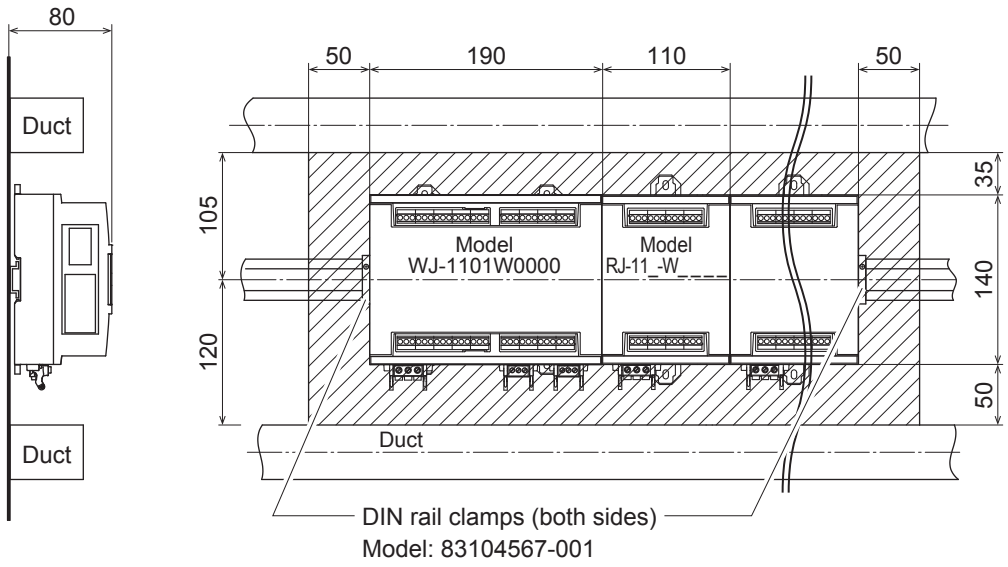


Figure 5. When products are installed on a DIN rail (multiple units)

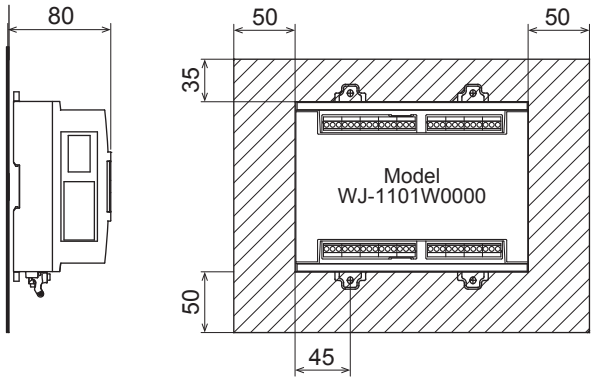


Figure 6. When the product is installed with screws (single unit)

Note: Multiple units can also be installed with screws as with the DIN rail.

● Installation Angle

- This product should be installed upright in the panel. Installation of this product on a slant or laid on its side is prohibited. Doing so reduces the radiation performance, which may cause the internal temperature to rise abnormally.

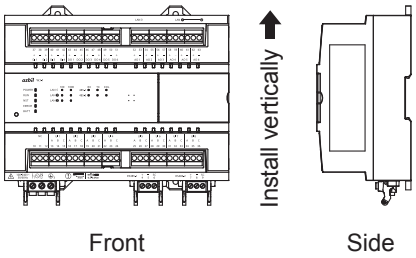


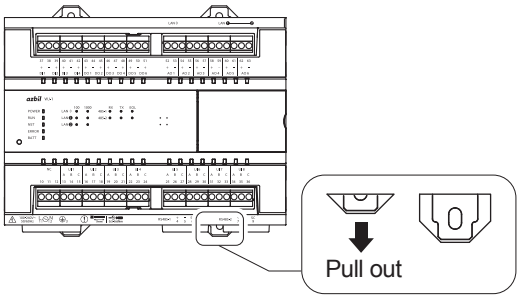
Figure 7. Installation angle

- Do not block the ventilation holes by putting an object on top of the product, etc.

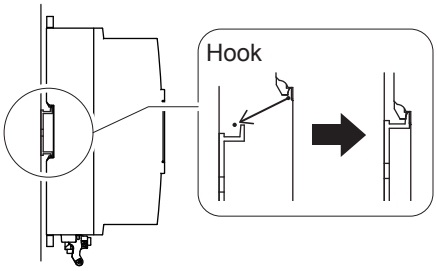
● Installation Method

<Installation on the DIN Rail>

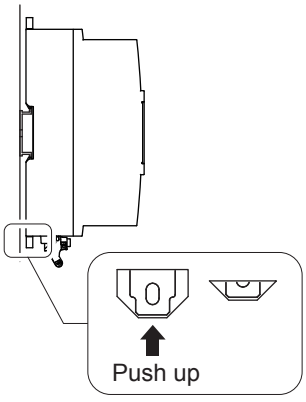
(1) Pull down the two DIN holders on the bottom of the device.



(2) Hook the upper part of the DIN holder to the DIN rail and check that it is hooked securely.



(3) Push up the two DIN holders on the bottom of the device.



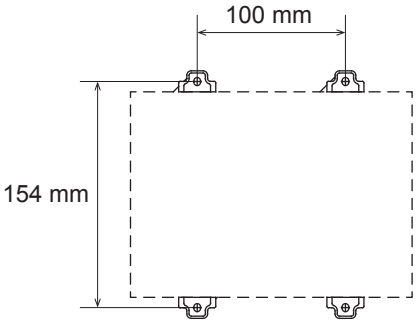
(4) Check that the four DIN holders on the top and bottom of the device are secured on the DIN rail. Check that the device is steady.

(5) Secure both ends with the DIN rail clamps (Model 83104567-001).
After installation, keep the connectors that come with the device because they will be used for wiring connection.

