

ACTIVAL™

Electro-Mechanical Actuator for Control Ball Valve

Model MY53X0AX000

General

Model MY53X0A actuator is designed specifically for Models VY5302 two-way and VY5303 three-way proportional control ball valves, which control the chilled/hot water in heating, ventilation and air conditioning (HVAC) applications.

ACTIVAL Model MY53X0AX000 has a reversible synchronous motor, which operates at a low voltage of 24 V AC.

6 kinds of control signals are available to operate the ACTIVAL ball valves:

- Floating (3-position) with nominal 135 Ω feedback potentiometer
- Nominal 135 Ω resistance input
- 4-20 mA DC input
- 2-10 V DC input
- 0-10 V DC input
- Floating (3-position)

These control signals provide proportional control in combination with an electric/electronic proportional controller or a DDC (direct digital control) controller.

Features

- Compact and lightweight:
The ACTIVAL can be installed in a limited space.
- Easy and simple mounting onto Models VY5302 and VY5303 valves:
The actuator can be mounted without tools, and no adjustment is required (one-touch lever-locking mechanism).
- IEC IP54:
Dust-proof and splash-proof enclosure enables to be installed in an AHU (air handling unit).
- Easy manual override:
The actuator operation can be switched to manual from electric. It besides can be manually operated without tools.
- Highly-visible position indicator:
Valve position is easily recognized with the indicator/manual lever.
- Energy-saving:
No power is consumed in fully open/closed position of the valve because of the limit switch mechanism. (Only for Model MY5310A.)
- Built-in auxiliary switch (except Model MY5370A):
The switch is adjustable between 20-80% position.
- 2-10 V DC output (for position feedback) available with 4-20 mA DC input type, 2-10 V DC input type, and 0-10 V DC input type.
- 90° stroke in 60 seconds (50 Hz) / 50 seconds (60 Hz) operating time.
- ACTIVAL Model MY53X0A conforms to all the standards related to CE Marking.



Safety Instructions

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

Usage Restrictions

This product is targeted for general air conditioning. Do not use this product in a situation where human life may be affected. If this product is used in a clean room or a place where reliability or control accuracy is particularly required, please contact Azbil Corporation's sales representative. Azbil Corporation will not bear any responsibility for the results produced by the operators.

CAUTION



- DANGER: To prevent the risk of severe or fatal electrical shock, always disconnect power before performing any wiring.

CAUTION



- Installation must be performed by qualified personnel in accordance with all applicable safety standards.
- This product must be operated within its operating ranges specified in this manual. Failure to comply will cause equipment damages.
- Installation must be carried out under the operating conditions specified in this manual to prevent equipment damages.
- For storage, do not stack too many container boxes in which products are packed.
- To combine this product with the valve Model VY5302 or VY5303, refer to Specifications/Instructions manual of the valve.
- Do not install the product in a location close to a steam coil or a hot-water coil. High temperatures radiation may result in an actuator malfunction.
- Avoid application that keeps equipment operating cycle excessively frequent so as not to shorten the equipment operating life.
- When this product is used with a controller of another manufacturer, contact Azbil Corporation sales representatives.
- All wiring must comply with local codes of indoor wiring and electric installation rules.
- Do not put heavy load on the actuator.
- Do not disassemble the product at any time except when removing the cover to wire. Equipment damage may result.
- Do not incinerate this product for waste disposal.
- Do not put your fingers inside the yoke. Your fingers will get pinched and injured by the indicator/manual lever.
- Make sure all the wires are tightly connected to prevent heat generation and equipment damages.
- Dispose of this product as industrial waste in accordance with the local regulations.

Trademark information:

ACTIVAL is a trademark or registered trademark of Azbil Corporation in Japan or in other countries.

CE Marking Conformity

This product complies with the following Electromagnetic Compatibility (EMC).

EMC : EN61000-6-2, EN55011 Class A

Dimensions and Parts Identification

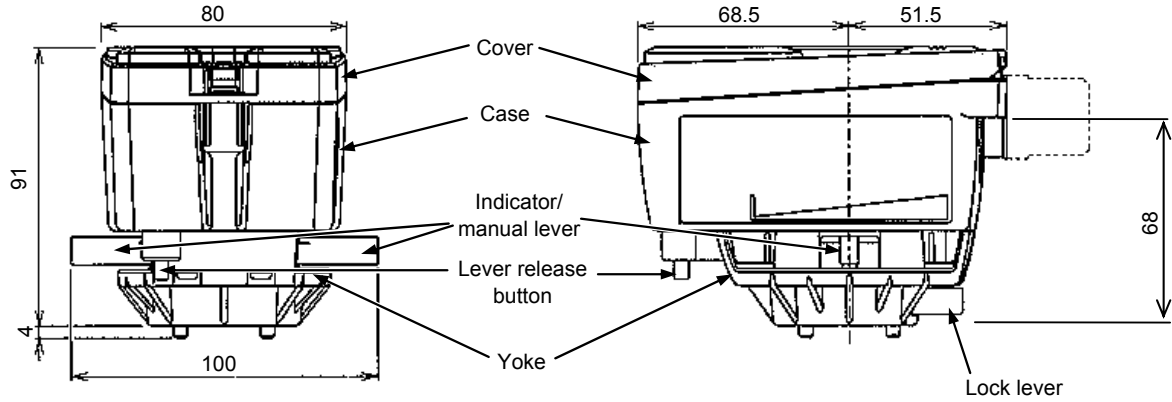


Figure 1. Dimensions and parts identification (mm)

