T

SERIES

Compact

Electric Valve Actuators

SUNYEH

OPERATION MANUAL

SUN YEH ELECTRICAL IND. CO., LTD.

SY05-C001A-TC

Contents

1 General Information

⚠ **Failure to follow safety instructions may cause serious injury, equipment damage, or voided warranty.**

1.1 Safety Instructions

- Installation, maintenance and repair works must be performed by trained personnel.
- The handling shall follow the safety and warning instruction contained in this manual.
- Before operation, the user should read and follow instructions contained in this operation manual. Failure to do this may result in damages and void warranty. Sun Yeh will not be liable for damages due to operator negligence or misuse.
- Local health and safety legislation shall be complied with.
- In a few cases, the surface temperature may exceed 60 °C (140 °F). Please check the surface temperature before operation, using an appropriate thermometer and wearing protective gloves before operation.

1.2 Installation Notices

⚠ **Operating by manual device：**
Do not use any tools to increase force on manual device for operating as this can damage the actuator or valve.

- 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.
- 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 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.

1.3 Inspection, Storage, Transport

1.3.1 Receiving / Inspection

- Carefully inspect the package for any damages resulting from shipping and report all damages to the freight carrier and seller.
- After unpacking the product and information packet, please keep the cartons and any packing materials in case of product return or replacement. Verify that the items on the packing slip or on the bill of lading are the same as what were ordered. If there is any discrepancy, please contact the seller.
- Verify if the technical data on nameplate is accordance with what was ordered.

1.3.2 Storage

- The actuator should be stored in a dry area with relative humidity of less than 90 % and at temperatures between -10 °C to +40 °C (14°F to +104 °F).
- The product shall be stored with suitable protection from corrosive substance that can damage the metal and insulating parts.
- The red dustproof plug should not be removed until the actuator is ready to be cabled. Use suitable cable glands with IP67 protection when wiring.

1.3.3 Transport

- Actuators packaged in cartons can stand up to land, sea, or air transportation.
- Packaged actuators shall avoid of violent impact and strong vibrations and be protected from rain or snow.

1.3.4 Lubrication

- The gear train has been sufficiently lubricated at the factory. No additional lubrication is required.

2 Product Overview

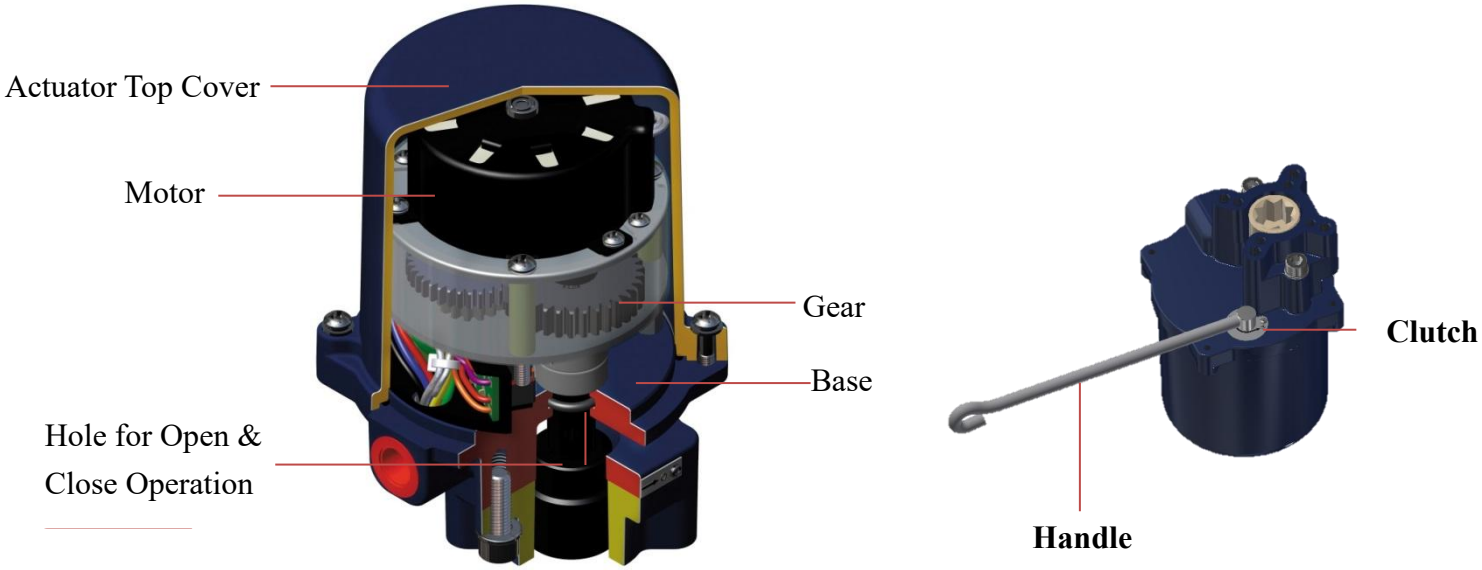
The compact size T series comes with 6 Nm (53 in-lb) and 15 Nm (132 in-lb) output torque. The compact actuators are designed for limited space and suitable for small valve or damper application.

