# High Thrust Linear Actuators
# Model MY940X Series

## General

Model MY940X series actuators are high-horsepower motorized for operating control valves in various facilities including air-conditioning systems.

In combination with Models V5063A (single-seated two-way valve), V5064A (double-seated two-way valve), and V5065A (mixing three-way valve), they are suitable for large-bore valves and for fluid control systems where a high differential pressure is generated while the valves are shut off.

Model MY940X series is equipped with high/low limit switch and feedback potentiometer (135 Ω nominal). ON/OFF and proportional actions are available. To mount Model 940X on an applicable valve, the yoke set (Model QMY9400) is additionally required.

## Features

- Compact and lightweight actuator body facilitates installation, maintenance, and inspection.
- High horsepower is available with the compact and lightweight actuator.
- Manual operation is available while the power is off (with the attached crank handle).
- Built-in high/low limit switch and thermal protectors protect the motors even under overload conditions.

## Model Numbers

| Basic model number | Applicable valve type and size | Power supply | Option | Fixed | Specifications |
|---|---|---|---|---|---|
| MY940 | | | | | High thrust linear actuator |
| | 0 | | | | For two-way valve: DN80 (3”) or less (19 mm stroke) |
| | 1 | | | | For two-way valve: DN100 to DN150 (4” to 6”) (38 mm stroke) |
| | 2 | | | | For three-way valve: DN80 (3”) or less (19 mm stroke) |
| | 3 | | | | For three-way valve: DN100 to DN150 (4” to 6”) (38 mm stroke) |
| | | A | | | Power supply 100 V AC |
| | | B | | | Power supply 200 V AC |
| | | | 0 | | Without option |
| | | | 1 | | With two auxiliary switches |
| | | | | 001 | Fixed |

### Combination of Valve and Actuator

| Actuator model numbers | Applicable valve model numbers | Actuator model numbers | Applicable valve model numbers |
|---|---|---|---|
| MY9400 | V5063A series | MY9402 | V5065A6001 |
| | V5063C series | | V5065A6019 |
| | V5064A6002 | | V5065A6027 |
| | V5064A6010 | | V5065A6035 |
| | V5064A6028 | | V5065A6043 |
| | V5064A6036 | | V5065A6050 |
| | V5064A6044 | | V5065A6068 |
| MY9401 | V5064A6051 | MY9403 | V5065A6076 |
| | V5064A6069 | | V5065A6084 |
| | V5064A6077 | | V5065A6092 |

### 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 Restriction

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.

**⚠ WARNING**

- DANGER: To prevent the risk of severe or fatal electrical shock, always disconnect power source before performing any wiring.
- This product is not explosion-proof. Avoid atmospheres containing flammable (gasoline, etc.) or corrosive gases. Burn injury or fire may result.
- Do not disassemble the product at any time except when removing the cover to wire or replacing a part. Equipment damage or electrical shock may result.
- Do not detach the actuator from the valve when operating with the power supply turned on. Electrical shock may result.