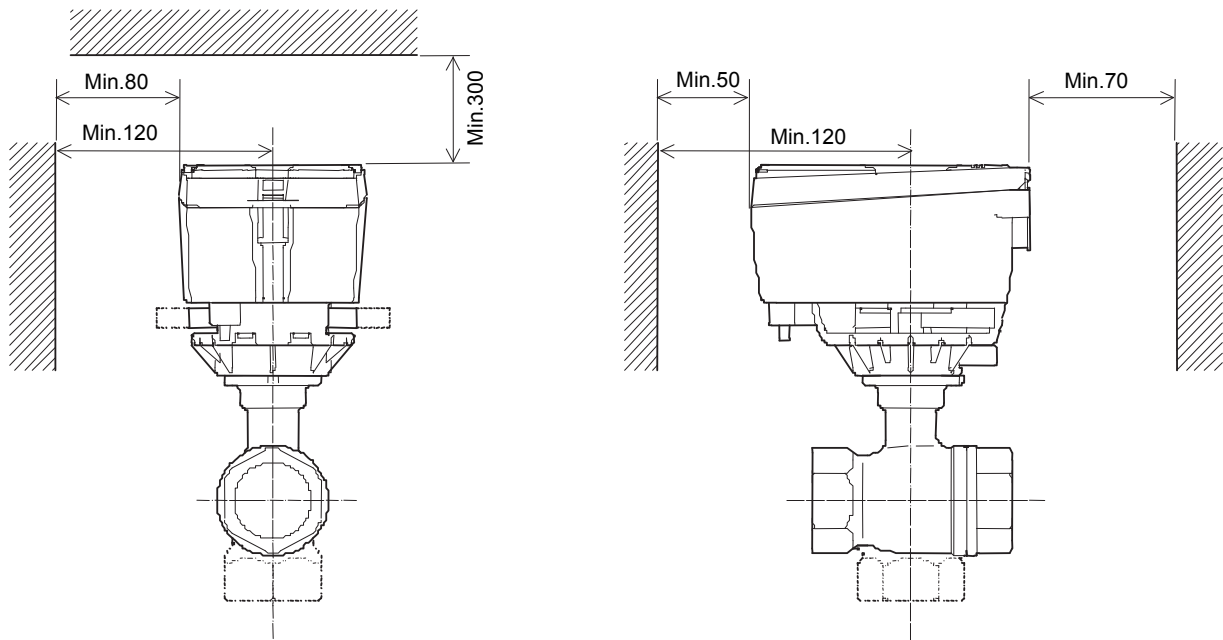


Figure 2. Mounting dimensions with clearance (mm)

Installation

⚠ CAUTION	
!	<ul style="list-style-type: none"> Install Model MY53X0A actuator indoors. Avoid installation in an atmosphere containing salt damage, corrosive gas and organic solvent. The actuator ambient temperature is rated between -20 °C to 50 °C.

Position for shipment

The actuator shaft is at 100% (in fully open position) for shipment. Make sure the indicator/manual lever is positioned at “100” when the actuator is unpacked.

(See Fig. 3)

Mounting on the valve (Model VY5302/VY5303)

IMPORTANT:	
The actuator can be horizontally rotated every 90 degrees to fit into the valve mounting position (4 mounting positions). Make sure the positions of the actuator and the valve are as follows. (see Fig. 3.)	
<ul style="list-style-type: none"> Actuator: The indicator/manual lever points at 100 (fully open). Valve: An arrow on the top of the valve stem points at 100. 	
Align the hole on the side of the valve stem with the tip at the valve flange. (See “a” in Fig. 3.)	

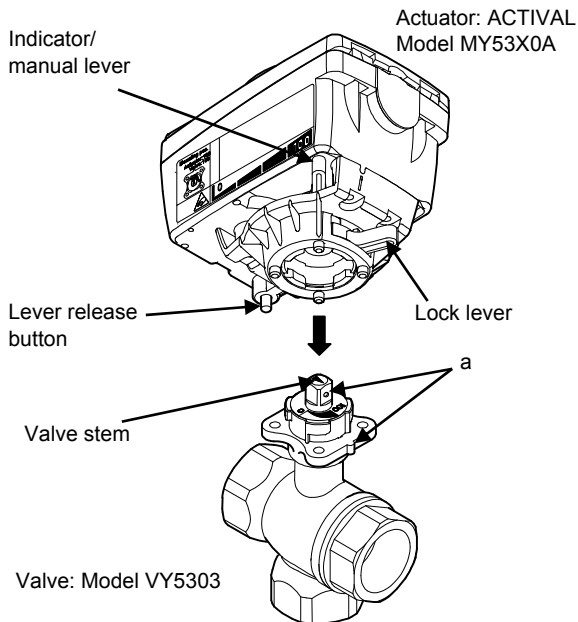
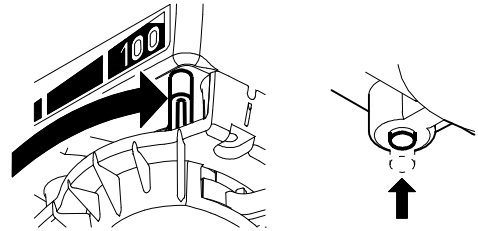
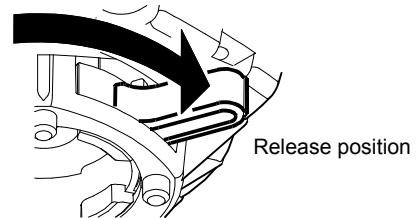


Figure 3. Mounting Model MY53X0A actuator on Model VY5303 valve

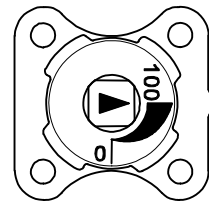
- 1) Adjust the indicator/manual lever to “100” with the lever release button pushed in.



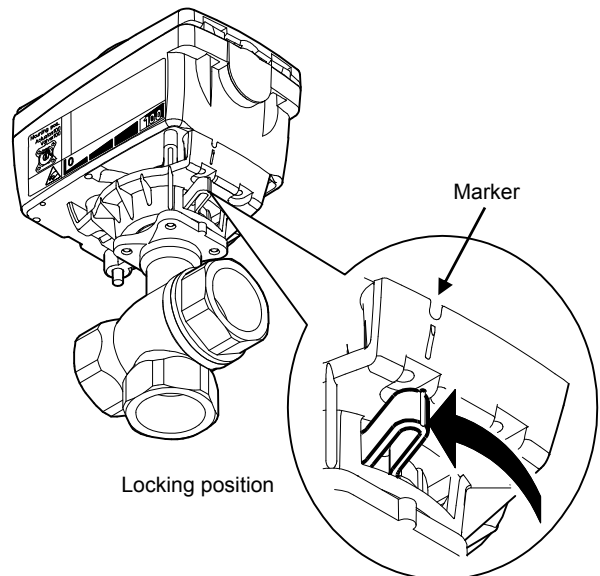
- 2) Move the lock lever to the right-end.



- 3) Adjust the valve stem to “100”.



- 4) Mount Model MY53X0A onto the flange of the valve (Model VY5302/VY5303). Insert the four pins into the four holes on the valve.
- 5) Move the lock lever to the left-end (marked with the marker).



⚠ CAUTION	
!	<ul style="list-style-type: none"> Although Model MY53X0A actuator can be used in a high humidity environment (max. 95 %RH), do not immerse it in water.

Manual Override

⚠ CAUTION	
!	• Before manually opening or closing the ACTIVAL, be sure to disconnect it from the power supply (24 V AC). If being manually opened or closed with the power applied, the ACTIVAL may be damaged.
!	• Do not put your fingers between the main unit and the indicator/manual lever to prevent your fingers from being pinched and injured.

As shown in the procedures 1) and 2) of the section “Mounting on the valve”, turn the indicator/manual lever while pushing the lever release button.