2.1 Product Features

- Compact size can fit into a small space.
- Aluminum alloy, polyester powder coated enclosure conforms to NEMA Type 4X / 5 & IP 67 for outdoor use.
- Manual operation can be applied in case of power outage.
- Built-in thermal protection prevents motor burnout (induction motor).
- Simple design, easy operation.

3. Product Mechanical Data

3.1 Parts Identification



3.2 Technical Information

Model	Torque		Weight		Motor Power	Manual Override	Flange Type
	Nm	in-lb	kg	lb	W		ISO 5211
T-6	6	53	1.5	3.3	5	Handle	F03 / F05
T-15	15	132	1.5	3.3	5	Handle	F03 / F05

3.3 Duty Cycle

- The standard duty cycle for T series is 30% is for option. The duty cycle is the relationship between the running time and resting time. It is calculated as below:

$$\text{Duty Cycle} = \frac{\text{Running Time (Sec)}}{\text{Running Time (Sec)} + \text{Rest Time}} \times 100\%$$

$$\Rightarrow \text{Rest Time (Sec)} = \frac{\text{Running Time (Sec)} \times (1 - \text{Duty Cycle})}{\text{Duty Cycle}}$$

- **If the running time for T-6 is 8 sec, 30% duty cycle, the rest (off) time shall be calculated as below:**

→8 × [(1–30%) / 30%] = 18.67 The rest time will be 19 sec.

⚠ **One cycle consists of open-rest-close-rest.**

3.4 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 is suggested for the calculation of torque requirement).

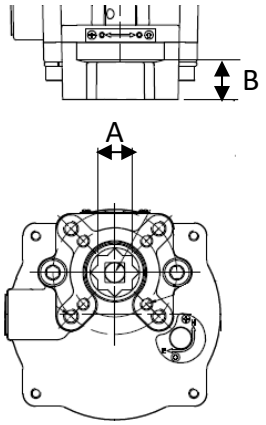
- If the maximum torque of 10" valve is 10 Nm → 10 × 1.3 (safety factor) = 13 Nm

  13 Nm < 15 Nm (T-15) →**OK!**

  13 Nm > 6 Nm (T-6) →**Not OK**!

b. 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.

3.5 Mounting Base Details

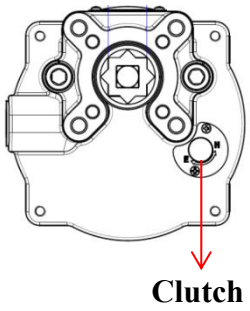


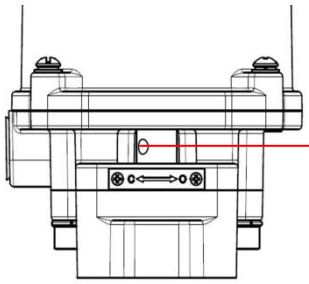
Model	Flange Type	Output Drive (A)		Depth of Output Drive (B)	
	ISO 5211	mm	inch	mm	inch
T-6	F03 / F05	14	0.551	16	0.629
T-15	F03 / F05	14	0.551	16	0.629

3.6 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, refer to 4 (P.8) Manual Operation to adjust the actuator position to be the same as the valve. For example, the valve is at the open position, the actuator must be at the open position as well.

