CYCLEMASTER® BALL VALVES
SERIES I ACTUATOR AND WEATHERPROOF ENCLOSURE
INSTALLATION INSTRUCTIONS

ACTUATOR/HUB REMOVAL
1. Disconnect Actuator (10) from all electrical sources.
2. Remove Actuator from Sealed Hub Stem (3) by:
   a) Loosening the Adjustment Lever (8)
   b) Slide the Actuator off the Stem (3)
3. Remove Hub Assembly (2-7) from Ball Valve (1) by
   a) Loosening the Set-Screws (6) on Hub (7)
   b) Remove Hub by placing wrench on flats of the Sealing Mechanism (5) and turn counter-clockwise.
   c) Unscrew Hub Assembly from valve

HUB INSTALLATION
1. Remove Seal Mechanism (5) from Hub Assembly (2-7, 9). Sealed Hub Stem (3) should remain partially installed in the Seal Mechanism. Ensure Stem and O-Ring Seals (4) are well lubricated
2. Ensure top of the Ball Valve (1) brass sealing surface is clean and free of debris.
3. Place Seal Cap Gasket (2) on sealing surface of Seal Mechanism (5) where it is located between the Seal Mechanism and the top of the valve neck.
4. Thread the Seal Mechanism down on top of valve neck (hand tighten). Align slot in the Stem (3) with valve stem, and seal is between Seal Mechanism (5) and top of valve neck.
5. Partially install the Set Screws (6) into the Hub.
6. Thread Hub (7) over the Seal Mechanism (5) and onto the valve as far as possibly, stopping just before bottoming out.
7. Align Hub so that Actuator (10) in desired orientation. With Allen wrench, tighten Set Screws (6). Torque 65 lb-in on either side of Hub until Hub is secured against the Ball Valve body to avoid rotation during operation.
8. While holding to proper orientation, continue to tighten Seal Mechanism with wrench, approximately ¼ to ½ turns until secure to ensure tight seal against valve body.
9. Pull Stem (3) upward, away from Ball Valve until no additional space is between the Hub Assembly’s Stem and Seal Mechanism.
10. Place Actuator against the Hub, over the Stem with the 3/8-inch Shaft Adapter in place and aligning the thread holds on the Actuator housing. Bottom of Actuator should be flush against the top of the Hub (Figure 6).
11. Assemble Hex-Head Bolts (9) onto the Actuator (10). Align bolts with corresponding holes on Hub (7).
12. While holding manual override switch on Actuator, align Adjustment Lever (8) and tighten against Stem. Torque: 60-90 lb.-in. (7-10 N-m). See Commissioning Instructions.

ACTUATOR INSTALLATION (No Enclosure)
1. Actuator (10), 3/8-inch Shaft Adapter (Figure 2 and Position Indicator required for installation.
2. Remove factory installed ¼-inch guide, as shown in Figure 3, to accommodate the size of the Stem (3).
3. Insert the 3/8-inch Shaft Adapter (Figure 2) into the back of the Actuator, aligning Shaft Adapter with Adjustment Lever (8) and raised-tabs part of the Shaft Adapter. Raised tabs act as tops. (Figure 4 and Figure 5)
4. Slide red manual override know toward back of actuator (10) and match full counter-clockwise position of Adjustment Lever (8) to the full counter-clockwise rotation of the Ball Valve (1). Reposition if necessary.
5. Pull Stem (3) upwards, away from Ball Valve until no additional space is between the Hub Assembly’s Stem and Seal Mechanism.
6. Place Actuator against the Hub, over the Stem with the 3/8-inch Shaft Adapter in place and aligning the thread holds on the Hub with the holes on the underside of the Actuator housing. Bottom of Actuator should be flush against the top of the Hub (Figure 6).
7. Assemble Hex-Head Bolts (9) onto the Actuator (10). Align bolts with corresponding holes on Hub (7).
8. While holding manual override switch on Actuator, align Adjustment Lever (8) and tighten against Stem. Torque: 60-90 lb.-in. (7-10 N-m). See Commissioning Instructions.
**ACTUATOR INSTALLATION (with Enclosure)**

1. Disassemble cover by loosening plastic screws on enclosure.
2. Follow steps 2 through 8 of "HUB INSTALLATION". DO NOT REMOVE SEAL MECHANISM (already installed) or thread sealant between Hub and Seal Mechanism will be damaged.
3. Install O-Ring into Hub Groove. (Figure 7) If Hub does not have groove, use Hub from the new Enclosure Kit. Apply small amount of lubricant to O-Ring, if necessary.
4. Place enclosure over Stem and on Hub, aligning holes with underside of Enclosure and Actuator. Bottom of Enclosure should be flush against top of Hub.
5. From top of Enclosure, assemble two Cap Screws, using Plastic Washer, into lower side bolt holes. Tighten Enclosure on Hub. (Bolt Heads should be on top, Bolt Shaft protrudes on underside of Hub). (Figure 8)

**Notes:**
1. Do not over-tighten Adjustment Lever.
2. Hub (7) is tightened to Seal Mechanism (5), not to bottom of the valve neck. Seal Cap Gasket (2) should be tight enough to seal valve surf ace.