Wiring

⚠ CAUTION	
!	• Always disconnect the power source and product power supply before performing any wiring to prevent electrical shock or equipment damage.
!	• Do not apply any voltage other than the specified (24 V AC). Motor or printed circuit board (PCB) may burn out.
!	• For correct wiring of 0-10 V DC input, 2-10 V DC input, and 4-20 mA input, refer to Fig. 7 and make sure the polarity of power supply and 2-10 V DC output. Incorrect wiring may result in PCB burnout.
!	• Make sure that the cover is always closed except during wiring work.
!	• All wiring must be performed by qualified personnel in accordance with all applicable safety standards.

Cable replacement

To place the cable, connect the new cable as follows:

- 1) Open the cover by pressing the area where Fig. 4 shows.

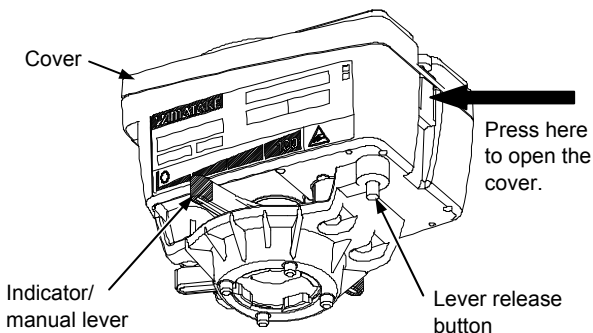


Figure 4. Cover removal

- 2) Let the lead wires go through the wiring conduit. (See Fig. 5) Connect the lead wires to the corresponding terminals while pushing clamp buttons.

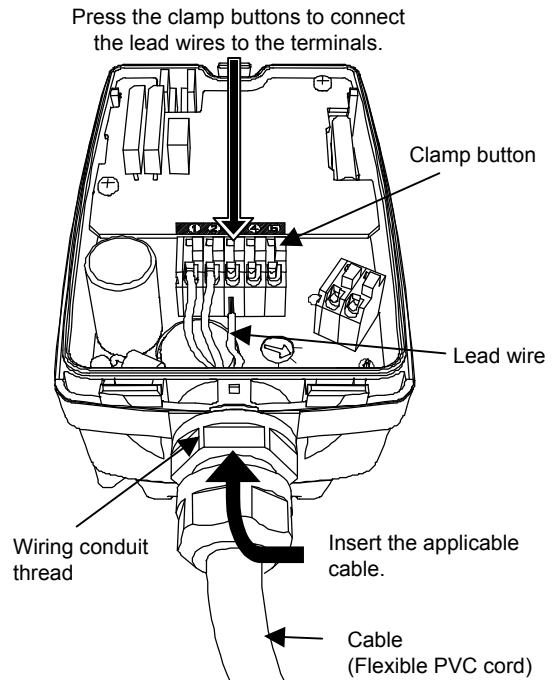


Figure 5. Lead wire connection

The strip length of the lead wires are 8 to 11 mm.

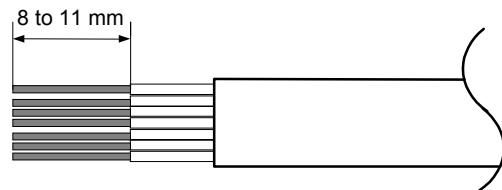


Figure 6. Strip length of the lead wires

- 3) After wiring, pull each lead wire lightly to check that each lead wire will not come off from the terminals.

For splash-proof enclosure...

- 1) Be sure to completely close the cover.
- 2) Waterproof the conduit hole with water-proof cable gland.

Recommended water-proof cable gland:

Part No. 83104346-012 (for $\phi 6$ mm to $\phi 8$ mm cable)

Part No. 83104346-013 (for $\phi 7$ mm to $\phi 9$ mm cable)

Part No. 83104346-014 (for $\phi 9$ mm to $\phi 11$ mm cable)

Adjusting the Auxiliary Switch

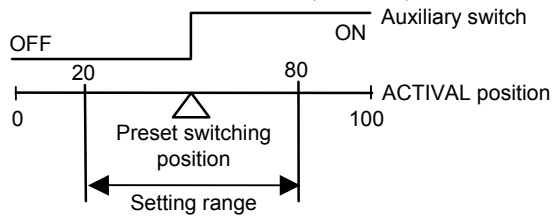
Model MY5310A1000 has one built-in auxiliary switch connected to the terminals 7 and 8.

Models MY5320A1000, MY5330A1000, MY5350A1000, and MY5340A1000 have one built-in auxiliary switch connected to the terminals 6 and 7.

When the ACTIVAL is in open operation from 0 % position, the auxiliary switch is turned on (the terminals 7 and 8 or 6 and 7 are electrically connected) at the preset position.

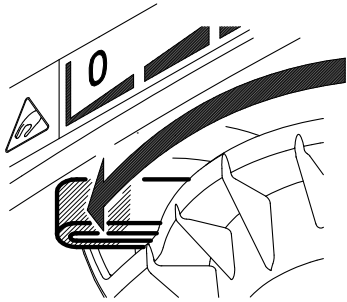
Terminals 7 and 8 for Model MY5310A.

Terminals 6 and 7 for Models MY5320A, MY5330A, and MY5380A.

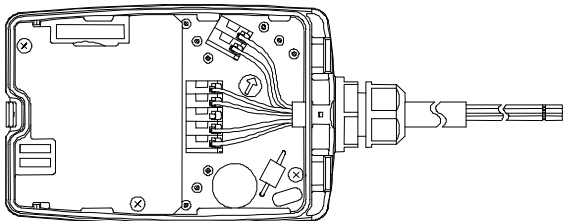


Setting procedure

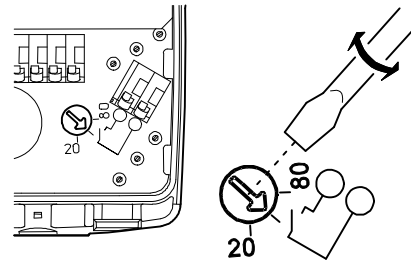
- 1) Disconnect the power supply. Manually turn the indicator/manual lever to "0" with the lever release button pushed in.



- 2) Remove the cover.

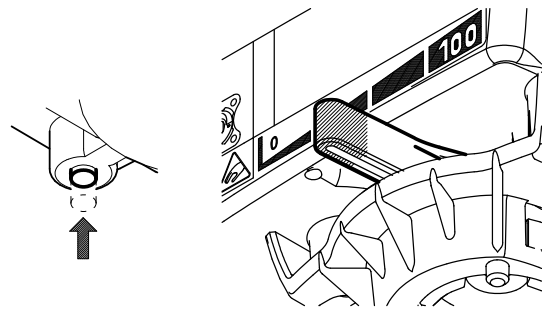


- 3) Set the switch adjustment dial to the desired position with a slotted screwdriver. (Adjustable between 20 and 80%)

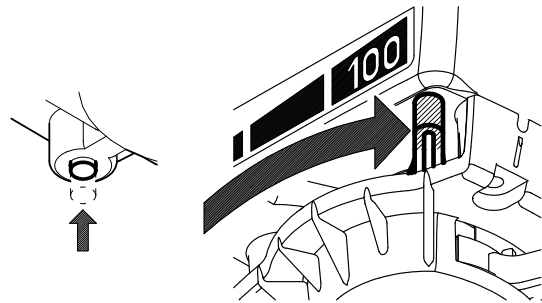


(50 % setting example)

- 4) Turn the indicator/manual lever to the preset position while pushing the lever release button. Check that the switch is turned on. (Make contact) If switch is not turned on, finely adjust the adjustment dial.



