



CYCLEMASTER® Ball Valves – Actuated Standard Installation Instructions – Series I

ACTUATOR/HUB REMOVAL

1. Disconnect the Actuator (10) on the Actuated Ball Valve (ABV) from all connected electrical sources.
2. Remove the Actuator from the Sealed Hub Stem (3) by loosening the Adjustment Lever (8), unscrewing the anti-rotation Hex Bolts (9) and sliding the Actuator off the Stem (3).
3. In order to remove the Hub Assembly (2-7, 9) from the Ball Valve (1), first loosen the Set-Screws (6) on the side of the Hub (7) and then remove the Hub itself by placing a wrench on the flats of the Seal Mechanism (5) and turning it counter-clockwise. The entire Hub Assembly should unscrew from the valve.
4. Confirm that the Seal Cap Gasket (2) remains with the Hub Assembly (2-7, 9).

HUB INSTALLATION

1. Remove the Seal Mechanism (5) from the Hub Assembly (2-7, 9). The Sealed Hub Stem (3) should remain partially installed in the Seal Mechanism. Confirm that the Stem and the O-Ring Seals (4) are well-lubricated.
2. Make sure the brass sealing surface on top of the Ball Valve (1) is clean and free of debris.
3. Confirm that the Seal Cap Gasket (2) is in place. It should be placed on the sealing surface of the Seal Mechanism (5) so that when it is threaded on top of the valve neck, the seal is located in between the Seal Mechanism and top of the valve neck.
4. Thread the Seal Mechanism down on top of the valve neck (hand tighten), taking care that the slot in the Stem (3) aligns properly with the valve stem and the Seal is in place between the Seal Mechanism (5) and the top of the valve neck.
5. Partially install the Set-Screws (6) into the Hub.
6. Thread the Hub (7) over the Seal Mechanism (5) and onto the valve as far as possible, stopping just short of bottoming out.
7. Align the Hub so that the Actuator (10) orientation will be as desired (i.e., Aligning the Set Screws (6) with the flat pads on the Ball Valve body will cause the Actuator, when placed, to be aligned with the Ball Valve tubes). With an Allen wrench, tighten the Set Screws (6) (**Torque: 60-65 lb.-in.**) on either side of the Hub, so that the Set Screws secure the Hub against the Ball Valve body. This will keep it from rotating during operation.
8. While holding the larger diameter to the proper orientation, continue to tighten the Seal Mechanism portion with a wrench approximately 1/4 to 1/2 turn until secure. This ensures a tight seal against the valve body. Pull the Stem (3) upward while tightening the Seal Mechanism, away from Ball Valve, to remove any slack that may be in the assembly.

ACTUATOR (MOTOR) INSTALLATION

1. Get the Actuator (10), 3/8-inch Shaft Adapter (Figure 2: 3/8-inch Shaft Adapter) and the Position Indicator (Figure 3) out of the packaging.
2. Remove factory installed 1/2-inch guide, as shown below (Figure 3), to accommodate the size of the Stem (3).

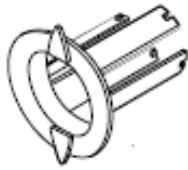


Figure 1: Position Indicator

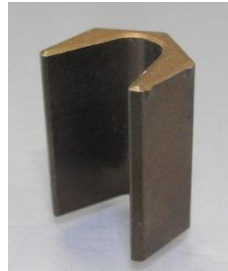


Figure 2: 3/8-inch Shaft Adapter

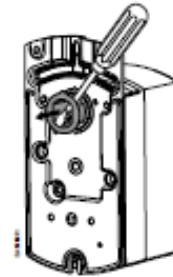


Figure 3

3. Insert the 3/8-inch Shaft Adapter into the back of the Actuator by aligning the Shaft Adapter with the Adjustment lever (8) and with the raised-tabs part of the Shaft Adapter inserted last. The raised tabs on the Shaft Adapter act as stops. (Figure 4 and Figure 5)