6. Set Enclosure aside and follow steps 1 through 5 of ACTUATION INSTALLATION.
7. Place Actuator against Enclosure, over Stem with 3/8-inch Shaft Adapter in place. Align holes of Enclosure with underside of Actuator housing. Bottom of Actuator should be flush against top of Enclosure.
8. Assemble remaining two Cap Screws onto Actuator into upper holes of Enclosure and Hub. Torque = 15 lb.-in
9. While holding manual override switch on Actuator, align Shaft Coupling. Refer to Torque Table for maximum tightening. See Commissioning Instructions.
10. Install Enclosure using cover screws. (Torque ≈ 10 lb.-in, 1.2 N-m.)

**Actuator Features:**
- Compact, lightweight design
- Manual override
- cUL and UL Listed, CE Certified
- Independently adjustable dual auxiliary switches available

**Service Warnings/Cautions**
- DO NOT OPEN THE ACTUATOR. IF THE ACTUATOR IS INOPERATIVE, REPLACE THE UNIT.
- Do not wire different types of actuators in parallel with these models.
- All six outputs of the dual auxiliary switch (A and B) must only be connected to:
  - Class 2 voltage (UL/CSA),
  - Separated Extra-Low Voltage (SELV) or Protective Extra Low Voltage (PELV) (according to HD384-4-41) for installations requiring conformance. You must use a certified plenum actuator.
- Installations requiring conformance:
  - All wiring for CE certified actuators must only be separated extra low voltage (SELV) or protective extra low voltage (PELV) per HD384-4-41. Use safety isolating transformers (Class III transformer) per EN61558. They must be rated for 100% duty cycle. Overcurrent protection for supply lines is maximum 10A.
- Mixed Switching operation is not permitted to the switching outputs of both auxiliary switches (A and B)
- Personal injury/loss of life may occur if a procedure is not performed as specified.
- Not for use in condensing or wet applications.
- Equipment damage or loss of data may occur if the user does not follow a procedure as specified.
- To avoid injury or loss of life, pay attention to any hazardous voltage when performing checks.

**Manual Override**

To move the valve and lock the position with no power present:

1. Slide the red manual override knob toward the back of the actuator.
2. Make adjustments to the valve position.
3. Slide the red manual override knob toward the front of the actuator.

Once power is restored, the actuator returns to the automatic control.

INST-026, Rev 06/2020
Wiring

All wiring must conform to NEC and local codes and regulations. Use earth ground isolating step-down Class 2 transformers. Do not use auto transformers. The sum of the VA ratings of all actuators and all other components powered by one transformer must not exceed the rating of the transformer. It is recommended that one transformer power no more than 10 actuators.

Figure 1. Standard Models

Figure 2. Auxiliary Switch Models

START UP/COMMISSIONING

1. Check that the wires are connected correctly.
2. Connect wires 1 (red) and 6 (violet) to a Digital Multimeter (DMM) with the dial set at Vac. Apply a control signal (24 Vac) to wires 1 and 6 to verify that the operating voltage is within range.
3. Check that the direction of the rotation switch matches the rotation of the valve ball.
4. Check the operation.
   a) Connect wire 1 (red) to the actuator.
   b) Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet).
   c) Allow the actuator Adjustment Lever to rotate from 0 to 90°.
   d) Stop applying a control signal to wires 1 (red) and 6 (violet).
5. Check the Auxiliary Switch A.
   a) Set the DMM dial to Ohms (resistance) or continuity check.
   b) Connect wires S1 and S3 to the DMM. The DMM should indicate an open circuit or no resistance.
   c) Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet). The DMM should indicate contact closure as the actuator Adjustment Lever reaches the setting of switch A.
   d) Stop applying a control signal to wires 1 (red) and 6 (violet).
   e) Connect wires S1 and S2 to the DMM. The DMM should indicate an open circuit or no resistance.
   f) Apply a control signal (24 Vac) to wires 1 (red) and 7 (orange). The DMM should indicate contact closure as the actuator Adjustment Lever reaches the setting of switch A.
6. Check the Auxiliary Switch B.
   a) Set the DMM dial to Ohms (resistance) or continuity check.
   b) Connect wires S4 and S6 to the DMM. The DMM should indicate an open circuit or no resistance.
   c) Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet). The DMM should indicate contact closure as the actuator Adjustment Lever reaches the setting of switch B.
   d) Stop applying a control signal to wires 1 (red) and 6 (violet).
   e) Connect wires S4 and S5 to the DMM. The DMM should indicate an open circuit or no resistance.
   f) Apply a control signal (24 Vac) to wires 1 (red) and 7 (orange). The DMM should indicate contact closure as the actuator Adjustment Lever reaches the setting of switch B.

Weatherproof Enclosure Kits

Includes Enclosure, Hub Kit, Cord Grips (2), O-Ring, Cap Screws (4), Gaskets (4)

PRODUCT HAS BEEN MANUFACTURED TO BE CONSISTENT WITH NEMA3R SPECIFICATIONS.