⚠ **Make sure to switch the clutch from electrical operation (E) to manual operation position (H).**





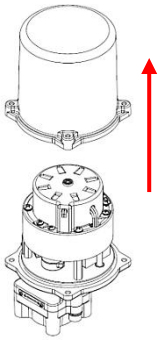
b. Once mounted together, either directly or with a mounting kit, ensure that they are properly secured together and all fasteners are tightened.

⚠ **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 section 3.7 (P. 7) for wiring instructions and connect the wires according to the wiring diagram labeled inside the cover of actuator.

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 5.1.1 (P.9) for further instructions.

h. Assemble the cover and secure cover screws firmly after setting.

⚠ **Please ensure that the O-ring seal is in good condition prior to cover installation.**

Screw	Torque	
	Nm	in-lb
M4	1.3	12

3.7 Wiring Instructions

⚠ **Turn power off before making the electrical connection!**

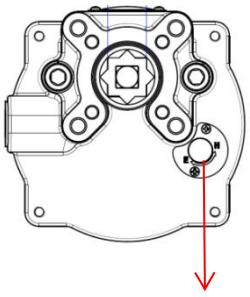
- Connect the ground wire to PE point placed inside the electric actuator (a green screw) and wiring according to the wiring diagram inside the top cover.
- Each actuator is attached with red dust-proof plug to conduit entries.

  ⚠ **Use correct size of fittings so as to not damage the threads.**
- Verify the supply power is in accordance with the data on the nameplate to prevent a short circuit and an electrical shock.

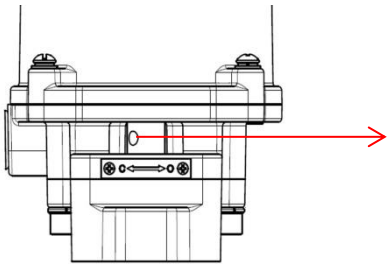
  ⚠ **Do not apply power to actuator before wiring, otherwise it can cause an electrical shock or damage components of the actuator.**
- The red plastic dustproof plug is not meant for long-term use. Use suitable cable glands with IP 67 protection when wiring.

4. Manual Operation

a. Switch the clutch from electrical operation (E) to manual operation (H) with attached handle.



Clutch

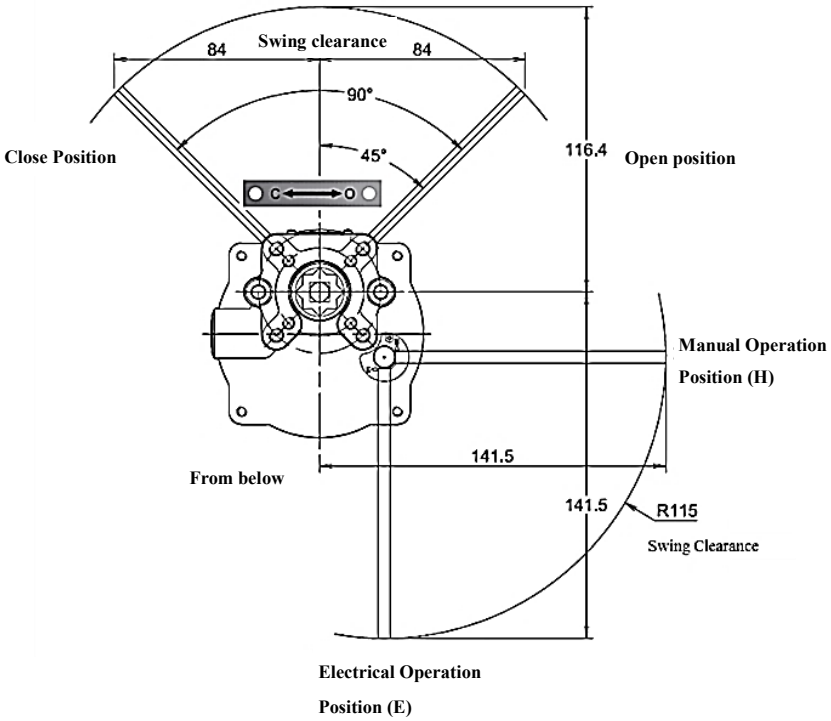


Hole for Open & Close Operation

b. Insert the handle into the hole for open & close operation. (O : Open direction ; C : Close direction)

c. Switch the clutch back to electrical operation (E) mode after the manual operation (H) is completed.

