



## 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

- Please read operation manual and wiring diagram carefully before installation.
- 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.
- Turn power off before wiring or maintenance.
- Connect the ground wire to PE point inside the electric actuator.
- To avoid functional failure caused by static, do not touch any components on the PCBA with metal tools or bare hands.
- Do not parallel wire multiple actuators together without using an extra relay or equipping with Isolation relay module.
- 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 original 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.
- Actuator should be installed in an upright or horizontal position. Do not mount upside down or below a horizontal position.
- These units are not designed to operate in vacuum spaces or where an explosive atmosphere exists.
- Periodically inspect actuator enclosure to prevent dust from accumulating.
- Please obey the local environment regulation for equipment scrapping.
- If the actuator is installed in a low-temperature environment and not operated according to the rated duty cycle, the initial startup time may be delayed.

### Sizing

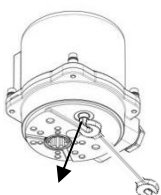
- The actuator shall be sized to ensure that its torque output meets the load requirements of valve and its ability to overcome the required duty cycle of application. (As a MINIMUM, a 30% safety factor when calculating the torque requirement. Refer to the example below.)

- If the maximum torque of 5" valve is 80 Nm  
 $\rightarrow 80 \times 1.3$  (safety factor) = 104 Nm  
 $104 \text{ Nm} < 150 \text{ Nm (OM-3)} \rightarrow \text{OK!}$   
 $104 \text{ Nm} > 90 \text{ Nm (OM-2)} \rightarrow \text{Not OK!}$

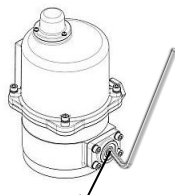
- In cases where the actuator does not directly fit onto the valve, a mounting kit is required. Please ensure the bracket and coupling are properly designed and manufactured to withstand the torque output of the actuator.

### Manual Device Installation

- OM-1, OM-AM



Manual Position

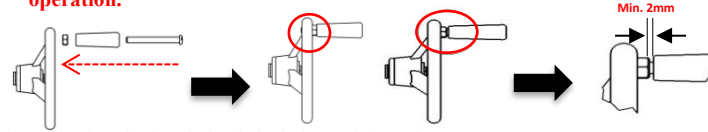


Manual Position

- OM-1:  
Use a 8 mm wrench to rotate the shaft.  
Max. torque : 5 Nm.
- OM-AM:  
Use a 5 mm wrench to rotate the shaft. Max. torque : 5 Nm.

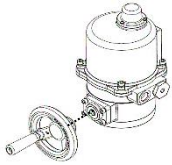
### ● OM-AM (Optional)

- Pass the screw through the handle and tighten the nut onto handwheel.  
 ⚠ **Do not overtighten.**
- 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.**



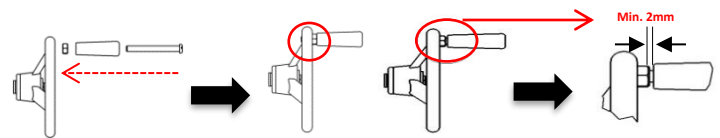
- After aligning the handwheel shaft, insert it into the actuator's mounting hole.

- ⚠ **After manual operation is completed, be sure to remove the handwheel.**
- ⚠ **Do not install the handwheel on the actuator during electric operation to avoid potential hazards.**



### ● OM-2 to OM-13, OM-F, OM-G and OM-H

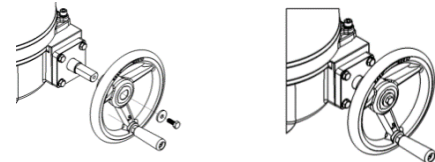
- Pass the screw through the handle and tighten the nut onto handwheel.  
 ⚠ **Do not overtighten.**
- Secure the handle to the wheel with the slotted screw and tighten the locknut all the way down to the wheel. Ensure that the locknut is locked between the wheel and the handle.  
 ⚠ **Leave a 2 mm gap 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.**



- 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.**

- Assembly completed as shown in the figure below.