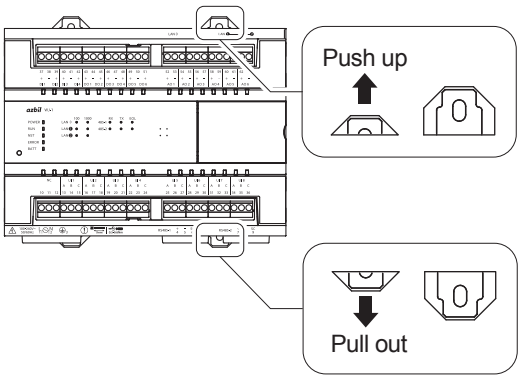
<Direct Installation with Screws>

Install the product on the wall using four M4 L=8 screws.

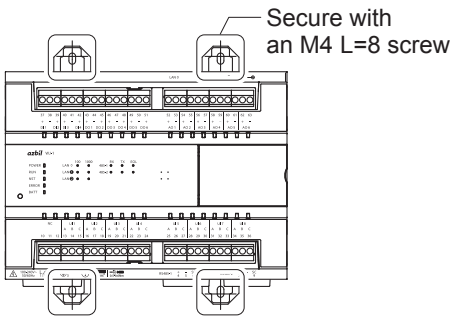
(1) Make four screw holes in the installation locations.



(2) Push up the two DIN holders on the top of the device and then pull out the two DIN holders on the bottom.



(3) Use the four holes for the DIN holder to secure the device with the M4 L=8 screws.
Check that the device is steady.
After installation, keep the connectors that come with the device because they will be used for wiring connection.



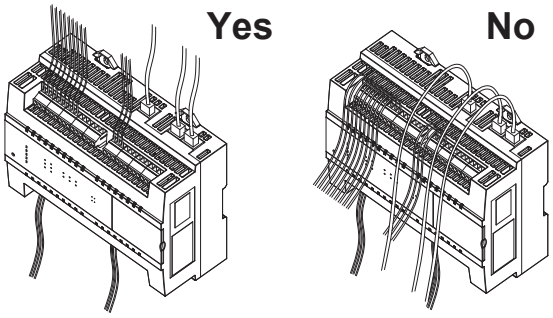
■ Wiring

⚠ WARNING	
	Be sure to ground this product with a ground resistance of less than 100 Ω. Improper grounding may cause electric shock or malfunction.
	Before wiring or maintenance, be sure to turn off the power to this product. Failure to do so may result in electric shock or device failure.

⚠ CAUTION	
	Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards. Failure to do so may cause fire or electric shock.
	All wiring must comply with applicable codes and ordinances. Failure to do so may cause fire.
	Take anti-noise measures if this product is installed in a location near source of electric noise. Failure to do so may cause malfunction or device failure.
	For wiring, strip the insulation from cables as specified in this manual. If the length of exposed wire is longer than specified, it may cause electric shock or short circuit between adjacent terminals. If it is too short, it may not make any proper contact.
	Firmly tighten the terminal screws with the specified torque as listed in the specifications. Insufficient tightening of the terminal screws may cause overheating or fire.

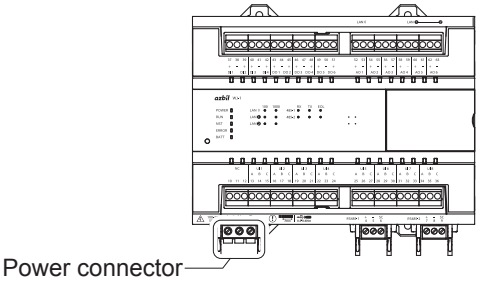
● Notes on Wiring

- Do not use unused/spare terminals on this product as relay terminals.
  Doing so may cause device failure.
- Install a circuit breaker on the power line used for this product.
  This product cannot be turned off because it does not have a power switch.
- Do not use an uninterruptible power supply that outputs rectangular waves.
  Doing so may cause the device to fail.
- Do not allow the cables to cover the front of this product.
  Pull out the cables upwards or downwards out of the product as shown in the following figure.
  Do not hide the front of the product with the cables because it has areas for LED displays and to adjust the product.



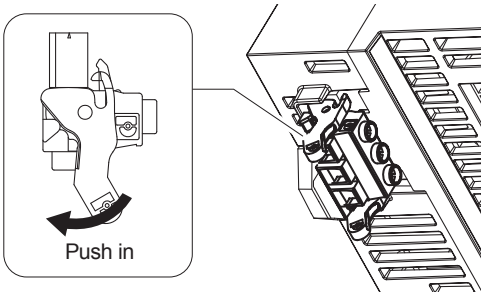
● Wiring of Power Supply Terminal Block

Screw connectors are used.

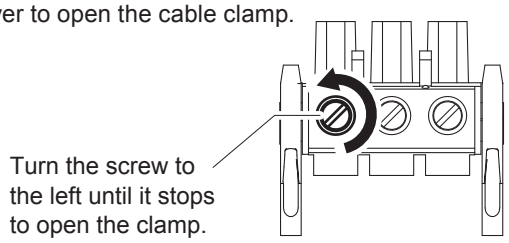


(1) Strip 7 mm of insulation from the cable core wire.

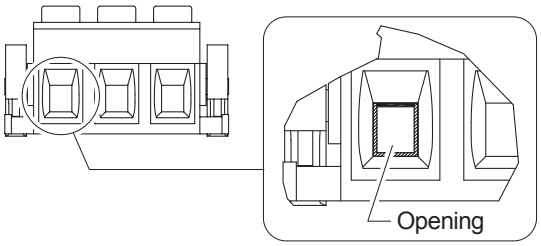
(2) If the connector is plugged into the device, push in the release levers on the right and left sides of the connector to remove it from the device.



(3) Turn the screw above the cable clamp (the hole for the cable) of the connector to the left with a screwdriver to open the cable clamp.

