

# Control Motor

## Overview

Control motor, Model MY3000\_ \_ \_00, actuates a control valve or a damper when combined with a linkage.

When being combined with a control valve, it is mounted with the Model Q455\_ valve linkage.

When being combined with a damper, it is mounted with the Model Q605\_ damper linkage.

The following control motor types are available, classified by control method.

- The control motor with built-in nominal 135  $\Omega$  feedback potentiometer exerting proportional control when combined with the digital controller (Model WY5111, etc.)
- Nominal 135  $\Omega$  resistance input type exerting proportional control when combined with the electric proportional controller such as Neostat (Model TY900\_Z), insertion type temperature controller (Model TY9800)
- 4-20 mA DC input type exerting proportional control when combined with the digital controller such as Inflex GC (Model WY5111), Models R15, R35, R36
- 2-10 V DC input type exerting proportional control when combined with the digital controller such as Inflex AC (Model WY5117)
- ON/OFF or floating type that exerts floating control when combined with a digital controller



## Features

- A variety of control input signals available
- Durable and low power consumption
- Valves and dampers in varied sizes can be actuated using the linkage.
- The auxiliary switch unit can be installed easily.

### IMPORTANT

- If you want to use this product combined with a third party's controller, please contact Azbil corporation.

## 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.

### 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.





## Warnings and Cautions

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

## Signs

	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.)

 <b>WARNING</b>	
	Before wiring, setting, or maintenance, be sure to turn off the power to this product. Failure to do so may result in electric shock or device failure.
	Be sure to ground this product with a ground resistance of less than 100 Ω. Improper grounding may cause electric shock or malfunction.
	After wiring, setting, or maintenance, be sure to reattach the cover. Failure to do so may result in electric shock.
	Before setting or engineering work, be sure to turn off the power to the output terminals. Failure to do so may cause electric shock.

 <b>CAUTION</b>	
	Provide a circuit protector (e.g., a fuse or circuit breaker) for the power source. Failure to do so may cause a short circuit leading to fire or device failure.
	Install, wire, and use this product under the conditions specified by this manual. Failure to do so may cause fire or device failure.
	Do not put a load or weight on this product. Doing so may damage the product.

⚠ CAUTION	
❗	Installation and wiring of the actuator must be performed by personnel qualified to do instrumentation and electrical work. Mistakes in installation or wiring may cause fire or electric shock.
❗	All wiring must comply with applicable codes and ordinances. Otherwise there is a danger of fire.
❗	Use crimp terminals with insulation for connections to the product terminals. Failure to do so may cause a short circuit leading to fire or device failure.

⚠ CAUTION	
❗	Tighten the terminal screws with the specified torque. Insufficient tightening of the terminal screws may cause fire or overheating.
🚫	Do not touch any parts unless instructed to do so in this manual. Failure to observe these precautions may result in burns, because actuator parts reach a high temperature.

## ■ Model Numbers

Model number	Specification						
	Power supply	Control signal	Angular stroke	Operating time for one stroke		Output torque	Remarks
				50 Hz	60 Hz		
MY3000F0200	24 V AC	Nominal 135 Ω feedback potentiometer	160°	69 s	58 s	12.5 N·m	—
MY3000F0400				35 s	29 s	6 N·m	High speed motor type
MY3000E0200		Nominal 135 Ω resistance Input		69 s	58 s	12.5 N·m	—
MY3000G0200				4–20 mA DC	—		—
MY3000G9200	85–264 V AC	2–10 V DC		72 s	72 s	—	—
MY3000V0200	24 V AC			69 s	58 s	—	—
MY3000D0200	—		SPDT floating	—	—	ON/OFF operation	

Note: The auxiliary switch unit is an optional part.

## ● Options

Item	Model number		Specification	
Valve linkage	Q455			
Damper linkage	Q605			
Power transformer	AT72-J1		Primary voltage	100 V AC, 200 V AC, or 220 V AC
			Secondary voltage	23 V AC
			Power frequency	50–60 Hz
Waterproof connector*1	83104346-	003	Applicable wire	Dia. 7–9 mm
Auxiliary switch unit	83174065-	102	Number of auxiliary switches	4
			Max. applied voltage, current	30 V DC, 100 mA*2 (inductive load includes inrush current.)
				250 V AC, 100 mA*2 (inductive load includes inrush current.)
Operation range	SW1 to SW4: Variable from 5 % (fully closed) to 95 % (fully open) Can be changed by setting the dials A to D.			

\*1 Required to maintain IP54.

\*2 If the applied current exceeds 100 mA, please contact Azbil Corporation.

## ■ Specifications

(1/2)

Item	Specification		
Power supply	Model MY3000F0200, Model MY3000F0400, Model MY3000E0200, Model MY3000G0200, Model MY3000V0200, Model MY3000D0200	24 V AC $\pm$ 15 %, 50/60 Hz	
	Model MY3000G9200	100–240 V AC (85–264 V AC) , 50/60 Hz	
Power consumption (apparent power)	Model MY3000F0200, Model MY3000D0200	Operating	Approx. 9 VA
		Stopped	0 VA
	Model MY3000F0400	Operating	Approx. 14 VA
		Stopped	0 VA
	Model MY3000E0200, Model MY3000G0200, Model MY3000V0200	Operating	Approx. 9 VA
		Stopped	4 VA
Model MY3000G9200	Operating	Approx. 14 W	
	Stopped	4 W	
Operating time	Model MY3000F0200, Model MY3000E0200, Model MY3000G0200, Model MY3000V0200, Model MY3000D0200	69 $\pm$ 5 s (50 Hz) , 58 $\pm$ 5 s (60Hz)	
	Model MY3000F0400	35 $\pm$ 3 s (50 Hz) , 29 $\pm$ 3 s (60Hz)	
	Model MY3000G9200	72 $\pm$ 10 s (50/60 Hz)	
Control signal	Nominal 135 $\Omega$ feedback potentiometer	F.B. potentiometer: total resistance = nominal 135 $\Omega$ Max. applied voltage: 5 V DC	
	Nominal 135 $\Omega$ resistance Input		
	4–20 mA DC input	Input impedance: 125 $\Omega$	
	2–10 V DC input	Input impedance: 1 M $\Omega$ or more	
	SPDT	Floating type	
2–10 V DC output signal for valve position (applied for the 4–20 mA DC input and 2–10 V DC Input)	Output voltage range	2 V DC (valve position: 0 %) to 10 V DC (valve position: 100 %)	
	Maximum load resistance	10 k $\Omega$ or more (max. output current: 1 mA)	
Wiring	Screwed on the terminal block (M3.5) , tightening torque 0.8–1.0 N·m Note: Open an appropriate knockout hole (dia. 22) located on both sides of the actuator at the worksite.		
Enclosure protection	IEC IP54 (dust-proof, splash-proof)		
Factory preset position	The shaft is completely turned counterclockwise.		
Major materials	Case	Aluminum alloy diecast	
	Cover	Polycarbonate resin with GF (color: gray)	
	Bracket	Steel plate	
	Chassis	Polycarbonate resin with GF	
Surface finishing	Case	None	
	Yoke	Electro-galvanizing (bright chromate finish)	