⚠ **After manual operation, switch to electrical operation (E) to enable motorized actuator, otherwise the actuator will not operate properly.**



5. Actuator Set-up

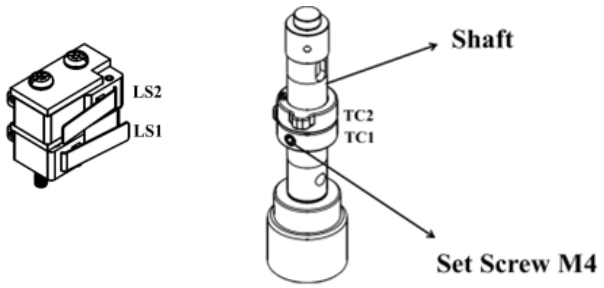
⚠ **The power must be off during this procedure so as to avoid damage to the actuator.**

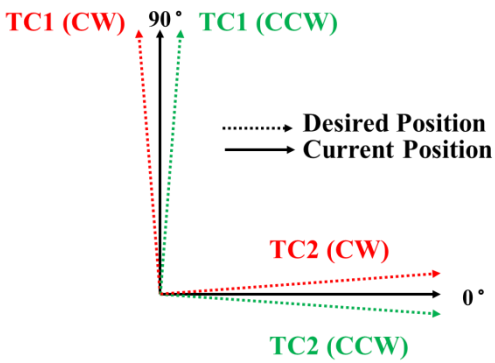
⚠ **All steps below must be completed before normal operation.**

The cam angle is the factory default value. After installation with the valve, if adjustment is needed, please adjust it in sequence.

5.1 Instructions

- The travel cams are set to control the open and closed position of the actuator.
- The standard is with two limit switches (LS1 & LS2) and cams (TC1 & TC2).
  LS1 & LS2：LS1 is for open and LS2 is for close. They limit the fully-open and fully-closed travel range by disabling the electric motor.



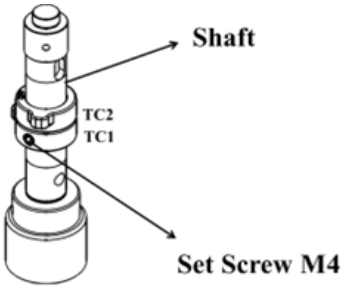


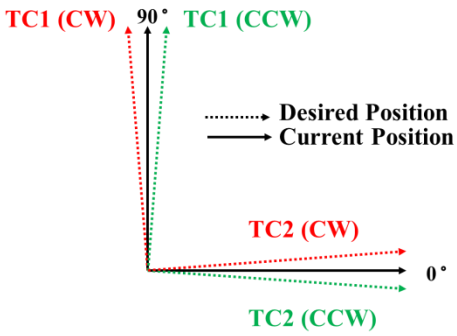
5.1.1 Adjustment Steps

a. Turn power off.
b. Adjust the fully-open position:
   1. Switch the clutch from electrical operation (E) to manual operation (H) with attached handle.
   2. Insert the handle into the hole for open & close position and manually operate the actuator to the fully-open position.
   3. Remove the cover.
   4. Loosen the M4 set screw of cam TC1 with a 2 mm Allen Key.
   5. Adjust the travel cam per below steps:
      - Rotate the cam TC1 counter-clockwise to contact the switch arm.
      - Slowly rotate the cam TC1 counter-clockwise until a light click is heard.
   6. Securely tighten the M4 set screw and switch from manual operation (H) back to electrical operation (E).
   7. Apply power to check if the fully-open position is correct. If it is not correct, please repeat steps 1 to 5.
   8. After the adjustment is completed, check again that the set screw is securely tightened.

c. Adjust the fully- closed position

1. Switch the clutch from electrical operation (E) to manual operation (H) with attached handle.
2. Insert the handle into the hole for open & close position and manually operate the actuator to the fully-closed position.
3. Remove the cover.
4. Loosen the M4 set screw of cam TC2 with a 2 mm Allen Key.
5. Adjust the travel cam per below steps:
   - Rotate the cam TC2 clockwise to contact the switch arm.
   - Slowly rotate the cam TC2 clockwise until a light click is heard.
6. Securely tighten the M4 set screw and switch from manual operation (H) back to electrical operation (E).
7. Apply power to check if the fully-closed position is correct. If it is not correct, please repeat steps 1 to 5.