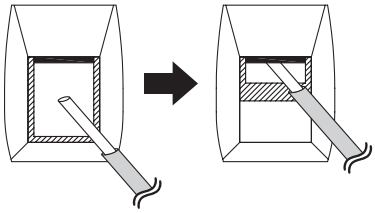


Note: Compatible screwdriver blade: 0.6 × 3.5 mm

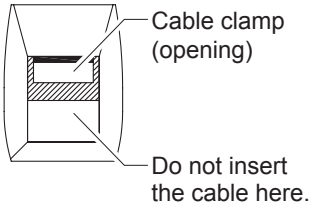


(4) For a daisy chain connection, use and twist the cables specified in "Specifications for Wiring" (limited to those with the same cross-sectional area ranging from 1.25 mm^2 to 1.5 mm^2).

(5) Insert the cable whose wire was exposed in step (1) into the cable clamp and tighten it by turning the screw above the cable clamp to the right with a screwdriver.
The screw tightening torque is 0.5 N·m–0.6 N·m.
Make sure there are no strands of cable wire protruding from the cable clamp.

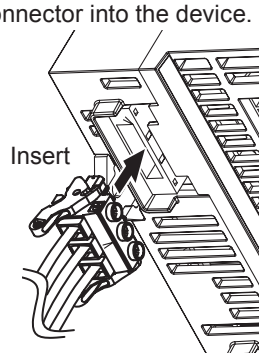


Note: Check that the cable is inserted into the cable clamp.

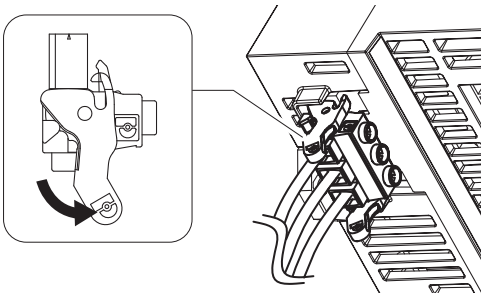


(6) Lightly pull the cable to check that it does not come out.

(7) Insert the connector into the device.



Check that the release levers of the connector are securely locked.



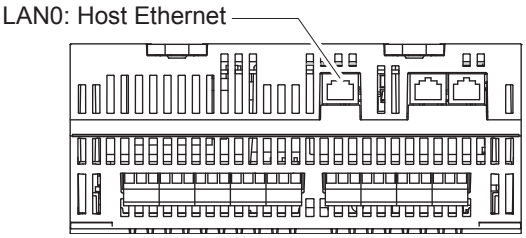
(8) Lightly pull the cable to check that the power supply connector does not come out.

<Power Supply Terminals>

Terminal No.	Symbol	Description
1	L	AC input
2	N	AC input
3	⏚	Protective ground terminal

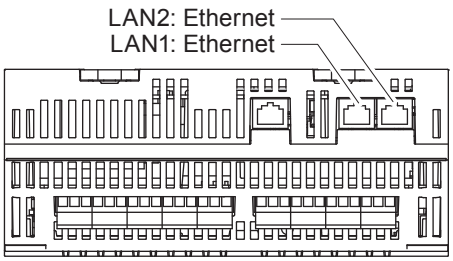
● Connecting to the Host Network

Connect the LAN cable to LAN0.

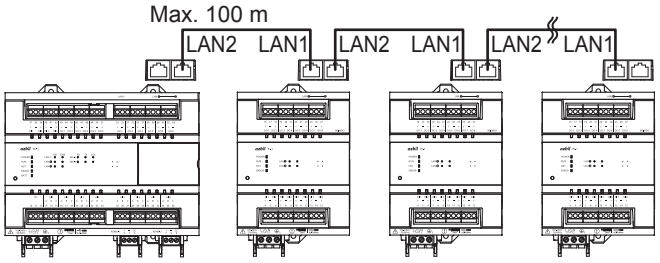


● Connecting to the Local I/O Network

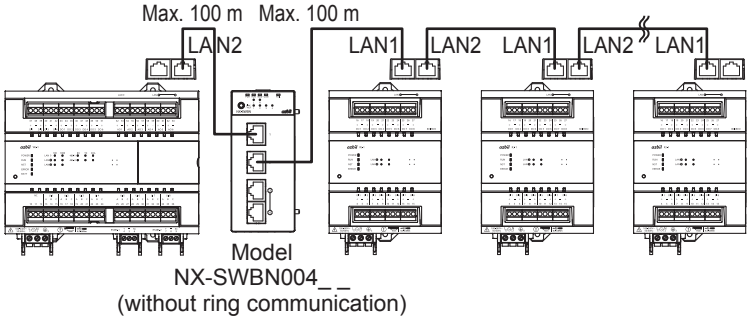
Connect the LAN cables to LAN1 and LAN2.
There are two network topologies that can be used with the Advanced Remote I/O Modules: linear topology and ring topology.



<Linear Topology>



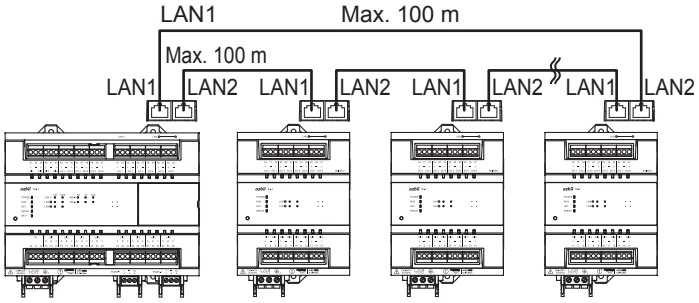
- The maximum communication distance is 100 m.
  To extend the communication distance, connect an industrial switching hub without ring communication (Model NX-SWBN 004_ _) as shown below. This extends the communication distance by 100 m.