Item	Specification		
Operating conditions	Rated operating conditions	Ambient temperature	-20–60 °C
		Ambient humidity	5–95 % RH
	Transport and storage conditions (in packed state)	Ambient temperature	-20–70 °C
		Ambient humidity	5–95 % RH
Installation Location	Indoor use Note: Salt air, corrosive gas, flammable gas, and organic solvent must be avoided.		
	Outdoor use Note: Salt air, corrosive gas, flammable gas, and organic solvent must be avoided. And, use the outdoor cover (optional parts) etc. to avoid direct sunlight.		
Mounting position	Refer to ■ "Installation," ● "Mounting position."		
Manual operation	Available Refer to ■ "Installation," ● "Manual open/close operation."		
Insulation resistance	Between terminals and case	5 MΩ or more at 500 V DC	
Withstand voltage	Between terminals and case	Model MY3000F0200 Model MY3000F0400 Model MY3000E0200 Model MY3000G0200 Model MY3000V0200 Model MY3000D0200	500 V AC for 1 min
		Model MY3000G9200	1500 V AC for 1 min
Weight	Approx. 3 kg		
Accessories*	Hexagon bolt M6x25 (for Model Q605 damper linkage)		

\* The bolt was not packed with the product since the shipment in March 2018 (date code: 1812 or later) .

## ■ Dimensions

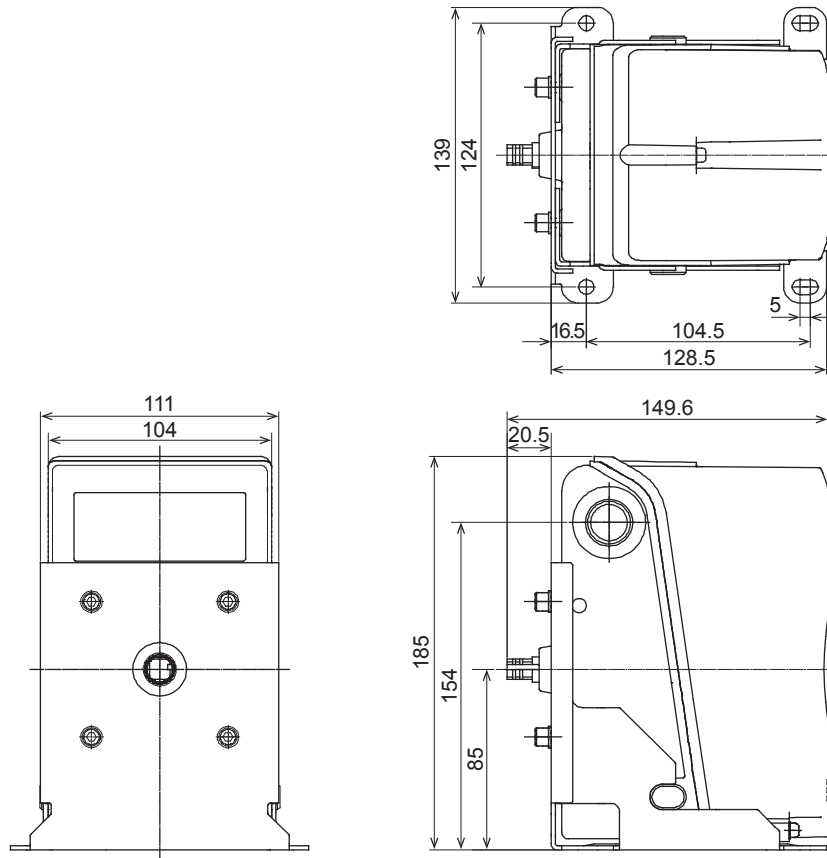


Figure. 1 Dimensions (mm)

