INSTALLATION, OPERATIONS AND MAINTENANCE FOR SHARPE® SEA ELECTRIC ACTUATORS
OVERVIEW
Sharpe® electric quarter-turn actuators offer a wide range of torque output models. The product design is based on a self-locking worm drive principal, which provides for a smooth running, dependable, robust drive system. All models are ISO 5211 compliant and most have a visual position indicator on top of actuator cover and manual override.

LUBRICATION
The gearbox of the Sharpe® actuator is enclosed, and it has already been lubricated sufficiently with high temperature lubricant at the factory and should not require any attention unless it has leaked out.

IMPORTANT NOTICES & MAINTENANCE

➢ Notices:
  • Make sure the voltage is correct before wiring.
  • Turn off power before for maintenance purposes.
  • Seal the casing and conduit entrance after wiring to prevent dust or water contamination.
  • The angle of installation must between 0~180°. Do not install upside down or below the horizontal.
  • Do not install when hazardous or explosive gases may be present.
  • The frequency of open and close is restricted based on duty cycle. Avoid too high frequency.

➢ Storage:
  • When more than one electric actuator needs to operate simultaneously, please connect individually.
  • Always connect the ground wire to the inside of the electric actuator.
  • Not intended for vacuum spaces and avoid installing near explosive atmospheres.
  • To avoid functional failure caused by statics, do not touch any components on the PCB with metal tools or bare hands.
• If actuator needs be stored outside, it must be protected from excess moisture, dust, and weather.

**INSTALLATION**

1. Before mounting actuator, verify that the torque requirement is less than the output torque of the actuator. (The suggested safety factor is 30% of the max. torque of valve.)
   1. **For example:**
      If the maximum valve torque is 80Nm - 80 × 1.3(safety factor) = 104 Nm
      
      104Nm < 150Nm  SEA 13 is **OK**!
      
      104Nm > 90Nm  SEA 8 is **not OK**!
2. Check if the output shaft fits to the stem of valve before inserting into actuator. Please use mounting plate or adapter to connect if it does not match.
3. Insert output shaft adapter into actuator. Make sure it fits satisfactory.
4. Determine that actuator position, open or closed, matches with position of equipment prior to mounting. Use manual override to change position if necessary.
5. Remove valve’s manual device and mount on the proper connection.
   - **CAUTION:** Don’t remove any necessary parts for the proper operation of the valve.
6. Check again that the valve and actuator are in the same position.
7. Install the actuator to valve directly or with mounting kits, then tighten all screws and nuts.
8. Remove actuator cover.
   - **CAUTION:** Be sure power is off at the main power box.
9. Wire actuator using the wiring diagram inside cover.
   - **CAUTION:** For the 3-Phase on-off controller actuator, please use the hand-wheel to turn the actuator to 45 degree before test. If the operating direction is opposite after supplying power, please change any two of the U, V, W.
10. Supply power to actuator.
   - **CAUTION:** Use remarkable mark warning “there are live circuits that could cause electrical shock or death”.
11. Make sure if it is needed to calibrate the fully-open or fully-closed position of the actuator.
12. If the actuator is modulating type make sure set the required settings.
   - **CAUTION:** Turn power off before changing any setting.
13. Replace cover and secure cover screws.
### SPECIFICATIONS

#### 12V/24V

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Max Torque Nm</th>
<th>Max Torque lb-in</th>
<th>Speed (90°)</th>
<th>Motor Power 10W</th>
<th>Motor Power 80W</th>
<th>12V DC/AC Run</th>
<th>12V DC/AC Start</th>
<th>12V DC/AC Lock</th>
<th>24V DC/AC Run</th>
<th>24V DC/AC Start</th>
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<td>20s</td>
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<td>797</td>
<td>15s</td>
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<td>16.1A</td>
<td>2.2A</td>
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<td>SEA 13</td>
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<td>1328</td>
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#### Single Phase

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<td>4.4A</td>
</tr>
</tbody>
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TRAVEL CAM & LIMIT SWITCHES ADJUSTMENT

- The travel cams are set to control the open and closed position of the valve. LS1 & LS2 limit the maximum range by disabling the electric motor.

