

# ACTIVAL™

## Actuator for Two-Way Valve with Flanged-End Connection (Large-Sized Valve for High Differential Pressure Applications)

### Model MY56X0C

#### General

ACTIVAL Model MY56X0C is an actuator combined with Model VY5609A, the large-sized two-way valve with flanged-end connection for high differential pressure applications. With this valve, Model MY56X0C actuator can be used as a pump bypass valve in heating/cooling plant to control pressure.

The actuator has a reversible synchronous motor, which operates at a low voltage of 24 V AC.

2 kinds of control signals are available to operate the actuator.

1. 4-20 mA DC input:  
Provides proportional control in combination with a direct digital controller (DDC), including Infilex™ GC (Model WY5111) and Model R35/R36.
2. 0-10 V DC input:  
Provides proportional control in combination with a DDC controller, including Infilex™ AC (Model WY5117).



#### Features

- Compact and lightweight.
- Durable actuator with low power consumption, leading to energy saving.
- Easy assembly with the valve Model VY5609A and no adjustment required.
- Manual open/close mechanism with position indication.
- 2-10 V DC output signal for position feedback.

#### Model Numbers

Base model number	Control signal	—	Power supply	—	Description
MY56					Actuator for ACTIVAL valve Model VY5609A
	3				4-20 mA DC input with 2-10 V DC output (for position feedback)
	5				0-10 V DC input with 2-10 V DC output (for position feedback)
		0			—
			C		24 V AC
				0000	Standard torque type

#### IMPORTANT:

To control ACTIVAL with a third-party controller, please consult with Yamatake's sales personnel.

## Safety Instructions

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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 Yamatake's sales representative. Yamatake Corporation will not bear any responsibility for the results produced by the operators.

### A CAUTION

- $\alpha$  • Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
- $\alpha$  • Read the instruction attached to the valve Model VY5609A to mount the actuator onto the valve.
- $\alpha$  • For storage, do not stack too many container boxes in which the products are packed.
- $\alpha$  • This product must be operated under the operating conditions (power, temperature, humidity, vibration, shock, installation position, atmospheric condition, etc) specified in this manual to prevent equipment damage.
- $\alpha$  • Avoid using the product (actuator, valve to combine with, and other components) in a corrosive gas including oxide gas and explosive gas.
- $\alpha$  • This product must be operated within its rated operating ranges specified in this manual. Failure to comply will cause equipment damage.
- $\alpha$  • Operate the product within the service life, and avoid application that keeps product operating cycle excessively frequent so as not to shorten its service life.
- $\Sigma$  • Avoid touching the operating part of the product to prevent personal injury.
- $\alpha$  • All wiring must comply with local codes of indoor wiring and electric installation rules.
- $\alpha$  • Disconnect power from the product before performing any wiring to prevent product damages.
- $\alpha$  • Use crimp terminal lugs with insulation for electric wires to be connected to the product terminals.
- $\alpha$  • Make sure all the wires are tightly connected to the screw terminals. Loose connection can cause fire or heat generation.
- $\alpha$  • Do not put heavy load on the product. The product can get damaged.
- $\alpha$  • Do not install the product in a location close to a steam coil or a hot-water coil. High temperature radiation may result in the product malfunction.
- $Y$  • Do not disassemble the product. Disassembly may result in electrical shock or equipment damage.
- $\alpha$  • Dispose of this product as an industrial waste in accordance with your local regulations. Do not reuse all or part of this product.

Trademark information:

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## Specifications

Item	Specification		
Power supply	24 V AC $\pm$ 15 %, 50 Hz/60 Hz		
Applicable valve size	DN100 to DN150 of standard torque type		
Power consumption	8 VA		
Timing	63 $\pm$ 5 sec (50 Hz) / 53 $\pm$ 5 sec (60 Hz)		
Control signal input	4 mA DC to 20 mA DC input (Input impedance: 100 $\Omega$ ) 0 V DC to 10 V DC input (Input impedance: 150 k $\Omega$ or higher)		
Feedback signal output	Range: 2 V DC (0 % position) to 10 V DC (100 % position) Max. load resistance: 10 k $\Omega$ or higher (Max. 1 mA)		
Environmental conditions		Rated operating condition	Transport/storage condition <sup>*2</sup>
	Ambient temperature <sup>*1</sup>	-20 °C to 50 °C (Fluid temperature 0 °C to 130 °C)	-20 °C to 70 °C
	Ambient humidity	5 %RH to 95 %RH	
	Vibration	4.9 m/s <sup>2</sup> (10 Hz to 150 Hz)	19.6 m/s <sup>2</sup> (10 Hz to 150 Hz)
	Notes: *1 Do not allow the fluid to freeze. *2 The actuator shall be packed during transport.		
Materials	Case: Aluminum alloy casting Top cover, terminal cover: Polycarbonate resin (Color: gray)		
Surface finishing	Case: None		
Installation location	Indoor / outdoor (Keep away from direct sunlight.)		
Installation orientation	Installable in any position ranging from upright to sideways (90° tilted). (If being installed outdoors, the actuator must be installed in upright position.)		
Valve position indication	Pointer located at the bottom of the actuator shows the position by pointing at the value (0: close to 100: open) of the scale on front, rear, and bottom sides.		
Manual operation	Available. Refer to the section <b>Manually opening/closing the actuator</b> .		
Wire connection	M3.5 screw terminal connection		
Enclosure rating	IEC IP54 (dust-proof and splash-proof)		
Insulation resistance	Between terminal and case: 5 M $\Omega$ or higher at 500 V DC		
Dielectric strength	Between terminal and case: 500 V AC/min. with 5 mA or less leakage current		
Accessory	4 hexagon socket head cap bolts (M5 $\times$ 14)		
Preset position for shipment	100 % (fully open)		

## Options

For operations, separate order is required.

