



CYCLEMASTER® Ball Valves – Actuated Standard Installation Instructions – Series II & III

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 Shaft (3) by loosening the screw on the Self-Centering Shaft Adapter (9) and slide the Actuator off the Shaft.
3. In order to remove the Hub Assembly (2-8) from the Ball Valve (1), first loosen the Set-Screws (5) on the side of the Hub (7) and then remove the Hub itself by placing a wrench on the flats of the Seal Mechanism (8) 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.

HUB INSTALLATION

1. Remove the Seal Mechanism (8) from the Hub Assembly (2-8). The Shaft (3) should remain partially installed in the Seal Mechanism. Confirm that the Shaft and the O-Ring Seals are well-lubricated.
2. Reinstall the Seal Mechanism into the Hub (7), hand-tight. Apply a small amount of lubricant to the threads, if necessary.
3. Assemble the hex-head Bolts (6) onto the Hub to go into actuator. Align Bolts with corresponding holes on underside of Actuator (10).
4. Partially install the Set-Screws (5) into the Hub.
5. Make sure the brass sealing surface on top of the Ball Valve (1) is clean and free of debris.
6. Confirm that the PTFE Seal (2) is in place, then install the entire Hub Assembly (2-7) onto the valve neck, taking care that the slot in the Shaft (3) aligns properly with the valve stem and the Seal is in place between the Seal Mechanism (8) and the top of the valve neck.
7. Thread the Hub over the Seal Mechanism (8) and onto the valve as far as possible, stopping just short of bottoming out.
8. Align the Hub so that the Actuator orientation will be as desired (i.e., Aligning the Set Screws (5) with the flat pads/parting line 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 (5) (*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.
9. 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.
10. Pull Shaft upward, away from Ball Valve to remove any slack that may be in the assembly.

ACTUATOR (MOTOR) INSTALLATION

1. Get the Actuator (10), Self-Centering Shaft Adapter (9) and the Locking Clip out of the packaging.

2. Assemble the Shaft Adapter (9) onto the Actuator as shown in Figures 1&2. Be sure to assemble the Shaft Adapter so that the line mark can be seen. Depress the manual override button on top of the Actuator and manually cycle the Shaft Adapter back-and-forth through the full 90° cycle to confirm that it has full range. Reposition if necessary.



Figure 1

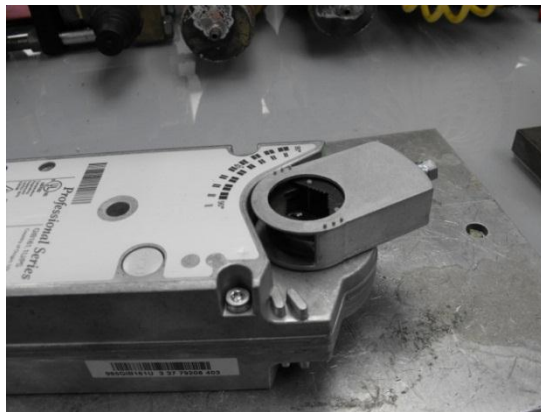


Figure 2

3. Attach Locking Clip to the underside of the Shaft adapter to secure it in the Actuator, as shown in Figure 3.



Figure 3

4. Depress the manual override button on top of the Actuator and match the full counter-clockwise position of the Shaft Adapter to the full counter-clockwise rotation of the Ball Valve (1).
5. Pull Shaft (3) upward, away from Ball Valve to assure that there is no additional space between Shaft and Seal Mechanism (8) within Hub Assembly (2-8).

6. Place the Actuator against the Hub (7), over the Shaft, taking care that the flange Bolts (6) align with the holes on the underside of the Actuator housing. The holes in the Actuator housing are not threaded; this is only to keep the Actuator from rotating with the Shaft. The bottom of the Actuator should be flush against the top of the Hub.
5. Holding the manual override switch on the motor, align the motor clamp and tighten against the shaft (refer to the table below for Max. Tightening Torque info) - see standard Commissioning Instructions.

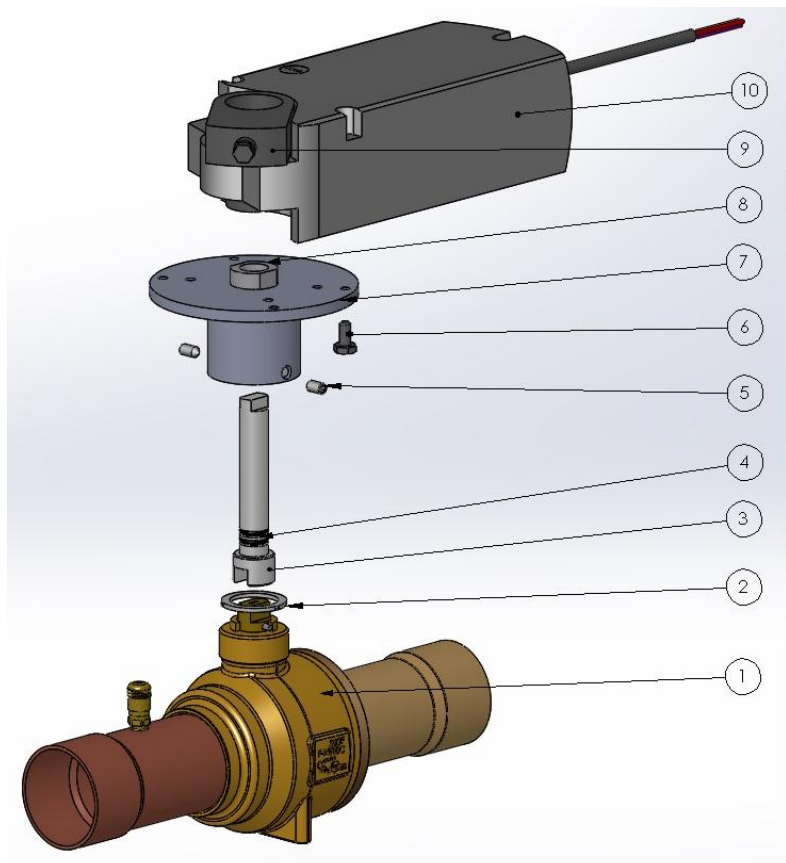
MOTOR SERIES	TORQUE (For Motor Clamp Tightening)
Series II	90-108 lb-in (10-12 N-m)
Series III	100-130 lb-in (12-15 N-m)