- LS3 & LS4 are optional. They allow external equipment to confirm that the valve has reached the fully open and fully closed positions.
  - IMPORTANT: If LS3 & LS4 are fitted, they should be set to trip prior to LS1 & LS2 to avoid over-travel.

- A 2.5mm hex key will be required to adjust cam settings.

➢ Travel Cam Adjustment – SEA 3
TRAVEL CAM & LIMIT SWITCHES ADJUSTMENT (cont.)

- Travel Cam Adjustment –SEA 4

- Travel Cam Adjustment –SEA 8 - SEA310

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TRAVEL CAM & TORQUE SWITCHES ADJUSTMENT

➢ Travel Cam Adjustment – SEA 8 - SEA310

MODULATING CONTROL BOARD PROCEDURE

Input Signal:
4 ~ 20mA
2 ~ 10V DC
1 ~ 5 V DC

Comparison Part ➢ Control Part ➢ Control Object Driving Part ➢ Valve 90°

Output Signal:
4 ~ 20mA
2 ~ 10V DC

Supplied Voltage: 24V DC / AC, 110V / 220V AC 1-Phase

Counter-clockwise: Decrease the degree of torque setting.
Clockwise: Increase the degree of torque setting.
SENSITIVITY SWITCH

Setting
- When switch is set to “1”:
  - The Highest Sensitive and the 0~90 degree can be divided up to around 50 times movement.

- When switch is set to “0”:
  - The Lowest Sensitive and the 0~90 degree can be divided up to around 10 times movement.

- The sensitivity decreases 5 times movement by sectors from SW1 to SW2, SW2 to SW3, SW3 to SW4 and so on.

DIP SWITCH SETTING

IMPORTANT: DO NOT ALTER SWITCH POSITIONS WHILE ACTUATOR HAS POWER

<table>
<thead>
<tr>
<th>Factory setting</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>4~20mA input</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>1~5V input</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>2~10V input</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>4~20mA output</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>2~10V output</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

20mA / 5V / 10V means valve fully-open
20mA / 5V / 10V means valve fully-closed

Close valve if input signal disconnected (when S6 sets “OFF”) OFF ON
Open valve if input signal disconnected (when S6 sets “OFF”) ON OFF
DIP SWITCH SETTING (cont.)

- **S1 & S2:**
  - INPUT SIGNAL SELECT
    - 4~20m/A set 1-ON / 2-OFF.
    - 1~5V set 1-OFF / 2-OFF.
    - 2~10V set 1-OFF / 2-ON.

- **S3 & S4 & S5:**
  - OUTPUT SIGNAL SELECT
    - 2-10V set 3-ON / 4-OFF / 5-ON.
    - 4-20m/A set 3-OFF / 4-ON / 5-OFF.

- **Position Select:**
  - S6 ON
    - 4mA, 2V, 1V = valve fully-open.
    - 20mA, 10V, 5V = valve fully-closed.
    - S7 & S8 – Position Select when input signal fails
      - Valve fully-closed set 7-ON / 8-OFF.
      - Valve fully-open set 7-OFF / 8-ON.
      - Valve stops set 7-ON / 8-ON or 7-OFF / 8-OFF.

  - S6 OFF
    - 4mA, 2V, 1V valve fully-closed.
    - 20mA, 10V, 5V valve fully-open.
    - S7 & S8 – Position Select when input signal fails
      - Valve fully-closed set 7-OFF / 8-ON.
      - Valve fully-open set 7-ON / 8-OFF.
      - Valve stops set 7-ON / 8-ON or 7-OFF / 8-OFF.

Even if S6 is adjusted, the feedback signal will not change.
OPEN AND CLOSE SETTING  
(SEA 3 & SEA 4)

The settings are set at factory, though in some cases re-set may be required when a particular rate of signal is requested.

- Settings for OPEN and CLOSE
  - The function of VR
    - Adjust output signal/input signal
      - VR1 — Adjust 10V, 20mA (Input signal: fully-open)
      - VR51 — Adjust 10V, 20mA (Output signal: fully-open)
      - VR2 — Adjust 2V, 4mA (Input signal: fully-closed)
      - VR52 — Adjust 2V, 4mA (Output signal: fully-closed)

  Note: If it is necessary to adjust VR51 and VR52, VR1 and VR2 also need to be adjusted accordingly.