Item	Specification
Seal connector (Part No. 83104346-003)	Applicable wire size: $\phi$ 7 mm to $\phi$ 9 mm (Seal connector is necessary for IEC IP54 protection)
Auxiliary switch* (Part No.83165274-002)	Number of switches: 2 (SW A and SW B) Max. applied voltage/current: 30 V DC / 3 A Actuating position (SW A): Adjustable between 0 % (fully closed) and 100 % (fully open) (SW B): Adjustable between 0 % (fully closed) and 100 % (fully open)
Auxiliary potentiometer* (Part No. 83165275-002)	Number of potentiometer: 1 Total resistance: Nominal 1 k $\Omega$ Actuating position: 0 % (fully closed) and 100 % (fully open) Max. applied voltage: 5 V DC

\* Note:

Either the auxiliary switch or auxiliary potentiometer can be added, but not both.

### Dimensions

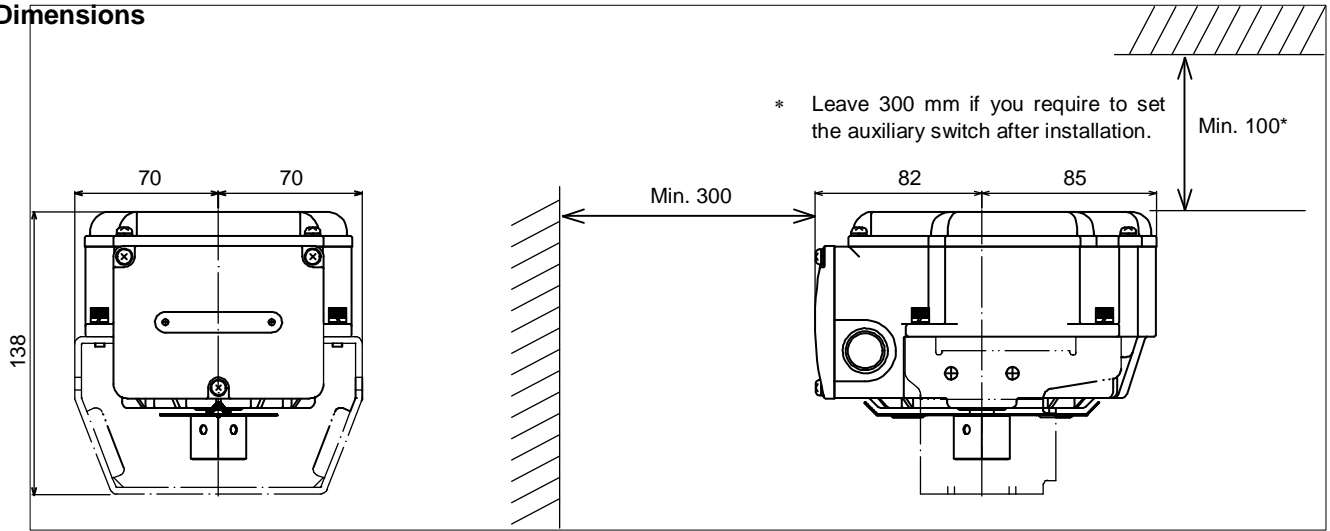
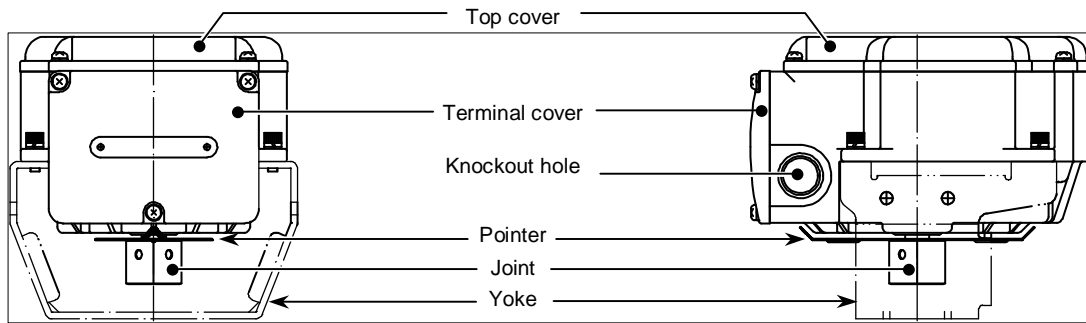


Figure 1. Dimensions with maintenance space (mm)

### Parts Identification



Yoke is an accessory of the valve (Model VY5609A).

Figure 2. Parts identification

**Installation**

**A CAUTION**

- $\alpha$  • Disconnect power from the product before performing any wiring to prevent product damages.
- $\alpha$  • Avoid using the product (actuator, valve to combine with, and other components) in a corrosive gas including oxide gas and explosive gas.
- $\alpha$  • Do not install the product in a location close to a steam coil or a hot-water coil. High temperature radiation may result in the product malfunction.

**IMPORTANT:**

- The covers might be corroded by some chemical and organic solvent/vapor. Do not clean the product using such substances, or do not expose the product to such substances.
- Although the product can be used in high humidity environments (max. 95 %RH), do not immerse it in water.
- Although the product can be used outdoors, be sure not to expose it to direct sunlight.