**⚠ CAUTION**

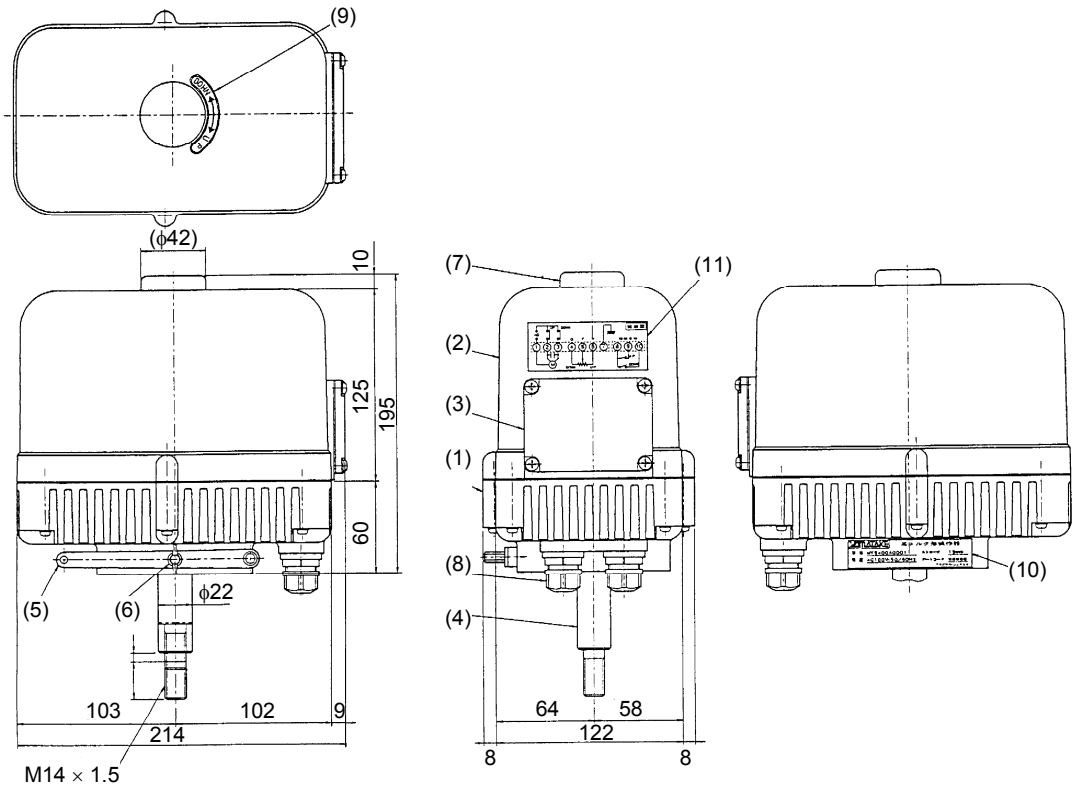
- Installation must be performed by qualified personnel in accordance with all applicable safety standards.
- This product must be operated within its operating ranges specified in this manual. Failure to comply will cause equipment damages.
- Installation must be carried out according to the operating conditions specified in this manual to prevent equipment damages.
- Do not drop or apply pressure to this product to prevent equipment malfunction.
- For storage, do not stack too many container boxes in which products are packed.
- Do not step on this product (e.g. as scaffold) to prevent equipment damages or personal injuries.
- Avoid an instrumentation that keeps equipment operating cycle excessively frequent so as not to shorten the equipment operating life.
- All wiring must comply with local codes of indoor wiring and electric installation rules.
- Do not perform wiring in wet weather or with water spraying.
- Use crimp terminal with insulation for wires.
- Make sure all wires are tightly connected to prevent operation errors or equipment damages.
- Do not incinerate this product for waste disposal. Do not recycle all or part of this product, either.

