Variable Air Volume Controller with Actuator for BACnet MS/TP Communication

■ Overview

This product (models WJ-1201C5 + MY8440) consists of a controller and an actuator for variable air volume (VAV) units.
The WJ-1201C5 and MY8440 are combined and attached to the VAV unit to control the air volume.
With a temperature sensor connected, the product controls air volume to maintain indoor temperature at the setpoint.
With a CO_2 concentration sensor connected, both a comfortable indoor environment and energy savings can be achieved.
If a user interface device is connected, users can change the settings or turn the VAV units ON/OFF.
This product is compatible with BACnet MS/TP, which is an open protocol.

■ Features

- Open communication protocol
  This product is a controller compatible with BACnet MS/TP, which is an open protocol.
- Energy-saving control
  Using a temperature sensor and a CO_2 concentration sensor, indoor temperature can be maintained at the setpoint with minimum ventilation volume.
  If there are not many people in a room, the air volume can be decreased to reduce the power used for transport.
  By combining this product with Azbil's air conditioning controllers, supply air temperature can be automatically optimized based on the conditions at the VAV units, and VAV units can be adjusted in the open direction to minimize the static pressure, achieving optimal fan speed control.
- Various input and output supported
  This product can be connected to a temperature sensor or a CO_2 concentration sensor.
  Also, general-purpose digital inputs and outputs can be used for linked ON/OFF of multiple VAV units or VAV unit(s) and other equipment.
  Also, a reheater can be controlled using general-purpose analog inputs and outputs.
- Various setting devices
  Azbil's various types of user interface, including the Neopanel™2 (model QJ-1301), Neopanel (model QY7205), Neoplate (model QY7290_301_), and Multi-area user terminal, can be connected so that users can turn VAV units ON/OFF or change the temperature settings.
  ON/OFF operation or temperature settings can be prohibited from the central monitoring unit.
- Online engineering
  If there is a need to change the control parameters during operation, they can be changed while the controller is running.
- Installation method
  Less labor is needed for wiring because LAN cables with RJ-45 modular connectors are used for temperature sensors, setting devices, and BACnet MS/TP communication.
  Wiring work is made easier by the spring terminal blocks for the power and I/O terminals.

CE

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 applications like the following where safety is especially required, implementation of fail-safe design, redundant design, regular maintenance, etc., should receive appropriate consideration so that the product can be used 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 (Recommended Period of Use)

It is recommended that this product be used within its design life. The 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 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 design life is 5 to 8 years for the actuator and 15 years for the controller.

■ 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.

■ Symbols

	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 means 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	
	Do not use the product where it is exposed to direct sunlight. Doing so may cause the internal temperature to rise which will result in an accident or device failure.
	Do not install the product in a location where it can be accessed by unauthorized people who have not been trained for safety.
	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.
	Before wiring or maintenance, turn off the power to this product. Failure to do so may result in electric shock or device failure.
	Do not touch the terminals or insert conductive material between the terminals while the power is on. Doing so may result in electric shock.
	Do not touch electrically charged parts. Doing so may cause electric shock.
	Use crimp terminals with insulation for connections to the product terminals. Failure to do so may result in electric shock or fire.

⚠ 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 this product in the package for storage. Failure to do so may damage or stain the product.
	Use this product under the operating conditions (for temperature, humidity, power, vibration, shock, mounting location, mounting method, 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.
	All wiring must comply with applicable codes and ordinances. Otherwise there is a danger of fire.
	Do not use an uninterruptible power supply (UPS) that outputs rectangular waves. Doing so may cause the device to fail.
	Provide a power circuit breaker for the power source to this product. The product does not have a power switch.
	When connecting digital output lines, provide a circuit protector (e.g., a circuit breaker or fuse) for the power source.
	When connecting a reheater, provide a temperature fuse on the reheater side.
	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 proper contact.
	Do not allow wire clippings, metal shavings, and other refuse to enter into the product. Doing so may cause fire or product damage.
	If more than the rated power voltage is applied to the product, replace the product with 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.

⚠ CAUTION	
	Do not allow chemicals (e.g., solvents, oil, or cleaning agents) to contact this product. They may damage the case.
	Before cleaning the product, be sure to turn off the power to the product. Failure to do so may cause electric shock, device failure, or malfunction.
	Actuator cables must not be removed from the device.
	When calculating the torque required, the specifications supplied by the damper manufacturers (cross-section, construction, place of installation), and the ventilation conditions must be observed.

■ System Configuration

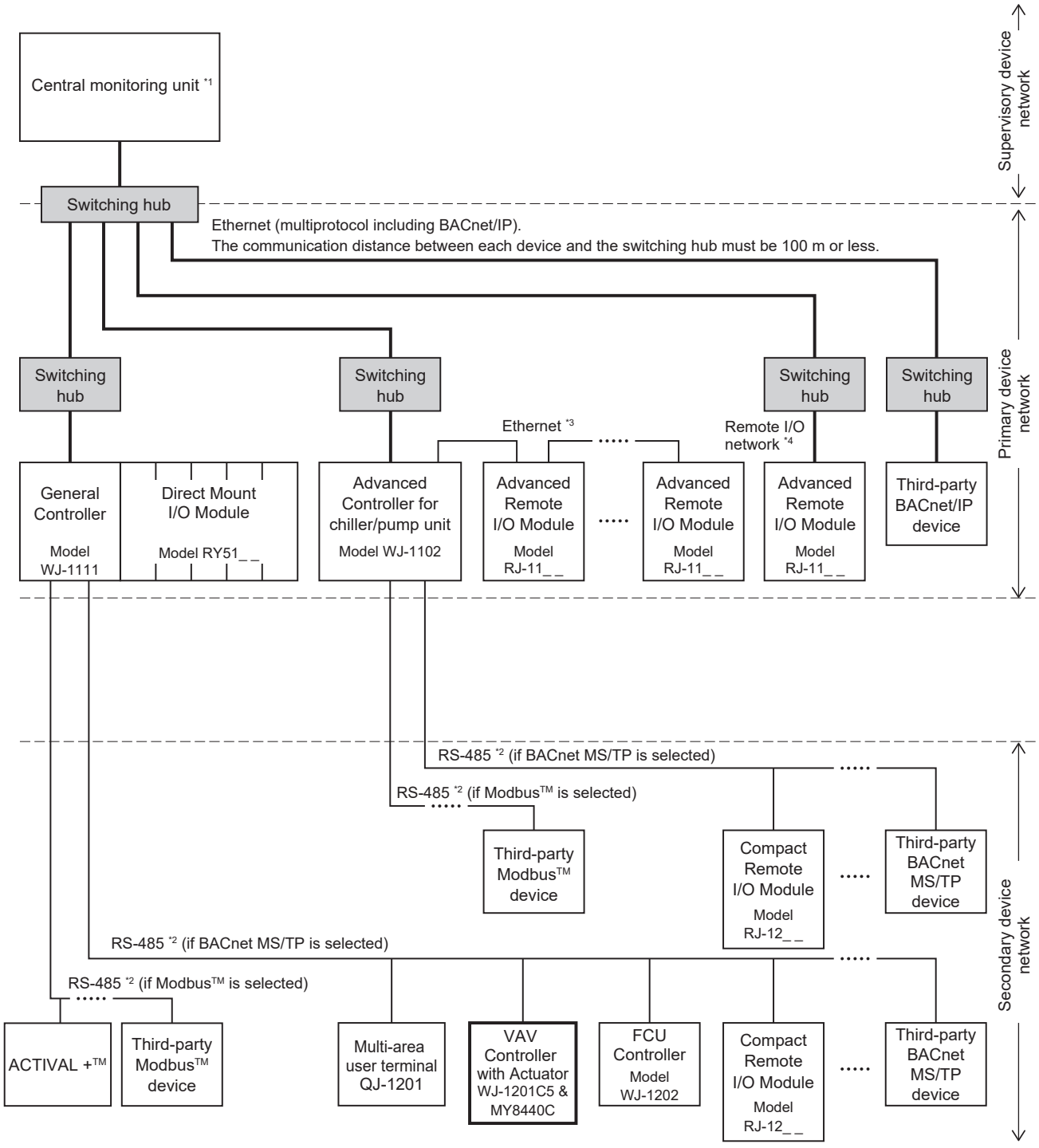


Figure 1. System configuration example

*1 Azbil's Supervisory Controller (model BH-101G0W0000) or a third-party central monitoring unit using BACnet/IP communications can be used for central monitoring.