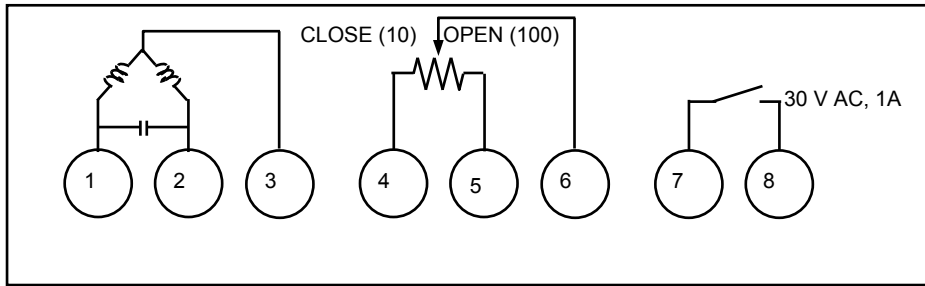
- 5) Turn the indicator/manual lever to 100 %.



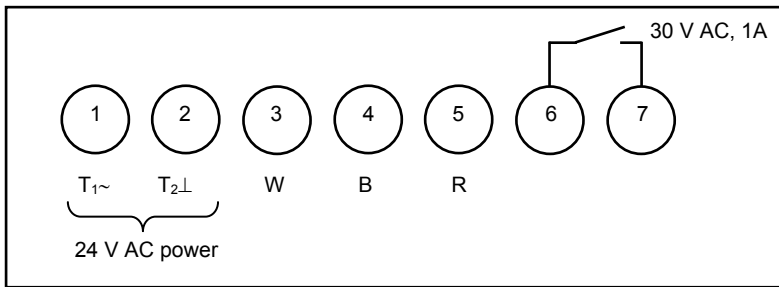
- 6) Be sure to put back the cover.

Wiring Terminals

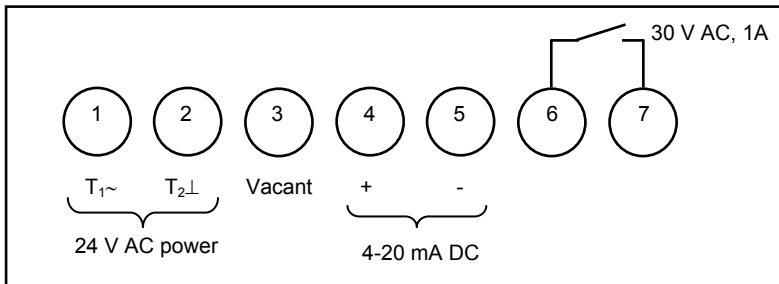
Model MY5310A1000 (Nominal 135 Ω feedback potentiometer, with auxiliary switch)



Model MY5320A1000 (Nominal 135 Ω resistance input, with auxiliary switch)



Model MY5330A1000 (4-20 mA DC input, with auxiliary switch)



Model MY5330A2000 (4-20 mA DC input, with 2-10 V DC output)

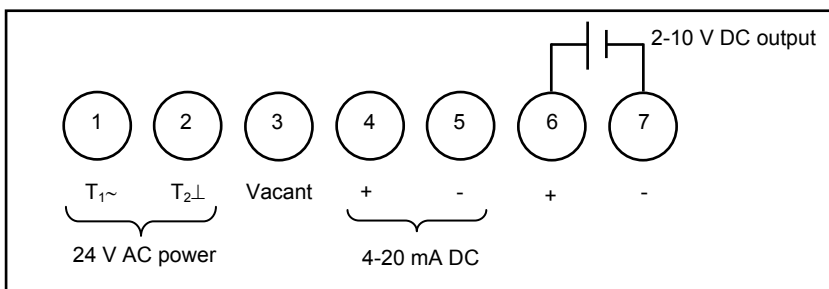
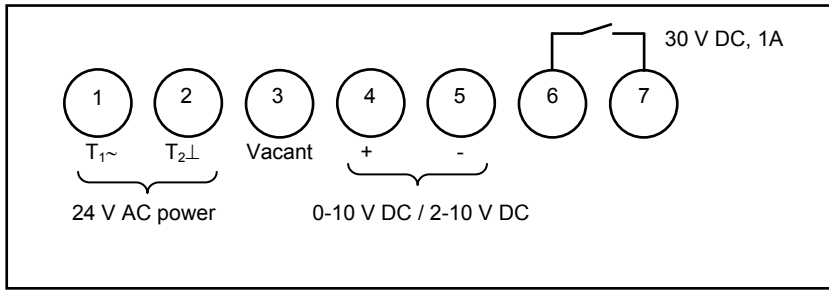
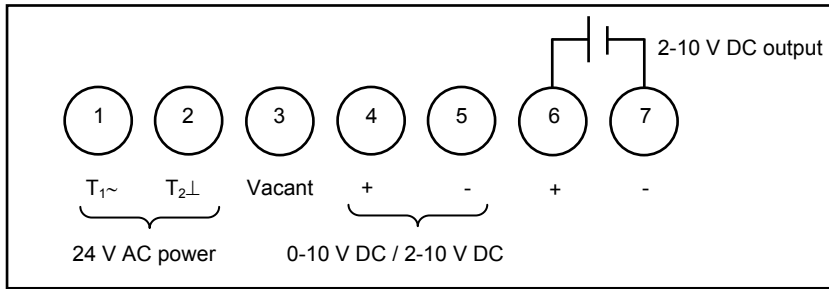


Figure 7-1. Wiring terminal diagrams

Model MY5340A1000 / MY5350A1000 (2-10 V DC / 0-10 V DC input, with auxiliary switch)



Model MY5340A2000 / MY5350A2000 (2-10 V DC / 0-10 V DC input, with 2-10 V DC output)



Model MY5370A0000 (Floating (3-position), with auxiliary switch)