TC2 "CLOSE"

Clockwise: decrease closing degree.

Counter-clockwise: increase closing degree.

TC1 " OPEN"

Clockwise: increase opening degree

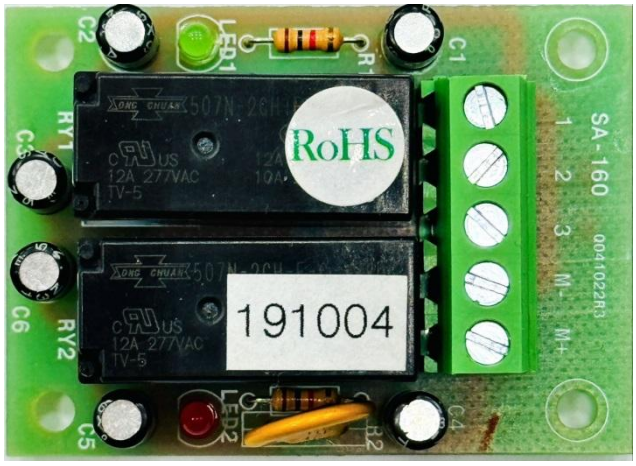
Counter-clockwise: decrease opening degree.

8. After the adjustment is completed, check again that the set screw is securely tightened.

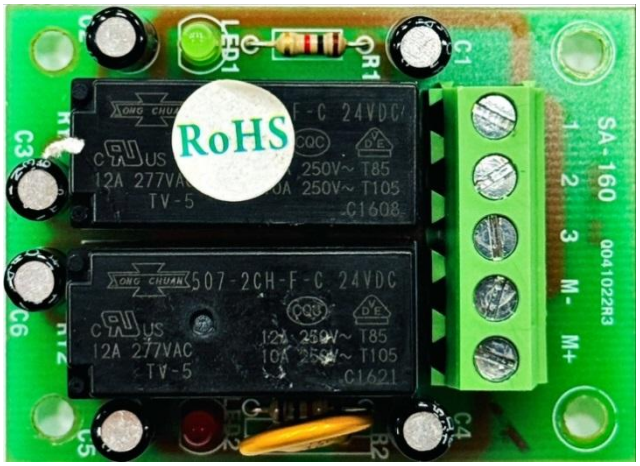
d. The setting procedure is now completed.