## ■ Parts Indication

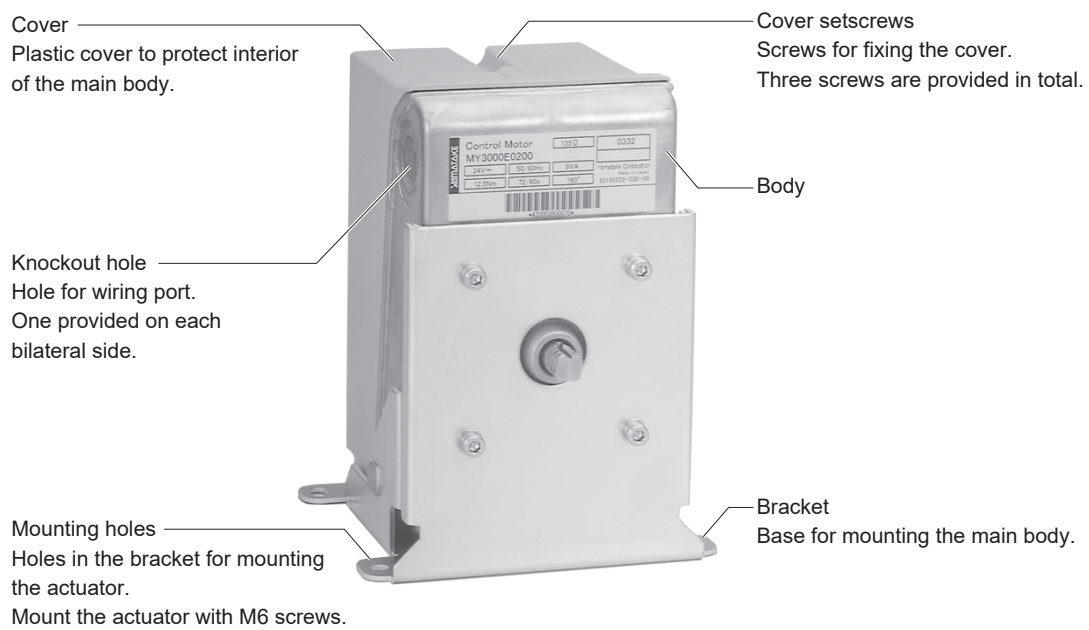


Figure. 2 Parts indication

## ■ Installation

⚠ CAUTION	
❗	Install, wire, and use this product under the conditions specified by this manual. Failure to do so may cause fire or device failure.
❗	Installation and wiring of the actuator must be performed by personnel qualified to do instrumentation and electrical work. Mistakes in installation or wiring may cause fire or electric shock.
⊘	Do not put a load or weight on this product. Doing so may damage the product.

### ● Precautions for installation

Observe the following cautions in order to avoid failure of this product.

- Do not strike or jar this product.
- Do not install this product near a steam coil or pressurized hot-water coil. High-temperature radiant heat may cause failure of the actuator.

In addition, observe the following cautions.

- Install the product in a position allowing easy access for maintenance and inspection. Refer to ■ "Dimensions."
- If the product is installed in a ceiling, make a trapdoor for inspection within 50 cm around the valve.

### ● Mounting position

- The product can be mounted at any angle from upright to sideways (90-degree inclination) based on the output shaft. Do not mount it with the output shaft pointing upward.

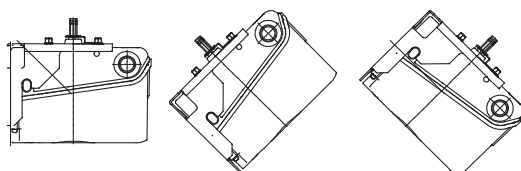


Figure 3 Incorrect mounting position

### ● When using with the control valve

When this product is used with the control valve (Models V5063A, 5064A, V5065A, etc.), use the valve linkage (Models Q455C or Q455D).

To attach the valve linkage, refer to AB-4051, "Valve Linkages Models Q455C, Q455D, Q455F Specifications/Instructions."

### ● When using with the damper

When this product is used with the damper, use the damper linkage (Models Q605A, Q605D, or Q605E).

To assemble the product, damper linkage, and damper, refer to AB-4062, "Damper Linkages Q605A, D and E Specifications/Instructions."

## ■ Wiring

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

⚠ CAUTION	
❗	Provide a circuit protector (e.g., a fuse or circuit breaker) for the power source. Failure to do so may cause a short circuit leading to fire or device failure.
❗	Install, wire, and use this product under the conditions specified by this manual. Failure to do so may cause fire or device failure.
❗	Installation and wiring of the actuator must be performed by personnel qualified to do instrumentation and electrical work. Mistakes in installation or wiring may cause fire or electric shock.
❗	All wiring must comply with applicable codes and ordinances. Otherwise there is a danger of fire.
❗	Use crimp terminals with insulation for connections to the product terminals. Failure to do so may cause a short circuit leading to fire or device failure.
❗	Tighten the terminal screws with the specified torque. Insufficient tightening of the terminal screws may cause fire or overheating.

**● How to maintain IP54 (dust-proof, splash-proof)**

In order to maintain IP54 performance, use a waterproof connector or a water-resistant plica tube when the product is used in high humidity environment or outdoor.

- Close the cover firmly.  
Be careful not to get the packing and cable caught in.
- Apply a waterproofing treatment for the knockout hole.
- For cable connection, use the waterproof connector (optional parts) .
- For conduit connection, use the waterproof plica tubes etc.

**● Wiring method**

- (1) Select a knockout hole according to the direction of conduit or wire outlet, and open the knockout hole. There are 2 knockout holes located on the right and left side. The knockout hole can be easily opened by lightly knocking the hole using a screwdriver.

Refer to Fig. 2, "Parts identification."

**IMPORTANT**

- Do not leave pieces of metal (generated by making the knockout hole) inside the product.

- (2) Unscrew the terminal cover screws (3 pcs) to detach the terminal cover.
- (3) Connect the wires to the terminals by the M3.5 screws.

Note: Correctly connect the wires referring to Fig. 4, "Terminal block," Fig. 11 to Fig. 16, "Terminals Connection," Fig. 17 to Fig. 25, "Wiring Examples" and "Advanced Wiring Examples."

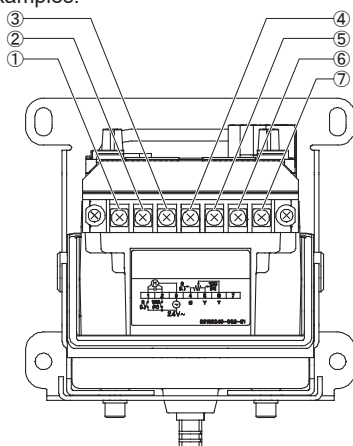


Figure. 4 Terminal block

- (4) Close the cover and attach it with the terminal cover screws.

**■ Auxiliary Switch Unit (Optional)**

**⚠ WARNING**

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

Before setting or engineering work, be sure to turn off the power to the output terminals.  
Failure to do so may cause electric shock.

**⚠ CAUTION**

Do not put a load or weight on this product. Doing so may damage the product.

Do not touch any parts unless instructed to do so in this manual.  
Failure to observe these precautions may result in burns, because actuator parts reach a high temperature.

The auxiliary switch unit is an optional part. Order it as necessary and attach it at the worksite. The auxiliary switch unit (optional parts) contains the following parts.