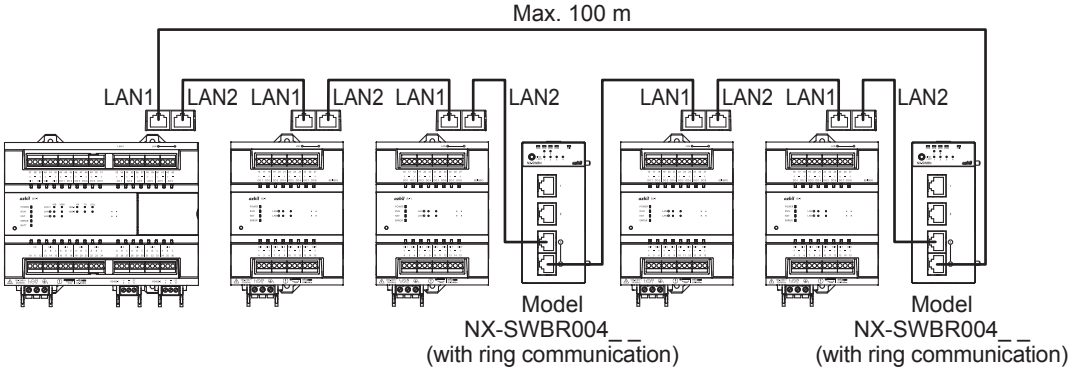
- The industrial switching hub requires a 24 V DC power supply.
  Any of the four Ethernet ports can be used.
  However, the two empty Ethernet ports cannot be used.

Note: Refer to CP-UM-5718JE, *Industrial Switching Hub User's Manual for Installation*.

<Ring Topology>



- The maximum communication distance is 100 m.
  To extend the communication distance, connect an industrial switching hub dedicated for ring communication (Model NX-SWBR 004_ _) as shown below. This extends the communication distance by 100 m.

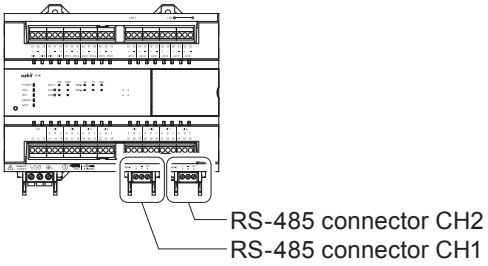


- The industrial switching hub requires a 24 V DC power supply.
  Only Ethernet ports 3 and 4 of the industrial switching hub are available.

Note: Refer to CP-UM-5718JE, *Industrial Switching Hub User's Manual for Installation*.

● Wiring the RS-485 Terminals

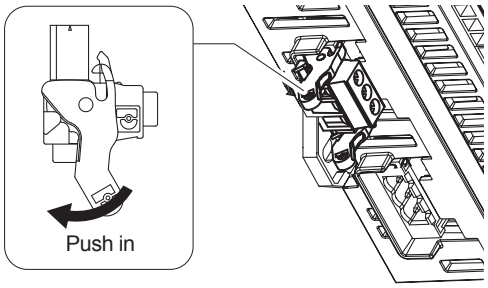
Screw connectors are used.



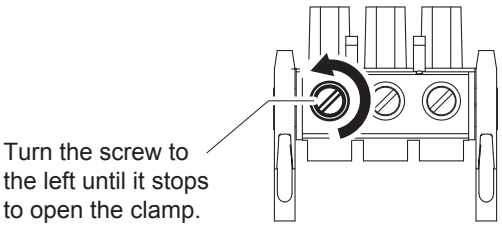
(1) Strip off the outer insulation from the shielded twisted-pair cable.

(2) Strip 7 mm of insulation from the cable core wire.

(3) If the connector is plugged into the device, push in the release levers on the right and left sides of the connector to remove it from the device.



(4) Turn the screw above the cable clamp (the hole for the cable) of the connector to the left with a screwdriver to open the cable clamp.

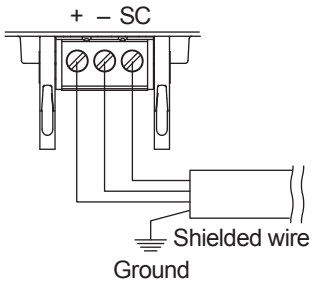


Note: Compatible screwdriver blade: 0.6 × 3.5 mm

Note: Refer to the figure shown in "Wiring of Power Supply Terminal Block, step (3)."

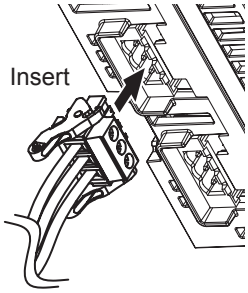
(5) For a daisy chain connection, use and twist the cables with the same cross-sectional area that are specified in "Specifications for Wiring."

(6) Insert the cable whose wire was exposed in step (2) into the cable clamp and tighten it by turning the screw to the right with a screwdriver.
The screw tightening torque is 0.5 N·m–0.6 N·m.
Make sure there are no strands of cable wire protruding from the cable clamp.
Refer to "Wiring of Power Supply Terminal Block, step (5)" in order to not insert the cable into a wrong cable jack.
If this device is not at the end of the network, connect the twisted cable with the same cross-sectional area, which are specified in "Specifications for Wiring," to the RS-485 connector.

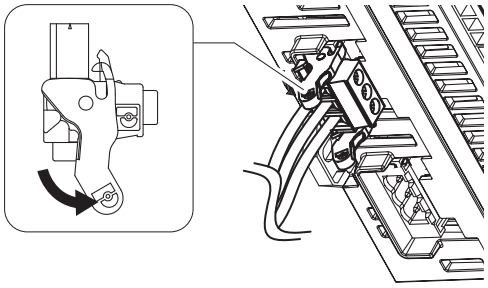


(7) Lightly pull the cable to check that it does not come out.

(8) Insert the connector into the device.



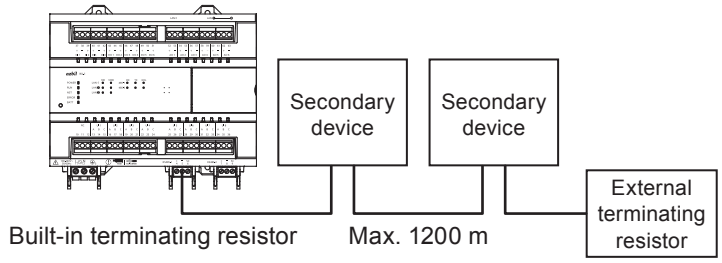
Check that the release levers of the connector are securely locked.



