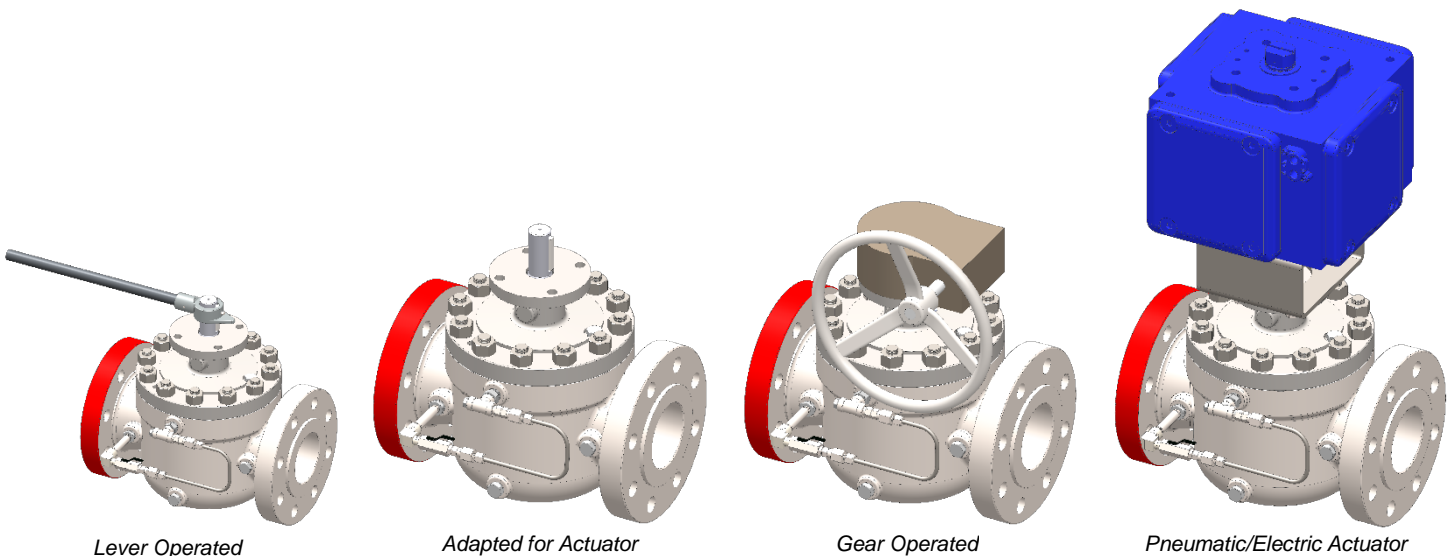


## GENERAL INFORMATION

The DOV valve is a quarter-turn valve with a Double Offset Ball (DOB) and a top entry cartridge design that fits within the valve housing while supporting opposed upstream and downstream sealing components. The spherical offset ball design provides low pressure and low differential pressure sealing characteristics as well as increased capability to seal at high pressure. This design will increase the life of the seat insert by reducing its mechanical load in the full open position. The spherical offset of the ball increases the sealing forces mechanically in the closed position in addition to the pressure energized piston sealing characteristic. The valve is bi-directional and may be installed on either side facing upstream. The valves are equipped with a Differential Thermal Relief (DTR) system to relieve the internal body cavity pressure upstream of the valve seat for liquid service as a preferred or normal flow direction. The thermal relief system can be configured to relieve internal body cavity pressure downstream of the valve seat, if required. The valve also has been designed to include "Double Isolation Bleed" (DIB) and "Double Block and Bleed" (DBB) functionality. The valve internal components, such as the seat, ball, seals, and bearings are all contained in the cartridge assembly and the parallel machined body allows for easy installation and removal of the cartridge in the field with minimal time and effort. The valve can be provided with the operating options illustrated below. Other options are available upon request. Gears, actuators, and levers are referred to as operators in the manual.



## STORAGE

Inspect for any damage that may have occurred during shipment prior to storage and contact your shipper immediately if damages exist. Valves are drained and flange faces are coated with rust inhibitor and flange protectors are installed. Valves and actuation equipment protective covers should remain in place until the valve is ready to be installed in the line. Valves and actuation equipment should be stored inside to protect them from harsh environment including humidity and dust. Valves are shipped in the opened position, with the exception of Fail-Close systems, and should be stored in the as shipped condition. For special long term storage requirements on actuation equipment refer to applicable actuation manuals.

## UNPACKING

Remove any packing material, valve flange protectors, and protective covers from actuation equipment. Inspect the valve bore for foreign objects and, if necessary, clean the valve body. Handling equipment must be provided which is appropriate for lifting the valve and actuator assembly safely into position. Use slings, end flanges or eyebolts in the provided tapped holes on the valve. Do not use the lifting lugs or eyebolts on the actuator to lift the total assembly. Pay attention that slings or braces do not damage the actuator or gear.