Assemble the kit in compliance with the Installation instructions provided, in order for the enclosure to perform its function.

Notes

The conduit hubs are to be connected to the conduit before being connected to the enclosure. Selected location must provide adequate wire bending space.

Cord grips provided for plenum applications.

Weatherproof Enclosure Features:

All the Enclosures have drilled holes to accommodate the Heater kit except the Series I Enclosure.

Enclosure has Metric Knockouts for easy wiring.

Enclosure Material: Polycarbonate (PC); Screw Cover; Opaque

NON-METALLIC ENCLOSURE DOES NOT PROVIDE GROUNDING BETWEEN CONDUIT CONNECTIONS. USE GROUNDING BUSHINGS AND JUMPING WIRES.

AMBIENT TEMPERATURE: -25°F to 125°F (-40°F TO 125°F, IF USED WITH A HEATER KIT)

†: The heater kit cannot be used with Series I Actuator and Enclosure. The Ambient Temperature (operation) for the Series I enclosure stays at: -25°F to 125°F.
**Specifications: Series I Actuator for Ball Valve Sizes 1/2 - 7/8**

### Power Supply
- **Operating Voltage**: 24 Vac +20%, -15%
- **Frequency**: 50/60 Hz
- **Power Consumption**: 2.3 VA (Floating Control)
- **3.3 VA (Modulating Control)**

### Control Signal (Only for Modulating)
- **Voltage Input**: 0 to 10 Vdc
- **Input Resistance**: > 100K ohms

### Feedback Signal (Only for Modulating)
- **Voltage Output**: 0 to 10 Vdc
- **Maximum output current**: DC 1mA

### Equipment Rating
- **Rating**: Class 2 according to UL, CSA, Class III per EN60730

### Auxiliary Features
- **Dual Auxiliary Switch Contact Rating**: 4A resistive, 2A inductive
- **Dual Auxiliary Switch Voltage Rating**: 24 Vac/12 to 30 Vdc

### Switch Range
- **Switch A**: 0 to 90° with 5° intervals
- **Recommended Range Usage**: 0 to 45°
- **Factory Setting**: 5°
- **Switching Hysteresis**: 2°
- **Switch B**: 0 to 90° with 5° intervals
- **Recommended Range Usage**: 45 to 90°
- **Factory Setting**: 85°

### Function
- **Torque**: 44 lb.-in (5 Nm)
- **Runtime for 90° Opening or Closing**: 90 sec. @ 60 Hz, 125 sec. @ 50 Hz
- **Nominal Angle of Rotation**: 90°
- **Maximum Angular Rotation**: 95°

### Housing
- **Enclosure**: NEMA Type 2, IP54 according to EN60529
- **Material**: Durable Plastic
- **Gear Lubrication**: Silicone free

### Ambient Conditions
- **Actuator Operation Temp.**: -25°F to 130°F (-32°C to 55°C); Enclosure Temp.: -25°F to 125°F (-32°C to 51°C)
- **Storage and Transport Temperature**: -40°F to 158°F (-40°C to 70°C)
- **Ambient Humidity (non-condensing)**: 95% rh

### Agency Certification
- **UL Listing**: UL listed to UL873
- **Canadian Conformance**: C-US certified to Canadian Standard C22.2 No. 24-93

### Conformity
- **In Accordance With the Directive Set Forth by the European Union For**
  - Electromagnetic Compatibility (EMC): 2004/108/EC

### Miscellaneous
- **Pre-Cabled Connection**: 18 AWG
- **Cable Length**: 3 feet (0.9 m)
- **Life Cycle**: 60,000 Full Strokes at rated torque and temperature.
- **Dimensions**: 6.2 L x 2.8 W x 2.4 D (157 L x 71 W x 61 D)
- **Weight**: 1.06 lb. (0.48 kg)

### Operation (for Floating Control)
- A floating control signal controls the actuator. The actuator’s angle of rotation is proportional to the length of time the signal is applied. A 24 Vac control signal to wires 1 and 6 (G-Y1) causes the actuator coupling to rotate clockwise. A 24 Vac control signal to wires 1 and 7 (G-Y2) causes the actuator coupling to rotate counterclockwise. To reverse the direction of rotation, the wires 6 and 7 (Y1 and Y2) can be interchanged. In the event of a power failure or with no control voltage, the actuator holds its position.

### Operation (for Modulating Control)
- A continuous 0 to 10 Vdc signal from a controller to wire 8 (Y) operates the damper actuator. The angle of rotation is proportional to the control signal. A 0 to 10 Vdc position feedback output signal is available between wire 9 (U) and wire 2 (G0) to monitor the position of the damper motor. In the event of a power failure, the actuator holds its position. In the event that only the control signal is lost, the actuator returns to the “0” position.

### Overload Protection
- In the event of a blockage in the damper, the actuator is overload protected over the full range to prevent damage to the actuator.

### Life Expectancy
- An improperly tuned loop will cause excessive repositioning that will shorten the life of the actuator.