



CYCLEMASTER® BALL VALVES

SERIES 2R & 3R SPRING RETURN ACTUATORS AND WEATHERPROOF ENCLOSURE INSTALLATION INSTRUCTIONS

NOTE: These instructions cover multiple kits. Use the instruction section(s) that applies to the kit being installed.

ACTUATOR/HUB REMOVAL

1. Disconnect Actuator (10) from all electrical sources.
2. Remove Actuator from Sealed Hub Stem (3) by:
 - a) Loosening the screw on the Shaft Coupling (9)
 - b) Slide the Actuator off the Sealed Hub Stem.
3. Remove Hub Assembly (2-8) from Ball Valve (1) by
 - a) Loosening the Set-Screws (5) on Hub (7)
 - b) Remove Hub by placing wrench on flats of the Sealing Mechanism (8) and turn counter-clockwise.
 - c) Unscrew Hub Assembly from valve
 - d) Confirm that the Seal Cap Gasket (2) remains with the Hub Assembly.

HUB INSTALLATION

1. Remove Seal Mechanism (8) from Hub Assembly (2-8). Sealed Hub Stem (3) should remain partially installed in the Seal Mechanism. Ensure Stem and O-Ring Seals are well lubricated.
2. Reinstall the Seal Mechanism into the Hub (7), hand-tight. Apply a small amount of thread sealant to the threads.
3. Assemble the hex-head Bolts (6) onto the Hub to go into actuator. Align Bolts with 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 Stem (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. With an Allen wrench, tighten the Set Screws (5) (Torque: 60-65 lb.-in.) on either side of the Hub so that Set Screws secure the Hub against the ball valve body.
9. While holding the larger diameter, tighten the Seal Mechanism portion with a wrench to snug, then approximately 1/4 to 1/2 more turns to fully secure the gasket.
10. Pull Stem upward away from Ball Valve while tightening to remove slack.

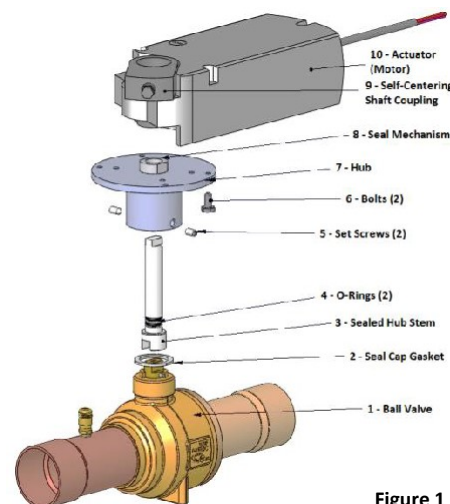


Figure 1

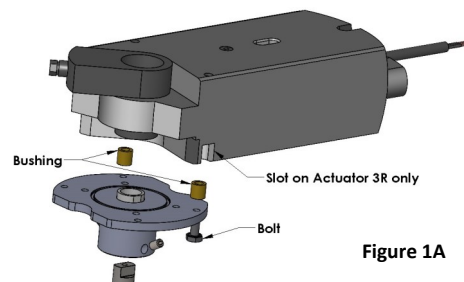


Figure 1A

ACTUATOR INSTALLATION (No Enclosure)

1. Get the Actuator (10), Self-Centering Shaft Coupling (9) and Locking Clip required for installation.
2. Assemble the Shaft Coupling (9) onto the Actuator as shown in Figures 2 & 3. The side of the Actuator facing upward will determine the rotation direction of the actuator and therefore whether the valve is opened or closed upon loss of power. On the label near the actuator arm is a diagram showing direction of rotation for powered operation, the number "1", and spring return rotation direction, the number "0" (power loss). For valve closed upon power loss, position the actuator arm fully counter clockwise, making sure the valve is fully closed. For valve open upon power loss, position the actuator arm fully clockwise, making sure the valve is fully open. The valve and actuator arm MUST be matched for proper function.
3. Attach Locking Clip to the underside of the Shaft Coupling to secure it in the Actuator as shown in Figure 4.
4. Pull Stem (3) upward, away from Ball Valve until no additional space is between the Hub Assembly's Stem and Seal Mechanism (8).
5. Place Actuator against the Hub (7), over the Stem taking care that the flange Bolts (6) align with the holes on the underside of the Actuator housing. The Series 3R Actuator has slots on one side which require two Bushings placed on the bolts for a proper fit (Figure 1A). Bottom of Actuator should be flush against the top of the Hub.
6. Align the Shaft Coupling and tighten against Stem. Series 2R – Torque ≈ 90 -108 lb.-in. (10-12 N-m), Series 3R – Torque ≈ 100 -130 lb.-in. (12-15 N-m). See commissioning instructions.