## PRE-INSTALLATION SAFETY INFORMATION

The valves shall be installed, operated, and maintained in accordance with these procedures. Always follow standard safety procedure set forth by the law and regulations required by your employer, end-users, and jurisdiction authorities. Any transportation, unpacking, lifting, installation, operation, and maintenance of the system shall be made by expert, trained, and qualified personnel.

**WARNING:** *When lifting a valve with an attached actuator assembly, be aware that the center of gravity may be above the lifting point. Additional support must be provided to prevent the valve and actuator assembly from flipping or rotating. Failure to do so can cause serious injury to personnel and/or damage to the equipment.*

## INSTALLATION

Identify the valves with the packing list and applicable documents against the name plate for proper identification. Check the total equipment weight and use suitable handling devices to safely install the valves.

Prior to installation, ensure the valve drain and bleed plugs are installed and tightened securely and the valve is in the full open position.

Valves shall be installed in a manner that will not support the weight of the line and line expansion and strain is isolated external to the valve. Install the valve with the preferred inlet, marked by the red flange and marking on the valve body, toward the pump or pressure source. Position the valve in piping to allow clearance and access to the operator. The valve should be installed that the drain and bleed plugs are accessible and cartridge removal is possible for in-line service and maintenance. The preferred orientation is with the drain plug to be at the lowest point of the valve.

Flanged valves should be installed using the proper gasket (not supplied) and procedure recommended by National and International Standards/Codes specified for the installation. Butt Weld ends shall be welded in accordance to proper Standard Code welding procedures.

Piping should be thoroughly flushed with the valve in the open position prior to valve operation and the body drained after testing to remove test fluid and debris that may have accumulated in the body during testing.

Install the valve operator according to the manufacturer's guidelines. Refer to pneumatic, hydraulic or electric actuators section for setting or adjusting the open and close stops for the operator.

Operate (dry run) the valve by cycling from open to closed position several times to test and ensure the proper operation of the valve.

Verify that a DTR system is installed on the valve and connected to the upstream side of the valve seat. The isolation valve which is part of the DTR system must be in the open position at all times except for maintenance and troubleshooting.

## OPERATIONS

Prior to valve operation, make sure that the valve has been installed in the pipeline with the preferred inlet upstream in the normal flow direction. The valve is bi-directional and will seal in either direction. The valves are equipped with a thermal relief system to relieve the internal body cavity pressure upstream of the valve seat for liquid service as a preferred or normal flow direction.

The valve operates 90° from the full open to full closed position. The valve is a torque seated valve with the maximum closing torque for the appropriate pressure is applied at the end of the close cycle. Under high differential pressures, the un-seating torque may be as high as the seated torque.

Note: *Do not over torque in the closed position. Over torque may cause damage to the valve and void the warranty.*

## PNEUMATIC, HYDRAULIC OR ELECTRIC ACTUATORS

In the case when the actuator has been installed prior to receipt or installation, check that air, hydraulic and electrical supply lines are connected per the manufacturer's specifications and instructions. Using the manual override, place the valve in the mid open position. Verify that the actuator mounting bolts are securely tightened. Activate the OPEN button or switch and make sure that the actuator travel counterclockwise towards the open position. If it does not, make the appropriate piping or wiring changes and/or adjustments.

In the case when an actuator has not been previously installed on the valve, mount the actuator and tighten the nuts on the studs securely to the proper torque specification per Table 1. Install the pneumatic or electrical wiring and cable to the actuator according to the manufacturer's instructions. After installation of the operator on to the valve, rotate the position of the ball approximately ¼ turn to determine if the ball moves to the closed position. If the ball does not completely close the port, adjust the actuator stop to reposition the valve's closed position. Turn the actuator to the open position and observe if the ball moves completely to the open position. A full port opening should be visible. If the ball does not completely move to the open position, adjust the actuator stop to reposition the valve's open position. The ball should be in the full open position at zero degrees.

**CAUTION:** *Do not attempt to operate the valve past the full open and closed position. Adjust the operator stops to engage prior to the valve integral stops, as the integral stops in the valve are not intended to be used as the operator stops.*

## MAINTENANCE

The valve does not require periodic lubrication or maintenance to provide continuous trouble-free service. The valve is a torque seated valve and maximum rated torque must be applied in the closed position. If the valve does not seal properly, or if there are difficulties opening or closing the valve, it may be due to foreign material deposits within the cartridge of the valve body. Cleaning may be required in order to remove the debris or foreign objects.