*2 The General Controller and Advanced Controller have two RS-485 communication channels.
For each channel, communication protocol can be selected from BACnet MS/TP, Modbus™ RTU, or Modbus™ ASCII.
- Number of devices that can be connected for BACnet MS/TP
  If only the Azbil devices are connected:
  50 devices/channel (VAV/FCU Controllers, Compact Remote I/O Modules, etc.)
  The maximum number of the secondary devices that can be connected to one General Controller is 70 , or 50 which is the sum of Azbil VAV and FCU Controllers. The Advanced Controller has no restrictions.
  If only the third-party devices are connected:
  31 devices/channel (when transmission speed is 76.8 kbps, 30 objects/device)
- Number of devices that can be connected for Modbus™
  31 devices/channel (when transmission speed is 76.8 kbps, 30 objects/device)

If the transmission speed and the number of objects are different among the third-party devices, or if the Azbil devices and third-party devices coexist on the same channel, the number of connected devices will vary. For details, please contact one of Azbil salespersons.

*3 A network that connects the Advanced Controller and 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 the Advanced Controller and the Advanced Remote I/O Modules under its control, as well as between the Advanced Remote I/O Modules and the I/O modules for the Advanced Controller.

*4 A network that connects the Advanced Controller and Advanced Remote I/O Modules through a host network is referred to as a remote I/O network.
A switching hub is required to connect the Advanced Remote I/O Modules to the remote I/O network.
The maximum number of the Advanced Remote I/O Modules connected to this network is 3 per Advanced Controller.

■ Model Number

● Controller

Model number							Specification	Remarks
WJ-12								
	01						VAV controller	
		C					Power supply: 24 V AC	
			5				Control: damper movement by connected actuator	
				0			Room temperature input: Pt100, CO_2 concentration input	
					2		External contacts: no air velocity, no I/O	
					3		External contacts: no air velocity, 2 DIs, 2 DOs, and 1 AO	
					4		External contacts: air velocity, no I/O	
					5		External contacts: air velocity, 2 DIs, 2 DOs, and 1 AO	
						1		

● Actuator

Model number							Specification	Remarks
MY84								
	40						Type: VAV actuator Used with model WJ-1201C5 VAV controller	
		C					Power voltage: 24 V AC	
			5				No selection	
				1			5 N·m	
				2			10 N·m	
					0		No selection	
						0		

■ Specifications

● Controller

Item			Specification
Power		Voltage	24 V AC (20.4–27.6 V AC)
		Frequency	50/60 ± 3 Hz
		Consumption	5 VA max.
		Inrush current	30 A max. (for 24 V AC)
Central processing unit			32-bit
Communication	RS-485	Method	BACnet MS/TP
		Speed	9.6, 19.2, 38.4, 76.8 kbps (default: 76.8 kbps)
		Distance	1,000 m max.
	Neopanel2/ Neopanel	Format	Dedicated serial communication (requires 12 V DC power)
		Speed	100 bps
		Distance	50 m
		Number of connectable units	2
	Actuator	Method	Proprietary
		Speed	1200 bps
		Distance	2 m
		Number of connectable units	1
Materials			Base: modified PPE resin
			Cover: modified PPE resin
Mass			0.3 kg
Environment	Operating conditions	Ambient temperature	0 to 50 °C
		Ambient humidity	10–90 % RH (without condensation)
		Elevation	2,000 m max.
		Vibration	3.2 m/s^2 max., 10–150 Hz
	Transportation/ storage conditions	Ambient temperature	−20 to 60 °C
		Ambient humidity	5–95 % RH (without condensation)
		Vibration (transport)	9.8 m/s^2 max., 10–150 Hz
		Vibration (storage)	3.2 m/s^2 max., 10–150 Hz
	Other		• No corrosive gas should be detected. • No exposure to direct sunlight. • Do not let the product get wet.*1
Installation location*2			In equipment
Installation method			Mounted with screws

*1 Because the device is not splash-proof, if installing in a location where it could be splashed by water, put into a splash-proof box or provide other splash-proof protection.

*2 Electric shock could occur if you step on the product or touch it with your hand, and so do not mount on the floor, in ceiling panels, or similar locations.

● Actuator

Item			Specification
Power		Input voltage	24 V AC (19.2–28.8 V AC)
		Frequency	50/60 ± 3 Hz
		Consumption	MY8440C5100: 4 W / 6 VA MY8440C5200: 5 W / 8 VA
		Inrush current	8 A max. (for 24 V AC)
Connection with controller		Communication method	Proprietary
		Communication distance	2 m
		Number of connectable units	1
Mass			MY8440C5100: 0.5 kg MY8440C5200: 0.7 kg
Environment	Operating conditions	Ambient temperature	−30 to 50 °C
		Ambient humidity	95 % RH max. (without condensation)
		Elevation	2,000 m max.
		Vibration	3.2 m/s^2 max., 10–150 Hz
	Transportation/ storage conditions	Ambient temperature	−40 to 80 °C
		Ambient humidity	5–95 % RH (without condensation)
		Vibration (transport)	9.8 m/s^2 max., 10–150 Hz
		Vibration (storage)	3.2 m/s^2 max., 10–150 Hz
	Other		• No corrosive gas should be detected. • No exposure to direct sunlight.
Installation location*2			In VAV box
Installation method			Using universal bracket
IEC/EN degree of protection			IP54
IEC/EN protection class			III (safety extra-low voltage)
Actuator angle of rotation			95° or 150/200/300 mm stroke
			Adjustable mechanical or electronic limiting

*2 Electric shock could occur if you step on the product or touch it with your hand, and so do not mount on the floor, in ceiling panels, or similar locations.

Note If the actuator and the controller use the same power supply, the power specifications conform to those for the controller.

● Controller input/output

Item			Specification
Temperature input		Measurement range	0 to 50 °C
		Input signals	RTD (Pt100)
CO_2 concentration input		Measurement range	0–2000 ppm
		Input signal	0–10 V DC
Analog output		Number of output points	1
		Output current	4–20 mA
		Allowable load resistance	300 Ω max.
Digital output		Number of outputs	Fan: 1, Reheat: 2
		Output method	Relay output, dry (non-voltage) contact
		Contact rating	30 V AC, 0.8 A max. (inductive load: cos φ0.4 min.)
			30 V DC, 0.5 A max.
		Minimum applied load	5 V DC, 10 mA
Digital input		Number of inputs	2
		Current	5 mA DC (typ.)
		Voltage	12 V DC (typ.)
		Connectable load	Dry contact
		Dry contact rating	Allowable ON contact resistance: 100 Ω max.
			Allowable OFF contact resistance: 100 kΩ min.
Neoplate (QY7290_301_)	Air conditioning switch input	Current	10 mA DC (typ.)
		Voltage	12 V DC (typ.)
		Connectable load	Dry contact
	Indicator lamp output	Output method	Transistor output, wet (voltage) contact
		Current	10 mA DC (typ.)
		Voltage	12 V DC (typ.)
		Output limit resistance	1.2 kΩ (typ.)
Air velocity signal input		Input type	Voltage pulse input
		Connection destination	TP-AFS001 (83174390-001)

● Wiring for controller

Item	Recommended cable	Rating	Maximum length	Connection type	Remarks
Power	600 V PVC-insulated (IEC-60227-3), control-use vinyl insulated vinyl sheathed (CVV), or equivalent	1.25–2.5 mm^2 stranded wire	—	Spring terminal block*1	—
Connection with actuator		0.75–1.5 mm^2 stranded wire	2 m	Spring terminal block*1	Only MY8440C5100 or MY8440C5200 can be connected
Input from airflow sensor		0.75–1.5 mm^2 stranded wire	3 m	Spring terminal block*1	Only the vane airflow sensor (83174390-001) can be connected
Analog output		0.75–1.5 mm^2 stranded wire	30 m	Spring terminal block*1	—
CO_2 concentration input		0.75–1.5 mm^2 stranded wire	30 m	Spring terminal block*1	A cable different from the power cable must be used
Digital input (for each input)		0.75–1.5 mm^2 stranded wire	100 m	Spring terminal block*1	Only contact input is allowed
Digital output		0.75–2.5 mm^2 stranded wire	100 m	Spring terminal block*1	30 V AC max.
Neopanel2/ Neopanel	—	LAN cable*3	50 m	RJ-45 modular connector*2	—
Neoplate					Only QY7290_301_ can be connected
BACnet MS/TP			1000 m	RJ-45 modular connector*2	—
Pt100 Ω			50 m	RJ-45 modular connector*2	—

*1 Ferrules can be used for spring terminal blocks, but there are restrictions on the wire size. For details, refer to the table 2 in “Wiring the IO terminal block.”

*2 Use the following connector. Plug: Model SS-37000-002 (Bel Stewart Connector)
The same plug is available from Azbil Corporation, model DY7207A0100 (100 pcs).

