OM Series Quarter-turn Electric Valve Actuator - Modulating Control

2020.06
SY01-B002D-EN

CAUTION !

- **Please ensure that the O-ring seal is in good condition prior to cover installation.**
- **Installation, maintenance and repair works must be performed by trained personnel.**
- **Do not use any tools to increase force on handwheel for operating as this can damage the actuator or valve.**

Installation Notices

a. Please read operation manual and wiring diagram carefully before installation.
b. Verify that supply voltage is in accordance with the data on nameplate to prevent short circuit or electrical/electronic parts damage caused by incorrect power input.
c. Turn power off before wiring or maintenance.
d. Connect the ground wire to PE point inside the electric actuator.
e. To avoid functional failure caused by static, do not touch any components on the PCB with metal tools or bare hands.
f. Do not parallel wire multiple actuators together without using an extra relay.
g. Use proper techniques when installing conduit and properly seal the connection. Do not mount the actuator with conduit entries in upright position to prevent condensation from entering the unit.
h. Actuator should be installed in an upright or horizontal position. Do not mount upside down or below a horizontal position.
i. These units are not designed to operate in vacuum spaces or where an explosive atmosphere exists.
j. Periodically inspect actuator enclosure to prevent dust from accumulating.

Sizing

a. The actuator shall be sized to ensure that its torque output meets the load requirements of valve and its ability to overcome the required duty cycle of application. (As a MINIMUM, a 30% safety factor when calculating the torque requirement. Refer to the example below.)

- If the maximum torque of 5" valve is 80 N·m
  → 80 × 1.3 (safety factor) = 104 N·m
  104 N·m < 150 N·m (OM-3) →OK!
  104 N·m > 90 N·m (OM-2) →Not OK!

b. In cases where the actuator does not fit directly onto the valve, a mounting kit is required. Please ensure the bracket and coupling are properly designed and manufactured to withstand the torque output of the actuator.

Manual Device Installation

- **OM-1 & OM-AM**

Manual Position

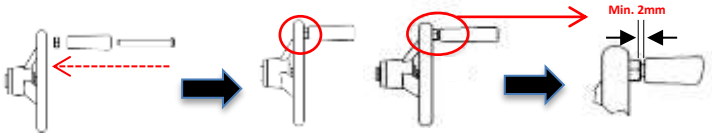
- Use a 8 mm wrench to rotate the shaft.
- Max. torque：5 N·m

Manual Position

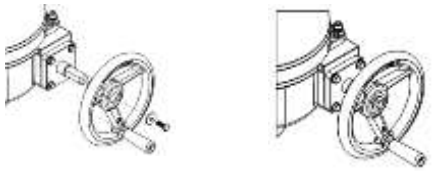
- Use a 5 mm wrench to rotate the shaft.
- Max. torque：5 N·m

- **OM-2 to 13, OM-F, OM-G, and OM-H**

a. Pass the screw through the handle and tighten the nut onto handwheel.
⚠ **Do not overtighten.**
b. Secure the handle to the wheel with the slotted screw and tighten the locknut all the way down to the wheel. Ensure that the locknut is locked between the wheel and the handle.
⚠ **Leave a 2 mm gap between the locknut and the handle as the figure below to allow the handle free to rotate and then to have a smooth manual operation.**



c. Slide fixing screw through washers and handwheel and secure them to override shaft as shown in the figure below.
⚠ **Turn off power when installing handwheel.**
d. Assembly completed as shown in the figure below.



Valve Mounting Instructions

a. Make sure both the valve and actuator are in the same position before mounting, either fully-open or fully-closed. If not, use the manual override to correct this.
b. Once mounted together, either directly or with a mounting kit, ensure that they are properly secured together and all fasteners are tightened.
⚠ **Remove all of valve handle parts, for example, the handle or open/close mechanical stops so as to not interfere with the actuator.**
c. Check again that the valve and actuator are in the same position.
d. Remove the conduit entry plug to relieve the pressure inside the actuator for the ease of the top cover removal and gently remove the cover.
⚠ **The power must be off before removing the cover.**
e. Refer to operation manual section 4.3 (P.9) for wiring notices and connect the wires according to the wiring diagram labeled inside the cover of actuator.
⚠ **Before operating a three-phase voltage actuator, please manually operate it to mid-travel position by the handwheel and power up to check if it rotates properly in order to verify the phase sequence is correct. If it is incorrect, please correct the phase errors by changing the connection of any two of power supply wires U, V, W to prevent the actuator from mechanical damages.**
f. Supply power to actuator.
⚠ **Care must be taken at all times as there are live circuits present that may cause electrical shock.**
g. Re-calibration may be require for the end positions, refer to Actuator Set-up section for further instructions.
h. Refer to Modulating Control Board Adjustment.
⚠