## Specifications

| Items | Model numbers MY9400XX001, MY9402XX001 (19 mm stroke) | Model numbers MY9401XX001, MY9403XX001 (38 mm stroke) |
|---|---|---|
| Power supply | 100 V AC ±10 % (50/60 Hz)<br>200 V AC ±10 % (50/60 Hz) | |
| Rated shaft output | 1334 N or more | |
| Rated operating time | 42 sec (50 Hz), 35 sec (60 Hz) | 41 sec (50 Hz), 34 sec (60 Hz) |
| Rated stroke | 19 mm | 38 mm |
| Feedback potentiometer | Resistance: 135 Ω nominal<br>Maximum applied voltage: 13.5 V DC | |
| Rated power consumption | 100 V AC, 22 W (50 Hz) / 23 W (60 Hz)<br>200 V AC, 24 W (50 Hz) / 26 W (60 Hz) | 100 V AC, 48 W (50 Hz) / 50 W (60 Hz)<br>200 V AC, 50 W (50 Hz) / 52 W (60 Hz) |
| Auxiliary switch (optional) | Potential free output contact for high/low limit switch<br>250 V AC, 5 A (Resistive load), Approx. 3.5 A (Inductive load) | |
| LED indication | ON while the torque limiter switch and high limit switch are operating (built-in) | |
| Insulation level | Type E (JIS* C4004) | |
| Insulation resistance | 100 MΩ or more / 500 V DC between power supply terminal and housing | |
| Dielectric strength | 1500 V AC / 1 min between power supply terminal and housing | |
| Ambient operating condition | Rated operating condition<br>Temperature: -25 to 55 °C<br>Humidity: 10 to 90 %RH<br>Vibration: 19.6 m/s², 5 to 100 Hz<br>Impact: 29.4 m/s² | Transport/storage condition<br>Temperature: -25 to 70 °C<br>Humidity: 10 to 95 %RH<br>Vibration: 19.6 m/s², 5 to 100 NHz<br>Impact: 294 m/s² |
| Enclosure rating | JIS C0920 Protection class 5 (Equivalent to IP55) | |
| Installation angle (to valve) | Upright to horizontal (Actuator must be positioned horizontally the same or higher then valve.) | |
| Manual operation | Using the detachable crank handle (accsesory) | |
| Wiring port | G1/2 × 2 (with waterproof conduit), cable outer diameter: ϕ9 mm to ϕ11 mm | |
| Material | Die-cast aluminum | |
| Color | Baking silver metallic coating | |
| Weight | 7.2 kg | 7.0 kg |
| Accessory | Detachable crank handle (for manual operation) | |
| Auxiliary equipment (Separate order required) | Yoke set: Models QMY9400A1001 (19 mm stroke), QMY9400B1001 (38 mm stroke)<br>Components: Yoke, stem adaptor, actuator installation bolt | |

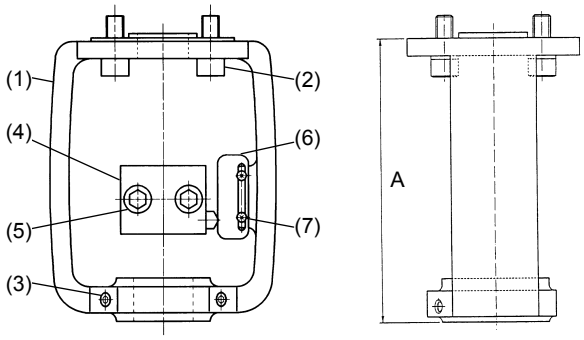
∗Note: JIS: Japanese Industrial Standards

## Dimensions and Parts Identification with Materials




| | Part | Material | | Part | Material |
|---|---|---|---|---|---|
| (1) | Base | Die-cast aluminum | (7) | Crank handle shaft cap | NBR |
| (2) | Cover | Die-cast aluminum | (8) | Waterproof conduit | Nylon |
| (3) | Side cover | Die-cast aluminum | (9) | Rotating direction sticker | Polyester |
| (4) | Output shaft | Stainless steel | (10) | Specifications plate sticker | Polyester |
| (5) | Crank handle | Stainless steel | (11) | Wiring diagram sticker | Polyester |
| (6) | Wing bolt (M4 × 10) | Stainless steel | | | |

Figure 1. Dimensions and parts identification: actuator (mm)




| Actuator model number: Stroke | Yoke set model number: Yoke length A |
|---|---|
| MY9400 / MY9402: 19 mm | QMY9400A1001: 164 mm |
| MY9401 / MY9403: 38 mm | QMY9400B1001 199.5 mm |

| | Part | Material | | Part | Material |
|---|---|---|---|---|---|
| (1) | Yoke | Gray iron | (5) | Stem adaptor fixing bolt | Carbon steel |
| (2) | Fixing bolt | Carbon steel | (6) | Scale plate | Stainless steel |
| (3) | Hexagon socket setscrew for mounting valve | Carbon steel | (7) | Scale plate fixing screw | Carbon steel |
| (4) | Stem adaptor (with pointer) | Carbon steel | | | |

Figure 2. Dimensions and parts identification: yoke set (mm)

## Installation

**⚠ CAUTION**

- Avoid an atmosphere containing acid gas or explosive gas that may corrode motor components.
- Avoid environmental conditions that disagree with the allowable ambient temperature and humidity ranges.
- Avoid direct sunlight and constant water splash.