*3 Use a category 5e (0.5 mm diameter × 8 cores) or higher LAN cable compliant with EIA/TIA-568. Cable with connector (model DY7210) and cable with connector for short-distance communication (model DY7220) are communication cables manufactured by Azbil Corporation using the connectors in *2. If a cable with an external diameter of 6 mm or more is used, make sure to leave sufficient maintenance space (especially in the depth direction) for the VAV controller.
The use of an existing category 3 or 5 cable compliant with EIA/TIA-568 is acceptable. In that case, please contact Azbil Corporation concerning the cable length.

■ Dimensions

● Controller

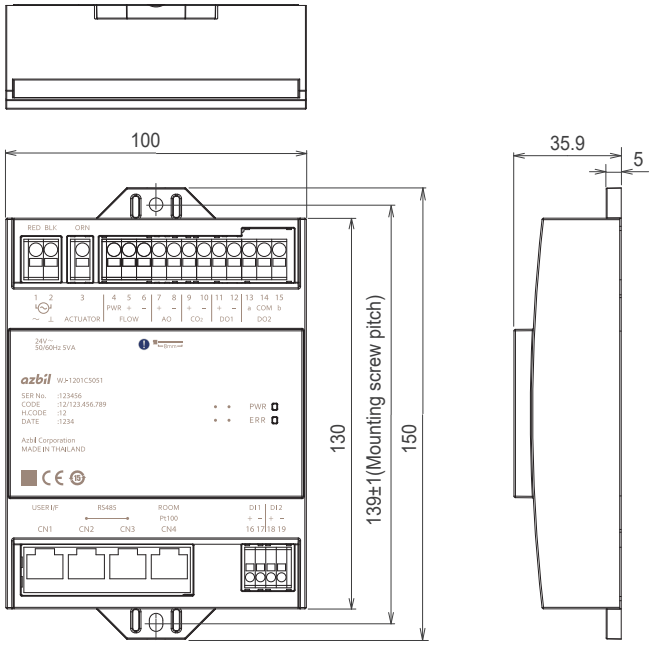


Figure 2. Dimensions of controller

● Actuator

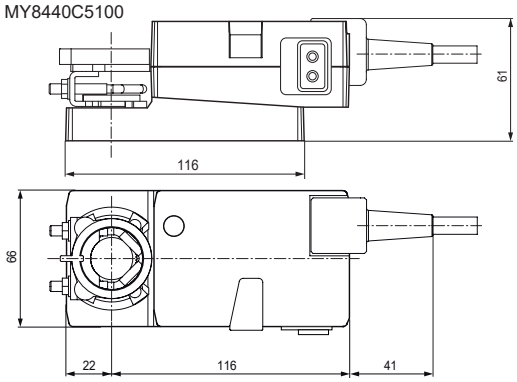


Figure 3. Dimensions of model MY8440C5100

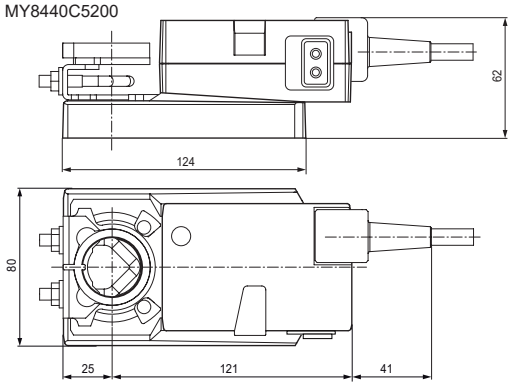


Figure 4. Dimensions of model MY8440C5200

● Universal bracket

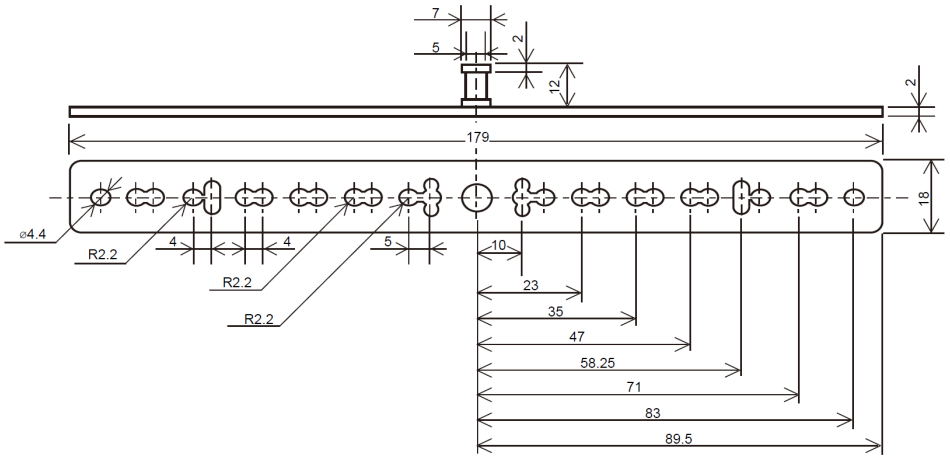


Figure 5. Dimensions: Universal bracket (mm)

■ Name of Parts

● Controller

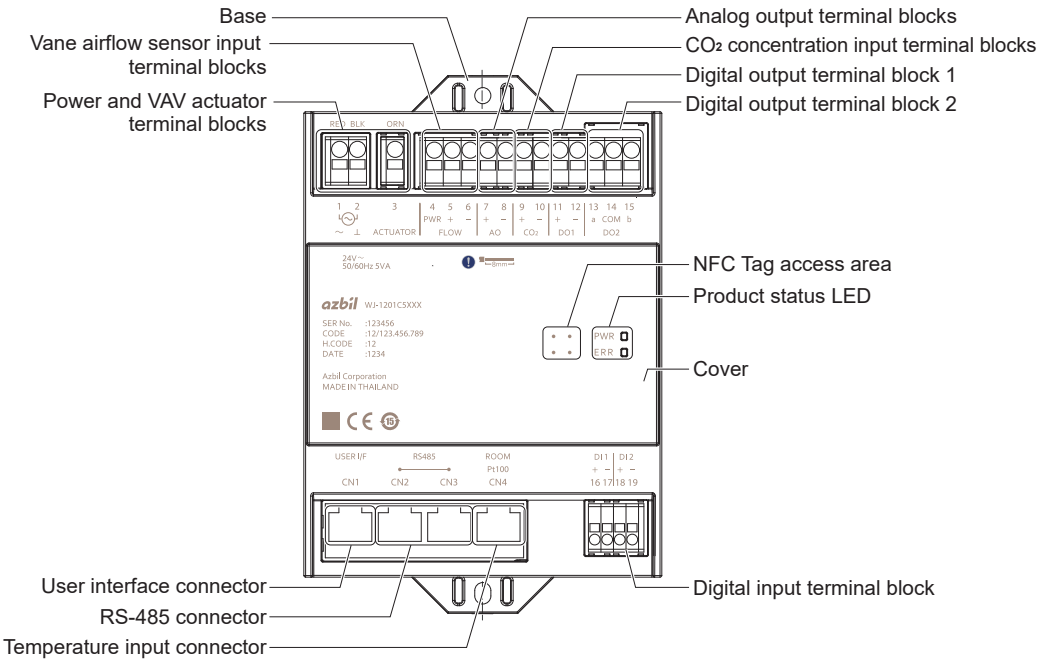


Figure 6.

● Actuator

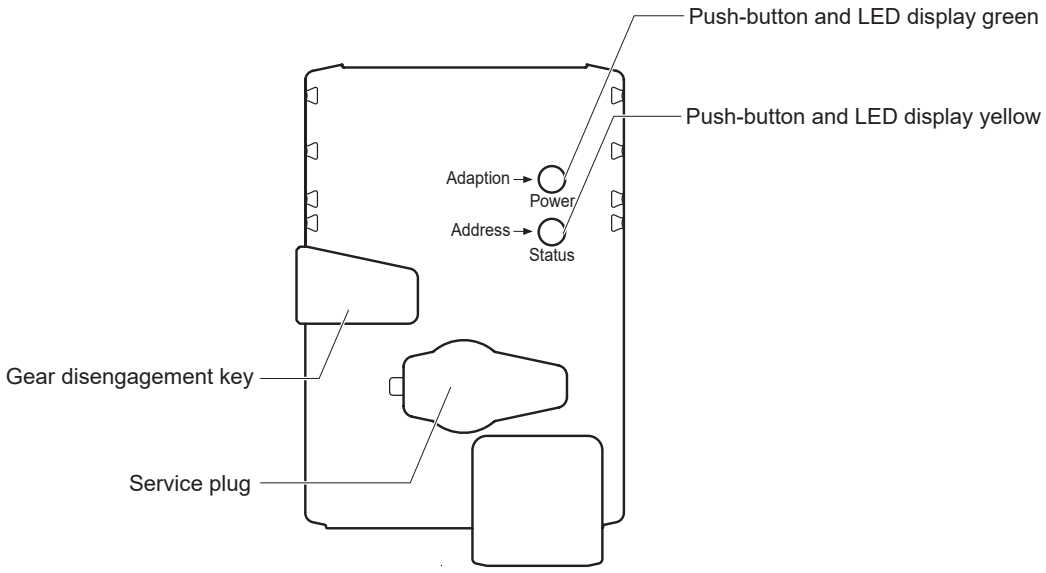


Figure 7.