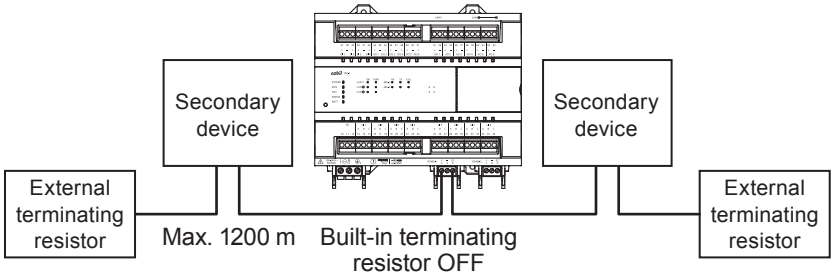
(9) Lightly pull the cable to check that the RS-485 connector does not come off.

(10) Connect a terminating resistor to the last secondary device connected to the RS-485.

- If this product is at the end of the network



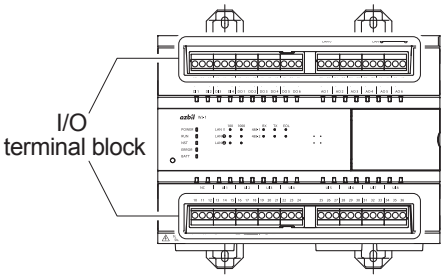
- If this product is not at the end of the network



<RS-485 Terminals>

Terminal No.	Symbol	Description
4	+	CH1 +
5	−	CH1 −
6	SC	CH1 common
7	+	CH2 +
8	−	CH2 −
9	SC	CH2 common

● Wiring the I/O Terminal Blocks

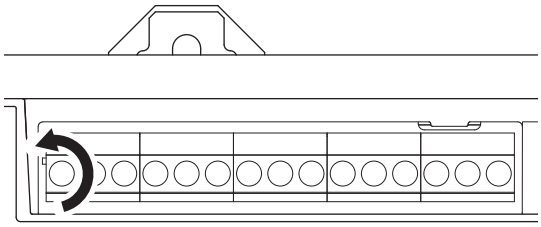


The terminal blocks use screw connections (clamping).

(1) Strip 7 mm of insulation from the cable core wire.

(2) Turn the screw of the terminal block to the left with a screwdriver to open the cable clamp (the hole for the cable).

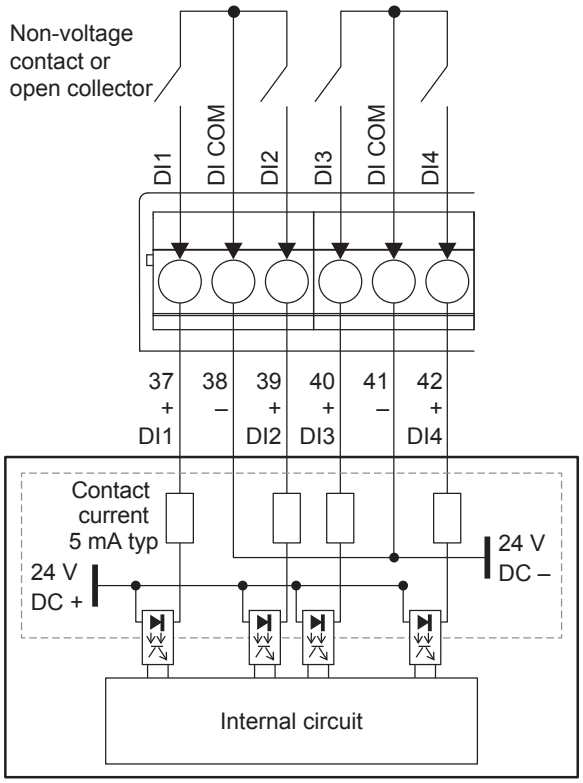
Note: Compatible screwdriver blade: 0.6 × 3.5 mm



(3) Insert the cable into the cable clamp of the terminal block, and then turn the screw to the right with a screwdriver to tighten the cable clamp.
The screw tightening torque is 0.5 N·m–0.6 N·m.
Make sure there are no strands of cable wire protruding from the cable clamp.
For every two channels there is one common terminal for digital inputs and digital outputs.
The cables with the same cross-sectional area, which are specified in "Specifications for Wiring," can be used and twisted for direct wire connection.

(4) Lightly pull the cable to check that it does not come out.

<DI Terminals>



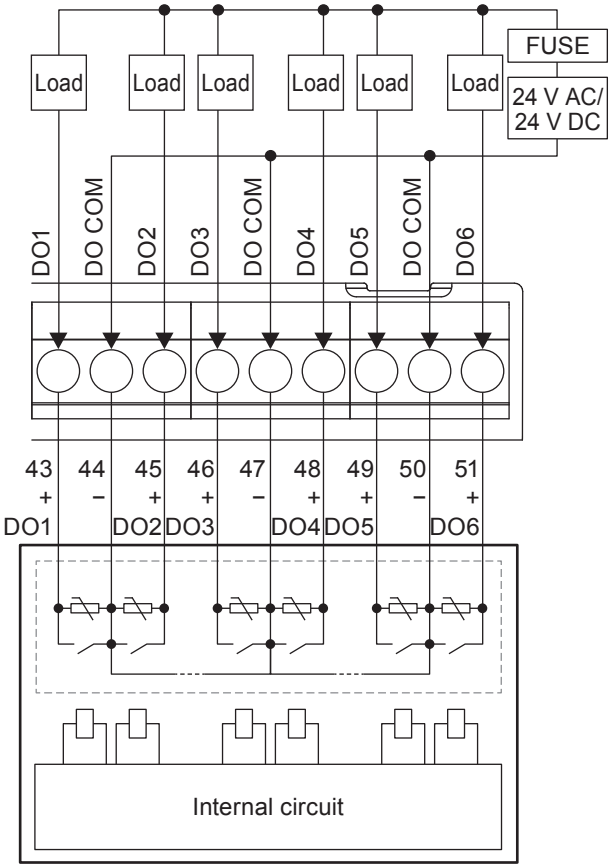
Terminal No.	Symbol	Description
37	+	CH1 +
38	−	CH1 and CH2 common
39	+	CH2 +
40	+	CH3 +
41	−	CH3 and CH4 common
42	+	CH4 +

Figure 8. Example of DI wiring

Note: The dashed line indicates internal isolation in this product.