Figure 2 Shaft Coupling



Figure 3 Shaft Coupling



Figure 4 Locking Clip

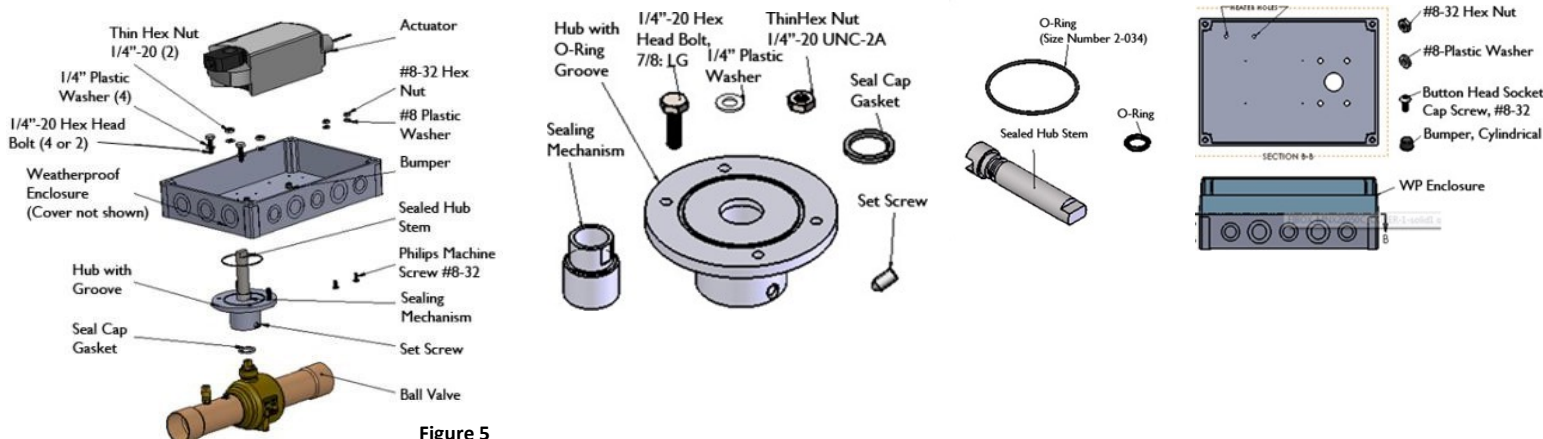


Figure 5

ACTUATOR INSTALLATION (with Enclosure)

Warning: Enclosures will not provide protection if water can intrude due to incorrect mounting.

- 1. Take the Enclosure and accessories out of the kit (In case of Act.- BV-Hub-Encl. Kit, the kit includes the Ball Valve and the Actuator as well).
- 2. Disassemble cover by loosening the screws on enclosure.
- 3. Follow steps 4 through 10 of "HUB INSTALLATION". DO NOT REMOVE SEAL MECHANISM (already installed) or thread sealant between Hub and Seal Mechanism will be damaged.
- 4. Install O-Ring into Hub Groove. (Figure 6) If Hub does not have groove, use Hub from the new Enclosure Kit. Apply small amount of lubricant to O-Ring.
- 5. Assemble two of the hex-head bolts onto the Hub (Figure 7). Align Bolts with holes on underside of Enclosure and Actuator.

- 6. Place enclosure over Stem and on Hub. Align flange bolts with holes on the underside of Enclosure. Tighten Enclosure onto the flange bolts (onto the Hub) using the two thin hex nuts and two plastic washers (Assembly Torque ≈ 70 lb. -in). Bottom of Enclosure should be flush against top of Hub.
- 7. From top of Enclosure, assemble the other two bolts (in case of series 3R, use the two cap screws), using the plastic washer, in the remaining 2 holes and tighten down the Enclosure onto the hub. (The heads of the bolts should be on the topside and the shaft of the body of the bolt protruding out of the underside of the hub – see Figure 8 & 9).
- 8. Before installing the actuator into the enclosure, follow steps 1-5 of the "Actuator (Motor) Installation" stated above. **NOTE: When installed in a Weatherproof Enclosure, the Shaft Coupling of the Actuator needs to be installed on the bottom side of the Actuator instead of the top side (as mentioned in Step 2 – Figure 3).**

