The Series WE05 3-Piece Socket Weld Stainless Steel Ball Valve offers the best possible design for socket weld ball valves. The swing out body feature and seat arrangement allow for trouble-free welding installation. The Series WE05 incorporates a full port 3-piece SS ball valve for ideal flow rates with minimal pressure drop. The valve features a blowout proof stem for added safety, reinforced PTFE seats and seals for longer life, and a 316 SS (ASTM CF8M) ball for better performance. Actuators are directly mounted creating a compact assembly for tight spaces. Limit switches can be mounted directly to the valves, allowing for remote position indication.

The Series WE05 can be configured with either an electric or pneumatic actuator. Electric actuators are available in weatherproof or explosion-proof, a variety of supply voltages and two-position modulating control. Two-position actuators use the supply voltage to drive the valve open or close, while the modulating actuator accepts a 4-20 mA input for valve positioning. Actuators feature thermal overload protection and a permanently lubricated gear train.

The pneumatic double acting actuator uses an air supply to drive the valve open and closed. The actuator has two supply ports with one driving the valve open and the other driving the valve closed. Spring return pneumatic actuators use the air supply to open the valve and internally loaded springs return the valve to the closed position. Also available is the SV3 solenoid valve to electrically switch the air supply pressure between the air supply ports for opening and closing the valve. Actuators are constructed of anodized and epoxy coated aluminum for years of corrosion free service.

### SPECIFICATIONS

**VALVE**
- **Service:** Compatible liquids and gases.
- **Body:** 3-Piece.
- **Line Sizes:** 1/2 to 3”.
- **End Connections:** Socket weld.
- **Pressure Limits:** 20” Hg to 1000 psi (-0.7 to 69 bar).
- **Wetted Materials:** Body and ball: 316 SS (CF8M); Stem: 316 SS; Seat: RTFE/PTFE; Seal, Washer, and Packing: PTFE.
- **Temperature Limits:** -20 to 392°F (-29 to 200°C).

**ACTUATORS**
**Pneumatic “DA” and “SR” Series**
- **Type:** DA series is double acting and SR series is spring return (rack and pinion).
- **Normal Supply Pressure:** DA: 40 to 115 psi (2.7 to 7.9 bar); SR: 80 psi (5.5 bar).
- **Maximum Supply Pressure:** 120 psi (8.6 bar).
- **Air Connections:** DA01: 1/8” female NPT; DA02 to DA05: 1/4” female NPT; SR02 to SR07: 1/4” female NPT.
- **Housing Material:** Anodized aluminum and epoxy coated aluminum end caps.
- **Temperature Limits:** -40 to 176°F (-40 to 80°C).
- **Accessory Mounting:** NAMUR standard.

**Electric “TD” and “MD” Series**
- **Power Requirements:** 110 VAC, 220 VAC, 24 VAC or 24 VDC (MD models not available in 24 VDC).
- **Power Consumption:** See page 8.
- **Cycle Time (per 90°):** TD01: 4 s; MD01: 10 s; TD02 and MD02: 20 s; TD03 and MD03: 30 s.
- **Duty Rating:** 85%.
- **Enclosure Rating:** NEMA 4X (IP67).
- **Housing Material:** Powder coated aluminum.
- **Temperature Limits:** -22 to 140°F (-30 to 60°C).
- **Electrical Connection:** 1/2˝ female NPT.
- **Modulating Input:** 4-20 mA.
- **Standard Features:** Manual override, position indicator, and TD models come with two limit switches.

**Electric “TI” and “MI” Series**
- **Power Requirements:** 110 VAC, 220 VAC, 24 VAC or 24 VDC.
- **Power Consumption:** See page 9.
- **Cycle Time (per 90°):** See page 9.
- **Duty Rating:** See page 9.
- **Enclosure Rating:** NEMA 7.
- **Housing Material:** Powder coated aluminum.
- **Temperature Limits:** -40 to 140°F (-40 to 60°C).
- **Electrical Connection:** 1/2˝ female NPT.
- **Modulating Input:** 4-20 mA.
- **Standard Features:** Position indicator and two limit switches.
VALVE BILL OF MATERIALS