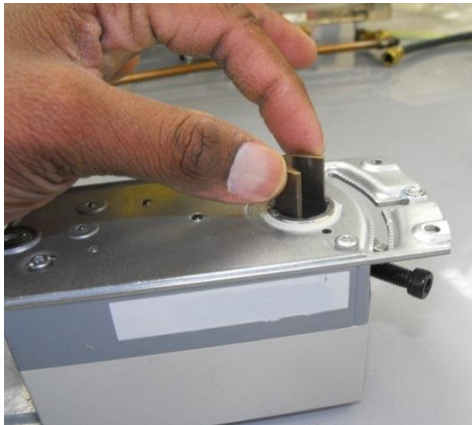


Figure 4



Figure 5

4. Slide the red manual override knob towards the back of the Actuator (10) and match the full counter-clockwise position of the Adjustment Lever (8) to the full counter-clockwise rotation of the Ball Valve (1). Reposition if necessary.
5. Pull the Stem (3) upwards, away from Ball Valve to assure that there is no additional space between Stem and Seal Mechanism (5) within Hub Assembly (2-7, 9).
6. Place the Actuator against the Hub (7), over the Stem (making sure the 3/8-inch Shaft Adapter is in place), taking care that the thread holes on the Hub align with the holes on the underside of the Actuator housing. The bottom of the Actuator should be flush against the top of the Hub. (Figure 6)
7. Assemble the Hex-Head Bolts (9) onto the Actuator to fasten it to the Hub (7). Align Bolts with corresponding holes on Hub (7).
8. Holding the manual override switch on the motor, align the Adjustment Lever (8) and tighten against the Stem (**Torque: 60-90 lb.-in. (7-10 N-m)**) - see standard Commissioning Instructions.

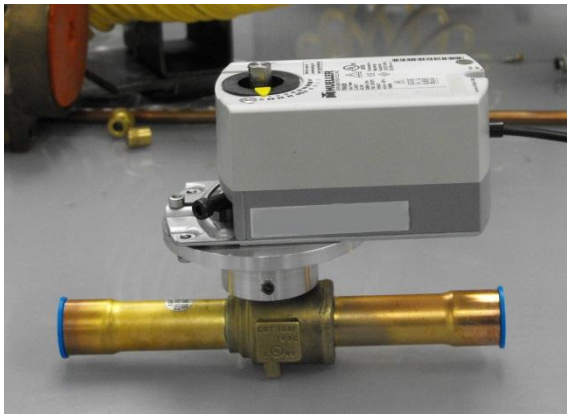


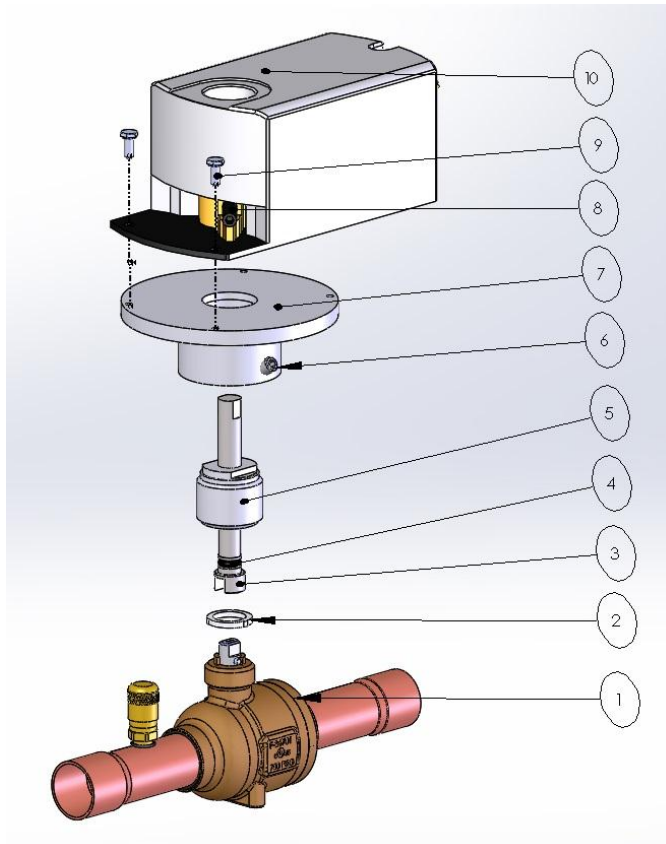
Figure 6

ADDITIONAL NOTES:

1. Do not over-tighten the Adjustment Lever.
2. Hub (7) need not to be tightened all the to the bottom of the neck of the valve but Seal Mechanism (5) and hence the Seal Cap Gasket (2) should be tight enough to seal the valve surface.