1) If installing this actuator outdoors, attach an awning to prevent exposure to direct sunlight.
2) Ensure at least 20 cm clearance around this actuator to allow wiring connection and manual operation.

### Mounting on valve

To mount the actuator on the valve, yoke set is additionally required. Order the yoke set.
This section shows the mounting procedure.

**⚠ CAUTION**

- Check that the actuator model number matches the specifications of the valve. An incorrect combination may damage the actuator and/or valve.
  Before shipment, the actuator is placed in the fully closed position (For a three-way valve, port B is closed). **Install the actuator as it is.**
- If the actuator before being mounted on the valve is supplied with the power or manually operated, actuator close action will not meet the valve (port B for the three-way valve) close action. To correct the actuator action, manually operate the actuator before mounting on the valve by rotating the crank handle counterclockwise till the handle completely stops. Then rotate it one turn clockwise so that the actuator full close position is fixed.

Procedures 1 to 5 below should be carried out without power supplied.

### Mounting procedures

1. The bolts are hexagon socket head cap screws (M10 × 25). Attach the yoke to the actuator using a hexagonal wrench. The actuator can be mounted facing every 90° direction. (See Fig. 3.)

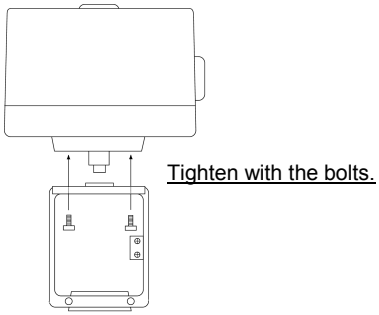



Figure 3. Attaching the actuator to the yoke

2. Push down on the stem of the valve to the lowest position. (See Fig. 4.) (Two-way valve: fully closed, three-way valve: port B fully closed.)

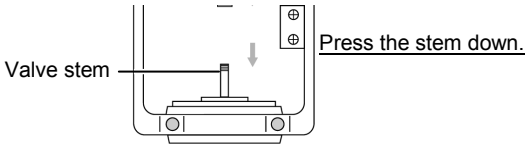



Figure 4. Stem of the valve

3. Mount the yoke with the actuator attached to on the valve and fix it with 2 hexagon socket setscrews (M8 × 25) using the hexagonal wrench for M5. (See Fig. 5.)

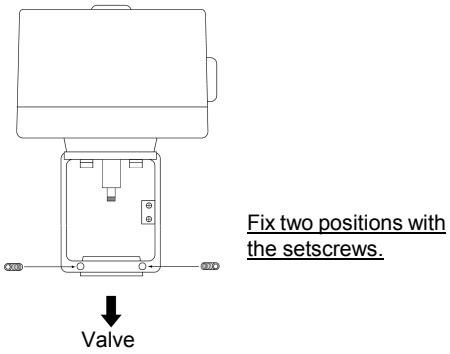



Figure 5. Fixing the actuator and yoke onto the valve

4. Connect the actuator output shaft and valve stem together with the stem adaptor. (See Fig. 6.)

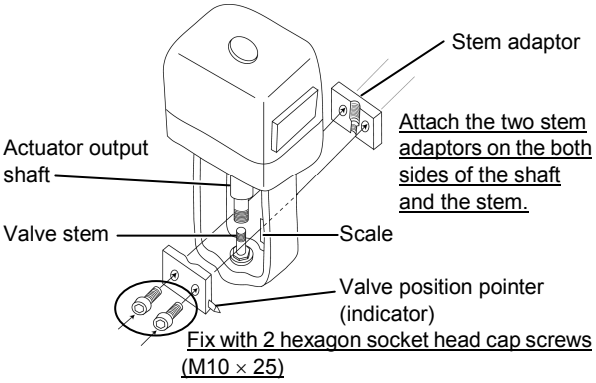



Figure 6. Connecting actuator output shaft and valve stem

5. Adjust the position of the scale plate so that the valve opening pointer points to S on the scale plate. To move the scale plate, loosen the screw fixing the scale plate on the yoke. (See Fig. 7.)