  - Rotate VR1 counterclockwise until a light click is heard, then supply 10V (or 20mA) to modulating board. Slightly rotate VR1 clockwise until green LED keeps on. Adjust VR51 to complete.
    - VR51:
      - Clockwise: decreasing signal.
      - Counterclockwise: increasing signal.

  - Rotate VR2 clockwise until a light click is heard, then supply 2V (or 4mA) to modulating board. Slightly rotate VR2 counterclockwise until red LED keeps on. Adjust VR51 to complete.
    - VR52:
      - Clockwise: decreasing signal.
      - Counterclockwise: increasing signal.
OPEN AND CLOSE SETTING
(SEA 8 & SEA 310)

The settings are set at factory, though in some cases re-set may be required when a particular rate of signal is requested

➢ Open Setting
  o Keep pressing “SET” for 2 seconds, then LD 9 comes on, it will enter to the manual mode.
  o Keep pressing “UP” until actuator runs to fully-open position, LD2 comes on, then supplies the input signal (5V or 10V or 20mA).
  o Press “MODE” once. The OPEN setting is completed.

➢ Close Setting
  o Keep pressing “DOWN”, until actuator runs to fully-closed position, LD1 comes on, then supplies input signal (1V or 2V or 4mA).
  o Press “MODE” once. The CLOSE setting is completed.

After completing the above settings, press “SET” once

➢ Adjust Output Signal
  o VR2:
    ▪ Clockwise: increasing signal.
    ▪ Counterclockwise: decreasing signal.

MECHANICAL STOPS

*Mechanical stops should only be reached during manual operation.* They are factory set, though in some cases adjustment may be required once a valve is fitted.

➢ For Electric Operation:
  o Please refer to Travel Cam & Limit Switches Adjustment section of this document.
MECHANICAL STOPS (cont.)

- For Manual Operation:
  - Set the open stop.
    - Remove power from actuator.
    - Loosen locknut on the open stop stud (left side) and unscrew it a few turns.
    - Unscrew the stop stud.
    - Manually turn the actuator to the desire limit position.
    - Screw in the stop stud until it contacts the internal cam, then reverse one rotation.
    - Tighten the locknut.
    - Check that the electrical limit switches can still be reached.
  - Set the close stop.
    - Remove power from actuator.
    - Loosen locknut on the close stop stud (right side) and unscrew it a few turns.
    - Unscrew the stop stud.
    - Manually turn the actuator to the desire limit position.
    - Screw in the stop stud until it contacts the internal cam, then reverse one rotation.
    - Tighten the locknut.
    - Check that the electrical limit switches can still be reached.

Failures to ensure the electrical limit switches are reached before the mechanical stops are hit, when operating in electric mode, can cause personal injury or damage to the actuator.
WIRING DIAGRAMS

The wiring diagrams provided are for Sharpe® standard actuators, for special order actuators or versions not listed please contact Sharpe® Valves for the correct wiring diagram.

➢ SEA 1- 24/110/220V AC

![Field wiring diagram for 24/110/220V AC actuators]

- Use proper wire size and fuse to prevent actuator failure. The data is provided below to assist on the selection of the proper wire and fuse.

<table>
<thead>
<tr>
<th>Wire Gage</th>
<th>Max Current</th>
<th>Fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>24(0.205mm²)</td>
<td>3A</td>
<td>2A</td>
</tr>
</tbody>
</table>

TERMINALS:
N connects to 1.
L connects to 3 for OPEN.
L connects to 4 for CLOSE.
LS - Limit switch.
CS - Control switch or relay.

➢ SEA 1- 12/24V DC

![Field wiring diagram for 12/24V DC actuators]

- Use proper wire size and fuse to prevent actuator failure. The data is provided below to assist on the selection of the proper wire and fuse.

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<tr>
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TERMINALS:
N connects to 1.
L connects to 3 for OPEN.
L connects to 4 for CLOSE.
LS - Limit switch.
CS - Control switch or relay.
➢ SEA 3-4: 24V DC – 30% Duty Cycle

**Power Supply**

24V DC

- [Diagram of electrical circuit with labels and connections]

**ACTUATOR**

LS – Limit switch.
H – Heater (option).

**NOTE:**

1. “+” connects to #1, “−” connects to #7.
2. “−” connects to #3 for “OPEN”, “−” connects to #4 for “CLOSE”.
3. Using less than 3A current for “A, B, C, E, F”.
4. Using battery to supply power for DC units.