ADDITIONAL NOTES:

1. Do not over-tighten the motor clamp.
2. Hub (7) need not to be tightened all the to the bottom of the neck of the valve but sealing mechanism(8) and hence the Seal cap gasket (2) should be tight enough to seal the valve surface.

Actuated Ball Valve Assembly - Exploded View

Position	Description
1	Ball Valve
2	Seal Cap Gasket
3	Shaft
4	O-rings (2)
5	Set-Screws (2)
6	Bolts (2)
7	Hub
8	Seal Mechanism
9	Self-Centering Shaft Adapter
10	Actuator (Motor)





CYCLEMASTER® Ball Valves – Actuated Standard Technical Instructions – Series II & III

Series II



Series III



Features

- Synchronous motor technology with stall protection
 - Unique self-centering shaft coupling
 - Manual override
 - cUL and UL listed, CE certified
 - Independently adjustable dual auxiliary switches available
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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.



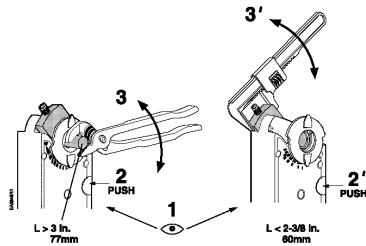
To avoid injury or loss of life, pay attention to any hazardous voltage when performing checks.

Manual Override

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

1. Hold down the PUSH button.
2. Make adjustments to the valve position.
3. Release the PUSH button.

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

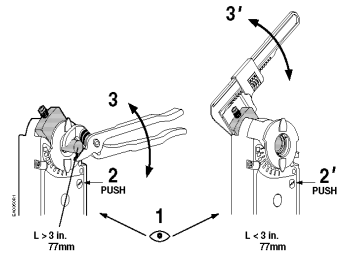


To move the valve and lock the position with no power present:

1. Hold down the PUSH button.
2. Make adjustments to the valve position.
3. Release the PUSH button.

NOTE: If there is no load, the actuator will hold the new position. If load conditions exist, the actuator might not be able to hold.

Once power is restored, the actuator returns to the 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

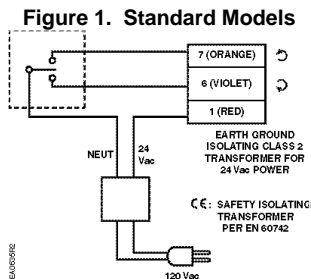
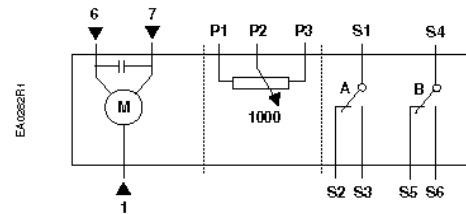


Figure 2. Auxiliary Switch Models



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 II Actuator	Series III Actuator
Sizes		1 1/8 - 1 5/8	2 1/8 - 3 1/8
Power Supply	Operating Voltage	24 Vac ±20%	
	Frequency	50/60 Hz	
	Power Consumption	3 VA	6 VA
Equipment Rating	Rating	Class 2 according to UL, CSA	
		Class III per EN60730	
Auxiliary Features	Dual Auxiliary Switch Contact Rating	6A resistive, 2A general purpose	4A resistive, 2A general purpose
	Dual Auxiliary Switch Voltage Rating	24 to 250 Vac/ 12 to 30 Vdc	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°	
Switching Hysteresis	2°		
Function	Torque	132 lb-in (15 Nm)	310 lb-in (35 Nm)
	Runtime for 90° Opening or Closing	125 sec. @ 60 Hz 150 sec. @ 50 Hz	
	Nominal Angle of Rotation	90°	
	Maximum Angular Rotation	95°	
Housing	Enclosure	NEMA Type 1	NEMA 2 in vertical position to 90° to the left and right of vertical
		IP54 according to EN60529	
	Material	Die Cast Aluminum Alloy	
	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	UL60730 (to replace UL873)	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	
	Low Voltage Directive	73/23/EEC	
Miscellaneous	Pre-Cabled Connection	18 AWG	
	Cable Length	3 feet (0.9 m)	
	Life Cycle	50,000 Full Strokes	
	Dimensions	8 3/8 H X 3 1/4 W X 2 2/3 D (213 H X 83 W X 68 D)	11 13/16 x 3 15/16 x 2 11/16 (300 x 100 x 68)
	Weight	2.2 lbs. (1 Kg)	4.4 lbs. (2 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.		