- Auxiliary switch unit 1
- Screws (M3×6) 2
- Label for wiring 1

**● Attaching the auxiliary switch unit**

**IMPORTANT**

- Break parts A (of the chassis) and B (of the auxiliary chassis) as instructed in the procedure below to remove them. Incorrect order of breaking the parts A and B may damage the printed circuit board.

- (1) Break the part A of the chassis in the direction of the arrow to remove it.

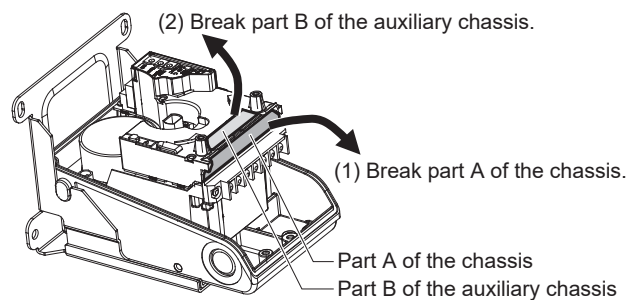


Figure. 5 Parts to be removed

- (2) Break the part B of the auxiliary chassis in the direction of the arrow to remove it.
- (3) Insert the shaft of the auxiliary switch unit into the shaft of the actuator.  
Align the tip of the arrow to the graduation side.



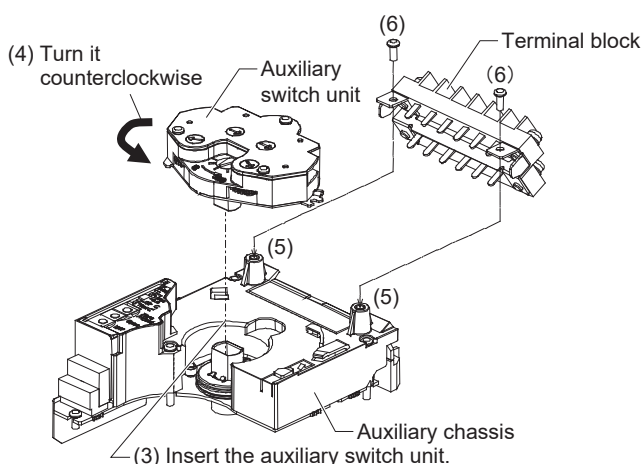


Figure 6 Attaching the auxiliary switch unit

- (4) Turn the auxiliary switch unit counterclockwise until a clicking sound can hear.
- (5) Align the holes on the mounting bracket of the terminal block with the screw holes on the chassis.
- (6) Attach the terminal block with the 2 screws.

### ● Detaching the auxiliary switch unit

- (1) Unscrew the 2 screws.
- (2) Detach the terminal block.  
The mounting bracket is put together with the terminal block.
- (3) While pressing the button, turn the auxiliary switch unit clockwise.
- (4) Lift and detach the auxiliary switch unit.

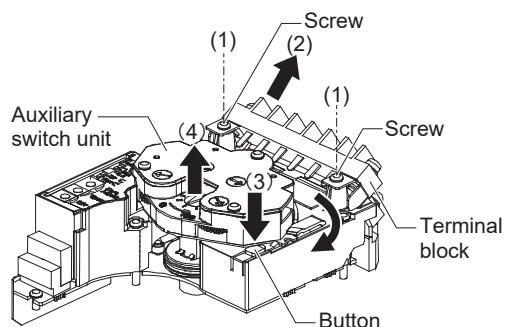


Figure 7 Detaching the auxiliary switch unit

### ● Auxiliary switch settings

Each auxiliary switch A to D has 3 terminals (①, ②, and ③).

- Terminal ① Common
- Terminal ② N/O (Normally Open)
- Terminal ③ N/C (Normally Closed)

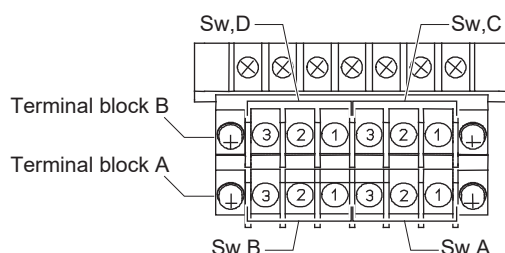


Figure 8 Terminal block on the auxiliary switch unit

The auxiliary switches operate at the ► mark on the setting dials (A, B, C, D).

After setting the auxiliary switches, check that they operate as intended.

The operation range of the auxiliary switches is as follows:

Setting range: valve position from 5 % to 95 %

Repeatability of operation range: less than  $\pm 3\%$

Fig.9, “Auxiliary switches setting example” shows a setting example that terminals between 1 and 2 is ON, between 1 and 3 is OFF when the valve position reaches 50 % while opening the valve.

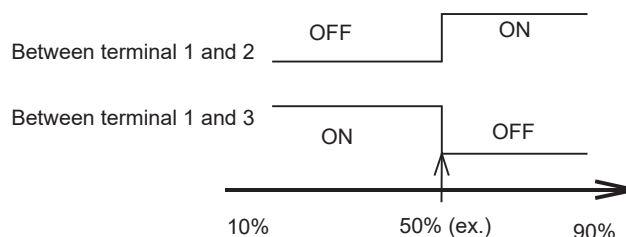


Figure 9 Auxiliary switches setting example

The setting method of the valve position for activating or inactivating the switches is shown below taking the 50 % opening as an example.

- (1) Electrically set the actuator’s valve position to the value with which the switches are activated or inactivated.
- (2) Set the setting dials to the position shown by “►” using a flathead screwdriver (recommended).
- (3) Operate the actuator close to the set valve position and check that the auxiliary switches are activated or inactivated as intended.