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Material</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>ASTM A351-CF8M</td>
</tr>
<tr>
<td>2</td>
<td>Cap</td>
<td>ASTM A351-CF8M</td>
</tr>
<tr>
<td>3</td>
<td>Ball</td>
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<tr>
<td>4</td>
<td>Ball Seat</td>
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<td>6</td>
<td>Stem</td>
<td>AISI 316</td>
</tr>
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<td>7</td>
<td>Thrust Washer</td>
<td>PTFE</td>
</tr>
<tr>
<td>8</td>
<td>Stem Packing</td>
<td>PTFE</td>
</tr>
<tr>
<td>9</td>
<td>High Washer</td>
<td>AISI 304</td>
</tr>
<tr>
<td>10</td>
<td>Belleville Washer</td>
<td>AISI 304</td>
</tr>
<tr>
<td>11</td>
<td>Stem Nut</td>
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<tr>
<td>12</td>
<td>O-Ring</td>
<td>Fluoroelastomer</td>
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<td>13</td>
<td>Bolt</td>
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<td>14</td>
<td>Spring Washer</td>
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<td>16</td>
<td>Stopper</td>
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<tr>
<td>17</td>
<td>Handle</td>
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</tr>
<tr>
<td>18</td>
<td>Handle Cover</td>
<td>PVC</td>
</tr>
<tr>
<td>19</td>
<td>Lock Washer</td>
<td>AISI 304</td>
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VALVE DIMENSIONAL DRAWING

MODEL CHART

<table>
<thead>
<tr>
<th>Size</th>
<th>1/2</th>
<th>3/4”</th>
<th>1”</th>
<th>1-1/4”</th>
<th>2”</th>
<th>2-1/2”</th>
<th>3”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cv (gal/min)</td>
<td>36.64</td>
<td>67.69</td>
<td>110.27</td>
<td>184.73</td>
<td>266.62</td>
<td>791.57</td>
<td>1151.95</td>
</tr>
<tr>
<td>Ød (in)</td>
<td>19/32 (15)</td>
<td>51/64 (20)</td>
<td>63/64 (25)</td>
<td>3-11/32 (85)</td>
<td>2-59/64 (74)</td>
<td>3-3/4” (112)</td>
<td>7-13/32 (188)</td>
</tr>
<tr>
<td>L (in)</td>
<td>2-9/16 (65)</td>
<td>2-17/32 (75)</td>
<td>2-59/64 (85)</td>
<td>3-11/32 (79)</td>
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<td>7-13/32 (112)</td>
<td>7-13/32 (188)</td>
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<tr>
<td>H (in)</td>
<td>2-3/8 (60)</td>
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<td>5-53/64 (148)</td>
<td>3-1/8” (79)</td>
<td>7-1/8” (101)</td>
<td>7-1/8” (101)</td>
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<tr>
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<td>7/16” (11)</td>
<td>7/16” (11)</td>
<td>7/16” (11)</td>
<td>7/16” (11)</td>
<td>7/16” (11)</td>
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<tr>
<td>S (in)</td>
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<td>5/64” (19)</td>
<td>5/64” (19)</td>
<td>5/64” (19)</td>
<td>5/64” (19)</td>
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<tr>
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<td>1-21/32” (42)</td>
<td>1-21/32” (42)</td>
<td>1-21/32” (42)</td>
<td>1-21/32” (42)</td>
<td>1-21/32” (42)</td>
<td>1-21/32” (42)</td>
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<tr>
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<td>1-21/32” (42)</td>
<td>1-21/32” (42)</td>
<td>1-21/32” (42)</td>
<td>1-21/32” (42)</td>
<td>1-21/32” (42)</td>
</tr>
<tr>
<td>ØRa (in)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
</tr>
<tr>
<td>ØRb (in)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
</tr>
<tr>
<td>M1</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
<td>7/64” (2.75)</td>
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<tr>
<td>Cv (gal/min)</td>
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<td>110.27</td>
<td>184.73</td>
<td>266.62</td>
<td>791.57</td>
<td>1151.95</td>
</tr>
</tbody>
</table>
PNEUMATIC ACTUATOR

Note: For optimal operation, pneumatic actuators should be run with a supply of clean, lubricated air.

Spring Return Actuator Operation

**WARNING** When working on the Actuator/Valve assembly, disconnect the air or power supply to the actuator. Spring return actuators/valves may change position if power fails or is removed. Never insert any object or body part into the valve body. Severe injury may occur.

Air to PORT 2 (the left hand port) causes the actuator to turn counterclockwise (CCW). Loss of air to PORT 2 causes air to exhaust and the actuator turns clockwise (CW). This is the FAIL CLOSE operation.