### Valve Mounting Instructions

- 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.
- 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.**
- Check again that the valve and actuator are in the same position.
- 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.**
- Refer to operation manual section 4.2 (P.10) 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.**
- Supply power to actuator.  
 ⚠ **Care must be taken at all times as there are live circuits present that may cause electrical shock.**
- Re-calibration may require for the end positions, refer to Actuator Set-up section for further instructions.
- 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.**
- Assemble the cover and secure cover screws firmly after setting.  
 ⚠ **Please ensure that the O-ring is in good condition prior to cover installation.**

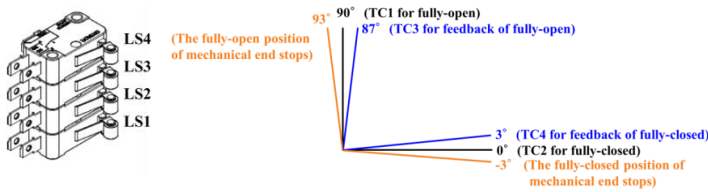
## Actuator Set-up

### 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.

#### 【OM-1, OM-A and OM-AM】

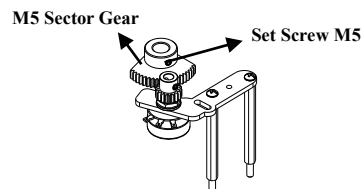
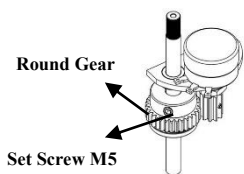
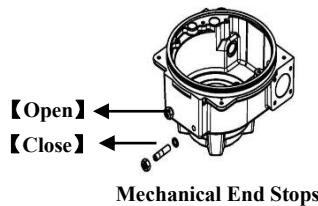
Symbol	Contact	Position	
		100%	0%
LS4 (Dry Contact)	A - F	---	—
	A - E	—	---
LS3 (Dry Contact)	A - C	—	---
	A - B	---	—

#### 【OM-2 to OM-13, OM-F, OM-G and OM-H】

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

### Adjustment Steps

- Turn power off and remove the top cover.
- Loosen the locknut and unwind both Open and Close Mechanical end stop screws for 7 turns.  
▲ **Mechanical end stops setting is available for OM-2 to OM-13, OM-F, OM-G, and OM-H.**
- Loosen the M5 set screw on the sector gear or round gear.



【OM-1, OM-A and OM-AM】

【OM-2 to OM-13, OM-F, OM-G and OM-H】

- 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 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)** ⤵ Counter-clockwise: increase opening degree.

#### 【OM-1】

Tool: 2 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.