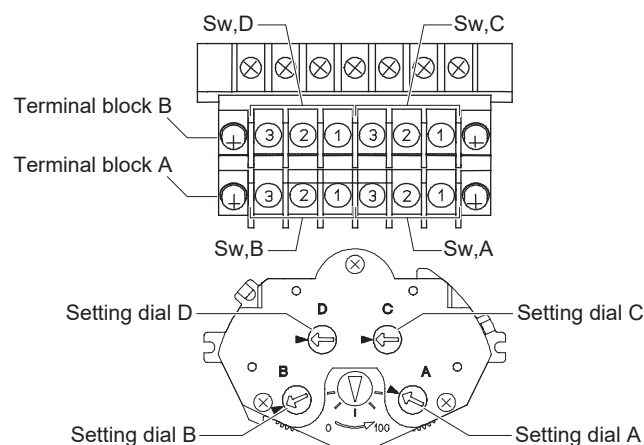


Figure 10 Example for setting the auxiliary switches to 50 %

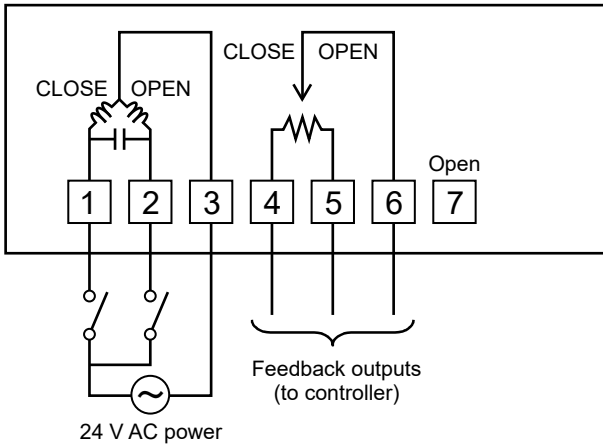
**⚠ WARNING**

After installation or setting, be sure to reattach the cover.  
Failure to do so may result in electric shock.

## ■ Terminals Connection

### ● Nominal 135 Ω feedback potentiometer

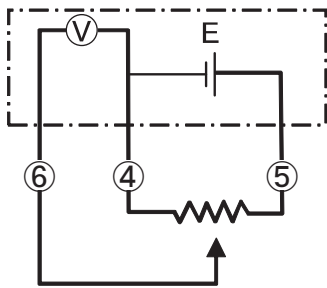
(Model MY3000F0200, Model MY3000F0400)



Note: The controller that reads the voltage between terminals 4 and 6 as a feedback signal is recommended.

Figure. 11

### Recommended controller circuit



Note: If a third-party's controller is used combining with the product, the controller in above is to be used.

- ⋯ : Recommended controller circuit
- E : Voltage supplied by the controller
- V : Voltage between 4 and 6.

Figure. 12

### ● Nominal 135 Ω resistance Input

(Model MY3000E0200)

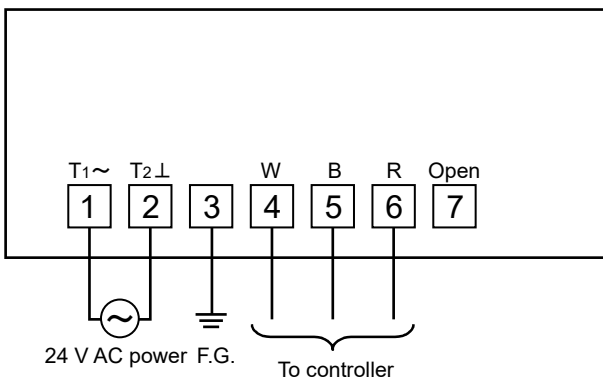
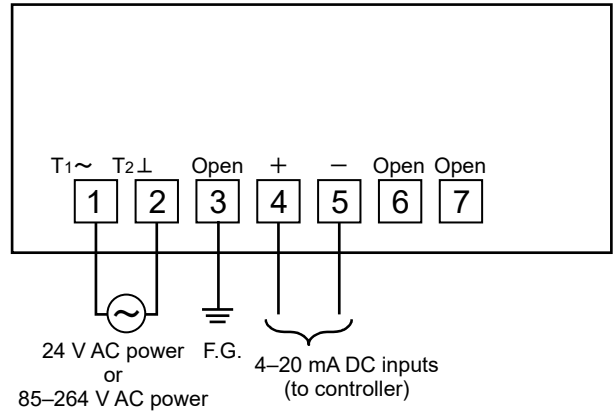


Figure. 13

### ● 4–20 mA DC input

(Model MY3000G0200, Model MY3000G9200)

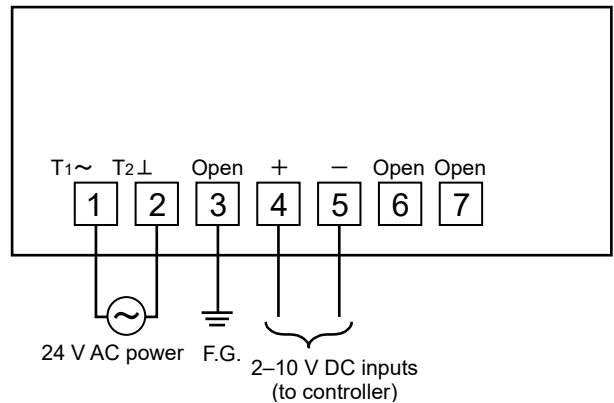


Note: The terminal 2 (power) and terminal 5 (4–20 mA DC input) are internally connected.

Figure. 14

### ● 2–10 V DC input

(Model MY3000V0200)



Note: The terminal 2 (power) and terminal 5 (2–10 V DC input) are internally connected.

When connecting the product to the common system instrumentation, externally connect the terminal 2 (power) and terminal 5 (2–10 V DC input).