Double Acting Actuators Operation

Air to PORT 2 (the left hand port) causes the actuator to turn counterclockwise (CCW). Air to PORT 1 (the right hand port) causes the actuator to turn clockwise (CW).

Pneumatic Actuator Maintenance

Routine maintenance of pneumatic actuators:

- Keep the air supply dry and clean
- Keep the actuator surface clean and free from dust
- Periodic checks should be done to make sure all fittings are tight
- Pneumatic actuators are supplied with lubrication to last the entire life span of the actuator under normal operating conditions.

The outer surface of the pneumatic actuator should be clean to avoid friction or corrosion. All fittings and connections should be tight to prevent leaks during operation. Check the bolts mounting the valve to the actuator to make sure they have not come loose during shipping or installation. Make sure the valve and actuator are not rubbing or jarring against other components during operation. The actuator should be inspected annually to make sure all fittings and bolts are tight and nothing has come loose during operation.

Disassembling Pneumatic Actuators

**WARNING** Before beginning disassembly, ensure that the air supply to the actuator has been disconnected, all accessories have been removed, and that the actuator has been disassembled from the valve.

1. Loosen the end cap fasteners (23) with a wrench (size varies depending on actuator model). On the spring return actuator, alternate 3 to 5 turns on each fastener until the springs are completely decompressed. Use caution when removing the cap since the springs are under load until the fasteners are fully extended.
2. Remove the pinion snap ring (13) with a lock ring tool. The indicator (12) may now be removed.
3. Turn the pinion shaft (2) counterclockwise until the pistons are at the full end of travel. Disengage the pistons (15) from the pinion. **(Note: Low pressure air—3 to 5 psi MAXIMUM—might be required to force the pistons completely from the body.)** Note the position of the pistons before removing them from the actuator body.
4. Remove the pinion through the bottom of the actuator. The actuator is now completely disassembled.

Reassembling Pneumatic Actuators

**WARNING** Be sure the actuator surfaces are free of debris and scratches before reassembling.

1. Apply a light film of grease to all O-rings and the pinion before replacing.
2. Put the pinion (2) back through the actuator with the flats of the pinion shaft running parallel with the body.
3. When reassembling the actuator, make sure that the piston racks are square to the actuator body and returned to their original orientation. **(Note: The normal operation of all spring return pneumatic actuators is FAIL CLOSED. To change the orientation to FAIL OPEN, rotate the racks 180º to create a reverse operation.)**
4. When replacing springs in a spring return actuator, ensure that the springs are replaced in their identical position in the end cap from which they were removed. **(Note: In some circumstances, you might want to change the standard 80 pound spring set to fit your application and available air pressure.)**
5. Seal the end caps with a petroleum lubricant and bolt to actuator body.
6. Check the seal of the actuator by covering seal areas (pinion, end caps) with soapy water and using low pressure air to the actuator to ensure that no bubbles are produced.

### Disassembling Pneumatic Actuators

<table>
<thead>
<tr>
<th>Failures</th>
<th>Inspection Items</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic actuator won't operate</td>
<td>1. Check the solenoid valve. Is the coil burnt out or is the solenoid plug? (CW).</td>
<td>1. Replace the solenoid valve coil or remove debris.</td>
</tr>
<tr>
<td></td>
<td>2. The actuator will not move because of debris in the gears.</td>
<td>2. Disassemble the actuator, clean the debris and reassemble the actuator.</td>
</tr>
<tr>
<td></td>
<td>3. The pneumatic line to the actuator is distorted or smashed.</td>
<td>3. Replace pneumatic line to the actuator.</td>
</tr>
<tr>
<td></td>
<td>4. The pneumatic line is frozen because of low temperatures and moisture.</td>
<td>4. Warm the pneumatic lines and remove moisture from supply lines.</td>
</tr>
</tbody>
</table>