**Installation to piping**

This product is assembled with the valve Model VY560XA and installed to piping. For the installation to piping, refer to Specifications/Instructions of Model VY5609A.

**Assembling the actuator Model MY56X0C the valve Model VY5609A**

**IMPORTANT:**

- Do not assemble the actuator with any other valve.
- Mount the actuator in 100 % (fully open) position onto the valve in 100 % (fully open) position.

This actuator Model MY56X0C must be combined with the valve Model VY5609A. The following illustrates the procedure for mounting the actuator onto the valve.

- 1) Make sure that the valve is in fully open (100 %) position. (The valve position is preset at 100 % before factory shipment.)  
As shown in Fig. 4, the valve is in fully open position when the groove on the valve stem (top surface) points to the raised line on the valve bonnet (side surface).  
To set the valve position to 100 %, turn the valve stem so that the groove points to the raised line, using a 10 mm wrench.
- 2) Mount the yoke on the valve and fix them with four hexagon bolts (M6) with washers, using a 10 mm wrench.  
Fasten the bolts at 7.0 N·m to 10.0 N·m fastening torque. Yoke mount position can be turned every 90° by engaging the holes (for the bolts) of the yoke with the holes of the valve.  
(Yoke, thermal insulation sheet, and four hexagon bolts with washers are accessories of the valve.)

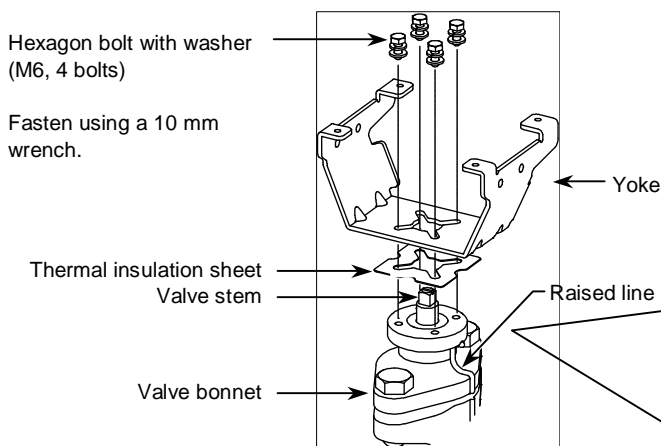


Figure 3. Mounting the yoke onto the valve

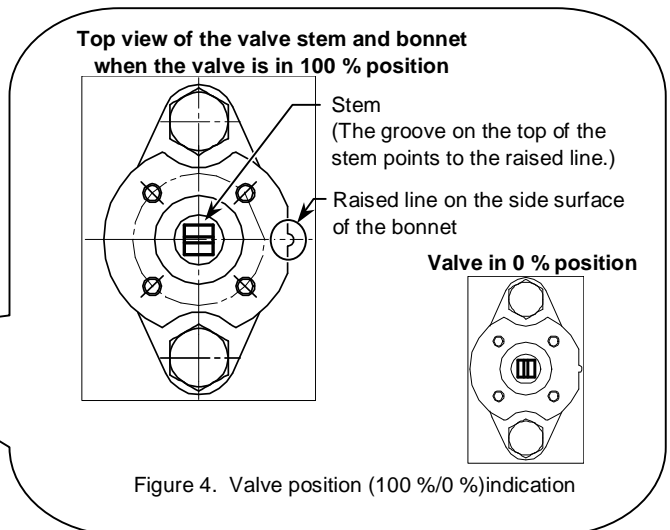


Figure 4. Valve position (100%/0%) indication

- 3) Make sure that the actuator is in fully open (100 %) position. (The actuator position is preset at 100 % before factory shipment.) As shown in Fig. 5, the pointer on the bottom of the actuator indicates the position. To set the actuator position to 100 %, see **Manually opening/closing the actuator** section.

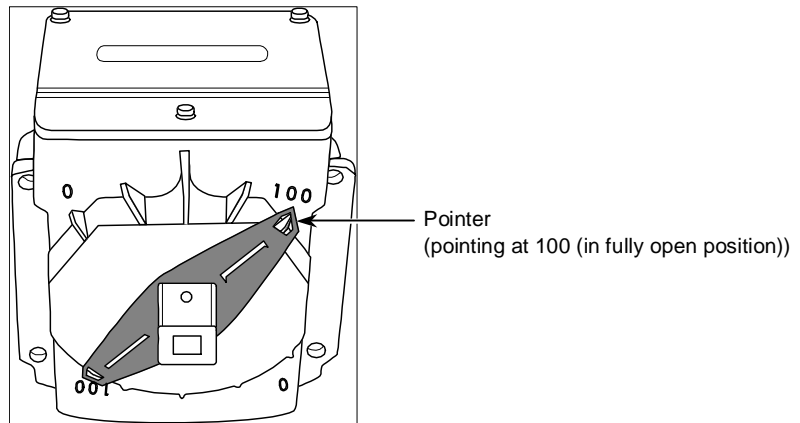


Figure 5. Pointer of the actuator in fully open position

Assemble the actuator in 100 % position with the valve in 100 % position. If the actuator in 100 % position is assembled with the valve in 0 % position, actuator puts torque (to closing direction) on the fully closed valve, and the gear of the actuator gets damaged.

- 4) To mount the actuator on the yoke assembled with the valve, engage the holes for the bolts of the actuator and of the yoke, and insert the valve stem in the actuator joint. Fix the actuator on the yoke with 4 hexagon socket head cap bolts (M5), using a 4 mm hexagon wrench. Fasten the bolts at 5.0 to 8.0 N·m torque. (The hexagon socket head cap bolts are supplied with the actuator.)