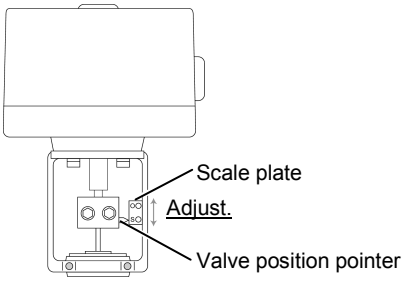



Figure 7. Adjusting the scale plate position

## Wiring

**⚠ CAUTION**

- Check that the model number of the actuator matches the power supply voltage. Incorrect combinations may damage the actuator.

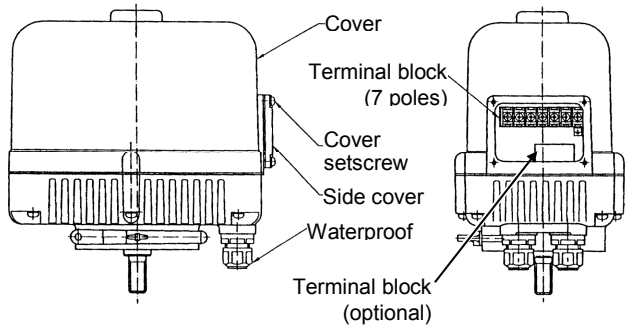



Figure 8. Parts for wiring

### Wiring precautions

- Remove the side cover and connect the wires to 7 poles of the terminal block (+ 3 poles of optional terminal block).
- Check Wiring diagram (Fig. 9) to avoid incorrect connection.
- Use cables with an outside diameter of ϕ9 to ϕ11 mm for the standard nylon resin waterproof conduit.

**⚠ CAUTION**

- After wiring, make sure to completely tighten the cover and conduit. Incomplete tightening may cause equipment damages.

Always install a protective fuse or circuit breaker on the power supply side. Refer to the following table for the capacity of the fuse (circuit breaker) and the capacity of power supply.

| Actuator model number | | Capacity of fuse/breaker | Power supply capacity* |
|---|---|---|---|
| MY9400/MY9402 (19 mm stroke) | 100 V AC | 3 A | Min. 30 W |
| | 200 V AC | 3 A | Min. 30 W |
| MY9401/MY9403 (38 mm stroke) | 100 V AC | 3 A | Min. 55 W |
| | 200 V AC | 3 A | Min. 55 W |

∗Note: Power supply capacity is 110 % of the actuator rated voltage at the maximum output.

### Terminal connection

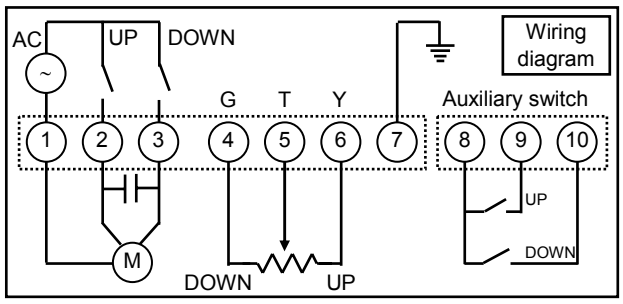



Figure 9. Terminal connection

Terminal 7 is the earth terminal.
The auxiliary switch (terminals 8, 9, 10) are optional (for Model MY940XX1 only).
The auxiliary switch turns ON between the terminals 8 and 9 when the valve (port B for three-way valve) is fully open, and turns OFF between the terminals 8 and 10 when the valve (port B for three-way valve) is fully closed.
The maximum voltage applicable to the feedback potentiometer (terminals 4, 5, 6) is 13.5 V DC. If excessive voltage is applied, the potentiometer may burn out.

**⚠ CAUTION**

- If two or more actuators are connected to one switch in parallel, they will not operate correctly and may be damaged.

## Operational Check

After wiring, repetitively operate the actuator to fully open the valve (port B for three-way valve) and to fully close the valve (port B for three-way valve). Check that the actuator operates correctly as follows.