<p>| Pneumatic actuator runs slowly | 1. The air supply pressure is insufficient. | 1. Increase the air supply pressure and look for leaks in the supply pressure pipeline. |
| | 2. Are other pneumatic devices consuming the air required for the actuator to operate? | 2. Increase the air supply or reduce the number of devices operating at the same time. |
| | 3. The pneumatic actuator is undersized for the application. | 3. Replace the actuator with a larger actuator. |</p>
<table>
<thead>
<tr>
<th>Part Number</th>
<th>Quantity</th>
<th>Part Name</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Cylinder</td>
<td>Extruded Aluminum Alloy</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Output Shaft</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>O-ring</td>
<td>Fluorine Silicon Rubber</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Bearing</td>
<td>Nylon46</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Adjusting Cam</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Thrust Bearing</td>
<td>Nylon46</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Bearing</td>
<td>Nylon46</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>O-ring</td>
<td>Fluorine Silicon Rubber</td>
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<tr>
<td>9</td>
<td>1</td>
<td>Bearing</td>
<td>Nylon46</td>
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<tr>
<td>10</td>
<td>1</td>
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<td>Screw</td>
<td>PPPP+30%GF</td>
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<td>Casting Aluminum Alloy</td>
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<td>16</td>
<td>2</td>
<td>Guide Ring</td>
<td>Nylon46</td>
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<tr>
<td>17</td>
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<td>O-ring</td>
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<tr>
<td>18</td>
<td>2</td>
<td>Guide Ring</td>
<td>Fluorine-Carbon Composite Material</td>
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<tr>
<td>19</td>
<td>5 to 12</td>
<td>Spring Assembly</td>
<td>Alloy Spring Steel</td>
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<tr>
<td>20</td>
<td>2</td>
<td>O-ring</td>
<td>Fluorine Silicon Rubber</td>
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<tr>
<td>21</td>
<td>1</td>
<td>Left End Cap</td>
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<tr>
<td>22</td>
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<td>Right End Cap</td>
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<td>8</td>
<td>End Cap Bolt</td>
<td>Stainless Steel</td>
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<td>24</td>
<td>2</td>
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<td>26</td>
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<tr>
<td>27</td>
<td>2</td>
<td>Adjusting Bolt</td>
<td>Stainless Steel</td>
</tr>
</tbody>
</table>
D. Continue applying power to terminals until valve is in the desired position.

C. Rotate the top cam counterclockwise (CCW) until the switch arm drops off.

B. Loosen the set screw in the top cam.

A. Apply power to terminals. This will begin to rotate valve CW. When valve is

3. If the valve opens too far:

C. When the top cam is set, tighten the set screw securely.

B. Rotate the cam clockwise (CW) by hand until the switch makes contact. Contact is made when a slight click can be heard. By making incremental CW movements of the top cam, the valve can be positioned precisely in the desired position.

A. Slightly loosen the set screw on the top cam.

2. If the valve is not open completely:

C. When the top cam is set, tighten the set screw securely.

B. Rotate the cam clockwise (CW) by hand until the switch makes contact. Contact is made when a slight click can be heard. By making incremental CW movements of the top cam, the valve can be positioned precisely in the desired position.

A. Slightly loosen the set screw on the top cam.

1. Operate valve manually and place in the open position.

To Set The Open Position

1. Operate valve manually and place in the open position.

2. If the valve closes too far:

C. When the top cam is set, tighten the set screw securely.

B. Rotate the cam clockwise (CW) by hand until the switch makes contact. Contact is made when a slight click can be heard. By making incremental CW movements of the top cam, the valve can be positioned precisely in the desired position.

A. Slightly loosen the set screw on the top cam.

ELECTRIC ACTUATORS

Electric Installation

1. Operate valve manually and place in the open position.

2. Remove any mechanical stops the valve might have. (DO NOT REMOVE ANY PARTS NECESSARY FOR THE PROPER OPERATION OF THE VALVE, SUCH AS THE PACKING GLAND, PACKING NUT, ETC.)

3. Ensure that the actuator output shaft and valve stem are aligned properly. If they are not, operate the valve manually until they are correct.

4. Remove actuator cover.

5. Bring power to the actuator. CAUTION: Make sure power is OFF at the main box.

6. Wire the actuator per the diagram attached to the inside of the cover. Special actuators (those with positioner boards, etc.) will have diagrams enclosed inside the cover.

7. Securely tighten bolts used to mount the actuator to a mounting bracket or directly to the valve mounting pad if it is ISSOS211 compliant.

8. Cycle the unit several times and check the open and closed positions of the valve. Cams are pre-adjusted at the factory; due to the variety of valve designs and types however, slight adjustments might be required.

9. Replace cover and tighten screws.

To Set The Closed Position

1. Apply power to terminals to move the valve toward the closed position. The bottom cam and switch control the closed position. In the closed position, the set screw in the bottom cam will be accessible.