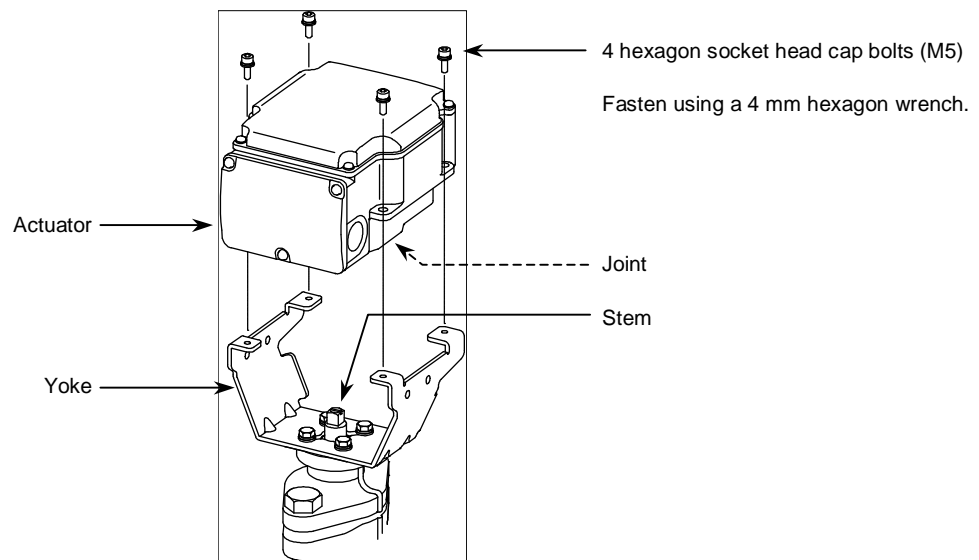


Figure 6. Mounting the actuator on the yoke

### Manually opening/closing the actuator

**IMPORTANT:**

- Manually opening/closing the actuator with the power (24 V AC) applied may damage the actuator.
- To manually open/close the actuator, do not turn the joint beyond the fully open (100)/closed (0) mark.
- To manually open/close the actuator, slowly turn the joint. If shock is sent to the actuator, the actuator may get damaged.

Disconnect the power from the actuator before manually operating the ACTIVAL. As shown in Fig. 7, from the front of the actuator, hold the joint using a 21 mm wrench, and turn the joint slowly toward the set position.

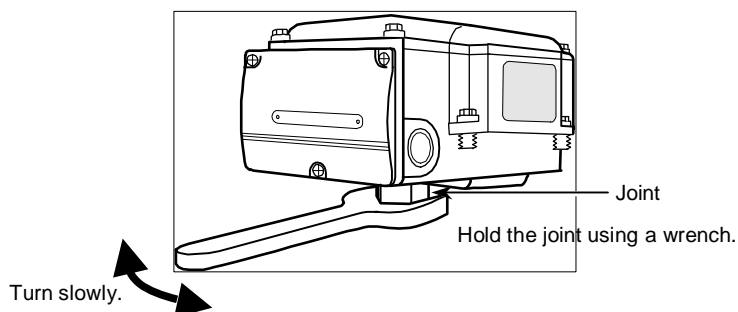


Figure 7. Manual operation

### Auxiliary switch / Auxiliary potentiometer (optional)

**IMPORTANT:**

- The auxiliary switch/potentiometer is installed on site. Refer to the instructions supplied with the auxiliary switch/potentiometer for installation.
- Do not open the top cover except when adjusting the auxiliary switch/potentiometer. Close the top cover instantly after adjusting the auxiliary switch/potentiometer.
- Do not put any load on the top cover.

## Wiring

### ⚠ CAUTION

- α • Disconnect power from actuator before performing any wiring or maintenance (installation) to prevent equipment damage.

#### IMPORTANT:

- The actuator is designed for 24 V AC power supply voltage. Do not apply any other power voltage (e.g., 100 V AC, 200 V AC) to the actuator.
- Make sure the polarity of the power supply and 2-10 V DC feedback output referring to the wiring diagrams. Incorrect wiring may result in PCB (print circuit board) burnout.
- To prevent damage, cover the terminals except when connecting/disconnecting wires.
- Do not connect 24 V AC power to the terminals 4 to 7. (Maximum applicable voltage: 5 V DC)

#### Wiring precautions

- 1) To lead the wires into the terminals, cut out a knockout hole for a wiring port. Two knockout holes are provided on the bilateral sides of the actuator terminals. Select a knockout hole according to the conduit mounting direction, and cut it out by lightly knocking the hole using a screwdriver.

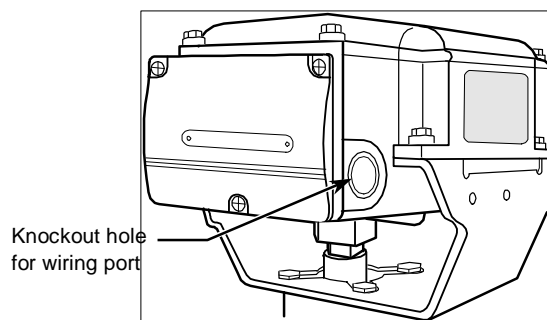


Figure 8. Knockout hole for wiring port

- 2) Unscrew the 3 setscrews (M4 × 10) of the terminal cover and remove the terminal cover, as shown in Fig. 9.