Note: Use contacts that have sufficient opening/closing capability for the contact current and opening voltage used by this product.

<DO Terminals>



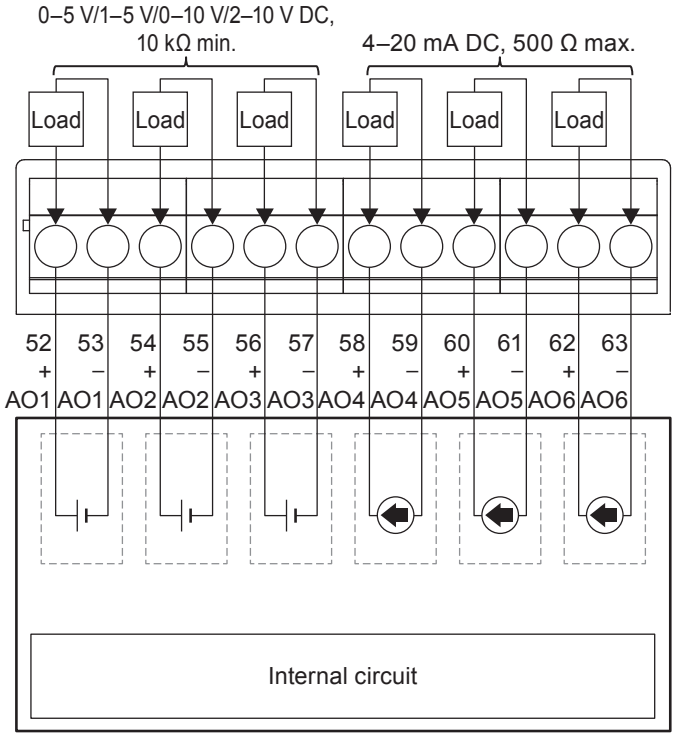
Terminal No.	Symbol	Description
43	+	CH1 +
44	−	CH1 and CH2 common
45	+	CH2 +
46	+	CH3 +
47	−	CH3 and CH4 common
48	+	CH4 +
49	+	CH5 +
50	−	CH5 and CH6 common
51	+	CH6 +

Figure 9. Example of DO wiring

Notes 1. Before connecting or removing a load, turn off the power to this product.
Failure to do so will cause malfunction of this product and load failure.

2. The DO COMs are connected with each other internally in the product.
However, up to 1 A can flow per common.

<AO Terminals>



Terminal No.	Symbol	Description
52	+	CH1
53	−	
54	+	CH2
55	−	
56	+	CH3
57	−	
58	+	CH4
59	−	
60	+	CH5
61	−	
62	+	CH6
63	−	

Figure 10. Example of AO wiring

Notes: For example, the above figure shows that AO1–AO3 are voltage outputs and AO4–AO6 are current outputs.

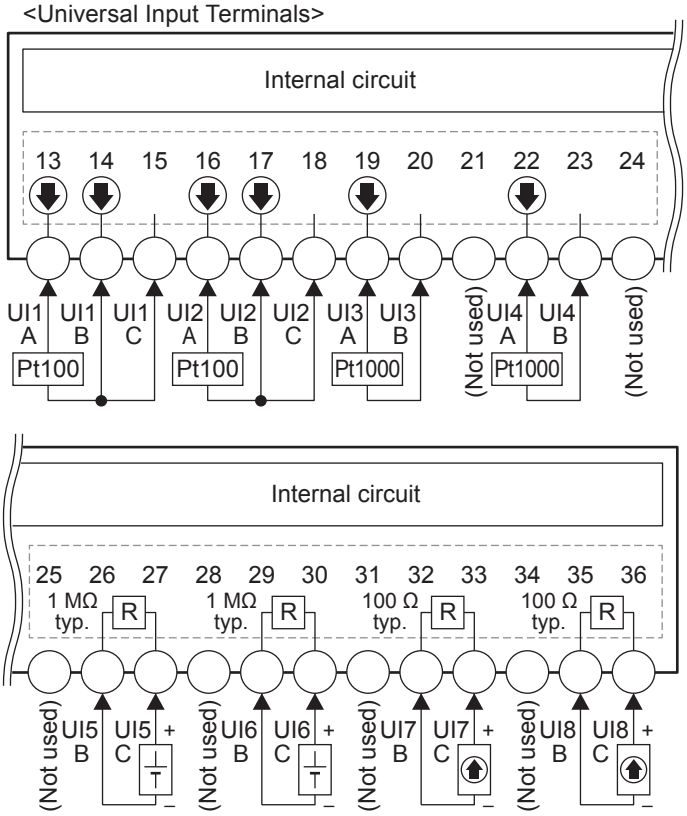
There are no restrictions on the settings for each CH.

Notes 1. Before connecting or removing a load, turn off the power to this product.
Failure to do so will cause malfunction of this product and load failure.

2. The input impedance of the connected voltage-output device should be 10 kΩ min.

3. The sum of the input impedance of the connected current-input device and the wiring resistance should be equal or lower than 500 Ω.

<Universal Input Terminals>



The wiring differs depending on the input type.

Terminal No.	Symbol	Description	Terminal No.	Symbol	Description
13	A	CH1	25	A	CH5
14	B		26	B	
15	C		27	C	
16	A	CH2	28	A	CH6
17	B		29	B	
18	C		30	C	
19	A	CH3	31	A	CH7
20	B		32	B	
21	C		33	C	
22	A	CH4	34	A	CH8
23	B		35	B	
24	C		36	C	

Input type	Symbol		
	A	B	C
Voltage	NC	−	+
Current	NC	−	+
Pt100	A	B	C
Pt1000	A	B	NC
DI	+	NC	−

Figure 11. Example of UI wiring

Note: For example, the above figure shows that UI1–UI2 are Pt100 inputs, UI3–UI4 are Pt1000 inputs, UI5–UI6 are voltage inputs, and UI7–UI8 are current inputs.