- Manual operation: the actuator output shaft acts smoothly without being eccentric or tilted.
- Motorized operation: The high and low limit LEDs light up in the fully open and fully closed positions. (Refer to Fig. 10.)

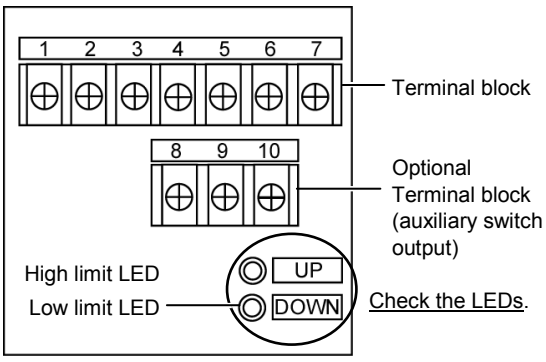



Figure 10. High and low limit LEDs

For actuators with options (Model MY940XX1), check that the auxiliary switch operates correctly.

### Manual Operation

⚠ CAUTION

- Before manual operation, make sure that the actuator power supply is turned off. If the actuator is operated manually with the circuit energized, the crank handle counter-rotates suddenly and may cause personal injuries.
- Keep the crank handle operation within the operation range. The operation under/over the operation range may cause equipment damages.

1) Remove the rubber cap on the top of the cover. A hexagonal hole is on the manual shaft.
2) Detach the crank handle, fixed with a wing bolt on the bottom of the actuator, and insert it into the hexagonal hole.
3) To move the shaft upward, turn the crank handle clockwise. To move the shaft downward, turn the handle counterclockwise. (One turn moves the valve about 3 mm.)
4) After manual operation is completed, replace the rubber cap.

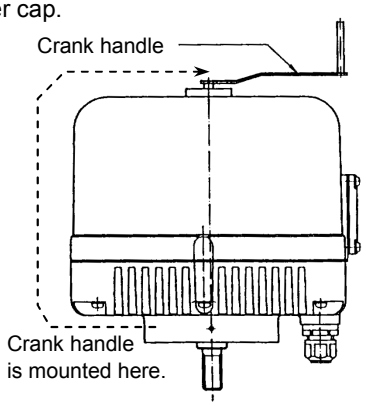



Figure 11. Manual operation

### Inspection and Maintenance

Carry out the following inspection about once every six months.

1) Check that the valve opening position and the high and low limit positions of the actuator match. Addtionally, check that the shaft moves up and down smoothly without being eccentric or tilted.
2) Check that the actuator operates correctly with the external operation commands. Additionally make sure that the motor stops at the high and low limit positions with the high/low limit LED ON).

Periodic lubrication is not necessary.
To restart operation from long-term standby status, be sure to first carry out the following checks.

1) Turn the power off and manually operate the handle to check that the actuator shaft is not eccentric or tilted and moves smoothly.
2) Remove the cover and check that no condensation is inside or no wire is incorrectly connected.

⚠ CAUTION

- After inspection, make sure to completely tighten each cover fixing screw. Incomplete tightening may cause equipment damages.

**Replaceable parts**

- Yoke set:
  Model QMY9400A1001 (for 19 mm stroke)
  Model QMY9400B1001 (for 38 mm stroke)
- Stem adaptor:
  Part No. 83163291-001 (for 19 mm stroke)
  Part No. 83163291-002 (for 38 mm stroke)

### Troubleshooting

| Problem | Cause | Action |
|---|---|---|
| Motor does not operate. | Actuator power supply is not ON. | Turn the power ON. |
| | Wire is disconnected, or terminal connection on the terminal block is loose. | Replace the wire or insert the terminals completely. |
| | Power voltage is incorrect or low. | Check the terminal voltage using a tester. |
| | Thermal protector is activated.<br>(Ambient temperature is too high, or valve load side is locked) | Reduce ambient temperature.<br>Check the valve action under manual operation. |
| | The motor malfunctions. | Replace the actuator |

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*Specifications are subject to change without notice*

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