■ Installation

⚠ WARNING

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.

⚠ CAUTION

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

● Installation location

- The following space should be secured around the product.
  The hatched area is for maintenance.

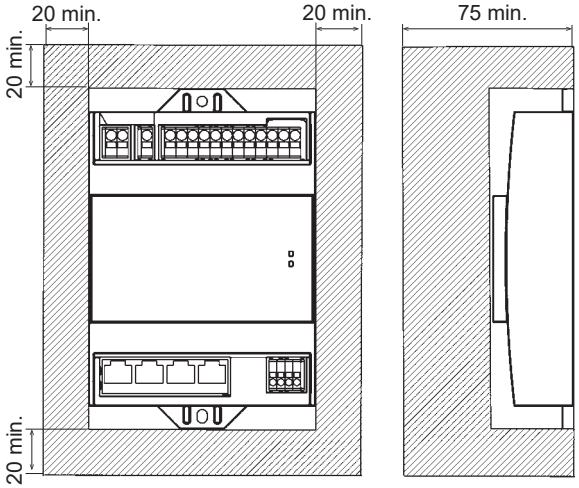


Figure 8. Maintenance space (mm)

- If you cannot secure 75 mm in the height direction, it is necessary to use a LAN cable with an external diameter of 6 mm or less. In addition, connect the terminator after extending using a connector cable (Model DY7220A0010) or modular relay unit (Model DY7202A0000) because there will be difficulties for installation of the terminator.

● Installation position

- Fasten the product firmly with the screws so as not to wobble.
- Be sure to mount the product so that the mounting surface is vertical.
  Mount the product in a position where the nameplate is easily seen.
- If the product is not installed in a dust-proof box, do not mount it as illustrated in figure 9A, because dust would easily collect in the connectors.

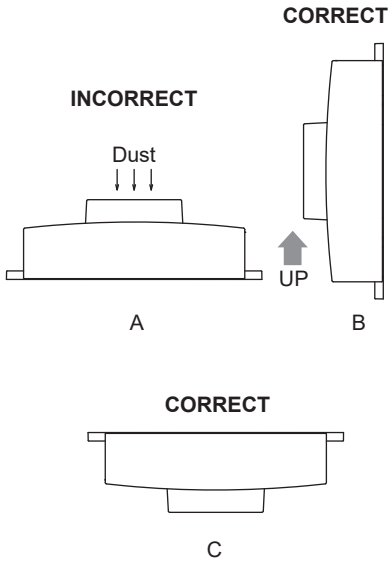


Figure 9.

● Installation method

Direct installation with screws

(1) Make screw holes for the M4 screws.
Screw hole pitch: 139 ± 1 mm

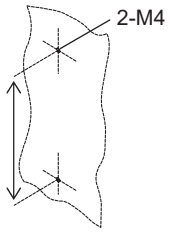


Figure 10.

(2) Fasten the product with two M4 screws.

(3) Check that the product is securely fastened.

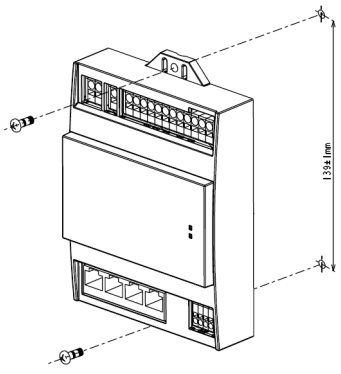


Figure 11.

Sample of installation

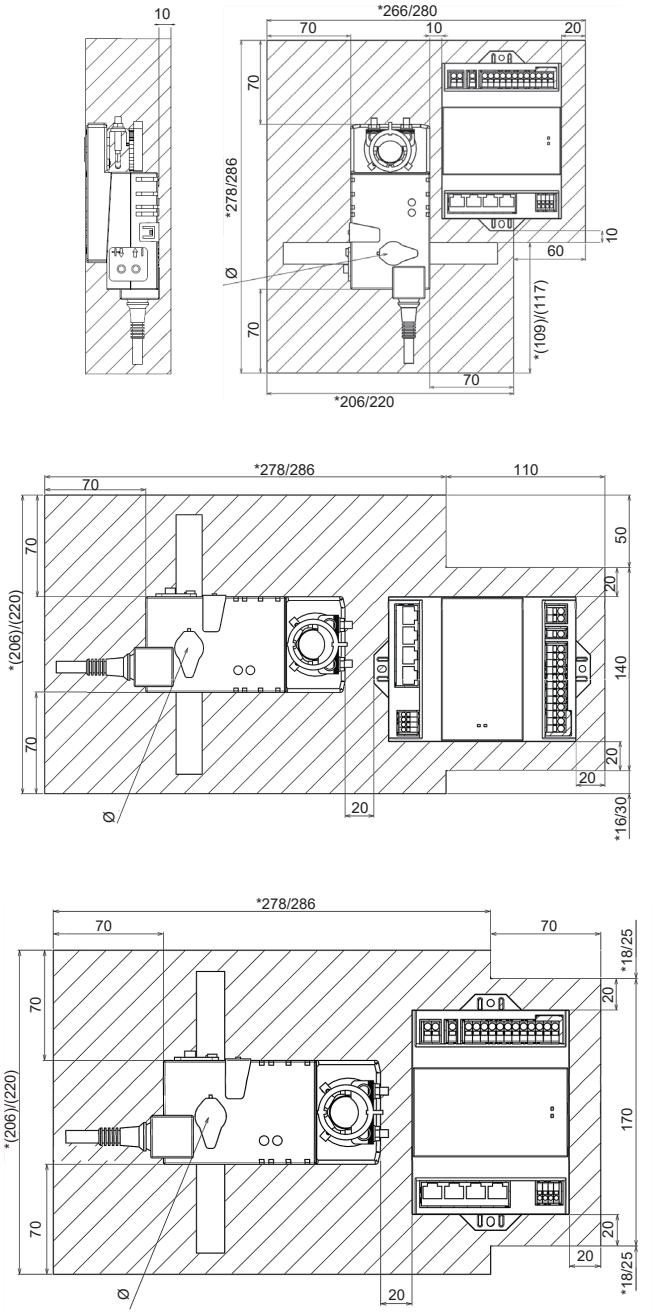
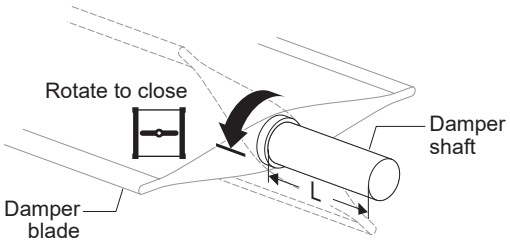


Figure 12.

Note: In the figure, where two dimensions are shown separated by a slash (/), the former is for MY8440C5100 and the latter is for MY8440C5200.

● Installation procedure

(1) Fully close the damper shaft.



Actuator torque type	L: Minimum length of the shaft (mm)	Diameter of the shaft (mm)		
		●	■	◆
MY8440C5100	37	6–20	≥ 6	≤ 20
MY8440C5200	40	8–26.7	≥ 8	≤ 26.7

Figure 13. Damper shaft

(2) Fully close the actuator of this product, and mount it to the damper shaft. Finger-tighten the fastening nuts of the shaft clamp to temporarily fix the actuator.