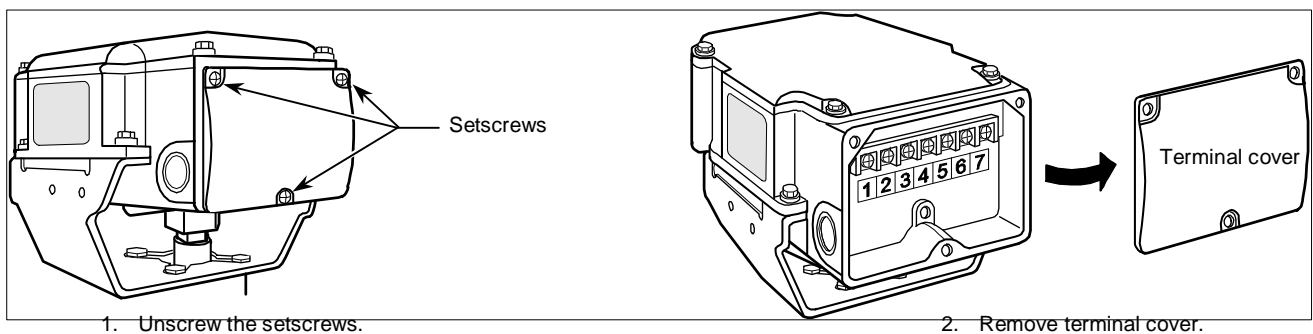


Figure 9. Terminal cover removal

- 3) Correctly connect the wires to the terminals with M3.5 screw terminal lugs, referring to Figs 10 to 17.

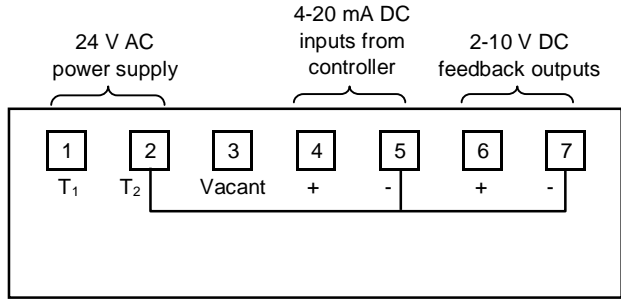
#### To keep IP54 protection (dust-proof and splash-proof),

Use a water-proof connector for the actuator in a high-humidity environment or outdoor location.

- Be sure to completely close the terminal cover and the top cover.
- Waterproof the wiring port.
  - For cable connection, use a water-proof connector. (Seal connector Part No. 83104346-003 is recommended.)
  - For conduit connection, use a water-proof plica tube or the like.

**Terminals connection**

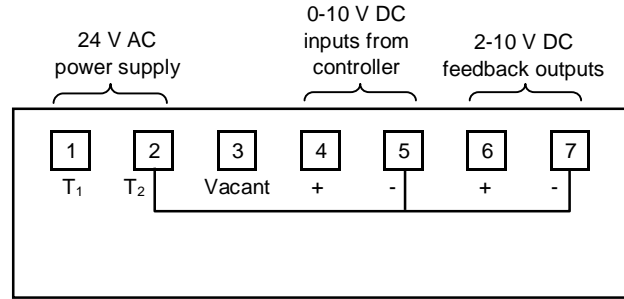
Model MY5630C



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

Figure 10. Terminals connection of Model MY5630C (4-20 mA DC input type)

Model MY5650C

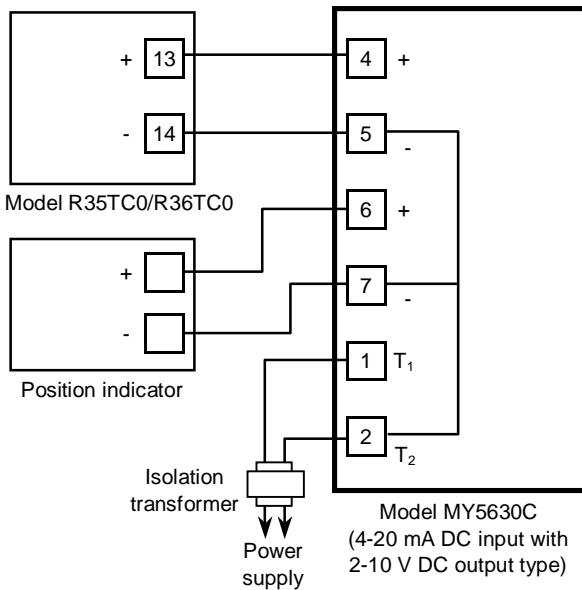


Note: Terminals 2, 5, and 7 are connected inside the actuator.

Figure 11. Terminals connection of Model MY5650C (0-10 V DC input type)