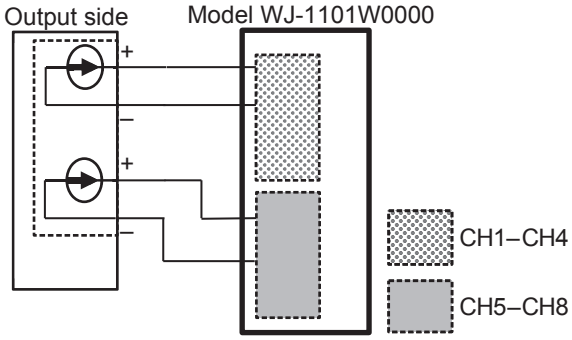
Note: The dashed line indicates internal isolation in this product.

Notes 1. Connected devices should have insulated outputs.

2. Be careful of the input polarity of the connected device.

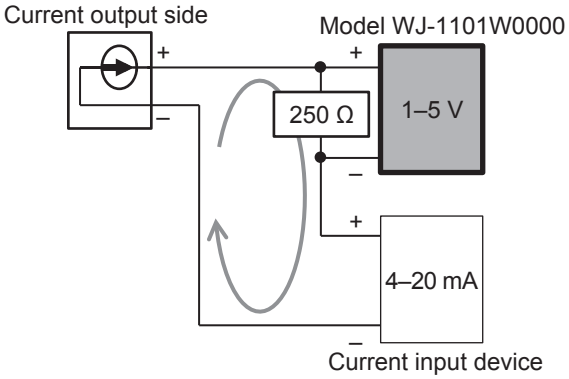
3. Before connecting or removing a load, turn off the power to this product.
Failure to do so will cause malfunction of this product and load failure.

4. Connection with devices that have multi-terminal outputs
The connected device is isolated from the power supply.
Outputs that are not isolated between channels should be connected to isolated channels of this product (or an isolator should be connected). The following figure shows connections with the current outputs. This also applies to voltage outputs.



5. When the power is turned off, the internal circuits of this product are cut off, and thus, the current loop is also cut off.
If a current loop is desired, set this product for 1–5 V input and install an external 250 Ω resistor (provided separately: Model 83173763-001).
Use an external 250 Ω resistor that satisfies the following specifications.

- The allowable tolerance is ±0.05 %, the temperature characteristic is ±25 ppm, and the rated power is 1/4 W or more.



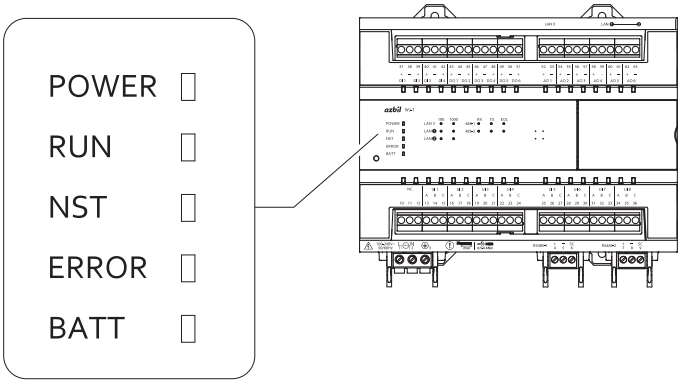
6. Since the wiring resistance causes an error in the Pt100 and Pt1000, 1.25 mm^2 is recommended as the nominal cross-sectional area.