Figure. 15

### ● Floating

(Model MY3000D0200)

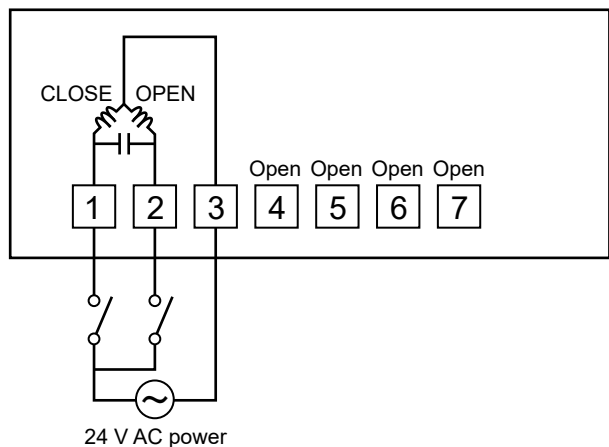


Figure. 16

## ■ Wiring Examples

### ● Nominal 135 Ω feedback potentiometer

(Model MY3000F0200, Model MY3000F0400)

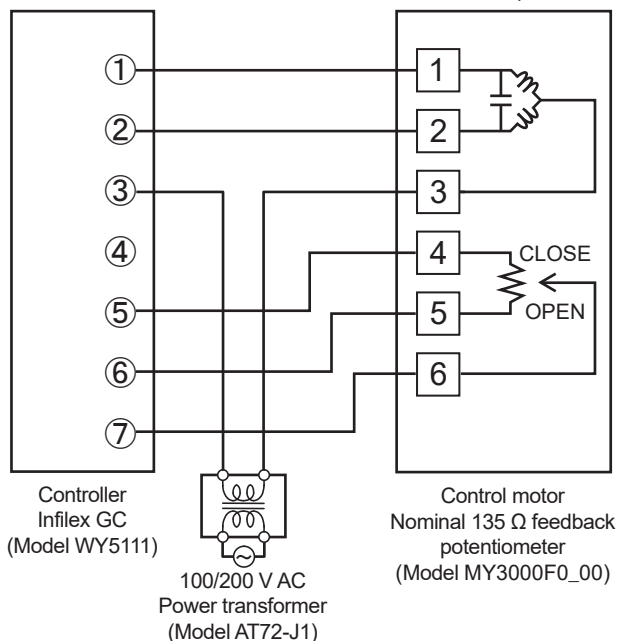
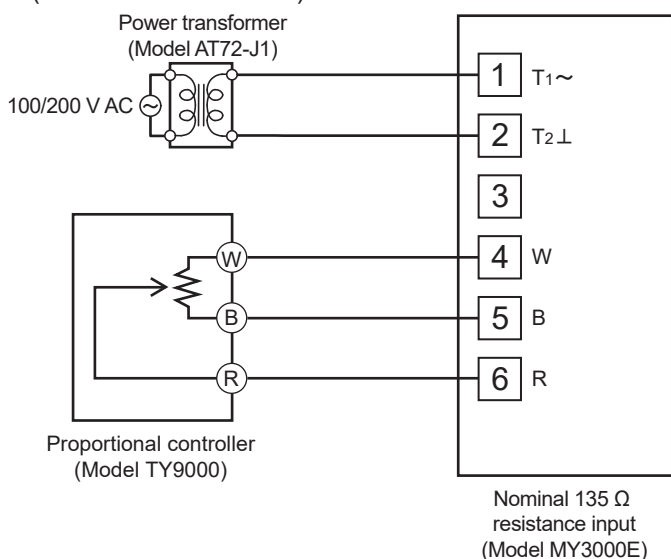


Figure. 17 Connection to Inflex GC

### ● Nominal 135 Ω resistance Input

(Model MY3000E0200)

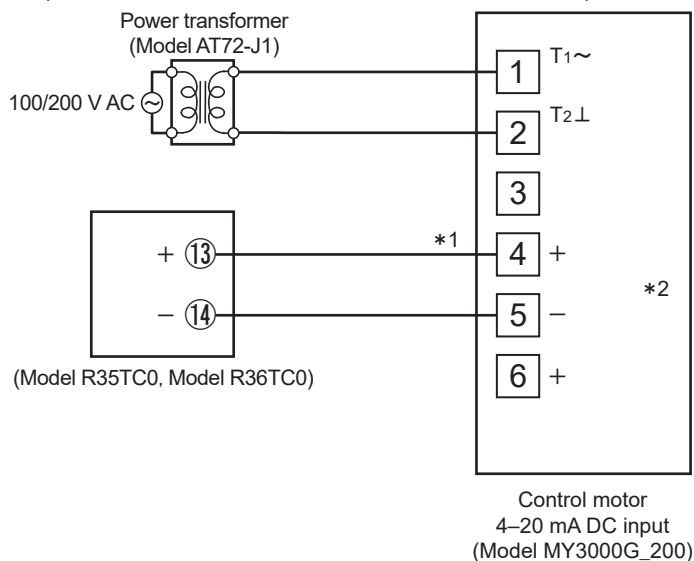


Note: To reversely drive the motor, replace the wiring to the terminal "B" with the wiring to the terminal "W" on either the motor side or the controller side.

Figure. 18 Connection to Neostat

### ● 4–20 mA DC input

(Model MY3000G0200, Model MY3000G9200)



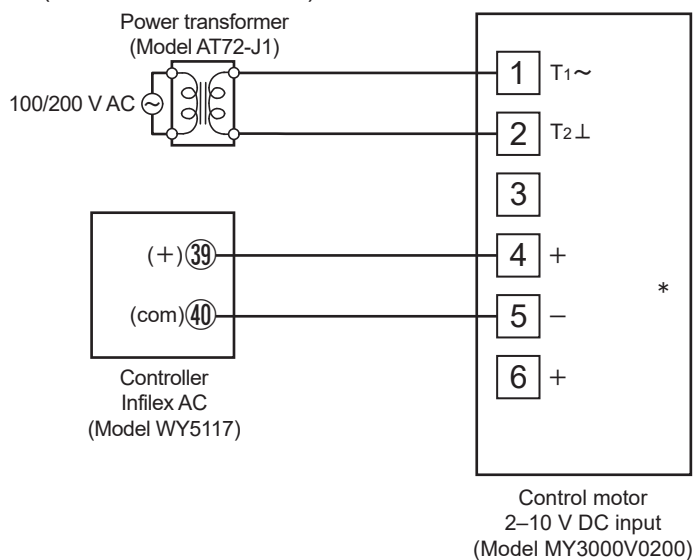
\*1 Input impedance of 4–20 mA DC input of this product is 50 Ω ±5 %.  
The 4–20 mA DC input is isolated.