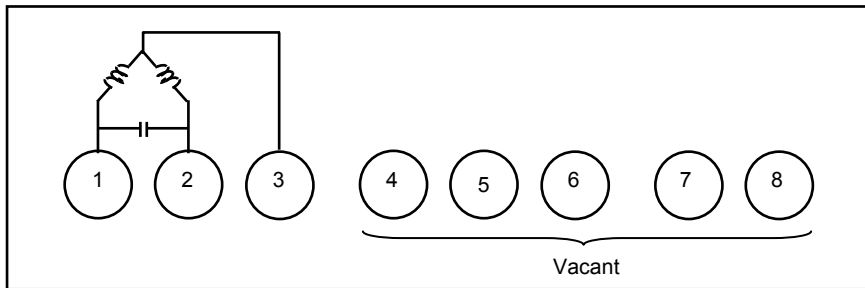
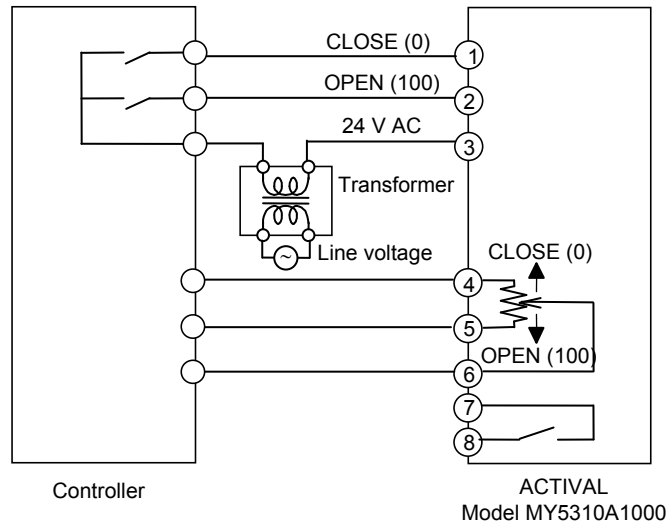


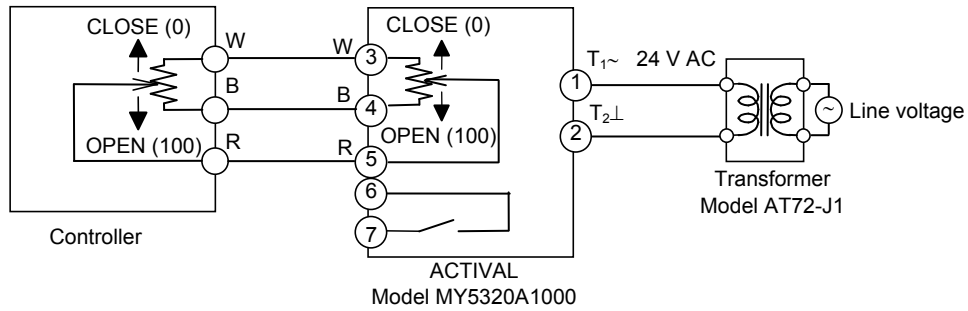
Figure 7-2. Wiring terminal diagrams

Connection Examples

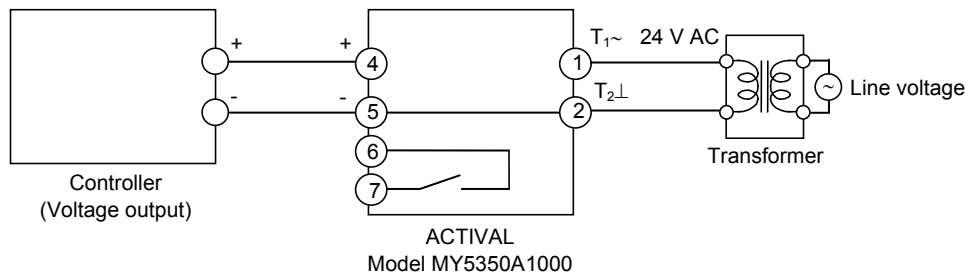
- Model MY5310A1000: Floating (3-position) with nominal 135 Ω feedback potentiometer



- Model MY5320A1000: Nominal 135 Ω resistance input

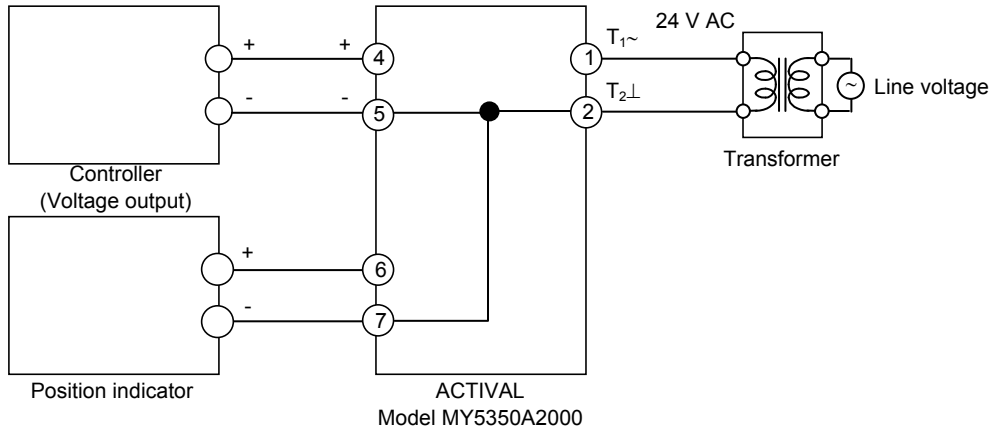


- Model MY5350A1000: 0-10 V DC input with auxiliary switch



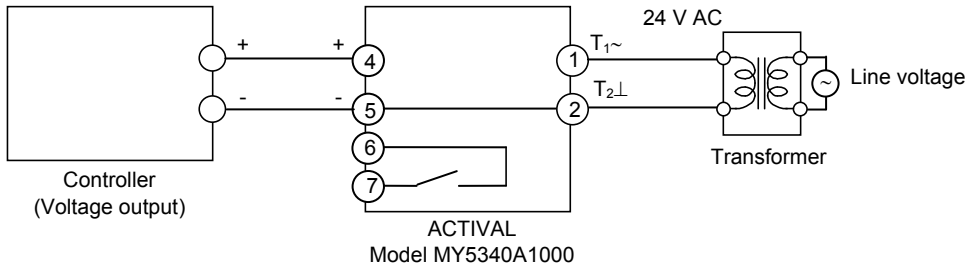
Note: Terminals 2 and 5 are connected inside the actuator.