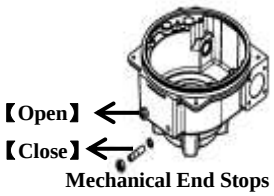
- **Use insulated wires and length should be less than 30m.**
- **A minimum of 18 AWG wiring is recommended for all field wiring.**
- **Turn power off before changing any setting.**

i. Assemble the cover and secure cover screws firmly after setting.
⚠ **Please ensure that the O-ring is in good condition prior to cover installation.**

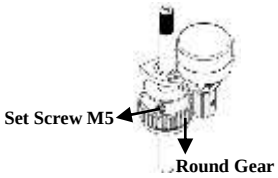
Actuator Set-up

CAUTION:
- **The power must be off during this procedure so as to avoid damage to the actuator.**
- **Do not make adjustments to the mechanical end stops when actuator is in motion.**
- **All steps below must be completed before normal operation.**

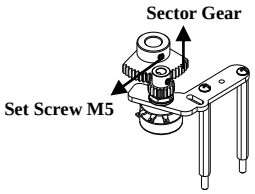
a. Turn power off.
b. Loosen the locknut and unwind both Open and Close Mechanical end stop screws for 7 turns.
c. Loosen the M5 set screw on the sector gear or round gear.



Mechanical End Stops



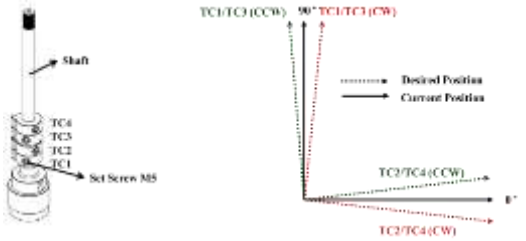
【OM-1, OM-A and OM-AM】



【OM-2 to OM-13, OM-F, OM-G and OM-H】

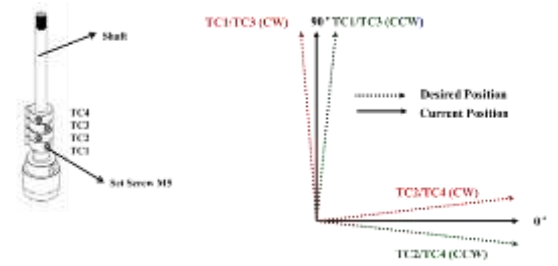
d. Refer to below illustrations to adjust the TC1 - TC4 to set the fully-open and fully-closed position.

【OM-A and OM-AM】 **Tool：2.5 mm Allen Key**



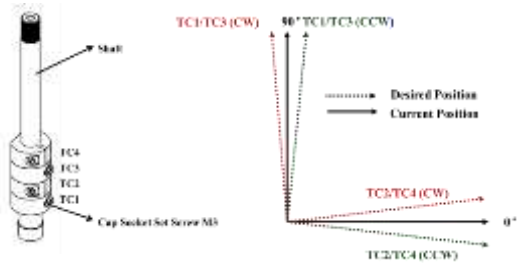
TC2"CLOSE"	**Clockwise：increase closing degree.**
TC4 (Optional Item)	**Counter-clockwise：decrease closing degree.**
TC1"OPEN"	**Clockwise：decrease opening degree.**
TC3 (Optional Item)	**Counter-clockwise：increase opening degree.**

【OM-1】 **Tool：2.5 mm Allen Key**



TC2"CLOSE"	**Clockwise：decrease closing degree.**
TC4 (Optional Item)	**Counter-clockwise：increase closing degree.**
TC1"OPEN"	**Clockwise：increase opening degree.**
TC3 (Optional Item)	**Counter-clockwise：decrease opening degree.**