## CARTRIDGE REMOVAL AND INSTALLATION

The following steps should be taken:

1. Isolate the valve section and depressurize and drain the pipeline.
2. Release any pressure which may be trapped in the valve body cavity by opening the bonnet's bleed plug and venting to the atmosphere.
3. Operate the valve to the open position. Remove the bottom drain plug and flush from the vent through the drain plug.
4. Remove the valve operator.
  - If an actuator is installed on the valve, reverse the steps described in the pneumatic, hydraulic or electric actuators section for the removal of the actuator.
  - If a manual lever is installed, back off on the set screw and remove the lever or handle.
5. Loosen and remove bonnet bolting. Remove the cartridge from the valve body, Figure 1. If the cartridge is difficult to remove, attach a lifting device to the two eye bolts or jack screws located on top of the bonnet. The cartridge must be pulled straight out from the body to ensure easy removal.
6. Inspect the cartridge for signs of damage to any internal parts.
  - Clean the cartridge by flushing all the inside surfaces of the cartridge with clean water. Flush several times with the ball in the open and closed positions to remove any deposited debris. Make sure that no foreign objects is between the ball and the cartridge's side plates.
  - If damaged, replace with a new cartridge. Remove the protective covering from the new cartridge assembly. The replacement cartridge unit has been attached to the bonnet for easy installation into the body.
7. Prior to installing the new cartridge, clean the inside of the valve body and apply grease to the machined areas of the body.
8. Remove and replace the old bonnet seal from the upper flange of the valve. Replace with a new bonnet seal by pressing the seal into the groove on valve body's upper flange. The replacement bonnet seal is shipped loose with the new cartridge.
9. Attached the installation tool to the replacement cartridge as shown in Figure 2. Tighten the nuts onto the threaded shaft until the cartridge assembly is compressed by approximately .060" (1.50 mm).
10. Install the cartridge unit by gently lower the cartridge into the valve body.
11. Once the cartridge is installed about halfway into the valve body and both retaining plates have firmly engaged with the valve body, remove the installation tool. Then slide the cartridge completely into the valve body.
12. Replace the nuts on each stud and torque securely to the proper torque specification in a cross pattern method in 25% increment per Table 1.
13. Reinstall the valve operator.
  - Reinstall the actuator according to the steps described in the pneumatic, hydraulic or electric actuators section.
  - Reinstall the manual lever on the valve by tightening the set screw to the valve stem.
14. Open and close the valve several times to assure proper sealing and operation.

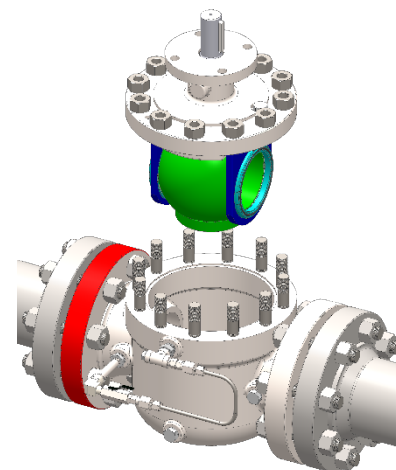


Figure 1: Cartridge Removal/Installation

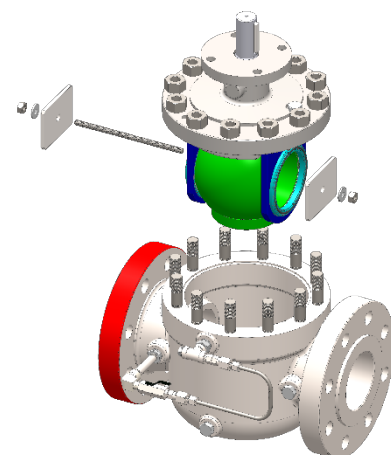


Figure 2: Installation Tool

Size (inches)	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2
Torque (lbf.ft)	68	136	242	390	584	856	1204	1632	2154
Torque (N.m)	92	184	328	528	792	1160	1632	2212	2920

Table 1: Bolt Torques

BILL OF MATERIAL	
ITEM NO.	DESCRIPTION
1	BODY
2	BEARING
3	DOUBLE OFFSET BALL
4	BEARING
5	STEM
6	WASHER
(1) 7	O-RING
8	BONNET SEAL
9	BONNET
(1) 10	STEM BEARING
(1) 11	WEATHER SEAL
12	STUD
13	NUT
14	SEAT ASSEMBLY
15	SEAT RETAINER
16	SCREW
17	KEY SQUARE
18	BLEED PLUG
19	DRAIN PLUG
20	DIFFERENTIAL THERMAL RELIEF
(2) 21	BOTTOM RETAINER
(2) 22	SCREW
(3) 23	STUD
(3) 24	STEM PACKING
(3) 25	STEM BEARING
(3) 26	FOLLOWER
(3) 27	GLAND PLATE
(3) 28	BELLEVILLE WASHER
(3) 29	NUT

- (1) O-Ring Stem Seal only
- (2) 6" and Larger Valves only
- (3) Outside Packing Gland only