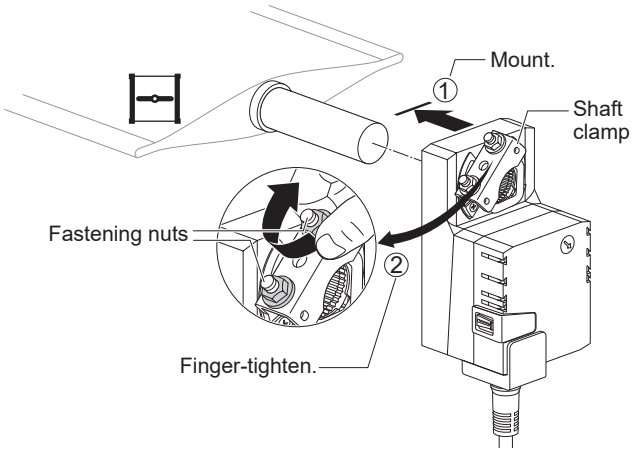
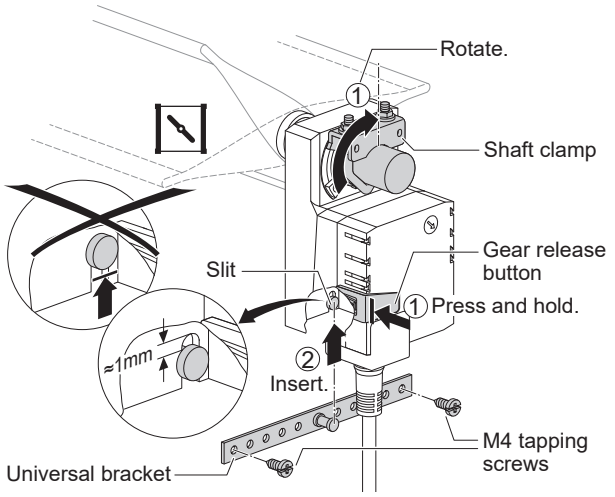


Figure 14. Temporal installation of the actuator body

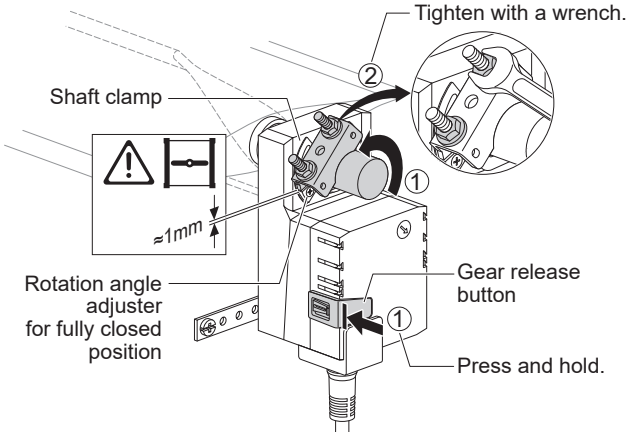
(3) While pressing the gear release button, manually rotate the shaft clamp until it is in the upright position. Then, insert the universal bracket (protruding part) into the slit of this product and fix the bracket with the two M4 tapping screws.



Note: The universal bracket, required for the installation of this product, is included in the package.

Figure 15. Attaching the universal bracket

(4) Manually rotate the shaft clamp back to the fully closed position while pressing the gear release button. At this time, be sure to leave a clearance (approx. 1 mm) between the shaft clamp and the rotation angle adjuster (mechanical stopper) for the fully closed position. This will allow the actuator to shut off the damper. Using a wrench, tighten the fastening nuts of the shaft clamp to completely fix this product. See the following table for the nut fastening torque.



Actuator torque type	Nut fastening torque (N·m)
MY8440C5100	5–6
MY8440C5200	8–9

Figure 16. Complete installation of the actuator body

(5) Manually rotate the shaft clamp to fully open the damper and set the rotation angle adjuster for the fully open position.

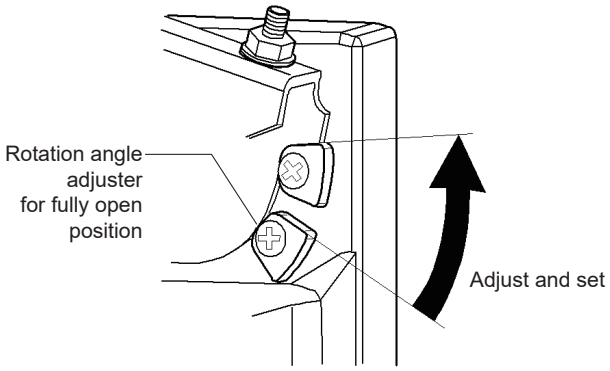


Figure 17. Setting the operating angle for the fully open position

● Connection of the air flow sensor

For differential pressure pickup, connect the tube for the total pressure measuring port of the air flow sensor to the high-pressure port (indicated with "+") of the actuator. Also connect the tube for the static pressure measuring port of the air flow sensor to the low-pressure port (indicated with "-") of the actuator.

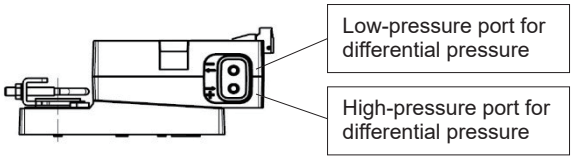


Figure 18. Differential pressure pickup

Table 1. Required specification of the air flow sensor tube

Type	Length	Inner diameter	Outer diameter	Material
Flexible tube	1 m	5 – 6 mm	Max.10 mm	Polyvinyl chloride (PVC), silicon rubber
Inflexible tube		5.5 – 6.5 mm		

Notes:

- Use the tube as specified in the above table.
- If the tube of the differential pressure pickup does not meet the required specification shown in the above table, use a joint to meet the specification.
- Total tube length must be 1 m max. even if two tubes with different diameters are connected by the joint.

■ Wiring

⚠ WARNING	
❗	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.
❗	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 touch the terminals or insert conductive material between the terminals while the power is on. Doing so may result in electric shock.
🚫	Do not touch electrically charged parts. Doing so may cause electric shock.
❗	Use crimp terminals with insulation for connections to the product terminals. Failure to do so may result in electric shock or fire.

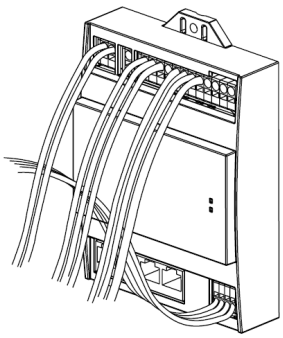
⚠ CAUTION	
❗	All wiring must comply with applicable codes and ordinances. Otherwise there is a danger of fire.
🚫	Do not use an uninterruptible power supply (UPS) that outputs rectangular waves. Doing so may cause the device to fail.
❗	Provide a power circuit breaker for the power source to this product. The product does not have a power switch.
❗	When connecting valves, FANs, and digital output lines, provide a circuit protector (e.g., a circuit breaker or fuse) for the power source.

⚠ CAUTION	
❗	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 proper contact.
🚫	Do not allow wire clippings, metal shavings, and other refuse to enter into the product. Doing so may cause fire or product damage.
❗	If more than the rated power voltage is applied to the product, replace the product with new one for your safety. Failure to do so may cause device failure or cause fire.

● Notes for wiring

- Use the specified wires.
- Be careful that tension caused by the wires is not applied on the unit.
  Use cable ties or similar implements to secure the wires to the mounting mating part of the unit so that tension from the wires is not applied to the unit.
  Secure at a position near the unit.
  Be particularly careful to secure the modular cable for temperature measurement as close as possible to the connector because the temperature measurement value can fluctuate if the temperature input connector is subjected to vibrations and other external effects.
  Bundle the power cable and RS-485 cable separately, and do not bundle these cables with any other cables.
- Do not route wires in front or back of the product (to prevent malfunctions due to noise).

INCORRECT



● Wiring diagram

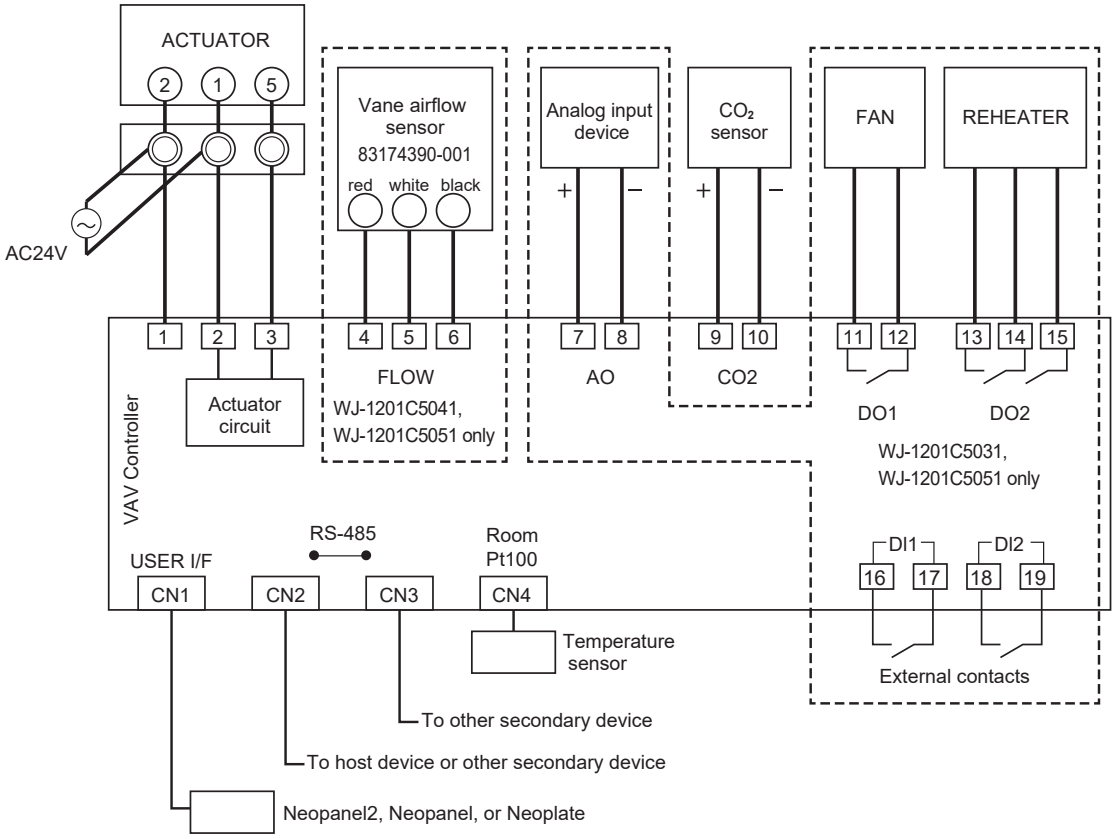
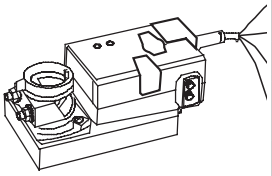


