The Series WE01 incorporates a full port two piece SS ball valve for great 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 direct mounted creating a compact assembly for tight spaces. Limit switches are able to be mounted directly to the valves allowing for remote position indication.

The WE01 series 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 or modulating control. Two-position actuators use the supply voltage to drive the valve open or close, while the modulating actuator accepts a 4 to 20 mA input for valve positioning. Actuators feature thermal overload protection and 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 SN 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**: 2-piece.
- **Line Sizes**: 1/2 to 3˝.
- **End Connections**: Female NPT.
- **Pressure Limits**: 20˝ Hg to 1000psi (-0.7 to 69 bar).
- **Wetted Materials**:
  - Body and Ball: 316 SS (CF8M);
  - Stem: 316SS;
  - Seat: RTFE/PTFE;
  - Seal, Washer and Packing: PTFE.
- **Temperature Limits**: -20 to 392°F (-29 to 200°C).
- **Other Materials**:
  - O-ring: Fluoroelastomer;
  - Handle: 304 SS;
  - Washer: 301 SS;
  - Stem Nut, Locking Device, Gland Ring: 304SS;
  - Handle Sleeve: PVC.

#### 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 body and epoxy coated aluminum end caps.
- **Temperature Limits**: -40 to 176°F (-40 to 80°C).
- **Accessory Mounting**: NAMUR standard.

**Electric “TI” and “MI” Series**

- **Power Requirements**: 110 VAC, 220 VAC, 24 VAC or 24 VDC.
- **Power Consumption**: See page 8.
- **Cycle Time (per 90°)**:
  - TI01 and MI01: 2.5 s;
  - TI02 and MI02: 5 s;
  - TI03 and MI03: 10 s;
  - TI04 and MI04: 15 s.
- **Duty Rating**:
  - Two-Position: TI01-TI06: 25%.
  - Modulating: MI01-MI06: 75%.
- **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 to 20 mA.
- **Standard Features**: Position indicator and two limit switches.

**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 to 20 mA.
- **Standard Features**: Manual override, position indicator, and TD models come with two limit switches.
### Double Acting Pneumatic Actuator

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<th>NPT</th>
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### Spring Return Pneumatic Actuator

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### W/ PNEUMATIC ACTUATOR

### W/ NEMA 4X ELECTRIC ACTUATOR

### W/ EXPLOSION-PROOF ELECTRIC ACTUATOR
PNEUMATIC ACTUATOR

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

Spring Return Actuator Operation

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

Pneumatic Actuator Maintenance

Routine maintenance of pneumatic actuator:

• 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 jamming 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 (22) 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 extended.

2. Remove the pinion snap ring (10) with a lock ring tool. The indicator (7) may now be removed.

3. Turn the pinion shaft (2) counter clockwise until the pistons are at the full end of travel. Disengage the pistons (11) 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.

Pneumatic Actuators Bill of Materials

<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>
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<td>1</td>
<td>Output Shaft</td>
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</tr>
<tr>
<td>3</td>
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<td>O-ring</td>
<td>Fluorine Silicon Rubber</td>
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<tr>
<td>4</td>
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<td>Nylon46</td>
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<tr>
<td>5</td>
<td>1</td>
<td>Adjusting Cam</td>
<td>Stainless Steel</td>
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<td>O-ring</td>
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<tr>
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<tr>
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<tr>
<td>27</td>
<td>2</td>
<td>Adjusting Bolt</td>
<td>Stainless Steel</td>
</tr>
</tbody>
</table>

PNEUMATIC ACTUATOR

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

Pneumatic Actuator Maintenance

Routine maintenance of pneumatic actuator:

• 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 jamming 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.

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⚠️ 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 (22) 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 extended.

2. Remove the pinion snap ring (10) with a lock ring tool. The indicator (7) may now be removed.

3. Turn the pinion shaft (2) counter clockwise until the pistons are at the full end of travel. Disengage the pistons (11) 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.

Pneumatic Actuators Bill of Materials

<table>
<thead>
<tr>
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<th>Part Name</th>
<th>Material</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
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<td>2</td>
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<td>Output Shaft</td>
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<td>Adjusting Bolt</td>
<td>Stainless Steel</td>
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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 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 ISO5211 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 Open Position
1. Cycle the valve to the open position by applying power to terminals. The top cam and switch control this position. In the open position, the set screw in the top cam will be accessible.
2. If the valve is not open completely:
   A. Slightly loosen the set screw on the top cam.
   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.
   C. When the top cam is set, tighten the set screw securely.
3. If the valve opens too far:
   A. Apply power to terminals. This will begin to rotate valve CW. When valve is fully open and in the exact position desired, remove power from actuator.
   B. Loosen the set screw in the top cam.
   C. Rotate the top cam counter-clockwise (CCW) 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.