- Model MY5350A2000: 0-10 V DC input with 2-10 V DC output



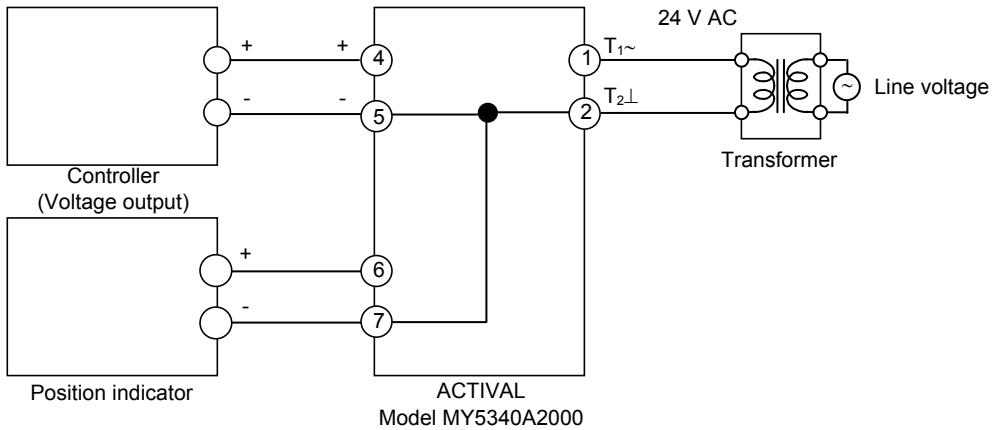
Note: Terminals 2, 5 and 7 are not connected inside the actuator.

- Model MY5340A1000: 2-10 V DC input with auxiliary switch



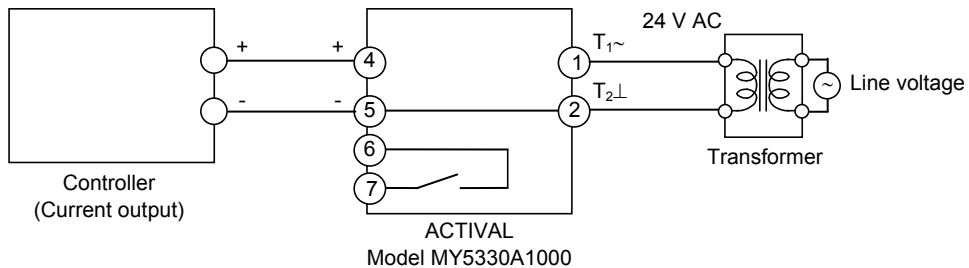
Note: Terminals 2 and 5 are connected inside the actuator.

- Model MY5340A2000: 2-10 V DC input with 2-10 V DC output



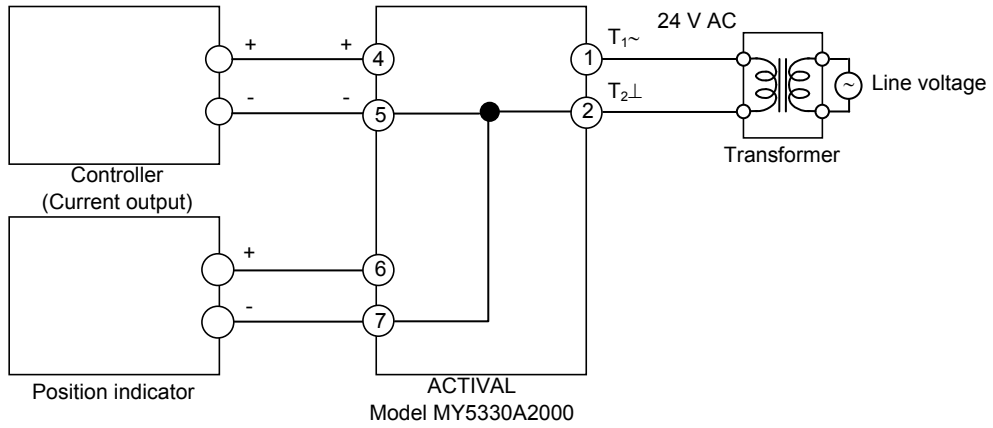
Note: Terminals 2, 5 and 7 are connected inside the actuator.

- Model MY5330A1000: 4-20 mA DC input with auxiliary switch



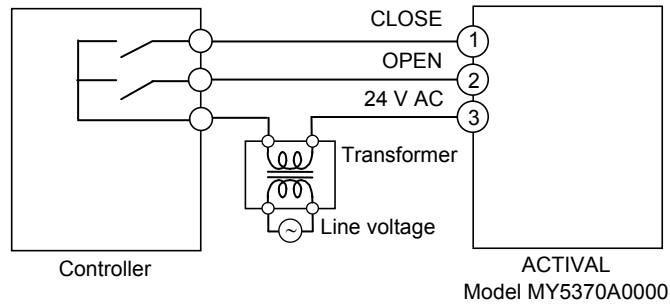
Note: Terminals 2 and 5 are connected inside the actuator.

- Model MY5330A2000: 4-20 mA DC input with 2-10 V DC output



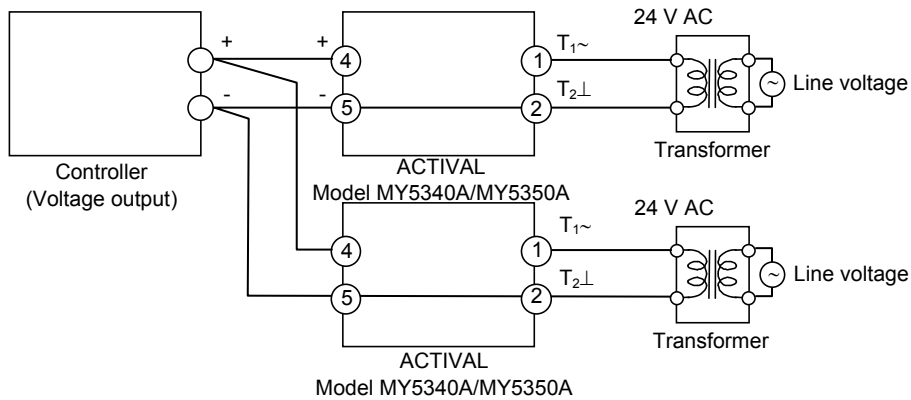
Note: Terminals 2, 5 and 7 are connected inside the actuator.

- Model MY5370A0000: Floating (3-position)



Application

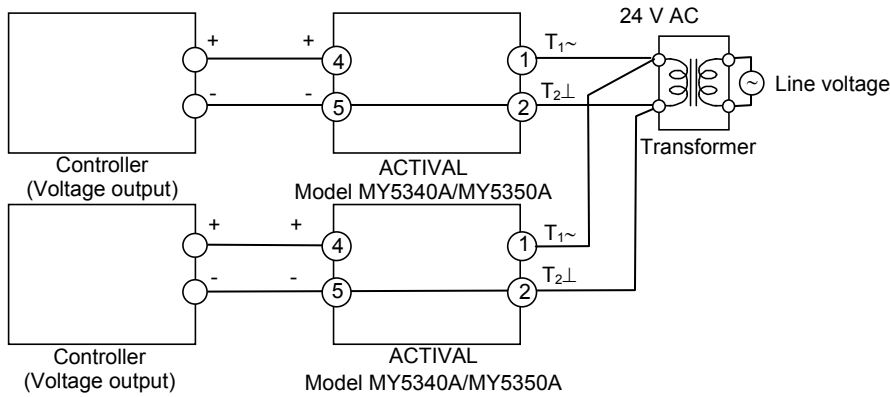
- 2-10 V DC input / 0-10 V DC input (an input signal used in common)



Notes:

1. Terminals 2 and 5 are connected inside the actuator.
2. Two ACTIVAL as shown in the figure above must be the same-type (same model number).