2. If the valve is not closed completely:

A. Slightly loosen the set screw on the bottom cam.

B. Rotate the cam counterclockwise (CCW) by hand until the switch makes contact. Contact is made when a slight click can be heard. By making incremental CCW movements of the bottom cam, the valve can be positioned precisely in the desired position.

C. When the top cam is set, tighten the set screw securely.

3. If the valve closes too far:

A. Apply power to terminals. This will begin to rotate valve CCW. When valve is fully closed and in the exact position desired, remove power from actuator.

B. Loosen the set screw in the top cam.

C. Rotate the top cam clockwise (CW) until the switch arm drops off the round portion of the cam onto the flat section. A slight click can be heard as the switch changes state.

D. Continue applying power to terminals until valve is in the desired position.
Electric Actuators Wiring Diagram: ACT-TI & ACT-MI

Wiring Diagrams for
TI01-A to TI05-A: 110 VAC, TI01-B to TI05-B: 220VAC, TI01-C to TI05-C: 24 VAC

**OPTIONAL BRAKE**

**PSC MOTOR**

**CAPACITOR**

**SW. #1 CLOSE LIMIT**

**SW. #2 OPEN LIMIT**

**GROUND SCREW**

**SWITCH LAYOUT**

**NOTES:**
- POWER TO TERMINALS ONE & TWO OPENS THE VALVE (CCW ROTATION)
- POWER TO TERMINALS ONE & THREE CLOSES THE VALVE (CW ROTATION)
- TERMINALS 4 & 5 ARE FOR LIGHT INDICATION
- WIRING DIAGRAM ILLUSTRATES THE ACTUATOR IN THE OPEN POSITION

**FIELD WIRING**

**LIGHTS FOR REMOTE POSITION INDICATION**

**DPDT CONTROL SWITCH SHOWN FOR ILLUSTRATION ONLY**

**OPTIONAL EQUIPMENT FIELD WIRING**

**FIELD WIRING**

**SW.#1**

**SW.#2**

SWITCH #1 OPEN SWITCH
SWITCH #2 CLOSE SWITCH

**OPERATION:**
- POWER TO 1 & 2 FOR CCW ROTATION
- POWER TO 3 & 4 FOR CW ROTATION
- TERMINALS 5 & 6 FOR FIELD LIGHT INDICATION CONNECTION

**REVERSING RELAY SUPPLIED BY CUSTOMER**

**DC VOLTAGE**

**SPDT SWITCH SHOWN FOR ILLUSTRATION ONLY**
Wiring Diagrams for MD01-A to MD03-A: 110 VAC, MD01-B to MD03-B: 220 VAC, MD01-C to MD03-C: 24 VAC

Wiring Diagram for 1Ph/60Hz Electric Actuator with 4-20mA, 0-5Vdc or 0-10Vdc Control.

**NOTE:**
ACTUATOR SHIPPED IN OPEN POSITION. 20mA REPRESENTS OPEN POSITION. DO NOT ADJUST FEEDBACK POTENTIALMETER OR LIMIT SWITCHES THEY ARE FACTORY SET AND DO NOT REQUIRE CALIBRATION. TO CALIBRATE THE OPEN AND CLOSE POSITION, USE THE ZERO (4mA) AND SPAN (20mA) TRIM POTENTIOMETERS.

TO CALIBRATE, OPERATE ACTUATOR TO CLOSE POSITION AND ADJUST WITH ZERO TRIM POT THEN OPERATE TO OPEN POSITION AND SET USING SPAN TRIM POT. NO FURTHER CALIBRATION IS NECESSARY.

WIRING DIAGRAM FOR 1Ph/60Hz Electric Actuator with 4-20mA, 0-5Vdc or 0-10Vdc CONTROL.

Wiring Diagrams for MI01-D to MI05-D: 24 VDC

WIRING DIAGRAM FOR 1Ph/60Hz Electric Actuator with 4-20mA, 0-5Vdc or 0-10Vdc CONTROL.
Electric Actuators Wiring Diagram: ACT-TD & ACT-MD

Wiring Diagrams for
TD01-A to TD03-A: 110 VAC, TD01-B to TD03-B: 220 VAC,
TD01-C to TD03-C: 24 VAC

Note: To speed up installation of the control wires to the ACT-MDXX modulating actuator, it is recommended to remove the control module from the actuator. The control module can be removed by removing the two mounting screws on the left and right of the control module. Install the control wires to the correct terminal points and then reinstall the control module.