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SEA 4-4: 24V DC – 30% Duty Cycle

Power Supply
24V DC

For customer connecting reference

Full-open Lamp
Fully closed Lamp

FULLY OPEN: A to B
FULLY CLOSE: A to E

ACTUATOR

NOTE:
1. “+” connects to #1, “−” connects to #7.
2. “−” connects to #3 for “OPEN”, “−” connects to #4 for “CLOSE”.
3. Using less than 3A current for “A, B, C, E, F”.
4. Using battery to supply power for DC units.

It is the responsibility of the customer to determine the suitability of Sharpe® Valves products in their particular application.

Disclaimer: Supplier shall not be liable or responsible for omissions or errors in its bulletin.
- **SEA 3-4-PP: 24V DC – 75% Duty Cycle Modulating Controller**

**Diagram: Actuator and Power Supply Connections**

**NOTE:**

1. **Modulating Board**
   a. **Input Signal:** 4~20mA, 1~5V, 2~10V  
      (It is suggested to use the shielding wire and its length should not exceed 30m.)
   b. **Output Signal:** 4~20mA, 2~10V
2. Using less than 3A current for “A, B, C, E, F”.
3. Using battery to supply power for DC units.

---

*It is the responsibility of the customer to determine the suitability of Sharpe® Valves products in their particular application.  
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**SEA 4-4-PP: 24V DC – 75% Duty Cycle Modulating Controller**

---

**NOTE:**

1. **Modulating Board**
   a. Input Signal: 4~20mA, 1~5V, 2~10V  
   (It is suggested to use the shielding wire and its length should not exceed 30m.)
   b. Output Signal: 4~20mA, 2~10V
2. Using less than 3A current for “A, B, C, E, F”.
3. Using battery to supply power for DC units.
- SEA 3 & SEA 4: 110V / 220V AC – 30% Duty Cycle

**Power Supply**

110V / 220V AC

- **N**
- **L**
- **N.F.B**
- **CS**
- Fully-Open Lamp
- Fully-Close Lamp
- For customer connecting reference

**ACTUATOR**

- PE
- 1
- 3
- 4
- 5
- 6
- 7
- A
- B
- C
- E
- F

- LS1
- LS2
- 110V/220V AC
- M
- LS3 (option)
- LS4 (option)

**NOTE:**
1. “N” connects to #1, “L” connects to #7.
2. “L” connects to #3 for “OPEN”, “L” connects to #4 for “CLOSE”.
3. Using less than 3A current for “A, B, C, E, F”.

It is the responsibility of the customer to determine the suitability of Sharpe® Valves products in their particular application. Disclaimer: Supplier shall not be liable or responsible for omissions or errors in its bulletin.
- SEA 3-PP & SEA 4-PP: 110V / 220V AC-75% Duty Cycle Modulating Controller

---

**NOTE:**

1. **Modulating Board**
   a. Input Signal: 4~20mA, 1~5V, 2~10V
      (It is suggested to use the shielding wire and its length should not exceed 30m.)
   b. Output Signal: 4~20mA, 2~10V
2. Using less than 3A current for “A, B, C, E, F.”

---

It is the responsibility of the customer to determine the suitability of Sharpe® Valves products in their particular application.

Disclaimer: Supplier shall not be liable or responsible for omissions or errors in its bulletin.
- SEA 8 – SEA 132: 12V / 24V DC – 30% Duty Cycle

**Power Supply**

12V / 24V DC

**NOTE:**

1. “+” connects to #1, “−” connects to #7.
2. “−” connects to #3 for “OPEN”, “−” connects to #4 for “CLOSE”.
3. Using less than 5A current for “A, B, C, D, E, F”.
4. Using battery to supply power for DC units.

It is the responsibility of the customer to determine the suitability of Sharpe® Valves products in their particular application.

Disclaimer: Supplier shall not be liable or responsible for omissions or errors in its bulletin.
➢ SEA 8-PP - SEA 132-PP : 12V / 24V DC-75% Duty Cycle Modulating Controller

**NOTE:**

1. **Modulating Board**
   a. **Input Signal**: 4~20mA, 1~5V, 2~10V  
      (It is suggested to use the shielding wire and its length should not exceed 30m.)
   b. **Output Signal**: 4~20mA, 2~10V
2. Using less than 5A current for “A, B, C, D, E, F”.
3. Using battery to supply power for DC units.