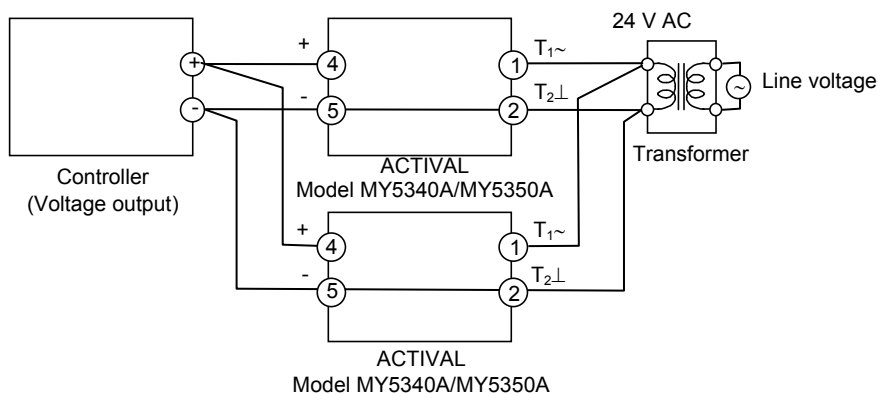
- 2-10 V DC input / 0-10 V DC input (power supply used in common)



Notes:

1. All actuators must be in phase when using common transformer supply. Connect one transformer terminal to T_1 on each actuator. Connect the other transformer terminal to T_2 on each actuator.
2. Do not connect the actuator power supply terminals in parallel.
3. If you do not connect the lead wire properly, actuator and wiring might get damaged.
4. Terminals 2 and 5 are connected inside the actuator.
5. Two ACTIVAL as shown in the figure above must be the same-type (same model number).

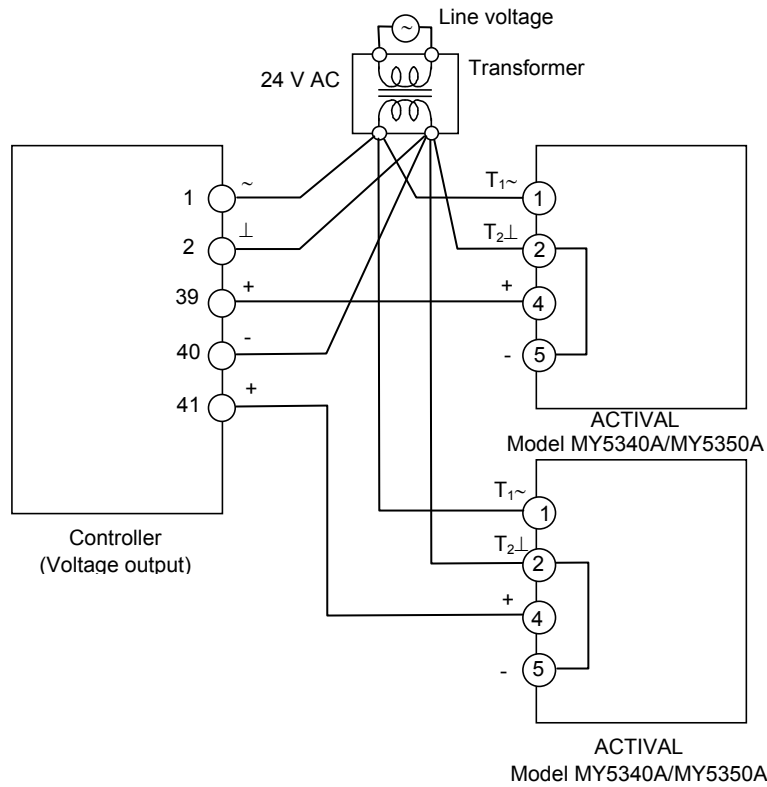
- 2-10 V DC input / 0-10 V DC input (both input signal and power supply used in common)



Notes:

1. All actuators must be in phase when using common transformer supply. Connect one transformer terminal to T_1 on each actuator. Connect the other transformer terminal to T_2 on each actuator.
2. Do not connect the actuator power supply terminals in parallel. Do not connect the actuator signal input terminals in parallel.
3. If you do not connect the lead wire properly, actuator and wiring might get damaged.
4. Terminals 2 and 5 are connected inside the actuator.
5. Two ACTIVAL as shown in the figure above must be the same-type (same model number).

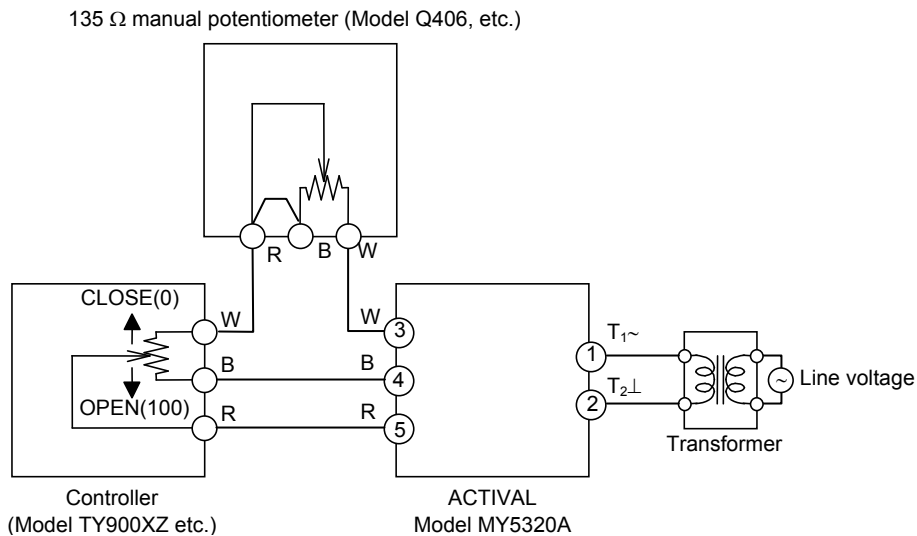
- 2-10 V DC input / 0-10 V DC input (system common wiring)
Ground line (⊥) is used as a common line (for analog signal (-) transmission). Actuator thus has to have mutual ground as the connected controller.



Notes:

1. Controller to be connected needs to be applicable to system common wiring.
2. Wiring length between the actuator terminal “⊥” and 0 V branch connection point of the transformer secondary side must be:
 - 10 m or shorter for JIS* IV electric wire with 1.25 mm² cross section (or equivalent)
 - 5 m or shorter for conducting wire with 0.75 mm² cross section
 * JIS: Japanese Industrial Standards
3. Terminals 2 and 5 are connected inside the actuator.
4. Two ACTIVAL as shown in the figure above must be the same-type (same model number).