- 9. Place Actuator against Enclosure, over the Stem. Align Flange Bolts with the holes on the underside of the Actuator housing. Note: Series 3R Actuator has slots on one side that require two Bushings for proper fit. Bottom of Actuator should be flush against top of Enclosure.
- 10. Align Shaft Coupling and tighten against the Stem. Series 2R, Torque ≈ 90-108 lb.- in (10-12 N-m), Series 3R, Torque ≈ 100-130 lb.- in (12-15 N-m) – see standard Commissioning Instructions.
- 11 Install Enclosure Cover using cover screws. (Torque ≈ 10 lb.-in/1.2 N-m).

Notes:

- 1. Do not over-tighten the motor clamp.
- 2. Hub is tightened to Seal Mechanism, not to bottom of the valve neck. Seal Cap Gasket should be tight enough to seal valve surface.



Groove Figure 6



Figure 7



Figure 8*

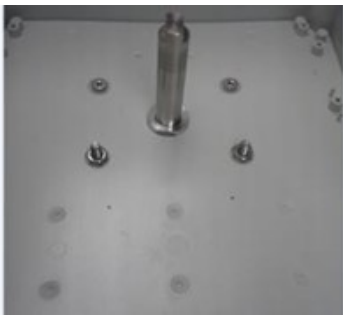


Figure 9 (Thin Hex Nuts)



Figure 10 *

* Illustrations using a Series III Enclosure

Actuator Features:

- Brushless DC motor technology with stall protection
- Bi-directional fail-safe spring return
- Unique self-centering Shaft Coupling
- Manual override
- cUL and UL Listed, CE Certified

Manual Override

To move the valve with no power present:

- 1. Use the hex wrench supplied with actuator.
 - 2. Insert into Manual Override hole and turn in the direction indicated by arrow.
- NOTE: When the wrench is released, the spring return mechanism will return the valve to it's starting position.

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.
	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. Use safety isolating transformers per EN61558 with double insulation designed for 100% duty cycle. Overcurrent protection for supply lines is maximum 10A.
	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.

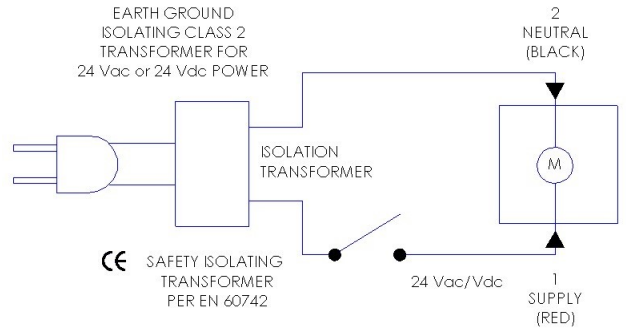
Wiring

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.

Standard Symbol	Function	Terminal Designation	Series 2R & 3R Color
1	Supply (SP)	G	Red
2	Neutral (SN)	GO	Black



START UP/COMMISSIONING

NOTE: The intended function of the Actuator and Ball Valve is to provide a “fail-safe” position for the valve upon loss of power, using an internal spring return.

Verification of Actuator Function

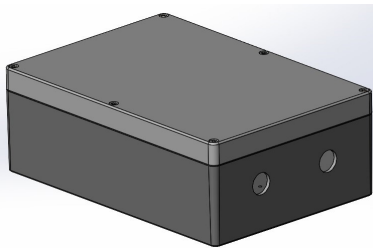
1. With the Actuator not mounted to the ball valve, check that the wires are connected correctly. Wire 1 (red) and 2 (black) to 24 Vac or 24 Vdc power supply.
2. Apply power and allow the actuator shaft coupling to rotate from 0° to 90°. Disconnect wire 1 (red) and the shaft coupling should return to the "0" position.
3. Check the spring return by reconnecting wire 1 (red). Allow the shaft coupling to rotate halfway, then disconnect wire 1 (red), and the shaft coupling should return to the "0" position.