7. When universal inputs are used for digital input settings, only open collector outputs can be connected as loads.

8. When universal inputs are used for digital input settings, totalizing pulse inputs are not supported.

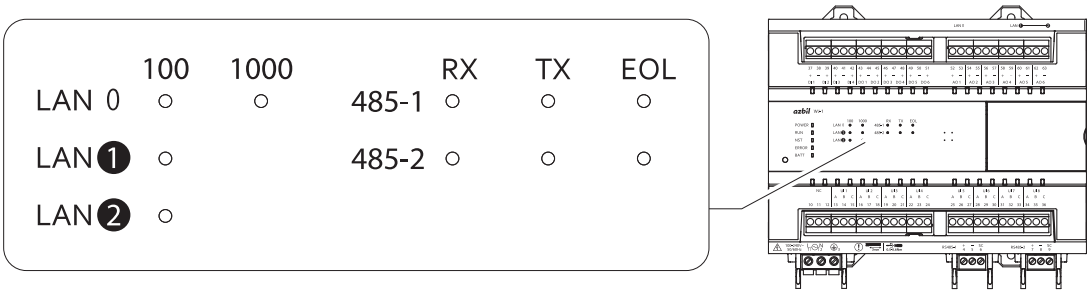
■ Indicators

● Product Status LEDs



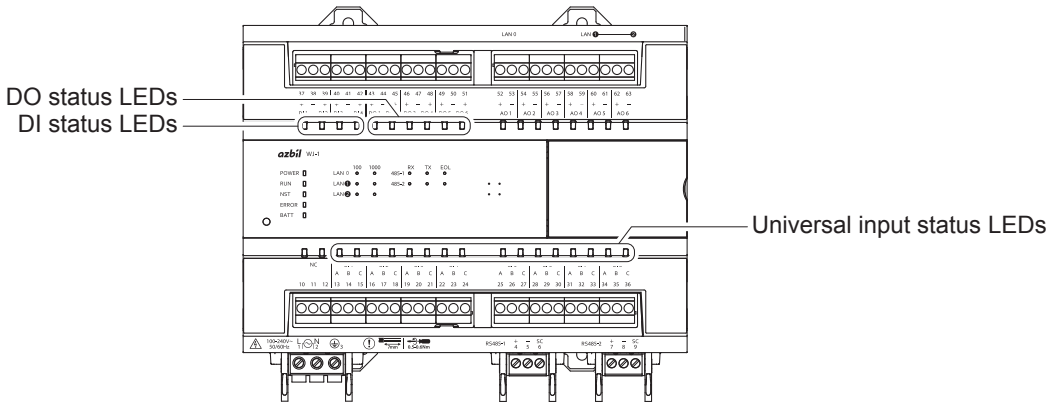
Item	Product indicator	Color	State	Description
Power supply status	POWER	Green	Lit	Power ON
			Not lit	Power OFF
Operation mode	RUN	Green	Lit	Operating in RUN mode
			Fast flash (flash every 0.2 s)	Ethernet congestion detected
			Slow flash (flash every 1.4 s)	Operating in DEBUG mode
			Not lit	Operating in IDLE mode
Network status	NST	Orange	Lit	Non-ring is set for communication with the local I/O network.
			Fast flash (flash every 0.2 s)	If Ring is set, the ring for communication with the local I/O network is disconnected at some node.
			Slow flash (flash every 1.4 s)	If Ring is set, the ring for communication with the local I/O network is disconnected between adjacent nodes.
			Not lit	If Ring is set, the ring for communication with the local I/O network is connected normally.
Abnormal status	ERROR	Red	Lit	Major failure
			Flashing	Minor failure
			Not lit	Normal
Battery status	BATT	Red	Lit	Low battery voltage
			Not lit	Normal battery voltage

● Communication Status LEDs



Item	Product indicator		Color	State	Description
Communication status	LAN0 100		Green	Lit	A link is established at 100 Mbps.
				Flashing	Data is being transmitted at 100 Mbps.
				Not lit	A link is not established at 100 Mbps.
	LAN0 1000		Green	Lit	A link is established at 1 Gbps.
				Flashing	Data is being transmitted at 1 Gbps.
				Not lit	A link is not established at 1 Gbps.
Communication status	LAN1		Green	Lit	A link is established.
				Flashing	Data is being transmitted and received.
				Not lit	A link is not established.
	LAN2		Green	Lit	A link is established.
				Flashing	Data is being transmitted and received.
				Not lit	A link is not established.
RS-485 CH1 Communication status	485-1	RX	Green	Flashing	Data is being received.
				Not lit	Data is not being received.
		TX	Green	Flashing	Data is being transmitted.
				Not lit	Data is not being transmitted.
		EOL	Green	Lit	RS-485 built-in terminating resistor ON
				Not lit	RS-485 built-in terminating resistor OFF
RS-485 CH2 Communication status	485-2	RX	Green	Lit	Data is being received.
				Not lit	Data is not being received.
		TX	Green	Lit	Data is being transmitted.
				Not lit	Data is not being transmitted.
		EOL	Green	Lit	RS-485 built-in terminating resistor ON
				Not lit	RS-485 built-in terminating resistor OFF

● IO Status LEDs



Item	Product indicator	Color	State	Description
DI status	DI1–DI4	Green	Lit	DI ON
			Not lit	DI OFF
DO status	DO1–DO6	Green	Lit	DO ON
			Not lit	DO OFF
Universal input status	UI1–UI8	Green	Lit	DI is ON when DI is set.
			Not lit	DI is OFF when DI is set.

■ Handling

Do the following before turning the power on.

(1) Check again that the wiring is done correctly.

(2) Peel off the protective sheets before powering the device on.

Notes 1. Check that all protective sheets have been peeled off.

2. If foreign substances might get into the product through holes during the period after the completion of installation and wiring but before the unit is powered on, block the ventilation holes with plastic sheets, etc., on the surfaces (on the sides and bottom) that are not covered with protective sheets.

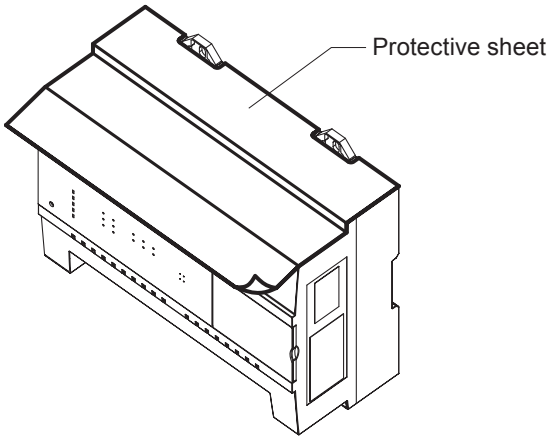


Figure 12. Protective sheet

⚠ WARNING

Do not touch electrically charged parts.
Doing so may cause electric shock.

⚠ CAUTION

Do not block the ventilation holes of this product. Doing so may cause device failure.

If more than the rated power voltage is accidentally applied to this product, replace the product with a new one for your safety.
Failure to do so may cause device failure or cause fire.

■ Maintenance

⚠ CAUTION

Do not disassemble this product.
Doing so may cause device failure.

Before cleaning the product or retorquing the terminal screws, be sure to turn off the power to the product.
Failure to do so may cause electric shock, device failure, or malfunction.

Azbil Corporation personnel who have been trained on the product will carry out periodic maintenance and parts replacement.

Please contact us as necessary.

Note: Refer to the "Model Numbers" section for details on replacement parts.

■ Disposal

⚠ CAUTION
Dispose of used lithium batteries in accordance with local regulations. Do not throw them in the fire or dispose of them with ordinary garbage. Doing so may cause the batteries to burst or ignite.

Dispose of the product as industrial waste in accordance with your local regulations.
Do not reuse all or part of this product.

CE Marking Conformity
For CE conformity, this product must be installed in a panel cabinet.
In addition, the product in the panel cabinet must be out of reach of unauthorized people who are not well-trained for work in electrical facilities.
This product complies with Electromagnetic Compatibility (EMC) and Low Voltage Directive (LVD) requirements as indicated below.

EMC : EN 61326-1 Class A, Table 2 (For use in an industrial electromagnetic environment)
LVD : EN 61010-1 Overvoltage category II
Pollution degree 2

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Azbil Corporation
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Specifications are subject to change without notice.