It is the responsibility of the customer to determine the suitability of Sharpe® Valves products in their particular application.

Disclaimer: Supplier shall not be liable or responsible for omissions or errors in its bulletin.
œ SEA 8 – SEA 132: 110V / 220V AC – 30% Duty Cycle

**Power Supply**
110V / 220V AC

**Actuator**
110V/220V AC

**NOTE:**
1. "N" connects to #1, "L" connects to #7.
2. "L" connects to #3 for "OPEN", "L" connects to #4 for "CLOSE".
3. Using less than 5A current for "A, B, C, D, E, F".

It is the responsibility of the customer to determine the suitability of Sharpe® Valves products in their particular application.

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SEA 8-PP – SEA 132-PP: 110V / 220V AC–75% Duty Cycle Modulating Controller

**Power Supply**

110V / 220V AC

- Input Signal
- Output Signal

For customer connecting reference

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**NOTE:**

1. **Modulating Board**
   a. Input Signal: 4–20mA, 1–5V, 2–10V
      (It is suggested to use the shielding wire and its length should not exceed 30m.)
   b. Output Signal: 4–20mA, 2–10V

2. Using less than 5A current for "A, B, C, D, E, F".

It is the responsibility of the customer to determine the suitability of Sharpe® Valves products in their particular application.

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### LAMP SIGNALS

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Description</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD1</td>
<td>Fully-closed</td>
<td>LD6 Motor thermostat turn off</td>
</tr>
<tr>
<td>LD2</td>
<td>Fully-open</td>
<td>LD7 Output signal short circuit</td>
</tr>
<tr>
<td>LD3</td>
<td>Power</td>
<td>LD8 Motor current is excessive</td>
</tr>
<tr>
<td>LD4</td>
<td>Abnormal Voltage</td>
<td>LD9 Manual Mode</td>
</tr>
<tr>
<td>LD5</td>
<td>Wrong Input signal</td>
<td></td>
</tr>
</tbody>
</table>

If the LED (LD4~LD9) is flashing under modulating control, refer to the following "Modulating Board Troubleshooting".

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Possibilities</th>
<th>Solution</th>
</tr>
</thead>
</table>
| No Lamp (LD3 off) | a. No power supply.  
    b. The voltage is over 260V to cause the board burn out.  
    c. Wrong connecting for the #8, #9 of the VR.  
    d. Faulty Modulating board. | a. Check the power supply and wiring (#4 & #5 of modulating board).  
    b. Check the voltage.  
    c. Check the wiring.  
    d. Send back to factory for inspection. |
| LD5    | a. Setting in 2-10V input signal but supply 4-20mA.  
    b. Setting in 2-10V input signal, but the input signal is over 13.5V.  
    **Setting in 4-20mA but supply 2-10V signal. The actuator could still be operated within 2~7V. But if the signal is over 7.2V the LED5 will come ON.** | Confirm if the input signal is the same as dip switch setting (refer to P54~P55). |
| LD6    | Motor thermostat turns off                          | a. Too high frequency for rated duty cycle (refer to P2).  
    b. Motor thermostat (MOT) is not connected.       |    |
| LD7    | a. Output signal short circuit.  
    b. Wrong connecting of the 2-10V input signal.   | a. Confirm the wiring of output signal #11(-) & #12(+).  
    b. Confirm the input signal for #6(-) & #7(+).     | |
| LD8    | Motor current is excessive                          | a. Too high frequency for rated duty cycle (refer to P2).  
    b. Check the load (refer to P4~P5).  
    c. Check if the motor rotor is locked (For example: Valve is stuck by foreign objects). | |
# TROUBLE SHOOTING

