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 manual override device 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 suitable water-proof cable gland to ensure it fits the conduit entry size, diameter of the cable and the enclosure protection of the actuator when wiring. The water-proof cable gland must be tightened and flattened to the cable after wiring procedure and use proper black water-proof plug to seal unused conduit entry and fasten the top cover of the actuator to prevent dust or water from entering the actuator. The red plastic dust-proof plug is not meant for long-term use. Replace it with suitable water-proof connector to ensure the enclosure protection rating.
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.
k. Please obey the local environment regulation for equipment scrapping.

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 Nm
→ 80 × 1.3 (safety factor) = 104 Nm
104 Nm < 200 Nm (CM-200) →OK!
104 Nm > 100 Nm (CM-100) →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 Override Device Setting

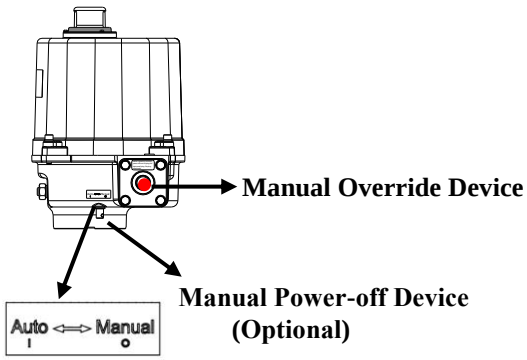
WARNING !

- **Ensure power is OFF before operating the manual override device if manual power-off device is not equipped.**
- **If manual power-off device is equipped, ensure the switch is in "Manual" mode before operating manually. Switch back to "Auto" mode before operating electrically again.**
- **Reconfirm it switches to "Auto" mode if the actuator didn't react after supplying power.**

Users can open or close the actuator with the manual override device. Please remove the red dust- proof plug on the manual override device when manual operation is required and put the red dust-proof plug back after finishing the manual operation.

a. Use the tool to insert the manual power-off device to switch the actuator from electrical operation (Auto) to manual operation (Manual).
b. Remove the red dust-proof plug from the manual override device and refer the table below to open or close the actuator.

Model No.	Allen Key	Fully-open→Fully-closed
CM-100 to CM-200	8 mm	10 turns
CM-300 to CM-600	10 mm	8.5 turns



c. After finishing the manual override device operation, switch the actuator from manual operation (Manual) back to electrical operation (Auto).

Valve Mounting Instructions

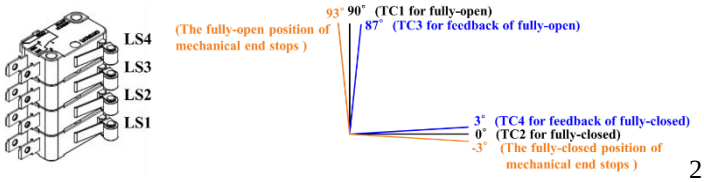
a. Make sure both the valve and actuator are in the same position before mounting, either fully-open or fully-closed. If not, use the manual override to correct this.
b. Once mounted together, either directly or with a mounting kit, ensure that they are properly secured together and all fasteners are 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 operating manual section 4.3 (P.8) 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 manual override device 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 required for the end positions, refer to Actuator Set-up section for further instructions.
h. Refer to Modulating Control Board Adjustment section.
   ⚠ **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.**

Instructions - Fully-open and fully-closed position limit switches

- The travel cams are set to control the open and closed position of the actuator. When the travel cams activate the limit switch, the actuator will start to run; otherwise, it will stop.
- The standard is equipped with two limit switches (LS1 & LS2) and cams (TC1 & TC2).
  LS1 & LS2：LS1 is for open and LS2 is for close. Travel limit settings for starting and cutting off the motor power to reach the fully-open and fully-closed positions.
  LS3 & LS4 are optional. They allow external equipment to confirm that the valve has reached the fully-open and fully-closed positions.
  ⚠ **LS3 (LS4) should activate before LS1 (LS2).**



Instructions – Dry contact sequence diagram:

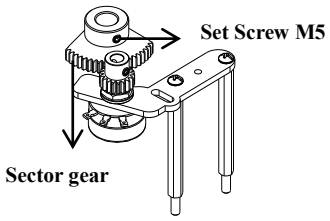
- The state of dry contact feedback signal:
  - Solid line (——): Dry contact in conductive state.
  - Dotted line (----): Dry contact in non-conductive state.

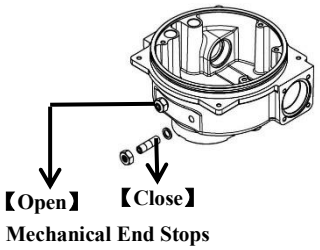
【CM-100 to CM-600】

Symbol	Contact	Position 100%	Position 0%
LS4 (Dry Contact)	D - F	——	----
	D - E	----	——
LS3 (Dry Contact)	A - C	——	----
	A - B	----	——

Adjustment Steps

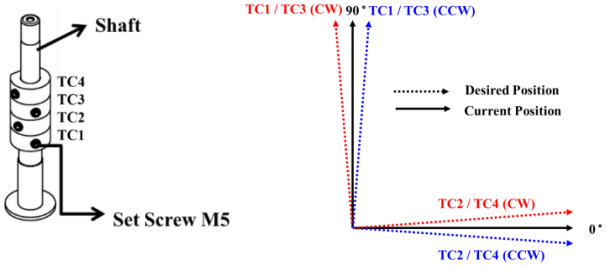
a. Turn power off.
b. Loosen the locknut and unwind both Open and Close Mechanical end stop screws for 7 turns.
c. Loosen the M5 set screw on the sector gear.