Figure 19.

*1 Since the AO circuit and CO_2 circuit are not isolated, take the power supply for the connected equipment into consideration when wiring.

*2 A terminal block is required between the actuator and the VAV controller.

Note
Supply via safety isolating transformer!



No.	Designation	Wire colour	Function
1	⊥ –	black	AC 24 V supply
2	~ +	red	
3	◄ Y	white	Not used
5	◄ U	orange	– Actual value signal – Communication with controller

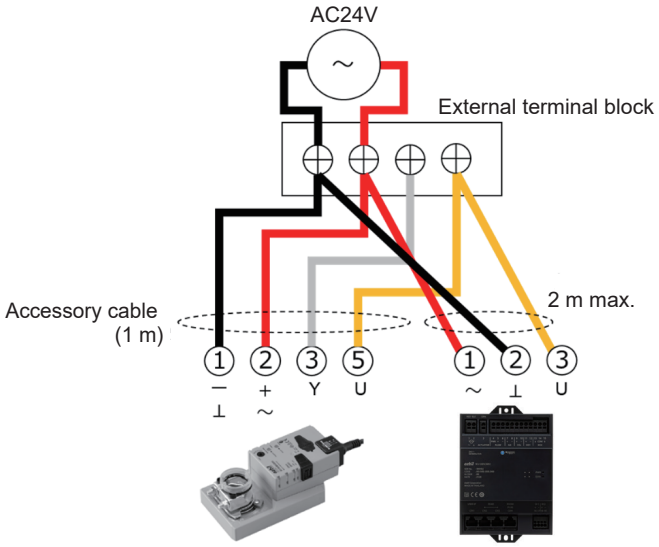


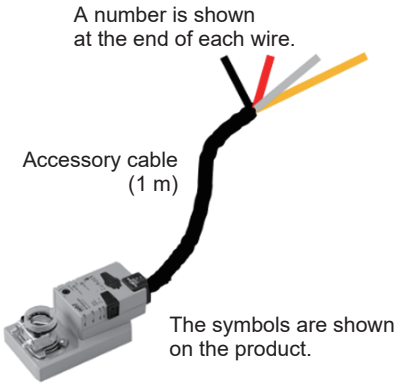
Figure 20.

Accessory cable wires

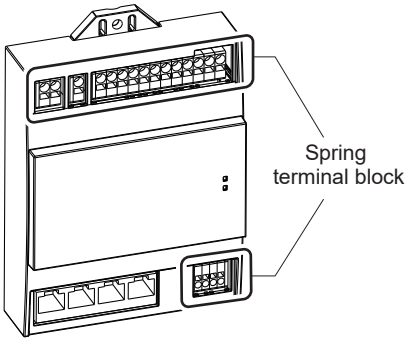
colour	black	red	white	orange
No.	1	2	3	5
Symbol	⊥	~	▲	▼

Controller terminals

No.	1	2	3
Symbol	~	⊥	Actuator



● Wiring the IO terminal block



(1) Strip 8–9 mm of sheath from the cable core wire.

Note: There is an insulation stripping gauge on the front side of the product.

Make sure that there are no stray wires from the stripped conductor.

The following restrictions apply when using ferrules for spring terminal blocks.

Table 2. Available ferrules (_ _ specifies the color)

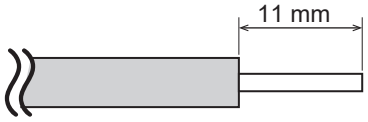
Manufacturer's part number (Phoenix Contact)	Wire size	
	mm^2	AWG
AI0.75-8_ _	0.75	18
AI1-8_ _	1.0	18
AI1.5-8_ _*1	1.5	16

*1 Cannot be used for terminal blocks for digital input.

Note: For the part numbers in Table 2, 100 ferrules are included (or the part number followed by "-1000" for 1000 included ferrules).
The crimping tool for the ferrules (made by Phoenix Contact) is CRIMPFOX 6: part No. 1212034.

- The length of insulation to strip is 11 mm.

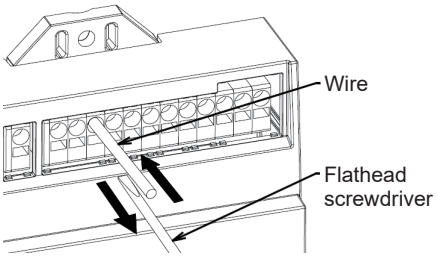
Note: This length is different from the length of the insulation stripping gauge (8 mm) on the front of the product.

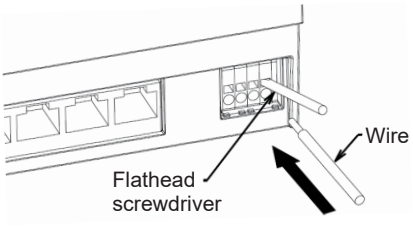


Make sure that there are no stray wires from the stripped conductor.

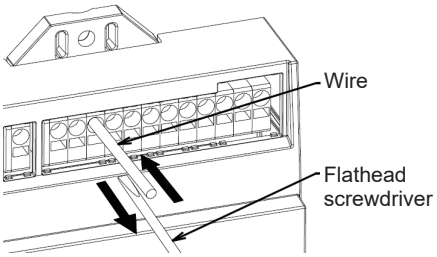
- If the wire protrudes out of the ferrule, cut the wire so that it does not protrude more than 0.5 mm.
- Lightly pull on the ferrule and wire to make sure they are correctly connected.

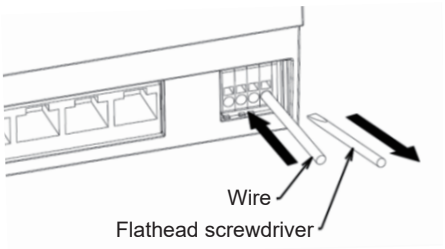
(2) Insert the flathead screwdriver* into the screwdriver insertion slot (square hole). While keeping the screwdriver there, insert the wire into the terminal (round hole) as far as it will go.





(3) Pull out the screwdriver* while holding the wire in.





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

Note: If you pull the wire diagonally, it may become disconnected.

(5) Check again that there are no stray wires.

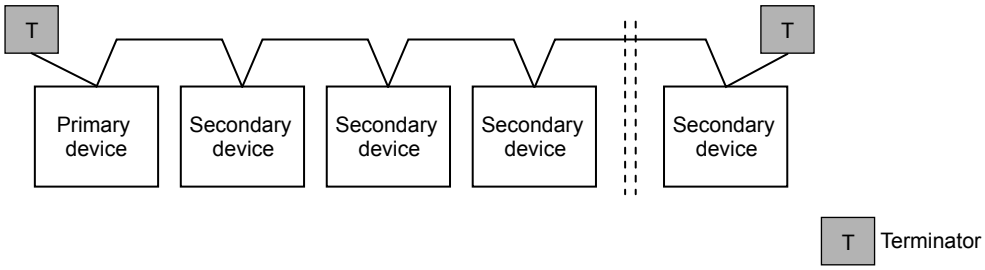
* Recommended screwdriver: SZF 0-0,4×2,5 Model 1204504 made by PHOENiX CONTACT

● Recommended wires

Refer to "Specifications for Wiring."

● Wiring the RS-485 terminals

RJ45 modular connectors are used for connection.
Connect a terminator (120 Ω) to the last device connected to the RS-485.