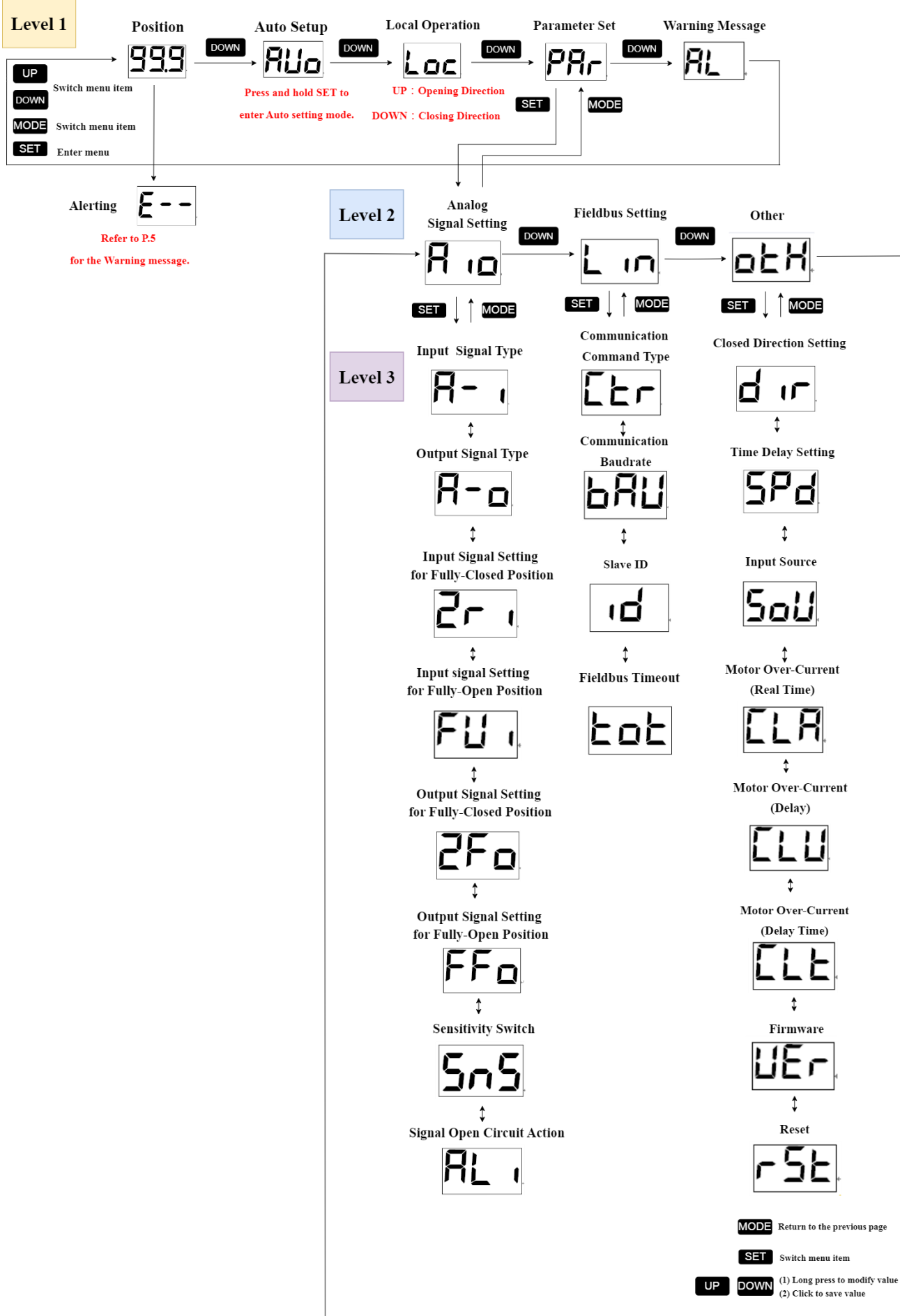
#### 【OM-2 to OM-13, OM-F, OM-G and OM-H】

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.

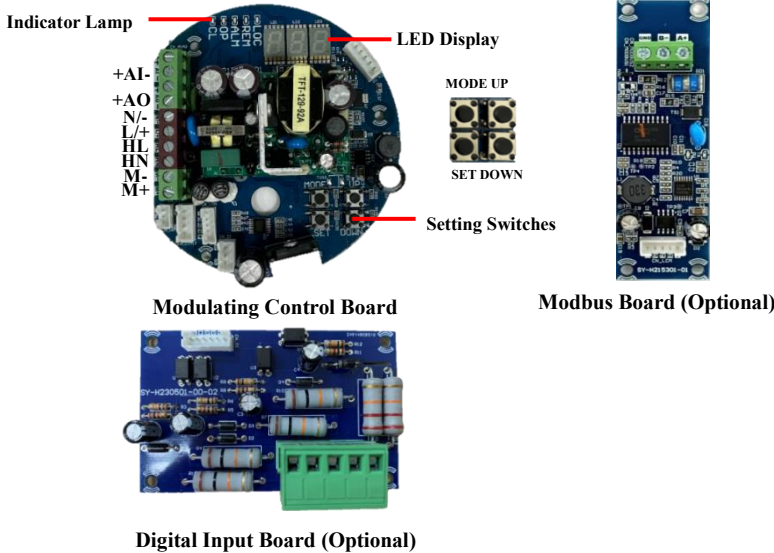
- Supply power to the fully-open position. Screw in the Open (left) Mechanical end stop screw until it bottoms out, and then turn back for 1/2, 3/4 or 1 turn based on the actuator model listed below.
  - OM-2 to OM-6, OM-F, OM-G and OM-H: 1 turn.
  - OM-7 to OM-8: 3/4 turn.
  - OM-9 to OM-13: 1/2 turn.
- Tighten the locknut of mechanical end stops. (Max. Torque : 5.88 Nm)
- 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 1/2, 3/4 or 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.
- Tighten the locknut of mechanical end stops. (Max. Torque : 5.88 Nm)
- Supply power to run the actuator to the fully-closed position and tighten the set screw of VR gear 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.
- The setting procedure is now completed.