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

【CM-100 to CM-600】 **Tool：2.5 mm Allen Key**



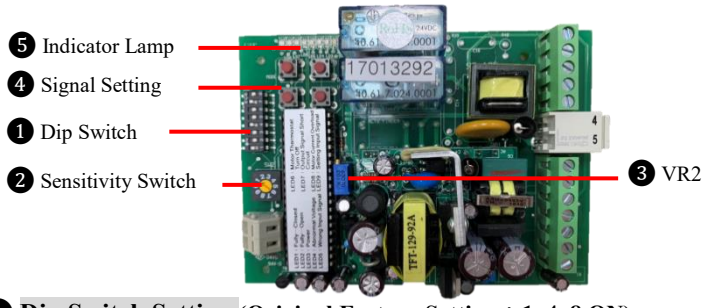
TC 2 "CLOSE"	↻	**Clockwise: decrease closing degree.**
TC 4 (Optional Item)	↺	**Counter-clockwise: increase closing**
TC 1 " OPEN"	↻	**Clockwise: increase opening degree.**
TC 3 (Optional Item)	↺	**Counter-clockwise: decrease opening degree.**

e. Supply the power and unwind the mechanical end stop screws to the fully-open position for 1 turn.
f. Tighten the locknut.
g. Supply the power and unwind the mechanical end stop screws to the fully-closed position for 1 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. After completing the fully-open and fully-closed calibration, run the actuator to the fully-closed position, and then rotate sector gear counterclockwise to the end and tighten M5 set screw.
k. The setting procedure is now completed.

Modulating Control Board Adjustment

The layout is based on 110 / 220 V AC.

▲Turn power off before adjusting below settings.



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

Analog Signal Setting

* S1, S2：Input Signal Setting

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

* S3, S4 & S5：Output Signal Setting

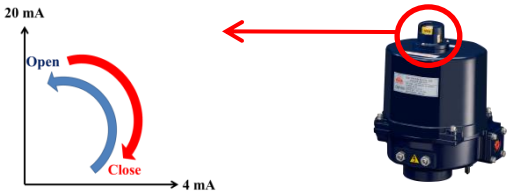
Output Signal	S3	S4	S5
4 - 20 mA	OFF	ON	OFF
2 - 10 V	ON	OFF	ON

* S6：Close direction setting

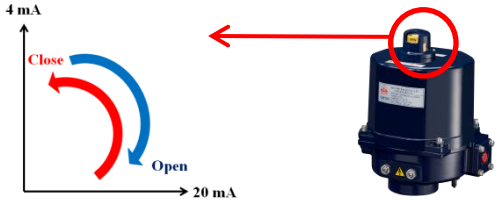
- When S6 is set to OFF, the close direction is CW (clockwise).
- When S6 is set to ON, the close direction is CCW (counterclockwise).

⚠ **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 as shown in the figure below, e.g., 4 - 20 mA input signal.**

⚠ **The operating direction of the actuator has been set and calibrated at the factory. Be sure to change the direction of the position indicator if different operating direction is required.**



S6	Position Indicator (Fully-Open→Fully-Closed)	Operating Position	Input Signal	LED	Output Signal
OFF	CW	Fully-Closed	1 V, 2 V, 4 mA	LD1 ON	2 V, 4 mA
		Fully-Open	5 V, 10 V, 20 mA	LD2 ON	10 V, 20 mA



S6	Position Indicator (Fully-Open→Fully-Closed)	Operating Position	Input Signal	LED	Output Signal
ON	CCW	Fully-Closed	1 V, 2 V, 4 mA	LD1 ON	2 V, 4 mA
		Fully-Open	5 V, 10 V, 20 mA	LD2 ON	10 V, 20 mA

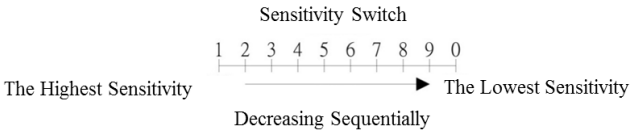
* S7 & S8：Setting of fail position when input signal failed.

Signal Failed Position	S7	S8
Fully-Open	ON	OFF
Fully-Closed	OFF	ON
The Last Position	ON	ON
	OFF	OFF

2 Sensitivity Switch Setting (SW2)

a. When switched to "1": The Highest Sensitivity.
When switched to "0": The Lowest Sensitivity.

b. Original factory setting
➢ CM-100 ~ CM-600 : 3



4 Signal Setting for Open and Close Position

⚠ **These settings are set and calibrated at the factory. Be sure to reset the Signal Setting for Open and Close Position when recalibrating TC1 and TC2 for fully-open and fully-closed position or other signal types are required.**

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

Press and hold "SET" button for 2 seconds until LD9 lights to enter local setting mode.

Signal setting for Fully-OPEN position

a. Press and hold "UP" button 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" button for 2 seconds until LD2 flashes to complete the setting of fully-open position.

Signal setting for Fully-CLOSED position

a. Press and hold "DN" button 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" button for 2 seconds until LD1 flashes 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" button to quit local setting.

5 Indicator Lamp (LD1 - LD9)

Lamp	Status	Lamp	Status
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		