【OM-2 to OM-13, OM-F, OM-G and OM-H】 **Tool：2.5 mm Allen Key**



TC2"CLOSE"	**Clockwise：decrease closing degree.**
TC4 (Optional Item)	**Counter-clockwise：increase closing degree.**
TC1"OPEN"	**Clockwise：increase opening degree.**
TC3 (Optional Item)	**Counter-clockwise：decrease opening degree.**

e. Supply power to the fully-open position. Screw in the Open (left) Mechanical end stop screw until it bottoms out, and then turn back for 3/4-1 turn based on the actuator model listed below.
- OM-2 to OM-6, OM-F, OM-G and OM-H：1 turn.
- OM-7 to OM-8：3/4 turn.
- OM-9 to OM-13：1/2 turn.

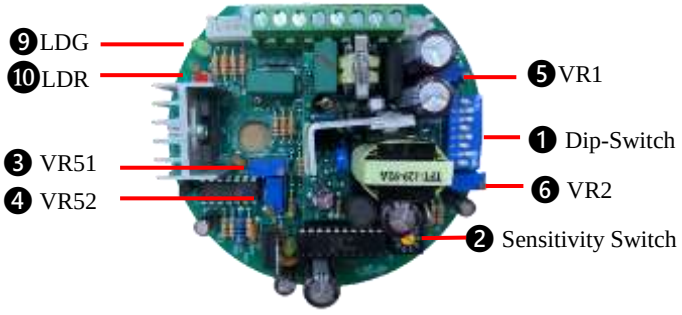
f. Tighten the locknut.
g. Supply power to the fully-closed position. Screw in the Close (right) Mechanical end stop screw until it bottoms out, and then turn back for 3/4-1 turn based on the actuator model listed below.
- OM-2 to OM-6, OM-F, OM-G and OM-H：1turn.
- OM-7 to OM-8：3/4 turn.
- OM-9 to OM-13：1/2 turn.

h. Tighten the locknut of mechanical end stops.
i. Supply the power to confirm that the limit switches achieve the fully open-close stroke.
j. Supply power to run the actuator to the fully-closed position. Adjust the gear and the set screws based on the actuator model listed below.
- OM-A and OM-AM：Rotate the round gear counter-clockwise to the end and tighten the M5 set screw.
- OM-1：Rotate the round gear clockwise to the end and tighten the M5 set screw.
- OM-2 to OM-13, OM-F, OM-G and OM-H：Rotate the sector gear clockwise to the end and tighten the M5 set screw.

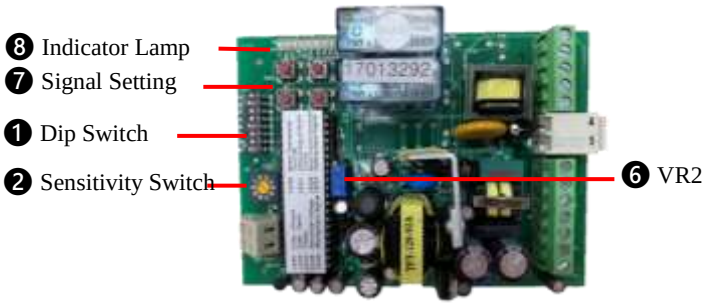
k. The setting procedure is now completed.

Modulating Control Board Adjustment

▲Turn power off before adjusting below settings.
- **OM-A, OM-AM & OM-1**
  ((The layout is based on the actuator in 110 / 220V.)



● **OM-2 to OM-13, OM-F, OM-G & OM-H**
(The layout is based on the actuator in 110 / 220V.)



❶ Dip Switch Setting (Original Factory Setting：1, 4, 8 ON)

Analog Signal Setting

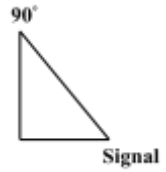
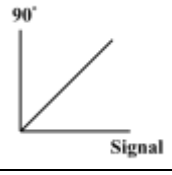
* S1, S2：Input Signal Setting* S3, S4 & S5：Output Signal Setting

Input Signal	S1	S2
4 - 20 mA	ON	OFF
1 - 5 V	OFF	OFF
2 - 10 V	OFF	ON

Output Signal	S3	S4	S5
4 - 20 mA	OFF	ON	OFF
2 - 10 V	ON	OFF	ON

* S6, S7 & S8：Setting of fail position when input signal fails.