PCB Setting Modulating board Settings Menu (OM-1, OM-A and OM-AM)



## Modulating Control Board Adjustment (OM-1, OM-A and OM-AM)

- ⚠ **If the LED display is not operated for ten minutes, it will go out and return to the first level `999`. Please press any button to display it again. In local control mode, the LED display will return to remote control mode after it goes out.**
- ⚠ **The layout is based on 110 / 220 V AC.**
- ⚠ **Modulating board, Modbus board, and digital input board (DI) can be installed simultaneously, but only one can be used for control.**



### ● Analog Signal Connection Terminal Blocks

Terminal	Status
AO -	Analog signal output (-)
AO +	Analog signal output (+)
	N/A
AI -	Analog signal input (-)
AI +	Analog signal input (+)

### ● Lamp Status

Lamp Code	Actuator Status
CL	Light on: Fully-Closed Flashing: Closing Direction
OP	Light on: Fully-Open Flashing: Opening Direction
ALM	Alerting Signal
REM	Remote Control Mode
LOC	Local Control Mode

### ● Auto Setup `PL0`

- ⚠ **Be sure to reset OPEN and CLOSE position according to the following steps after recalibrating fully-open and fully-closed position .**

- Auto setup for the fully-open and fully-closed positions.
- Setting Steps:
  1. Press “DOWN” several times to get into `PL0`.
  2. Press and hold “SET” around 3 sec to enter Auto Setup mode, Steps 3 to 5 will be executed automatically.
  3. Auto run the actuator in CCW direction until the display shows 100% to reach the fully-open position.
  4. Auto run the actuator in CW direction until the display shows 0% to reach the fully-closed position.
  5. The setting is completed.
  6. After completing the `PL0` setup, please set the input mode setting `S01` to choose the operation mode of the actuator according to the required control type.

- Local Control `LOC`
  - The actuator could be directly controlled in the field.
  - Setting Range: 0% to 100%.
  - Setting Steps:
    1. Press “DOWN” several times to get into `LOC` .
    2. Press “SET” until `LOC` comes on to enter local control mode. The indicator will show the current position and the `LOC` indicator lamp will light on.
    3. Press “UP” and “DOWN” buttons to perform open and close settings. Press “UP” to run the actuator toward opening direction and press “DOWN” to run the actuator toward closing direction.
    4. Press “MODE” to complete the local operation and return to remote control mode.
- Parameter Setting `PRR`
  - Please refer to the operation manual `S01` (P.36), then configure the signals and other parameters according to the selected input mode. If the input mode is changed, adjust the wiring according to the corresponding wiring diagram.

## Analog Signal Setting `F10`

- ⚠ **Use a multimeter to measure the output signal in accordance with the selected signal type.**
- ⚠ **Be sure to complete the analog input / output signal type setting before setting the fully-closed / fully-open input / output signal.**

- a. Analog Input Type `F10`
  - Analog input signal type setting.
  - Default setting: `000`
  - Setting Steps:
    1. Press “DOWN” several times until `PRR` displays, then press “SET” once to enter parameter setting.
    2. Press “UP” or “DOWN” until `F10` displays, then press “SET” once to enter signal setting.
    3. Press “UP” or “DOWN” until `F10` displays, then press “SET” once to enter analog input signal type setting.
    4. Press and hold “SET” around 3 sec until the indicator shows the parameter code and flashes.
    5. Press “UP” or “DOWN” to select desired parameter code according to the following table.

Parameter Code	Input Signal Type
<code>000</code>	4 - 20 mA
<code>001</code>	0 - 20 mA
<code>002</code>	1 - 5 V
<code>003</code>	0 - 5 V
<code>004</code>	2 - 10 V
<code>005</code>	0 - 10 V

6. Once selected, press “SET” once to complete analog input signal type setting.
- b. Output Signal Type `F10`
  - Output signal type setting.
  - Default Setting: `000`
  - Setting Steps:
    1. Press “DOWN” several times until `PRR` displays, then press “SET” once to enter parameter setting.
    2. Press “UP” or “DOWN” until `F10` displays, then press “SET” once to enter analog signal setting.
    3. Press “UP” or “DOWN” until `F10` displays, then press “SET” once to enter output signal type setting.
    4. Press and hold “SET” around 3 sec until the display shows the parameter code and flashes.