**Connection examples**

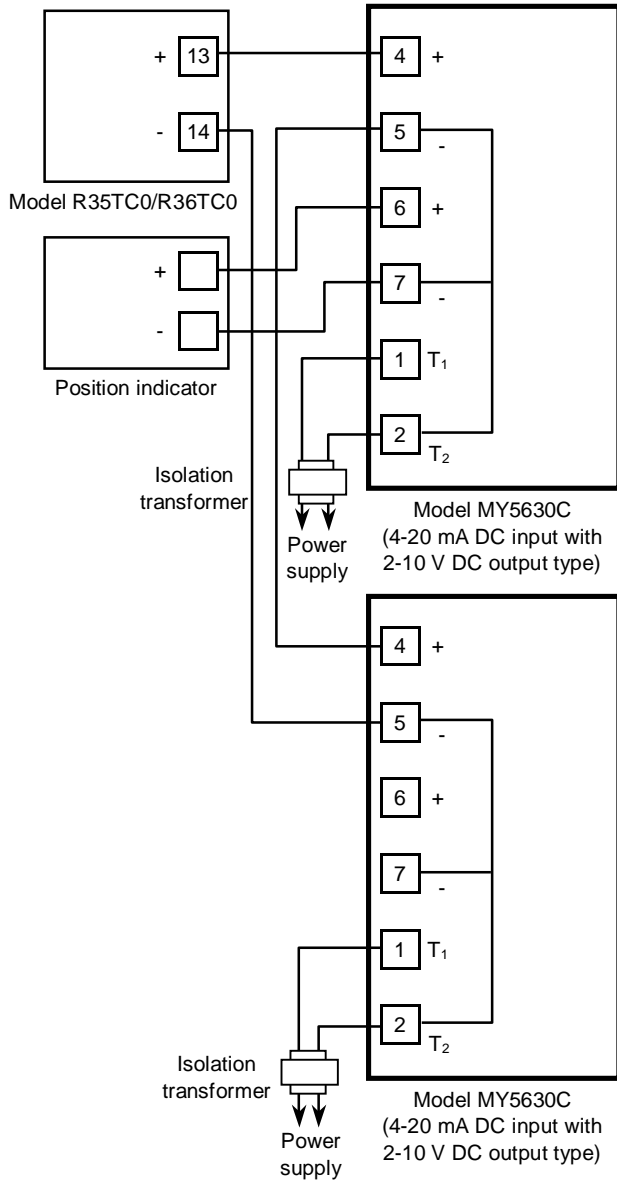
Model MY5630C (4-20 mA DC input type): [Actuator + Controller + Transformer] × 1



- \* For power supply, provide an isolation transformer.
- \* Terminals 2, 5, 7 of the actuator are connected inside.
- \* Input impedance for the actuator 4-20 mA DC input is 100 Ω.
- \* Do not pass the power supply line to another device through the terminals of the actuator.
- \* If the actuator terminals connected to the controller and the position indicator disagree with Fig. 12, the actuator or its cables may get damaged.

Figure 12. Connection example 1: Model MY5630C to Model R35TC0/R36TC0

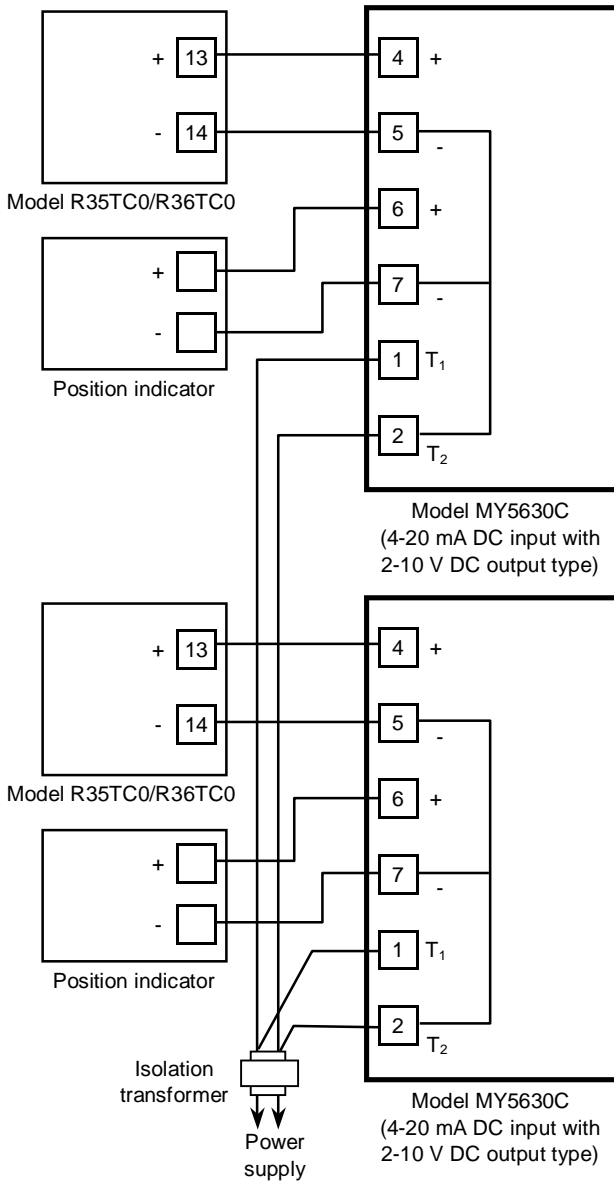
Model MY5630C (4-20 mA DC input type): [Actuator + Transformer] × 2 + Controller × 1



- \* For power supply, provide an isolation transformer.
- \* Terminals 2, 5, 7 of the actuator are connected inside.
- \* Since the actuator terminals 2 and 5 are not isolated, separate transformer is required for each actuator if the controller is shared with multiple actuators.
- \* Input impedance for the actuator 4-20 mA DC input is 100 Ω.
- \* Do not pass the power supply line to another device through the terminals of the actuator.
- \* If the actuator terminals connected to the controller and to the position indicator disagree with Fig. 13, the actuator or its cables may get damaged.