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 counter-clockwise (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 is no longer making contact with the round part of the cam.
   D. Continue applying power to terminals until valve is in the desired position.
Wiring Diagrams for TI01-TI10: 120 VAC, TI01-TI10: 220VAC, TI01-TI10: 24 VAC

1 2 3 4 5 6 7 8 9 10
N HOT

A.C. SUPPLY

POWER DPDT CONTROL SWITCH SHOWN FOR ILLUSTRATION ONLY

OPTIONAL BRAKE

PSC MOTOR

CAPACITOR

SW. #1

SW. #2

OPTIONAL HEATER & THERMOSTAT

GROUND SCREW

SW. #1 CLOSE LIMIT

SW. #2 OPEN LIMIT

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

OPTIONAL EQUIPMENT FIELD WIRING

Wiring Diagrams for TI01-TI10: 12VDC, TI01-TI10: 24 VDC

ACTUATOR SHOWN IN OPEN POSITION

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

FIELD WIRING

SPDT SWITCH SHOWN FOR ILLUSTRATION ONLY

REVERSING RELAY SUPPLIED BY CUSTOMER
NOTE: ACTUATOR SHIPPED IN OPEN POSITION. 20mA REPRESENTS OPEN POSITION. DO NOT ADJUST FEEDBACK POTENTIOMETER 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.

HEATER & THERMOSTAT OPTIONAL

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 POTENTIOMETER 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.

HEATER & THERMOSTAT OPTIONAL

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-TD09: 120 VAC, TD01-TD09: 220 VAC, TD01-TD09: 24 VAC

![Wiring Diagrams for TD01-TD06: 24 VDC](image1)

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. It 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

<table>
<thead>
<tr>
<th>Voltage</th>
<th>TD01</th>
<th>Voltage</th>
<th>TD02 and MD02 (MD Not Available in 24 VDC)</th>
<th>Voltage</th>
<th>TD03 and MD03 (MD Not Available in 24 VDC)</th>
<th>Voltage</th>
<th>TD04 and MD04 (MD Not Available in 24 VDC)</th>
<th>Voltage</th>
<th>TD05 and MD05 (MD Not Available in 24 VDC)</th>
<th>Voltage</th>
<th>TD06 and MD06 (MD Not Available in 24 VDC)</th>
<th>Voltage</th>
<th>TI01 and MI01</th>
<th>Voltage</th>
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</tbody>
</table>

### Duty Cycle (Two-Position)

- **TD01**: 100% (24 VAC)
- **MD01**: 100% (24 VAC)
- **TD02 and MD02**: 100% (24 VAC)
- **TD03 and MD03**: 100% (24 VAC)
- **TD04 and MD04**: 100% (24 VAC)
- **TD05 and MD05**: 100% (24 VAC)
- **TD06 and MD06**: 100% (24 VAC)
- **TI01 and MI01**: 100% (24 VAC)
- **TI02 and MI02**: 100% (24 VAC)

### Duty Cycle (Modulating)

- **TD01**: 50% (24 VAC)
- **MD01**: 50% (24 VAC)
- **TD02 and MD02**: 50% (24 VAC)
- **TD03 and MD03**: 50% (24 VAC)
- **TD04 and MD04**: 50% (24 VAC)
- **TD05 and MD05**: 50% (24 VAC)
- **TD06 and MD06**: 50% (24 VAC)
- **TI01 and MI01**: 50% (24 VAC)
- **TI02 and MI02**: 50% (24 VAC)

### AMP Draw

- **TD01**: 0.4 A (24 VAC)
- **MD01**: 0.4 A (24 VAC)
- **TD02 and MD02**: 0.4 A (24 VAC)
- **TD03 and MD03**: 0.4 A (24 VAC)
- **TD04 and MD04**: 0.4 A (24 VAC)
- **TD05 and MD05**: 0.4 A (24 VAC)
- **TD06 and MD06**: 0.4 A (24 VAC)
- **TI01 and MI01**: 0.4 A (24 VAC)
- **TI02 and MI02**: 0.4 A (24 VAC)

### Torque (Duty Cycle (Two-Position))

- **TD01**: 500 in-lb (24 VAC)
- **MD01**: 500 in-lb (24 VAC)
- **TD02 and MD02**: 500 in-lb (24 VAC)
- **TD03 and MD03**: 500 in-lb (24 VAC)
- **TD04 and MD04**: 500 in-lb (24 VAC)
- **TD05 and MD05**: 500 in-lb (24 VAC)
- **TD06 and MD06**: 500 in-lb (24 VAC)
- **TI01 and MI01**: 500 in-lb (24 VAC)
- **TI02 and MI02**: 500 in-lb (24 VAC)

### Cycle Time

- **TD01**: 12 s (24 VAC)
- **MD01**: 12 s (24 VAC)
- **TD02 and MD02**: 12 s (24 VAC)
- **TD03 and MD03**: 12 s (24 VAC)
- **TD04 and MD04**: 12 s (24 VAC)
- **TD05 and MD05**: 12 s (24 VAC)
- **TD06 and MD06**: 12 s (24 VAC)
- **TI01 and MI01**: 12 s (24 VAC)
- **TI02 and MI02**: 12 s (24 VAC)

### 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.