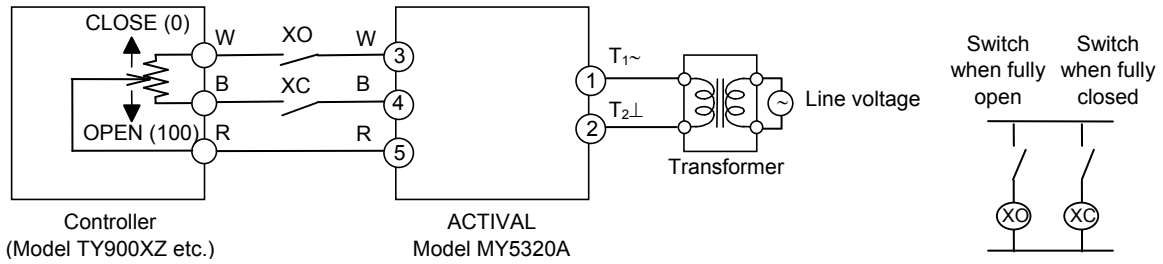
- Nominal 135 Ω resistance input (wiring for minimum position setting)
Besides a proportional controller, the minimum opening range can be set from 0 % to approximately 50 % by adding 135 Ω manual potentiometer .



Note :

When abnormal circumstances (wire disconnection inside the actuator, input signal error, the end of feedback potentiometer life cycle etc.) occur, the valve cannot maintain the minimum opening. This also may result in a secondary damage. Avoid the applications having any possibility of causing a secondary damage.

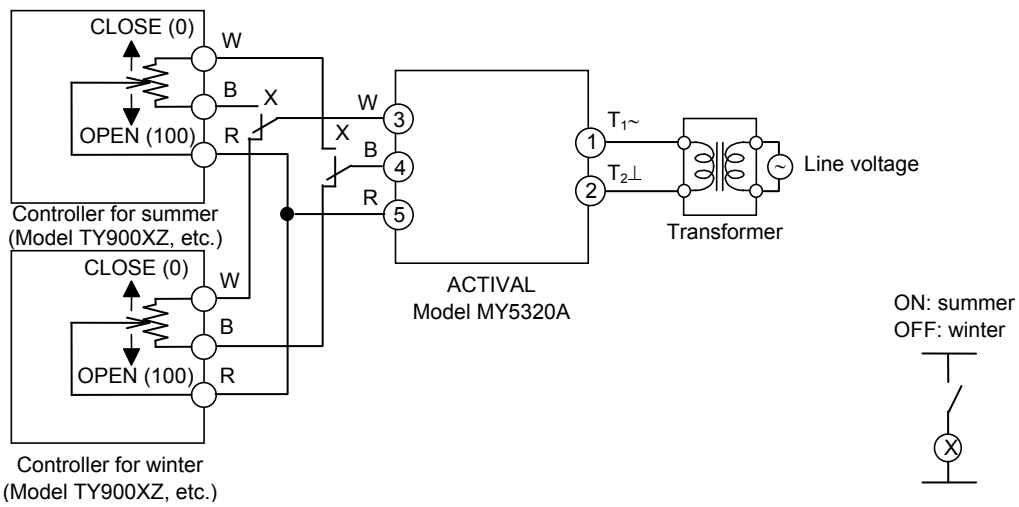
- Nominal 135 Ω resistance input (using relay and interlock)



Notes:

- When XO is open, the actuator is in 100% open position (fully open). When XC is open, the actuator is in 0% open position (fully closed). When both are open, the actuator is in 0% open position (fully closed).
- Connect between R and R directly.
- Use relay with: 10 V, 1 mA or lower min. contact load and 20 V, 20 mA or higher max. contact load.

- Nominal 135 Ω resistance input (summer / winter changeover)



Notes:

- Connect between R and R directly.
- Use relay with: 10 V, 1 mA or lower min. contact load and 20 V, 20 mA or higher max. contact load.

Inspection and Maintenance

⚠ CAUTION



- Cover and case of the ACTIVAL (actuator) is made of polycarbonate resin. Some chemicals and organic solvents or their vapor may corrode or crack the cover and the case. Do not expose the ACTIVAL to such substances.

- Inspection
Inspect the ACTIVAL according to Table 1.
Manually open/close the ACTIVAL at least once a month if it is left, being mounted on the valve, in inactive state for a long period.
- Maintenance
Visually inspect the fluid leakage of the assembled valve and the ACTIVAL (actuator) operations every six months. If any of the problems described in Table 2 are found, take corresponding actions shown in the table.

Table 1. Inspection items and details

Inspection item	Inspection interval	Inspection detail
Visual inspection	Semiannual	<ul style="list-style-type: none"> • Actuator damages. • Fluid leaks from the valve gland and the valve connecting part. • Loosened lock lever of the ACTIVAL mounted onto the valve.
Operating status	Semiannual	<ul style="list-style-type: none"> • Valve unstable open/close operation. • Abnormal noise and vibration.
Routine inspection	Any time	<ul style="list-style-type: none"> • Valve unstable open/close operation. • Abnormal noise and vibration. • Valve hunting

Table 2. Troubleshooting

(If your problem is not solved by the corresponding action, please contact Azbil Corporation near you.)

Problem	Part to check	Action
<ul style="list-style-type: none"> • Valve does not operate smoothly / valve stops halfway / valve does not operate at all. 	Conditions of the power applied and of the input signal applied. Wiring condition / disconnected wires. Jammed foreign substance (may block the valve open/close operation).	Check the power supply and the controller connected to the valve. Check the wiring. Remove the jammed foreign substances by manual operation.
<ul style="list-style-type: none"> • Auxiliary switch does not operate at all. 	Condition of the auxiliary switch (cam switch) dial. Wiring condition / disconnected wires.	Adjust the dial setting. Check the wiring.
<ul style="list-style-type: none"> • Fluid leaks when the ACTIVAL fully closes the valve. 	ACTIVAL incorrect mounting onto the valve.	Re-mount the actuator onto the valve referring to "Installation" on P.5..
<ul style="list-style-type: none"> • Valve hunting occurs. 	Secondary pressure condition and differential pressure condition. Unstable control.	Adjust the inlet and outlet pressure. Correct the control parameter setting of controller.
<ul style="list-style-type: none"> • ACTIVAL mounting position vibrates or produces abnormal noise. 	Lock lever status. Yoke damages.	Lock (close) the lock lever. Consult with Azbil Corporation's sales/service personnel.
<ul style="list-style-type: none"> • ACTIVAL produces abnormal noise when being in operation. 	—	Consult with Azbil Corporation's sales/service personnel.

Specifications are subject to change without notice.

Azbil Corporation

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