



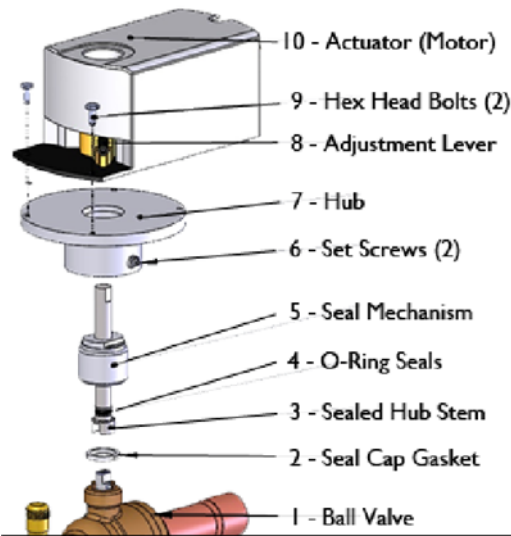
CYCLEMASTER® BALL VALVES

SERIES I ACTUATOR

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. Insert Hub Stem (3) into the Seal Mechanism (5). Align slot on Hub Stem with Ball Valve Stem (1) and thread Seal Mechanism onto the ball valve neck, pulling the Hub Stem upward, away from Ball Valve to remove any slack in the assembly, while tightening the Seal Mechanism. Tighten Seal Mechanism with wrench, 1/4 to 1/2 turn past finger tight.
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 possible stopping just before bottoming out, making sure not to loosen the Seal Mechanism.
7. Align Hub so that Actuator (10) is in desired orientation. With Allen wrench, tighten Set Screws (6). Torque 60-65 lb-in on either side of Hub until Hub is secured against the Ball Valve body to avoid rotation during operation.

ACTUATOR INSTALLATION

1. Actuator (10), 3/8-inch Shaft Adapter (Figure 2) and Position Indicator (Figure 1) required for installation.
2. Remove factory installed 1/2-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 release toward bottom 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 Hub 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 Hub 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.

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.

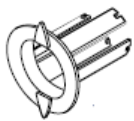


Figure 1: Position Indicator

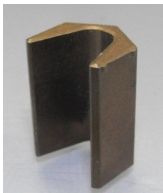


Figure 2: 3/8-inch Shaft Adapter

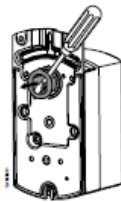


Figure 3



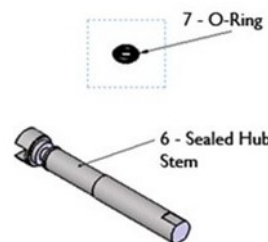
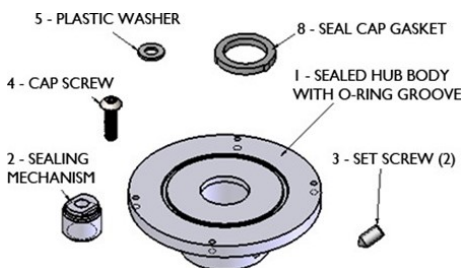
Figure 4

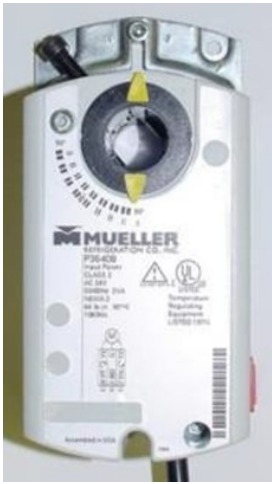


Figure 5



Figure 6





Actuator Features:

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

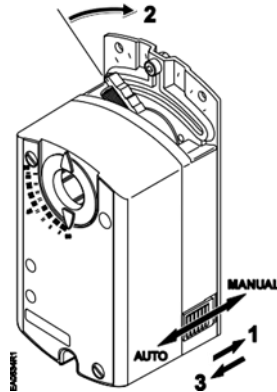
Service Warnings/Cautions	
	DO NOT OPEN THE ACTUATOR. IF THE ACTUATOR IS INOPERATIVE, REPLACE THE UNIT.
	Do not wire different types of actuators in parallel with these models.
	All six outputs of the dual auxiliary switch (A and B) must only be connected to: Class 2 voltage (UL/CSA), Separated Extra-Low Voltage (SELV) or Protective Extra Low Voltage (PELV) (according to HD384-4-41) for installations requiring CE conformance. You must use a CE certified plenum actuator.
	Installations requiring CE 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.



Wiring

All wiring must conform to NEC and local codes and regulations.

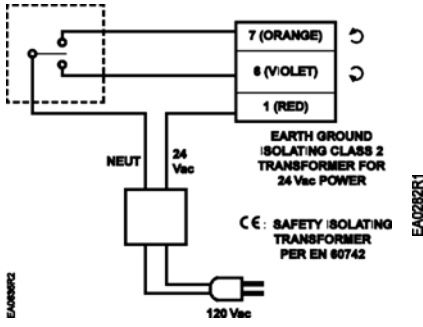


Figure 1. Standard Models

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.

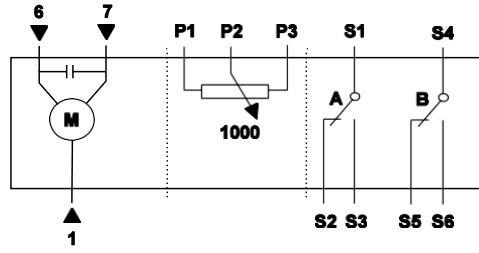


Figure 2. Auxiliary Switch Models

Standard Symbol	Function	Terminal Designation	Series I Color
1	Supply (SP)	G	Red
6	Control signal clockwise	Y1	Violet
7	Control signal counterclockwise	Y2	Orange
FACTORY INSTALLED OPTIONS			
S1	Switch A Common	Q11	Black
S2	Switch A N.C.	Q12	Black
S3	Switch A N.O.	Q14	Black
S4	Switch B Common	Q21	Black
S5	Switch B N.C.	Q22	Black
S6	Switch B N.O.	Q24	Black

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.

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	Switch B: 0 to 90° with 5° intervals
	Recommended Range Usage; 0 to 45 °	Recommended Range Usage: 45 to 90°
	Factory Setting: 5°	Factory Setting: 85°
	Switching Hysteresis : 2°	
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-UL 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 counter-clockwise. 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.	