Figure 13. Connection example 2: Model MY5630C to Model R35TC0/R36TC0

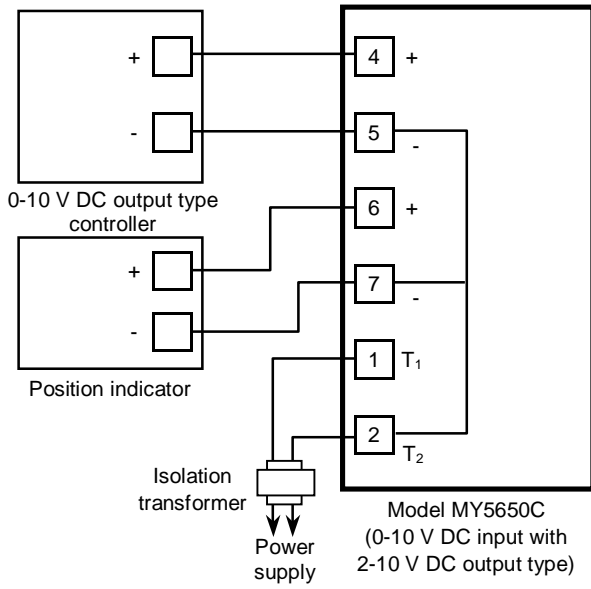
Model MY5630C (4-20 mA DC input type): [Actuator + Controller] × 2 + Transformer × 1



- \* For power supply, provide an isolation transformer.
- \* Terminals 2, 5, 7 of the actuator are connected inside.
- \* Input impedance for the actuator 4-20 mA DC input is 100 Ω.
- \* Do not pass the power supply line to another device through the terminals of the actuator.
- \* Connect the lines from the terminal 1 of each actuator to the transformer terminal with the same polarity. Connect the lines from the terminal 2 of each actuator the same way.
- \* If the actuator terminals connected to the controller and to the position indicator disagree with Fig. 14, the actuator or its cables may get damaged.

Figure 14. Connection example 3: Model MY5630C to Model R35TC0/R36TC0

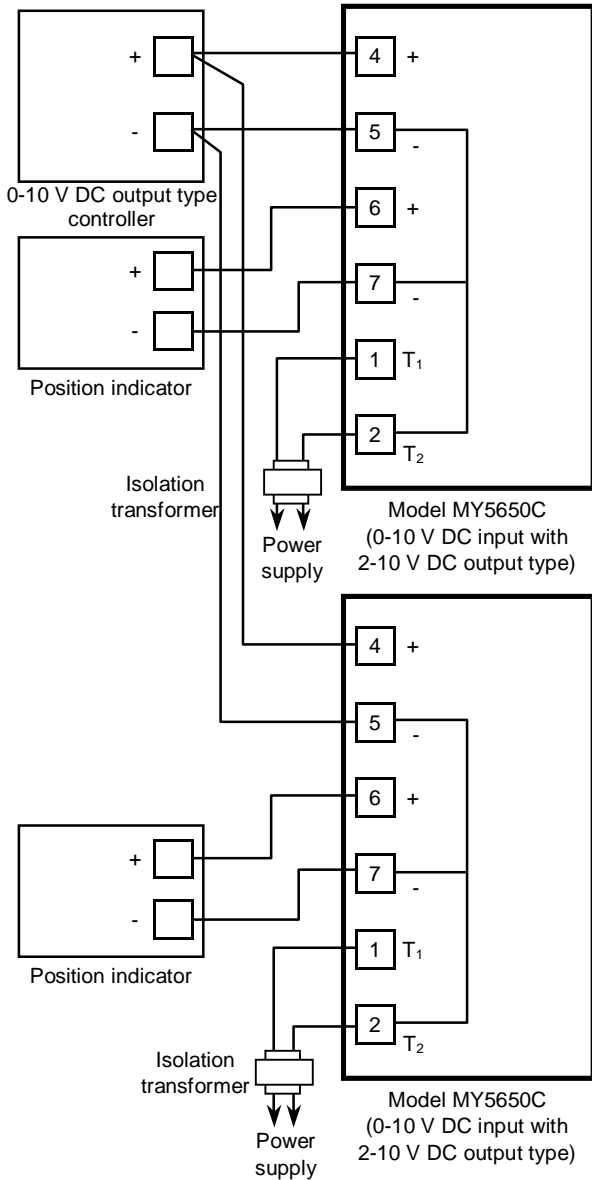
Model MY5650C (0-10 V DC input type): [Actuator + Controller + Transformer] × 1



- \* For power supply, provide an isolation transformer.
- \* Terminals 2, 5, 7 of the actuator are connected inside.
- \* Do not pass the power supply line to another device through the terminals of the actuator.
- \* If the actuator terminals connected to the controller and the position indicator disagree with Fig. 15, the actuator or its cables may get damaged.