\*2 Terminals 2 and 5 are not internally connected.

Figure. 19 Connection to R-series

### ● 2–10 V DC input

(Model MY3000V0200)



Note: Terminals 2 and 5 are not internally connected.  
Input impedance of the 2–10 V DC input is 1 MΩ or more.

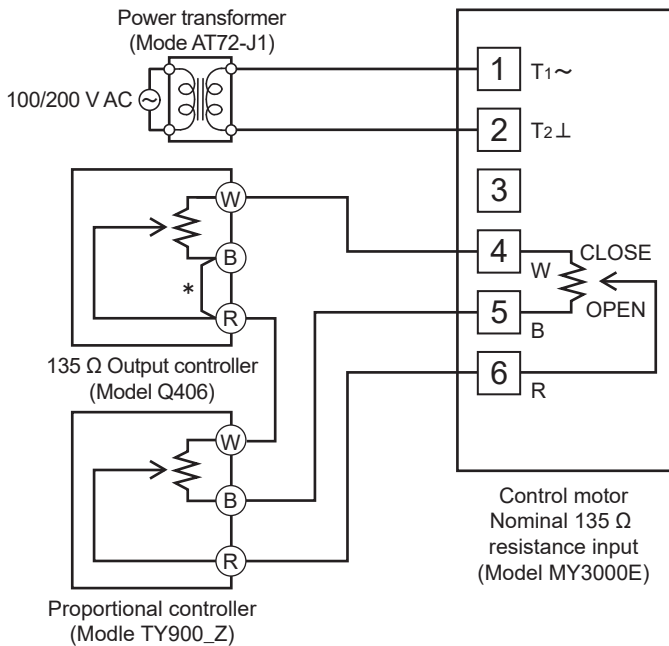
Figure. 20 Connection to Inflex AC

## Advanced Wiring Examples

### Nominal 135 Ω resistance Input

(Model MY3000E0200)

#### Minimum opening setting



In addition to the proportional controller, by adding the setting device of 135 Ω output, the minimum opening of this product can be set.

However, if this product is used in combination with the mixing type three-way valve (Model V5065A), it is not possible to set the minimum opening by changing the connections.

Following the above wiring, if the product is installed for a coil application, the minimum opening can be set by connecting the port A to the bypass side and the port B to the coil side.

By specifying the value, the minimum opening can be fixed from 0 % to 100 %.

\* Connect between (R) and (B) with a jumper.

Note: In an abnormal condition (such as disconnection in the actuator, an abnormal input signal, failure of the feedback potentiometer due to its product service life), the minimum opening position cannot be maintained. Avoid instrumentation that may cause secondary damage in case of abnormality.

Figure. 21

#### Using relay, interlock

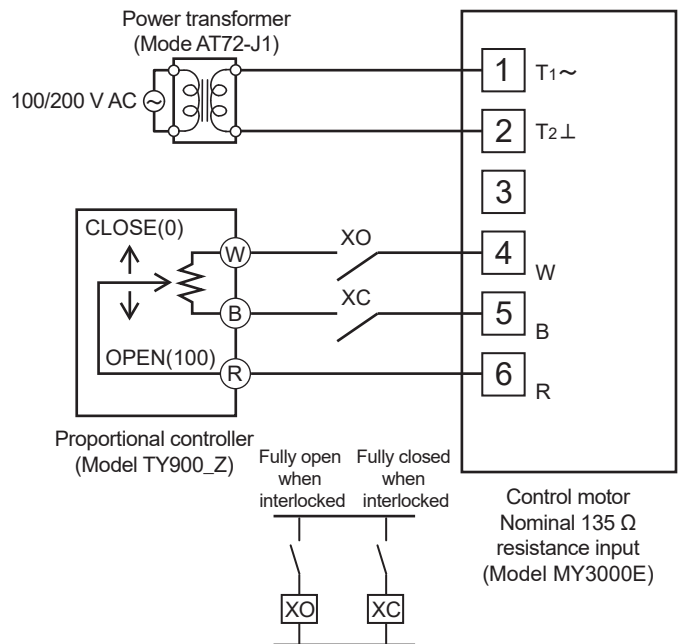
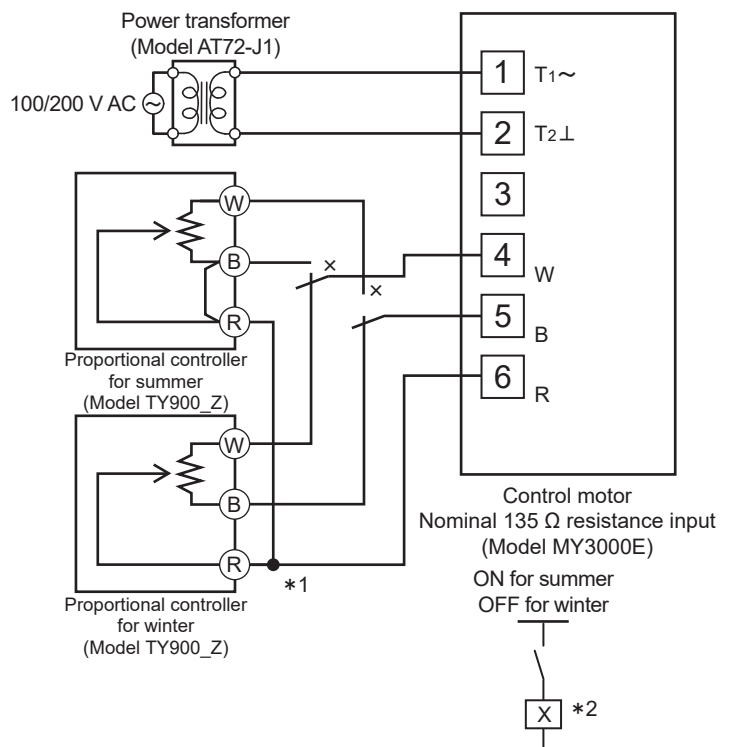


Figure. 22

#### Summer-winter changeover



\*1 Directly wire between (R) and (R).