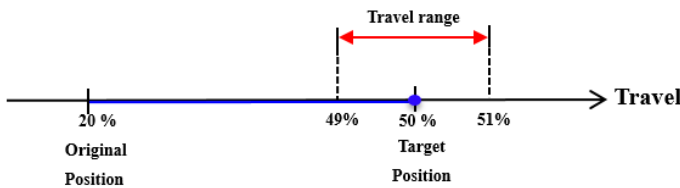
5. Press "UP" or "DOWN" to select desired parameter code according to the following table.

Parameter Code	Output Signal Type
000	4 - 20 mA
001	0 - 20 mA
002	1 - 5 V
003	0 - 5 V
004	2 - 10 V
005	0 - 10 V

6. Once selected, press "SET" once to complete analog output signal type setting.

c. Sensitivity Setting 5r5

- When the value of sensitivity (%) is lower, the resolution of the input signal will be higher, and relatively the dead band will be smaller. Excessive high resolution may cause the actuator to keep hunting and could not run to the desired position which will lead to the thermostat inside the motor to trip because of overheating, and finally the actuator will shut down. If this situation happens, it is suggested to adjust the sensitivity setting.
- Setting Range: 0.1 % to 5.0 %
  - When set to 0.1 %, it means that the allowable tolerance is ±0.1 %, which is the highest sensitivity.
  - When set to 5.0 %, it means that the allowable tolerance is ± 5 %, which is the lowest sensitivity.
  - For example, if the sensitivity switch is set to 1% and the target position is 50 %, the valid travel range will be from 49 % to 51 % as shown in the figure below.



- Default Setting: 0.7 %.
- Setting Steps:
  1. Press "DOWN" several times until PRr displays, then press "SET" once to enter parameter setting.
  2. Press "UP" or "DOWN" until F 10 displays, then press "SET" once to enter analog signal setting.
  3. Press "UP" or "DOWN" until 5r5 displays, then press "SET" once to enter sensitivity setting.
  4. Press and hold "SET" around 3 sec until the display shows the value and flashes.
  5. Press "UP" or "DOWN" to adjust the sensitivity setting value.
  6. Press "SET" to complete the sensitivity setting.

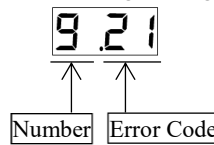
d. Signal Open Circuit Action AL

- Action when the input signal fails or communication protocol timeout.
  - ⚠ **This function is only available when the input signal type F- is set to 4 - 20 mA, 1 - 5 V or 2 - 10 V.**
- Setting Steps: 000 to 002.

Parameter Code	Instruction
<span style="border: 1px solid black; padding: 2px;">000</span>	Stay at the last position when input signal fails or communication protocol timeout.
<span style="border: 1px solid black; padding: 2px;">001</span>	Run to the fully-open position when input signal fails or communication protocol timeout.
<span style="border: 1px solid black; padding: 2px;">002</span>	Run to the fully-closed position when input signal fails or communication protocol timeout.

- Default Setting: 002
- Setting Steps:
  1. Press "DOWN" several times until PRr displays, then press "SET" once to enter parameter setting.
  2. Press "UP" or "DOWN" until F 10 displays, then press "SET" once to enter analog signal setting.
  3. Press "UP" or "DOWN" until AL displays, then press "SET" once to enter signal open circuit action mode.
  4. Press and hold "SET" around 3 sec until the display shows the value and flashes.
  5. Press "UP" or "DOWN" to adjust the value.
  6. Press "SET" to complete the signal open circuit action setting.
    - ⚠ **When set to 001 or 002, if a signal open circuit occurs, the actuator will operate to close direction for 1 second before executing the setting function.**

e. Warning Messages AL



1. Press "UP" or "DOWN" to switch the number from 0 to 9.
2. Press and hold "SET" to clean all the error data.
3. Press "MODE" to return to the first level.
4. A maximum of 10 records can be recorded. Number 9 is the latest data and number 0 is the oldest data.
5. The first digit shows the number of records, and the second and third one show the error code.
6. The latest data is listed at the top and the oldest data at the bottom.