Electric Actuator Maintenance
Once the actuator has been properly installed, it requires no maintenance. The gear train has been lubricated and in most cases will never be opened.

Duty Cycle Definition
“Duty Cycle” means the starting frequency.
Formula: Running Time ÷ (Running Time + Rest Time) x 100% = duty cycle
=> Rest Time = Running Time x (1 - duty cycle) ÷ duty cycle

For example: The running time is 15 seconds
30% duty cycle   15 x [(1 - 30%) / 30%] = 35 => The rest time will be 35 seconds
75% duty cycle   15 x [(1 - 75%) / 75%] = 5 => The rest time will be 5 seconds

If the duty cycle is higher, the rest time will be shortened, which means the starting frequency will be higher.

Thermal Overload
All actuators are equipped with thermal overload protection to guard the motor against damage due to overheating.

Mechanical Overload
All actuators are designed to withstand stall conditions. It is not recommended to subject the unit to repeated stall conditions.

Explosion-Proof Electric Actuators

WARNING
1. DO NOT under any circumstances remove the cover of the actuator while in a hazardous location. Removal of the cover while in a hazardous location could cause ignition of hazardous atmospheres.
2. DO NOT under any circumstances use an explosion-proof electric actuator in a hazardous location that does not meet the specifications for which the actuator was designed.
3. Always verify that all electrical circuits are de-energized before opening the actuator.
4. Always mount and cycle test the actuator on the valve in a non-hazardous location.
5. When removing the cover, care must be taken not to scratch, scar or deform the flame path of the cover and base of the actuator, since this will negate the NEMA rating of the enclosure.
6. When replacing the cover, take care that the gasket is in place to assure proper clearance after the cover is secured.
7. All electrical connections must be in accordance with the specifications for which the unit is being used.
8. Should the unit ever require maintenance, remove from the hazardous location before attempting to work on the unit. If the actuator is in a critical application, it is advisable to have a standby unit in stock.
### Electric Actuators Performance Rating

#### TD01

<table>
<thead>
<tr>
<th>Voltage</th>
<th>TD01 Cycle Time</th>
<th>TD01 Duty Cycle (Two-Position)</th>
<th>AMP Draw</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 VAC</td>
<td>4 s</td>
<td>85%</td>
<td>0.24 A</td>
<td>177 in-lb</td>
</tr>
<tr>
<td>220 VAC</td>
<td>4 s</td>
<td>85%</td>
<td>0.24 A</td>
<td>177 in-lb</td>
</tr>
<tr>
<td>24 VAC</td>
<td>4 s</td>
<td>85%</td>
<td>0.28 A</td>
<td>177 in-lb</td>
</tr>
<tr>
<td>24 VDC</td>
<td>4 s</td>
<td>85%</td>
<td>0.28 A</td>
<td>177 in-lb</td>
</tr>
</tbody>
</table>

#### MD01

<table>
<thead>
<tr>
<th>Voltage</th>
<th>MD01 Cycle Time</th>
<th>MD01 Duty Cycle (Modulating)</th>
<th>AMP Draw</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 VAC</td>
<td>10 s</td>
<td>85%</td>
<td>0.24 A</td>
<td>265 in-lb</td>
</tr>
<tr>
<td>220 VAC</td>
<td>10 s</td>
<td>85%</td>
<td>0.24 A</td>
<td>265 in-lb</td>
</tr>
<tr>
<td>24 VAC</td>
<td>10 s</td>
<td>85%</td>
<td>1.28 A</td>
<td>265 in-lb</td>
</tr>
<tr>
<td>24 VDC</td>
<td>10 s</td>
<td>85%</td>
<td>1.28 A</td>
<td>265 in-lb</td>
</tr>
</tbody>
</table>

#### TD02 and MD02 (MD Not Available in 24 VDC)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>TD02 Cycle Time</th>
<th>TD02 Duty Cycle (Two-Position)</th>
<th>AMP Draw</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 VAC</td>
<td>20 s</td>
<td>85%</td>
<td>0.24 A</td>
<td>442 in-lb</td>
</tr>
<tr>
<td>220 VAC</td>
<td>20 s</td>
<td>85%</td>
<td>0.24 A</td>
<td>442 in-lb</td>
</tr>
<tr>
<td>24 VAC</td>
<td>20 s</td>
<td>85%</td>
<td>1.28 A</td>
<td>442 in-lb</td>
</tr>
<tr>
<td>24 VDC</td>
<td>20 s</td>
<td>85%</td>
<td>1.28 A</td>
<td>442 in-lb</td>
</tr>
</tbody>
</table>