* Use the terminators listed below.
Model 83162637-005, RS-485 terminator (1 pc.)
Model 83162637-006, RS-485 terminators (10 pcs.)

Notes:
1. Do not branch wiring for RS-485 communication.
2. Branch wiring using Model DY7203A0000 is prohibited.

● Termination of modular connectors

The user I/F cable, RS-485 cable, temperature input cable, and return water temperature input cable are modular connectors.

- The modular connector is composed of modular plug (male) and modular jack (female).
- The modular jack is located on the controller unit.
- The modular plug needs to be crimped with the LAN cable at the site.
  This section describes how to crimp the modular plug onto the LAN cable and connect it to the modular jack.
  Note: Recommended modular plug
  Use the modular plug recommended by Azbil.

(1) Strip the sheath of the LAN cable.
You will see 8 core wires inside.

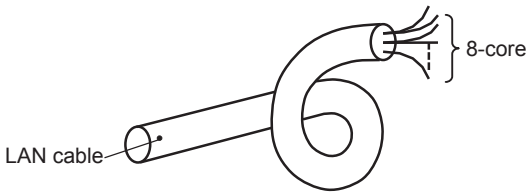


Figure 21.

(2) Arrange the 8 core wires according to number.
Refer to table 3 and check the color of the core wires to align them (a typical example is shown below). Do not damage or strip the insulation of the 8 core wires.

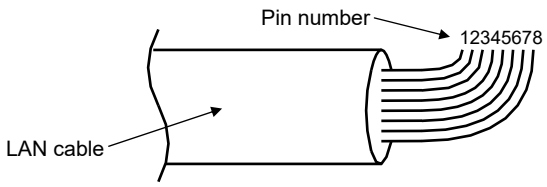


Figure 22.

Table 3.

Pin No.	Wire color	Wire alignment
1	White and orange	Line 2 of pair 2
2	Orange	Line 1 of pair 2
3	White and green	Line 2 of pair 3
4	Blue	Line 1 of pair 1
5	White and blue	Line 2 of pair 1
6	Green	Line 1 of pair 3
7	White and brown	Line 2 of pair 4
8	Brown	Line 1 of pair 4

(3) Insert the properly ordered core wires into the modular plug.
Figure 23 illustrates the order of lines on the side with the contact pins when it is viewed from above.

- Trim the core wires by a nipper so that their length is the same.
- If the wires are too long, crimping will fail. Be careful.

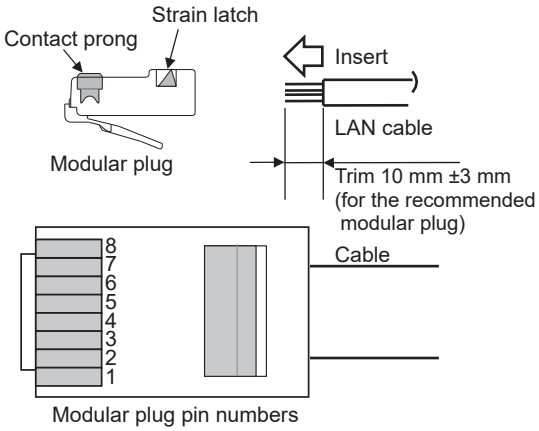


Figure 23.

(4) Crimp the wires using the tool for the modular plug.

- By crimping, the contact pins are inserted into the wires to ensure conductivity.
- Strength is ensured by the strain latch that crimps the LAN cable outer insulation.
  Check these two points.

(5) Attach the modular plugs on both sides of the LAN cable.

(6) Check conductivity.

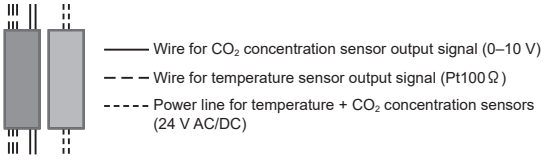
- Make sure that the core wires are correctly aligned and that the contact pins pierce the wires.
- Also, check that there is no damage or disconnection along the cable.
  Note: Conductivity can be checked easily using a modular tester (model DY7206A0000).

(7) Connect the LAN cable to the modular jack.
After checking the conductivity, plug the LAN cable into the modular jack on the product. Also, connect it to the user interface device.
Note: Insert the modular plug into the modular jack until it clicks.
Lightly pull on the cable to check that it does not come out.

● Connecting the temperature + CO_2 concentration sensors

Separate the wires for the temperature sensor output signal (Pt100Ω) and the CO_2 concentration sensor output signal (0–10 V) from the power lines for the temperature + CO_2 concentration sensors.

Note:
1. The wires for the temperature sensor output signal (Pt100Ω) and CO_2 concentration sensor output signal (0–10 V) must be separated from the power lines to prevent electrical noise from causing unstable signals.
2. For instructions on connecting the temperature + CO_2 concentration sensors, see the Specifications/Instructions for these sensors.



■ Other Parts

This section describes the use of other parts.

● Notes for use

- Be sure to install the modular branch unit, modular relay unit, and the the adapters for user interface devices or sensors in an outlet box or panel.
- Insert the modular plug into the modular jack until it clicks.
  Lightly pull on the cable to check that it does not come out.

● Modular branch unit

This is used to branch the communication cable when two user interface devices are connected.

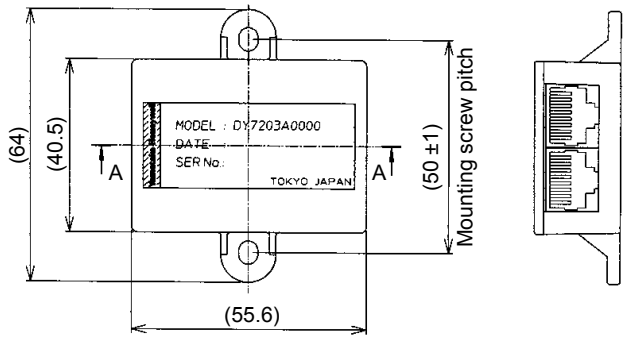


Figure 24. Modular branch unit (model DY7203A0000) (mm)

Note: Do not branch the RS-485 communication cable.
Branch wiring using model DY7203A0000 is prohibited.

● Modular relay unit

This is used to extend the communication cable by connecting it to another cable.

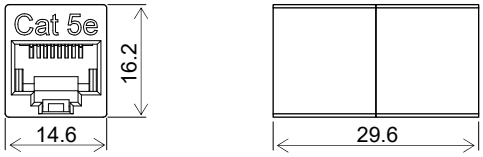


Figure 25. Modular relay unit (model DY7202A0000) (mm)

● Sensor adapter

This is used to connect the temperature sensor if the modular connector is used.

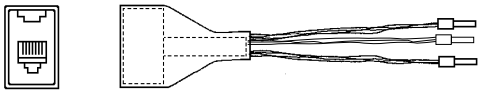


Figure 26. Sensor connecting adapter (model DY7204A0003) for Pt100

● Modular plug

This is used to connect the cable to the modular jack.

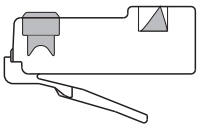


Figure 27. Modular plug (model DY7207A0100)

■ Tools

This describes how to use the products provided as construction tools.

● Modular crimper

A tool for crimping a modular plug to a LAN cable

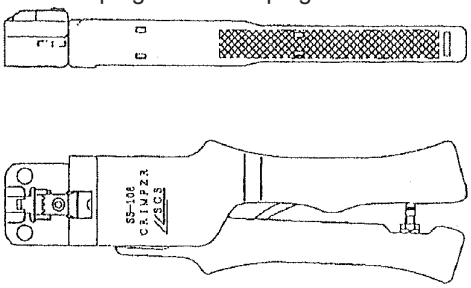


Figure 28. Modular crimper (model DY7205A0002)

● Modular cable tester

A tester tool that checks if a LAN cable and a modular plug are attached properly.