⚠ **The input signal type is set by switches 1 and 2. And switch 6 is used to set the corresponding relationship between value of input signal and operation direction of actuator.**

Symbol	S6	S7	S8	Signal Failed Position
	ON	OFF	ON	Fully-Open (90°)
		ON	OFF	Fully-Closed (0°)
		ON	ON	The Last Position
	OFF	ON	OFF	Fully- Open (90°)
		OFF	ON	Fully- Closed (0°)
		ON	ON	The Last Position

❷ Sensitivity Switch Setting (SW2)

a. When switched to “1”: The Highest Sensitivity.
When switched to “0”: The Lowest Sensitivity.
b. Original factory setting
- OM-1 to 13, OM-H, OM-A & OM-AM: 3.
- OM-F & OM-G: 0.

❽ Indicator Lamp LD1 - LD 9

LD1	Fully-closed	LD6	Motor thermal protector activated
LD2	Fully-open	LD7	Output signal short circuit
LD3	Power	LD8	Overcurrent in motor
LD4	Abnormal input voltage	LD9	Local setting mode
LD5	Wrong input signal		

❸、❹、❺、❻、❼ Signal Setting for Open and Close Position

●**OM-A, OM-AM & OM-1**

⚠ **These settings are set and calibrated at the factory. Mostly, they do not need to be recalibrated. Please follow steps below to set when required.**

⚠ **Use a multimeter to measure the output signal in accordance with the selected signal type.**

Variable Resistor	Signal type to be adjusted	Position to be adjusted
VR1	To adjust 10 V, 20 mA input signal	Fully-Open
VR51	To adjust 10 V, 20 mA output signal	Fully-Open
VR2	To adjust 2 V, 4 mA input signal	Fully-Closed
VR52	To adjust 2 V, 4 mA output signal	Fully-Closed

⚠ **If VR51 and VR52 are adjusted, VR1 and VR2 must be adjusted accordingly.**

Signal setting for Fully-OPEN position

Rotate VR1 counter-clockwise until a light click is heard, then apply10 V or 20 mA to the modulating board. After that, slightly rotate VR1 clockwise until the LDG goes on and then adjust VR51 to complete the setting. When adjusting VR51, if the LDG is off, keep rotating VR1 clockwise until the LDG goes on.

VR51：↻ Clockwise：decreasing signal value.
↺ Counter-clockwise：increasing signal value.

Signal setting for Fully-CLOSED position

Rotate VR2 clockwise until a light click is heard, then apply 2 V or 4 mA to the modulating board. After that, slightly rotate VR2 counter-clockwise until the LDR goes on and then adjust VR52 to complete the setting. When adjusting VR52, if the LDR is off, keep rotating VR2 counter-clockwise until the LDR goes on.

VR52：↻ Clockwise：decreasing signal value.
↺ Counter-clockwise：increasing signal value.

● **OM-2 to OM-13, OM-F, OM-G & OM-H**

Press and hold “SET” switch for 2 seconds until LD9 lights to enter local setting mode.

Signal setting for Fully-OPEN position

a. Press and hold “UP” switch to operate the actuator to open until it has reached fully-open position and LD2 lights and then input a signal 5 V or 10 V or 20 mA.
b. Press “MODE” switch for 2 seconds to complete the setting of fully-open position.

Signal setting for Fully-CLOSED position

a. Press and hold “DN” switch to operate the actuator to close until it has reached fully-closed position and LD1 lights and then input a signal 1 V or 2 V or 4 mA.
b. Press “MODE” switch for 2 seconds to complete the setting of fully-closed position.

ⓘ **See below description for VR2 adjustment：**

VR2：↻ Clockwise: decreasing signal value.
↺ Counter -clockwise: increasing signal value.

After completing the above settings, press “SET” switch to quit local setting.