#### TD03 and MD03 (MD Not Available in 24 VDC)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>TD03 Cycle Time</th>
<th>TD03 Duty Cycle (Two-Position)</th>
<th>AMP Draw</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 VAC</td>
<td>30 s</td>
<td>85%</td>
<td>0.24 A</td>
<td>885 in-lb</td>
</tr>
<tr>
<td>220 VAC</td>
<td>30 s</td>
<td>85%</td>
<td>0.24 A</td>
<td>885 in-lb</td>
</tr>
<tr>
<td>24 VAC</td>
<td>30 s</td>
<td>85%</td>
<td>1.28 A</td>
<td>885 in-lb</td>
</tr>
<tr>
<td>24 VDC</td>
<td>30 s</td>
<td>85%</td>
<td>1.28 A</td>
<td>885 in-lb</td>
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#### TI01

<table>
<thead>
<tr>
<th>Voltage</th>
<th>TI01 Cycle Time</th>
<th>TI01 Duty Cycle (Two-Position)</th>
<th>TI01 Duty Cycle (Modulating)</th>
<th>TI01 Full Load AMP Draw</th>
<th>TI01 Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 VAC</td>
<td>2.5 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>885 in-lb</td>
</tr>
<tr>
<td>220 VAC</td>
<td>2.5 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>885 in-lb</td>
</tr>
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<td>0.38</td>
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<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>885 in-lb</td>
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#### TI02 and MI01, MI02

<table>
<thead>
<tr>
<th>Voltage</th>
<th>TI02 Cycle Time</th>
<th>TI02 Duty Cycle (Two-Position)</th>
<th>TI02 Duty Cycle (Modulating)</th>
<th>TI02 Full Load AMP Draw</th>
<th>TI02 Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 VAC</td>
<td>5 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>200 in-lb</td>
</tr>
<tr>
<td>220 VAC</td>
<td>5 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>200 in-lb</td>
</tr>
<tr>
<td>24 VAC</td>
<td>5 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>200 in-lb</td>
</tr>
<tr>
<td>24 VDC</td>
<td>5 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>200 in-lb</td>
</tr>
</tbody>
</table>

#### TI03 and MI03

<table>
<thead>
<tr>
<th>Voltage</th>
<th>TI03 Cycle Time</th>
<th>TI03 Duty Cycle (Two-Position)</th>
<th>TI03 Duty Cycle (Modulating)</th>
<th>TI03 Full Load AMP Draw</th>
<th>TI03 Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 VAC</td>
<td>10 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>300 in-lb</td>
</tr>
<tr>
<td>220 VAC</td>
<td>10 s</td>
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<td>25%</td>
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<td>300 in-lb</td>
</tr>
<tr>
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<td>10 s</td>
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<td>0.38</td>
<td>300 in-lb</td>
</tr>
<tr>
<td>24 VDC</td>
<td>10 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>300 in-lb</td>
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#### TI04 and MI04

<table>
<thead>
<tr>
<th>Voltage</th>
<th>TI04 Cycle Time</th>
<th>TI04 Duty Cycle (Two-Position)</th>
<th>TI04 Duty Cycle (Modulating)</th>
<th>TI04 Full Load AMP Draw</th>
<th>TI04 Torque (in-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 VAC</td>
<td>15 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>400 in-lb</td>
</tr>
<tr>
<td>220 VAC</td>
<td>15 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>400 in-lb</td>
</tr>
<tr>
<td>24 VAC</td>
<td>15 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>400 in-lb</td>
</tr>
<tr>
<td>24 VDC</td>
<td>15 s</td>
<td>25%</td>
<td>25%</td>
<td>0.38</td>
<td>400 in-lb</td>
</tr>
</tbody>
</table>

#### MAINTENANCE/REPAIR

Upon final installation of the Series WE, only routine maintenance is required. The Series WE is not field serviceable and should be returned if repair is needed. Field repair should not be attempted and may void warranty.

#### WARRANTY/RETURN

Refer to “Terms and Conditions of Sale” in our catalog and on our website. Contact customer service to receive a Return Goods Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.