6. Control Board

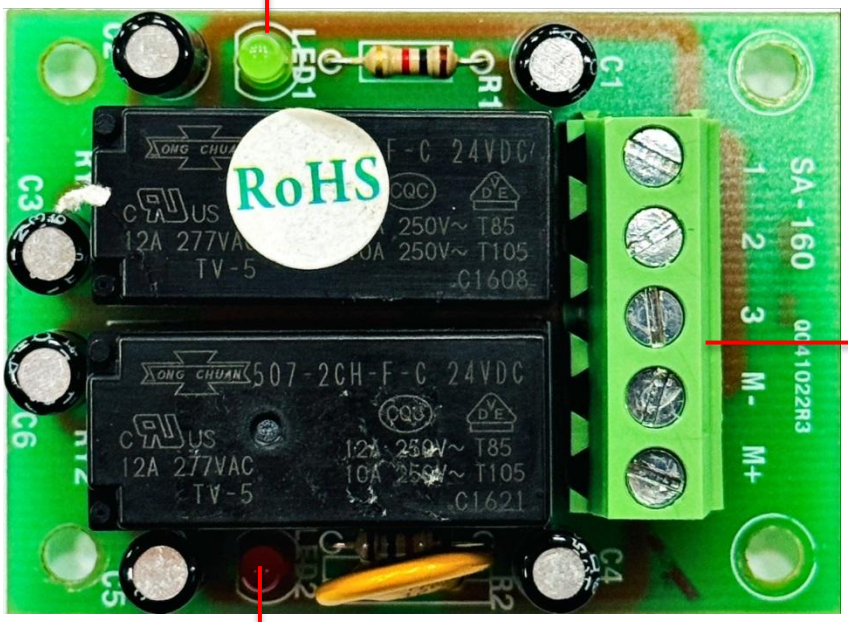
- **Surface**



Rated Voltage: 12V DC



Rated Voltage: 24V DC



● Lamp Status

Lamp Code		Actuator Status
LED1		Fully-Open
LED2		Fully-Closed

● Warning Messages

Error Lamp Status	Warning Message	Solution
LED 1 (green) and LED 2 (red) are lit simultaneously.	Simultaneously input open and closed control signals.	Refer to the wiring diagram and confirm whether the wiring is correct or not.
LED 1 (green) or LED 2 (red) is lit according to the command signal, but the actuator does not operate or operates too slowly.	a. A torque overload caused by the valve. b. The actuator is damaged. c. The input voltage is too low. d. The clutch is at manual operation position (H).	a. Replace the valve. b. Please contact the seller. c. Adjust the supply power to ±10% of the actuator's rated voltage. d. Switch the clutch to electrical operation position (E).
LED 1 (green) and LED 2 (red) are both off.	a. The control board cannot receive signals. b. The input polarity is opposite to the polarity indicated on the wiring diagram. c. The control board is damaged.	a. Please check if the cam touches the limit switch. b. Refer to the wiring diagram and confirm whether the wiring is correct or not. c. Replace a new control board.

7. Troubleshooting

Floating Control

Motor can not operate or overheats.

Possible problems	Solution
a. The limit switch does not trip.	a. Operate the actuator manually to fully-closed position and confirm if the limit switch trips.
b. Motor shaft or bearing were stuck.	b. Switch to manual operation mode and power on to see if the motor could not drive the gears, it means that the motor shaft or bearing is stuck and the motor needs to be replaced.
c. Power applied to terminals #3 and #4 simultaneously (Abnormal Wiring).	c. Follow the wiring diagram inside the cover to connect wires and make sure the wiring is correct.
d. Jammed pipe or stuck valve seat.	d. Check if any blockage or obstacle in pipe and remove.
e. The seating torque of valve increased due to oxidized seals and has resulted in a torque overload on actuator.	e. Check if the actuator can be operated manually; if not, replace the valve.

The actuator operates but the motor is hot.

Possible problems	Solution
a. A torque overload caused by the valve.	a. This situation occurs frequently after the valve has been operating for a period of time. It is suggested to replace with a new valve.
b. Wrong power supply.	b. Check the power supply.
c. Actuator operates too frequently and exceeded duty cycle rating.	c. Adjust the system bandwidth or reduce the frequency of operation, please refer to 3.3 (P.4).

To control two or more actuators, sometimes the actuator works abnormally and the motor is getting hot.

Possible problems	Solution
Parallel connection.	a. Please contact the seller to acquire the wiring diagram for parallel connection.

The valve cannot operate either electrical operation or manual operation.

Possible problems	Solution
a. The actuator was mounted to the valve improperly. b. The set screw of the cam loosened and resulted in that the travel end positions misaligned. c. The torque of valve is larger than the torque of actuator.	a. Please refer to 3.6 (P.6) Valve Mounting Instructions. b. Readjust the mechanical end stops and limit switches, please refer to 5 (P.9 to P.10). c. Replace with a new valve or a larger size actuator.

The capacitor is faulty.

Possible problems	Solution
a. The ambient temperature is too high or too low.	a. The actuator should be installed within the rated ambient temperature range of -30 °C to +65 °C (-22 °F to + 149 °F).
b. The service life has been reached.	b. Replace the capacitor.
c. The voltage is too high.	c. Adjust the range of rated voltage to ±10% and replace the capacitor.

8. Warranty

Sun Yeh Ele. Co. Ltd warrants that for a period of twelve months from the date of manufacture it will either repair or replace, at its option, any of its products which prove to be defective in material or workmanship. This warranty does not cover damage resulting from causes such as abuse, misuse, modification or tampering by users. This warranty is extended only to the immediate purchaser of the Sun Yeh product and is not transferable. To obtain service under this warranty, the purchaser must first acquire a return authorization from Sun Yeh. Products must be returned to Sun Yeh under freight prepaid.

This warranty is in lieu of all other obligations, liabilities or expressed warranties. Any implied warranties, including any implied warranty of merchantability are hereby expressly excluded. In no event shall Sun Yeh be liable for special, incidental or consequential damages arising in connection with the use of its products, or for any delay in the performance of this warranty due to cause beyond its control.

9. Disposal

Please obey the local environment regulation for equipment scrapping.

SUNYEH

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