Figure 15. Connection example 1: Model MY5630C to Model R35TC0/R36TC0

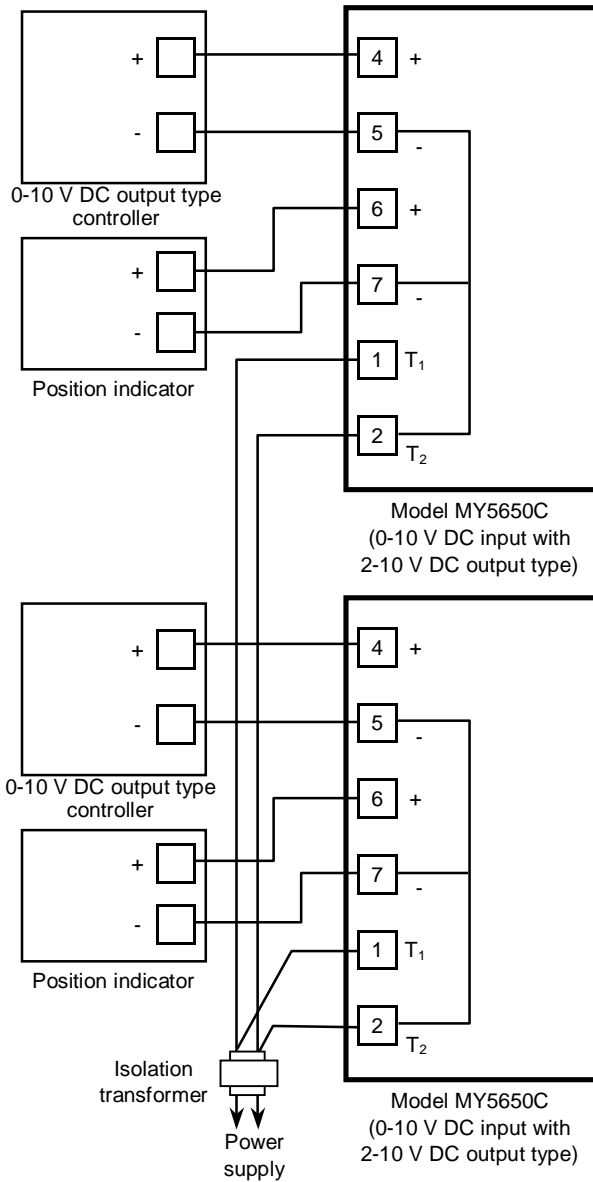
Model MY5650C (0-10 V DC input type): [Actuator + Transformer] × 2 + Controller × 1



- \* For power supply, provide an isolation transformer.
- \* Terminals 2, 5, 7 of the actuator are connected inside.
- \* Since the actuator terminals 2 and 5 are not isolated, separate transformer is required for each actuator if the controller is shared with multiple actuators..
- \* Do not pass the power supply line to another device through the terminals of the actuator.
- \* If the actuator terminals connected to the controller and to the position indicator disagree with Fig. 16, the actuator or its cables may get damaged.

Figure 16. Connection example 1: Model MY5650C to 0-10 V DC output type controller

Model MY5650C (0-10 V DC input type): [Actuator + Controller] × 2 + Transformer × 1



- \* For power supply, provide an isolation transformer.
- \* Terminals 2, 5, 7 of the actuator are connected inside.
- \* Do not pass the power supply line to another device through the terminals of the actuator.
- \* Connect the lines from the terminal 1 of each actuator to the transformer terminal with the same polarity. Connect the lines from the terminal 2 of each actuator the same way.
- \* If the actuator terminals connected to the controller and to the position indicator disagree with Fig. 16, the actuator or its cables may get damaged.

Figure 17. Connection example 2: Model MY5650C to 0-10 V DC output type controller

## Inspection and Maintenance

### ⚠ CAUTION

- Σ • Avoid touching the installed ACTIVAL (valve body, yoke, joint). When being used to control hot water, it reaches high temperature and may cause burn injury.

- Inspect the ACTIVAL according to Table 1.
- Manually open/close the ACTIVAL at least once a month if it is left in inactive state for a long period.
- Visually inspect the fluid leakage of the valve and the actuator operations every six months. If any of the problems described in Table 2 are found, take corresponding actions shown in the table.  
If your problem is not solved by the corresponding action, please contact Yamatake near you.

Table 1. Inspection items and details

Inspection item	Inspection interval	Inspection detail
Visual inspection	Semiannual	<ul style="list-style-type: none"> <li>• Fluid leakage from the gland and the flange face</li> <li>• Loosened bolts</li> <li>• Valve and actuator damages</li> </ul>
Operating status	Semiannual	<ul style="list-style-type: none"> <li>• Unstable open/close operation</li> <li>• Abnormal noise and vibration</li> </ul>
Routine inspection	Any time	<ul style="list-style-type: none"> <li>• Fluid leakage to the outside</li> <li>• Abnormal noise and vibration</li> <li>• Unstable open/close operation</li> <li>• Valve hunting</li> </ul>

Table 2. Troubleshooting

Problem	Part to check	Action
Fluid leaks from the flange face.	Loosened flange bolts Gasket on the flange face Misaligned piping	Tighten the flange bolts. Replace the gasket. Redo piping.
Fluid leaks from the gland part.	—	Consult with our sales/service personnel.
Fluid leaks from the bonnet.	Loosened bolts	Tighten the bolts.
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 Loosened terminals Wiring condition / disconnected wires	Check the power supply and the controller connected to. Tighten the terminals. Check the wiring.
Fluid leaks to the outside of the valve when the ACTIVAL is in fully closed position.	Actuator pointer not pointing to fully closed position	Fully close the ACTIVAL.
The valve vibrates or produces an abnormal noise.	Primary pressure condition Differential pressure condition	Adjust the mounting position and change the installation location.
The auxiliary switch does not operate.	Auxiliary switch (cam switch) condition Loosened terminals Wiring condition / disconnected wires	Redo the cam switch setting. Tighten the terminals. Check the wiring.
The auxiliary potentiometer does not operate.	Condition of resistance Loosened terminals Wiring condition / disconnected wires	Check the resistance value (1 k $\Omega$ ). Tighten the terminals. Check the wiring.
Valve hunting occurs.	Secondary pressure condition Differential pressure condition Control stability	Adjust the mounting position and change the installation location. Correct the control parameter setting of controller.



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*Specifications are subject to change without notice.*

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