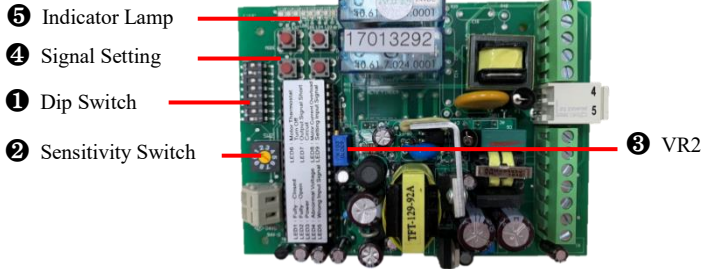
Error Code	Warning Message	Solution
<span style="border: 1px solid black; padding: 2px;">11</span>	Limit Switch Fault	Refer to P.2 for adjustment steps setting.
<span style="border: 1px solid black; padding: 2px;">19</span>	Digital Input Fault	Please exclude the input signal of open and closed are both ON.
<span style="border: 1px solid black; padding: 2px;">21</span>	Input Signal Fault	Please set the correct input signal type.
<span style="border: 1px solid black; padding: 2px;">22</span>	Output Signal Fault	Please refer to the wiring diagram to confirm whether the input signal are connected correctly. ("AO-" to "AO+").
<span style="border: 1px solid black; padding: 2px;">23</span>	Flash Memory and Operating Status Fault	Replace a new modulating board.
<span style="border: 1px solid black; padding: 2px;">25</span>	MODBUS Timeout	Please check if the main control of the system is normal.
<span style="border: 1px solid black; padding: 2px;">27</span>	Low Input Voltage	a. Confirm the supply power. b. Replace a new power board.
<span style="border: 1px solid black; padding: 2px;">30</span>	Installation Error of Potentiometer	Contact the seller.
<span style="border: 1px solid black; padding: 2px;">31</span>	Positioning Fault	Refer to P.5 c. for sensitivity setting.
<span style="border: 1px solid black; padding: 2px;">32</span>	OPEN Potentiometer Fault	Confirm that if the torque is overloaded or the motor is locked. If this problem cannot be solved, please contact the seller.
<span style="border: 1px solid black; padding: 2px;">33</span>	CLOSE Potentiometer Fault	Confirm that if the torque is overloaded or the motor is locked. If this problem cannot be solved, please contact the seller.
<span style="border: 1px solid black; padding: 2px;">34</span>	Abnormal Current for Open Direction	Use the manual device to check if the valve is stuck by foreign objects and remove them.
<span style="border: 1px solid black; padding: 2px;">35</span>	Abnormal Current for Closed Direction	Use the manual device to check if the valve is stuck by foreign objects and remove them.
<span style="border: 1px solid black; padding: 2px;">38</span>	Signal Open Circuit	Check if the input signal is connected or not.

## Modulating Control Board Adjustment

(OM-2 to OM-13, OM-F, OM-G & OM-H)

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 (counter-clockwise).

⚠ 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



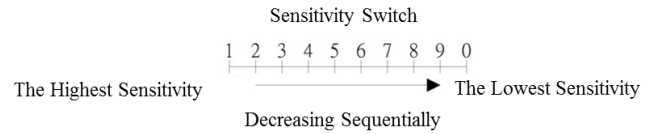
S6	Position Indicator (Fully-Open → Fully-Closed)	Operating Position	Input Signal	LED	Output Signal
ON	CCW	Fully-Closed	1 V, 2 V, 4 mA	LD1 ON	2 V, 4 mA
		Fully-Open	5 V, 10 V, 20 mA	LD2 ON	10 V, 20 mA

\* 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)

- When switched to "1": The Highest Sensitivity.  
When switched to "0": The Lowest Sensitivity.
- Original factory setting
  - OM-2 to OM-13, OM-H : 3
  - OM-F, OM-G : 0



### 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.

⌚ Please adjust the signal setting for fully-open position first, then adjust the signal setting for fully-closed position.

#### Signal setting for Fully-OPEN position

- 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.
- Press "MODE" button for 2 seconds until LD2 flashes to complete the setting of fully-open position.

#### Signal setting for Fully-CLOSED position

- 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.
- 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		