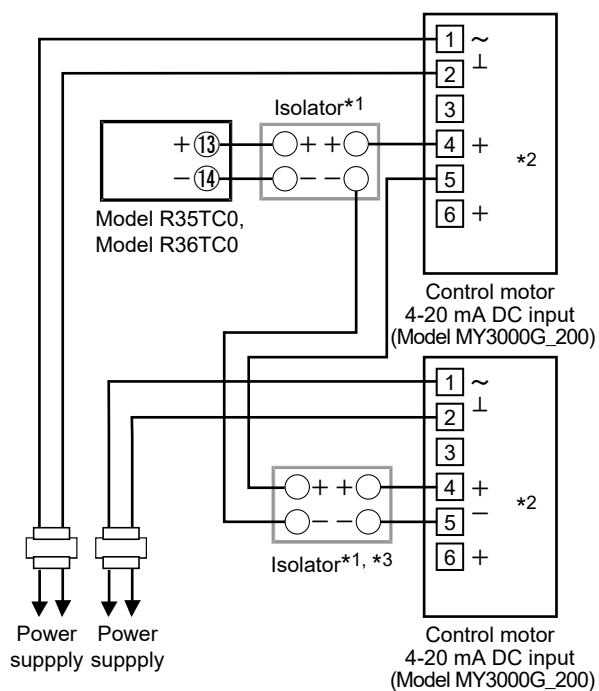
\*2 The current among W, B, and R is 5 mA or more. A relay equivalent to Model HH54P of Fuji Electric Co. can be used. Minimum load of the relay contact: 10 V, 1 mA or less. Maximum load of the relay contact: 20 V, 20 mA or less.

Figure. 23

● **4–20 mA DC input**

(Model MY3000G0200, Model MY3000G9200)

**Input signals are shared**



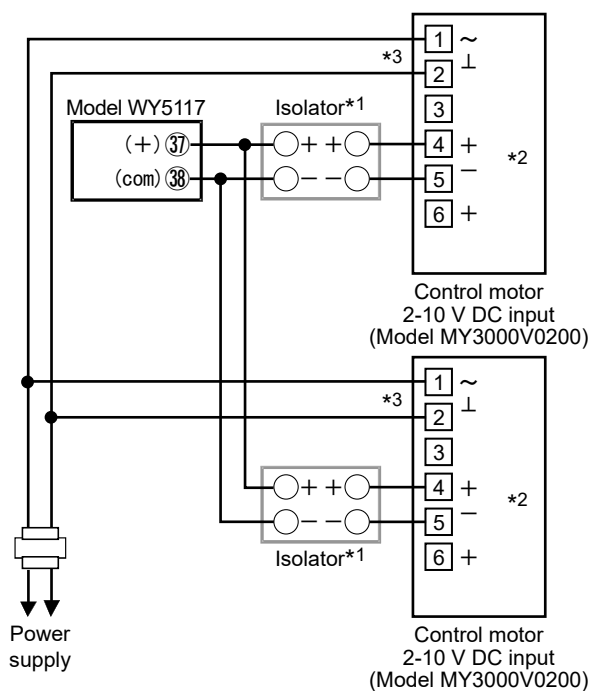
- \*1 Provide an isolator for the controller that is not internally isolated.
- \*2 Terminals 2 and 5 are not internally connected.
- \*3 Do not implement a daisy chain wiring passing through this product's power terminals.

Figure. 24

● **2–10 V DC input**

(Model MY3000V0200)

**Input signals and power are shared**



- \*1 Provide an isolator for the controller that is not internally isolated.
- \*2 Terminals 2 and 5 are not internally connected.
- \*3 Do not implement a daisy chain wiring passing through this product's power terminals.

Figure. 25

## ■ Maintenance

⚠ WARNING	
❗	Before doing maintenance, be sure to turn off the power to this product. Failure to do so may result in electric shock or device failure.
❗	After maintenance, be sure to reattach the terminal cover. Failure to do so may result in electric shock.

⚠ CAUTION	
⊘	Do not put a load or weight on this product. Doing so may damage the product.
⊘	Do not touch any parts unless instructed to do so in this manual. Failure to observe these precautions may result in burns, because actuator parts reach a high temperature.

- If the product is not operated for a long period, execute valve open and close operations once a month or so.
- Execute maintenance according to Table 1.
- Once every six months or so, visually check that the product operates smoothly.  
if a trouble occurs as described in Table 2, take appropriate measures according to the symptom. Although the measures are taken, if the trouble cannot be recovered, please contact Azbil Corporation.

Table 1 Inspection items and inspection method

Item	Inspection cycle	Inspection method
Visual check	6 months	<ul style="list-style-type: none"> <li>• Loose bolts</li> <li>• Damages on the product.</li> </ul>
Operation status	6 months	<ul style="list-style-type: none"> <li>• Check that the valve is smoothly opened or closed.</li> <li>• Check that no abnormal sound or vibration is observed.</li> </ul>
Regular inspection	Whenever necessary	<ul style="list-style-type: none"> <li>• Check that the valve is smoothly opened or closed.</li> <li>• Check that no abnormal sound or vibration is observed.</li> <li>• Check that there is no hunting observed with.</li> </ul>

Table 2 Troubleshooting

Abnormal phenomenon	Where to inspect	Measure
The valve is not smoothly opened or closed. The valve stops halfway. The valve does not operate.	Check that the power line and the input signal are correctly fed. Loose terminals Check that wires are firmly connected, no disconnected wire.	Check the power supply voltage and the controller. Retighten the terminals. Check the wirings.
The auxiliary switches do not operate.	Check the conditions of the auxiliary switch cam. Loose terminals Check that wires are firmly connected, no disconnected wires are observed.	Do settings again. Retighten the terminals. Check the wirings.
The control sensitivity is deteriorating. The torque is decreasing.	Check that wires are firmly connected, no disconnected wires are observed. Loose terminals Check the supplied voltage.	Check the wirings. Retighten the terminals. Adjust the supplied voltage. (Excluding the 85–264 voltage type)

**■ Disposal**

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

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