Verification of Valve and Actuator Function

1. Mount the Actuator on the Ball Valve, using the installation instructions. The valve is to be fully open or closed, depending on the desired “fail-safe” position, which is the spring return, or unpowered, position. The label on the Actuator indicates which side of the actuator needs to face “up” for the desired spring return and powered rotation directions.
2. Once the Actuator is securely mounted to the Ball Valve, connect the power wires; wire 1 (red) and wire 2 (black) to 24 Vac or 24 Vdc power supply.
3. Apply power and allow the Actuator shaft coupling to rotate 90°. This should fully open or fully close the valve. If the valve does not rotate the full 90°, verify the shaft coupling is fully tightened to the Hub Shaft, and that the Hub Shaft is engaged with the Ball Valve Shaft. After 90° rotation is achieved, disconnect wire 1 (red) from the power supply. The actuator and valve should then return to the starting position (fail-safe).
4. To further test the Spring Return function, re-connect wire 1 (red) and apply power. Allow the Actuator Shaft Coupling to rotate halfway, then disconnect wire 1 (red). The actuator shaft coupling should then return to the starting position (fail-safe), and the valve should be fully open or fully closed.

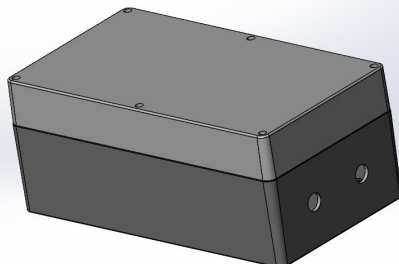
Weatherproof Enclosure Kits - Series 2R

Includes Enclosure, Hub Kit and accessories; O-Ring (1), Bolts (4), Hex Nuts (2), Gaskets (4), Hole Plug (1)



Weatherproof Enclosure Kits - Series 3R

Includes Enclosure, Hub Kit and accessories; O-Ring(1), Bolts(2), Cap Screws(2), Hex Nuts(2), Gaskets(4), Hole Plug (1)



PRODUCT HAS BEEN MANUFACTURED TO BE CONSISTENT WITH NEMA 3R 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.

Weatherproof Enclosure Features:

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

Enclosure has two standard size conduit holes, with one hole plug provided for use with standard, one-cable actuators.

Encl. 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)

Enclosures will not provide protection if water can intrude due to incorrect mounting.

Specifications		Series IIR Actuator	Series IIIR Actuator
Sizes		1 1/8	1 3/8 & 1 5/8
Power Supply	Operating Voltage	24 Vac ±20%, Vdc ±15% 24 Vac ±20%, Vdc ±10%	
	Frequency	50/60 Hz	
	Power Consumption- <i>Running</i> <i>Holding</i>	5 VA / 3.5W 4 VA / 3W	7 VA / 5W 5 VA / 3W
Equip- ment Rating	Rating	Class 2 according to UL, CSA	
		Class III per EN60730	
Function	Torque (running); Maximum	62 lb-in (7 Nm); 180 lb-in (21Nm)	160 lb-in (18 Nm); 350 lb-in (40 Nm)
	Runtime for 90° Opening Closing (Spring Return)	90 sec. 15 sec.	
	Nominal Angle of Rotation	90°	
	Maximum Angular Rotation	95°	
Actuator Housing	Enclosure	NEMA Type 1	NEMA Type 1
	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 Certifica- tion	UL Listing	UL60730	UL60730
	Canadian Conformance	C-UL certified to Canadian Standard C2.2 No. 24-93	
CE Conformity	In Accordance With the Directive Set Forth by the European Union For		
	Electromagnetic Compatibility (EMC)	2004/108/EC	
	Low Voltage Directive	2006/95/EC, EN60730-2-14 (Type 1)	
Miscellaneous	Pre-Cabled Connection	18 AWG	
	Cable Length	3 feet (0.9 m)	
	Dimensions	8 3/8 L x 3 1/4 W x 2 3/8 H (212 L x 83 W x 66 H)	11 13/16 L x 3 15/16 W x 2 7/8 H (300 L x 100 W x 73 H)
	Weight	2.9 lbs. (1.3 kg.)	4.85 lbs. (2.2 kg.)
Operation	When operating voltage is supplied, the actuator rotates from 0° to 90°. The actuator is reversible, and the direction of rotation depends on how the actuator is mounted, which determines whether the ball valve is opened or closed when powered. On power failure or when the operating voltage is switched off, the spring return moves the actuator to its mechanical starting position. The information label on the actuator shows the rotation direction for powered and spring return operation, depending on mounting.		
Overload Protection	The actuator is equipped with an automatic switch-off mechanism.		
Life Expectancy	50,000 full cycles at rated torque and temperature.		