1. **Motor does not operate and overheats**

<table>
<thead>
<tr>
<th>Possibilities</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Supply power to #3, #4 simultaneously (Parallel Connection).</td>
<td>a. Check the wiring.</td>
</tr>
<tr>
<td>b. The capacitor failed (whether the surface of the capacitor deforms).</td>
<td>b. Replace to a new part.</td>
</tr>
<tr>
<td>c. Valve’s rubber is getting hardened or the valve’s torque is excessive (it takes longer time to reach fully-closed position).</td>
<td>c. Use hand-wheel for test or change to a new valve.</td>
</tr>
<tr>
<td>d. Foreign objects in the flow stream.</td>
<td>d. Check if any obstructions</td>
</tr>
<tr>
<td>e. Broken motor stem or bearing.</td>
<td>e. Replace to a new parts.</td>
</tr>
<tr>
<td>f. The limit switch for fully-closed does not trip.</td>
<td>f. Operate the actuator manually to fully-closed position and confirm if the limit switch trips.</td>
</tr>
</tbody>
</table>

2. **The actuator is operated very well but the motor is hot.**

<table>
<thead>
<tr>
<th>Possibilities</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Actuator operates too frequently (Starting frequency is too high).</td>
<td>a. Change system bandwidth or replace to a higher duty cycle actuator.</td>
</tr>
<tr>
<td>b. Overload.</td>
<td>b. This situation often happens after operating for a long time. It is suggested to replace to a new valve.</td>
</tr>
<tr>
<td>c. Under or over rated voltage.</td>
<td>c. Check the supply circuit.</td>
</tr>
<tr>
<td>d. Mechanical stops are reached by the gear train at fully-open or fully-closed position.</td>
<td>d. Reset the mechanical stops and cam.</td>
</tr>
<tr>
<td>e. Wrong power supply.</td>
<td>e. Check the power supply.</td>
</tr>
</tbody>
</table>

3. **When operating two or more actuators simultaneously, the actuator works abnormally some times and the motor is getting hot.**

<table>
<thead>
<tr>
<th>Possibilities</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel connection.</td>
<td>a. Check current values and install a relay respectively.</td>
</tr>
</tbody>
</table>
TROUBLE SHOOTING (cont.)

4. The valve can not fully-open or fully-closed by either power supply or hand-wheel.

<table>
<thead>
<tr>
<th>Possibilities</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. The actuator does not mount with the valve tightly during installation process.</td>
<td>a. Contact technical department to solve the problem.</td>
</tr>
<tr>
<td>b. The torque of valve is larger than the torque of actuator.</td>
<td>b. Replace to a new valve or a larger actuator.</td>
</tr>
<tr>
<td>c. The set screw of the cam is loose.</td>
<td>c. Readjust the mechanical stops and limit switches</td>
</tr>
<tr>
<td>d. The installing angle of actuator and valve is not correct.</td>
<td>d. Check the angle of the valve and actuator.</td>
</tr>
</tbody>
</table>

5. The capacitor is failed.

<table>
<thead>
<tr>
<th>Possibilities</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Overload (exceed the rated torque of actuator).</td>
<td>a. Replace to a new part. It’s suggested to change a new valve or a larger actuator.</td>
</tr>
<tr>
<td>b. Starting frequency is too high or ambient temperature is too high.</td>
<td>b. Replace to a new part and change to 75% duty cycle actuator</td>
</tr>
<tr>
<td>c. Over service life.</td>
<td>c. Check the capacitance and surface every year.</td>
</tr>
</tbody>
</table>

➢ Modulating controller:

1. The LED (LD5–LD9) is flashing after the operating check is completed.

   Solution

   Refer to p. 14

2. The lamps on the modulating board are normal but the actuator can’t work properly during test or it only can tum to fully open/closed position.

<table>
<thead>
<tr>
<th>Possibilities</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The signal is connected oppositely (means to signal failure).</td>
<td>Confirm if the input signal and the wiring are correct (terminal #6 connects to “-“ and terminal #7 connects to “+“).</td>
</tr>
</tbody>
</table>

3. Can not operate by modulating controller.

<table>
<thead>
<tr>
<th>Possibilities</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Faulty VR.</td>
<td>a. Replace to a new VR.</td>
</tr>
<tr>
<td>b. The sector gear of the VR is loose.</td>
<td>b. Remove the input signal wires. Operate the actuator to fully-closed. Then readjust the VR</td>
</tr>
<tr>
<td>c. Wrong input signal.</td>
<td>c. Check if the input signal is correct</td>
</tr>
<tr>
<td>d. Faulty modulating board.</td>
<td>d. Send back to factory for inspection.</td>
</tr>
</tbody>
</table>