Actuated Ball Valve Assembly - Exploded View

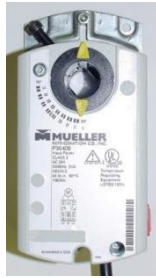
Balloon #	Description
1	Ball Valve
2	Seal Cap Gasket
3	Sealed Hub Stem
4	O-ring Seals (2)
5	Seal Mechanism
6	Set Screws (2)
7	Hub
8	Adjustment Lever
9	Hex Head Bolts (2)
10	Actuator (Motor)





CYCLEMASTER® Ball Valves – Actuated Standard Technical Instructions – Series I

Series I



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.



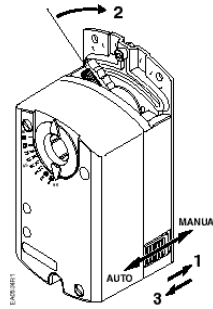
To avoid injury or loss of life, pay attention to any hazardous voltage when performing checks.

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 automatic control.



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.

Wiring Designations

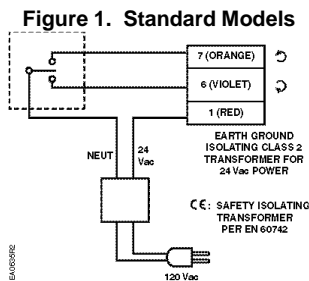
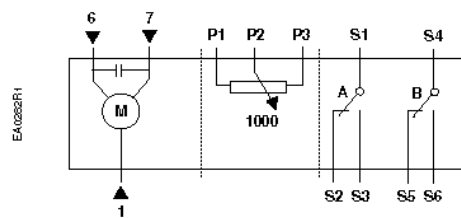


Figure 2. Auxiliary Switch Models



Standard Symbol	Function	Terminal Designation	Series I Color	Series II & III Color
1	Supply (SP)	G	Red	Red
6	Control signal clockwise	Y1	Violet	Violet
7	Control signal counterclockwise	Y2	Orange	Orange
Factory Installed Options				
S1	Switch A Common	Q11	Black	Gray/Red
S2	Switch A N.C.	Q12	Black	Gray/Blue
S3	Switch A N.O.	Q14	Black	Gray/Pink
S4	Switch B Common	Q21	Black	Black/Red
S5	Switch B N.C.	Q22	Black	Black/Blue
S6	Switch B N.O.	Q24	Black	Black/Pink

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 shaft coupling 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 shaft coupling 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 shaft coupling 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 shaft coupling 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 shaft coupling reaches the setting of switch B.
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Specifications		Series I Actuator
Sizes		1/2 - 7/8
Power Supply	Operating Voltage	24 Vac +20%, -15%
	Frequency	50/60 Hz
	Power Consumption	2.3 VA
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°
	Switch B	0 to 90° with 5° intervals
	Recommended Range Usage	45 to 90°
	Factory Setting	85°
Function	Switching Hysteresis	2°
	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°
Housing	Maximum Angular Rotation	95°
	Enclosure	NEMA Type 2
		IP54 according to EN60529
	Material	Durable plastic
Gear Lubrication	Silicone free	
Ambient Conditions	Ambient Temperature	
	Operation	-25°F to 130°F (-32°C to 55°C)
	Storage and Transport	-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
CE Conformity	In Accordance With the Directive Set Forth by the European Union For	
	Electromagnetic Compatibility (EMC)	89/336/EEC
	Emissions Standards	EN 50 081-1
Miscellaneous	Pre-Cabled Connection	18 AWG
	Cable Length	3 feet (0.9 m)
	Life Cycle	60,000 Full Strokes
	Dimensions	5 7/16 x 2 3/4 x 2 3/8 (138 x 70 x 60)
	Weight	1.06 lb. (0.48 kg)
Operation	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.	
Overload Protection	In the event of a power failure or with no control voltage, the actuator holds its position.	
Life Expectancy	An improperly tuned loop will cause excessive repositioning that will shorten the life of the actuator.	