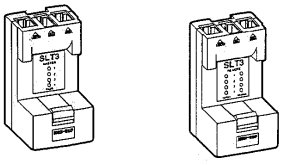


Figure 29. Modular cable tester (model DY7206A0000)

■ Software Details

(1/2)

Item	Function	Description	Remarks
Operation	VAV ON/OFF	Turns the VAV units ON/OFF from the user interface device or the central monitoring unit. ON/OFF operation from the user interface device can be prohibited by the central monitoring unit.	For ON/OFF operation from the user interface device or the central monitoring unit, the latest command has priority.
	Setback operation	Changes the temperature setpoint by the previously set setback value only. It is possible to switch to setback operation from the user interface device or the central monitoring unit.	For setback operation from the user interface device or the central monitoring unit, the latest command has priority.
	Temperature settings	Temperature settings can be changed from the user interface device or the central monitoring unit. Changing the temperature settings from the user interface device can be prohibited by the central monitoring unit.	When settings are changed from the user interface devicel or the central monitoring unit, the latest command has priority. The high/low limit settings on the user interface devices can be specified by the central monitoring unit.
	AHU → VAV ON/OFF	Turns VAV units ON/OFF in conjunction with ON/OFF of air handling units (AHUs)	One General Controller can control up to 6 VAV controller groups.
	VAV → AHU ON/OFF	Turns AHUs ON/OFF in conjunction with VAV units.	One General Controller can control up to 6 VAV controller groups.
	ON/OFF linkage with general DI	VAV units can be turned ON/OFF linked with a general-purpose DI to the VAV controller.	This can be used for switching to setback operation.
	ON/OFF linkage with general DO	The VAV controller can send output to a general-purpose DO linked with ON/OFF of VAV units.	
	Air volume changeover	Switches the air volume between three levels (L, M, H) using the user interface device or general-purpose DI.	
Control	Temperature control	Controls air volume from VAV units so that the measured temperature is at the setpoint.	
	CO_2 concentration control	Controls air volume from VAV units so that CO_2 concentration is at the specified concentration.	
	Temperature and CO_2 concentration control	Controls air volume from VAV units so that CO_2 concentration is at the specified concentration or lower and indoor temperature is at the setpoint.	
	Supply air fan RPM optimization control	Detects too much or too little VAV unit static pressure and optimally controls the revolution speed of the supply air fan for proper static pressure and minimal fan power consumption.	One General Controller can control up to 6 VAV controller groups.
	Supply air temperature optimization control (load reset control)	Controls supply air temperature for the air conditioning unit at the optimum level based on the control state of VAV units to provide comfort and to save energy.	One General Controller can control up to 6 VAV controller groups.
	Mixing prevention control	In order to prevent mixing loss, sets the difference between the temperature setpoints for air conditioning units for the interior and for the perimeter that operate in conjunction.	One VAV/FCU controller (or one group) can be set for one VAV controller (or one group).
	Linkage between VAV units	Turns multiple VAV units ON/OFF or changes their fan speed (supply air and return air VAV units).	1:1, 1:N (one-multiple) or N:M (multiple-multiple) linkage is available.
	Reheater control	If there is an electric heater or a heater that uses a hot water valve, multi-level or proportional control is executed.	For multi-level control, one or two levels can be selected. For proportional control, floating control is used.

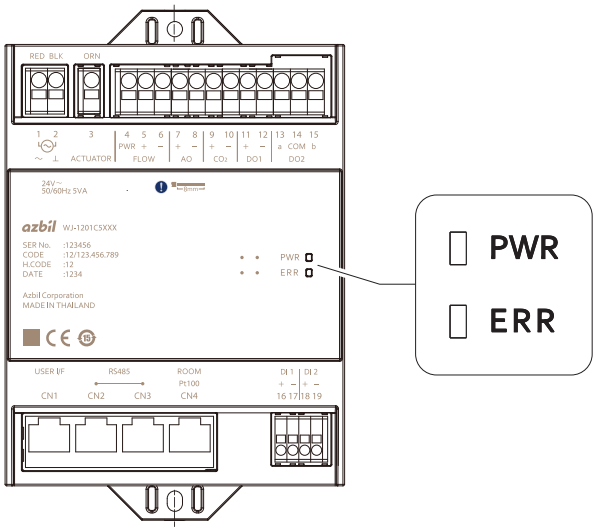
(2/2)

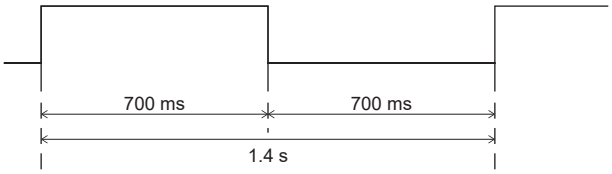
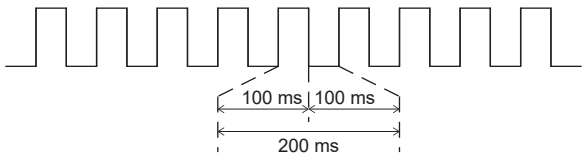
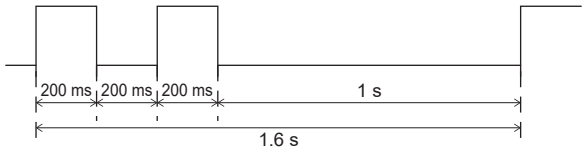
Item	Function	Description	Remarks
Input/output	General-purpose analog input	Provides 1 analog input. When controlling the CO_2 concentration, this port is used for connecting the CO_2 concentration sensor. Additionally, it can be used as a general-purpose input for monitoring.	0–10 V
	General-purpose analog output	Provides 1 analog output. It can be used as a manual operation point or a control output point via DDC.	4–20 mA
	General-purpose digital input	Two digital inputs (max.) are provided. They can be used as dedicated inputs or as general-purpose digital inputs for monitoring.	
	General-purpose digital output	Three digital outputs (max.) are provided. They can be used as linked ON/OFF outputs, fan outputs, reheater outputs, or general-purpose digital outputs.	

■ Indication

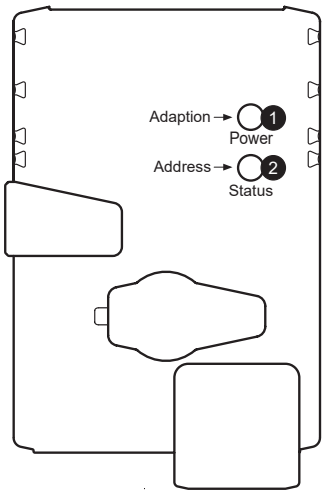
The drawing below shows the status ERR LED on the controller and actuator.

● Controller



State	LED indication	
Normal	Not lit	
Minor failure	Slow regular blink	
Major failure	Lit	
BACnet communication failure	Fast regular blink	
Initializing	Lit (10 s max. after startup)	
Program running (used for program update only)	Irregular blink	

● Actuator



❶ Push-button and LED display green
Off: No power supply or fault
On: Operation
Press key: Adaptation command (automatic setting of rotation angle) if the angle of the damper is set to automatic. Synchronization command if the angle of the damper is set to manual by the engineering tool.

❷ Push-button and LED display yellow
Off: Normal operation
Flickering: Controller communication active
On: Adaptation or synchronising process active
Flashing: Addressing request sent to the controller

Controller Connecting mode
❶Off and ❷On AC supply: connection 1 (⊥) and 2 (~) reversed

The test is performed once to switch on the 24 V supply.
For this test, the controller must be connected to the actuator.

■ Connecting 2 User Terminals

A maximum of two Neopanel2 (model QJ-1301) or Neopanel (model QY7205) units can be connected.

- To connect two user terminals, the modular branch unit (Model DY7203A0000) is required.
- The address number of the 2nd Neopanel should be "2."
  If two Neopanels have the address number "1," they will not work correctly.
  The address number is printed on the shipping carton and on the nameplate (base should be removed) attached to the inside surface of the Neopanel.

Notes:

1. The ON/OFF operation and temperature settings are prioritized based on the "higher priority to later commands" rule.
2. The Neopanel with the address "2" does not have the temperature measuring function.

■ Handling

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

● Notes before power-on

- Check again that the wiring is done correctly.

■ Maintenance

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

⚠ CAUTION	
	Do not disassemble this product. Doing so may cause device failure.
	Before cleaning the product, be sure to turn off the power to the product. Failure to do so may cause electric shock, device failure, or malfunction.

Azbil personnel who have been trained on the product will carry out periodic maintenance.
Please contact us as necessary.

● Notes on cleaning

Do not use chemicals containing cleaning agents, solvents, etc., when removing dirt and other dust on the product surface.

■ Disposal

When this product is no longer needed, dispose of it as industrial waste in accordance with local regulations.
Do not reuse all or part of this product.

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■ For CE-Marked Products

Install this product where it is accessible only to people with sufficient knowledge concerning electrical equipment.
The VAV Controller (model number WJ-1201C5_ _ _) complies with the following harmonised standards of the Radio Equipment Directive (RED), the Electromagnetic Compatibility Directive (EMCD) and the Low Voltage Directive (LVD).

RED: EN 300 330
EMCD: EN 61326-1 Class A, Table 2 (for use in an industrial electromagnetic environment)
EN 301 489-1 / EN 301 489-3
LVD: EN 61010-1 Overvoltage category II
Pollution degree 2

The Actuator for VAV Controller (model number MY8440C5_ _ _) complies with the following Electromagnetic Compatibility Directive (EMCD).

EMCD: EN 61000-6-2
EN 61000-6-3

Azbil Corporation
Building Systems Company

https://www.azbil.com/

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