DERWENT FLOW CONTROL

IOM

2” - 24” AWWA C517 ECCENTRIC PLUG VALVES

INSTALLATION OPERATION & MAINTENANCE MANUAL

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AWWA C517
ECCENTRIC PLUG VALVES

PRIOR INSTALLATION INSPECTION

Inspection of the body marking must be made to ensure that the correct valve is being installed.
Valves are precision manufactured items and should not be subjected to misuse such as:-

- Careless handling
- Allowing dirt to enter the valve through the end ports
- Lack of cleaning both valve and system before operation
- Excessive force during bolting.

When large valves are provided with lifting lugs or eye bolts, these should be used to lift the valve.
Immediately prior to valve insallation, the pipework to which the valve is to be fastened should be checked for cleanliness and freedom from debris.

Valve end protectors should only be permanently removed immediately before installation. The valve interior should be inspected through the end ports to detemine whether it is clean and free from foreign matter.

Valves should be cycled open and closed several times to ensure they are in good working order and have not been damaged during shipment or storage.

Note: All special packaging material must be removed.

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FITTING INSTRUCTIONS

1. The mating flange (both valve and pipework flanges) should be checked for correct gasket contact face, surface finish and condition. If a condition is found which might cause leakage, no attempt to assemble should be made until the condition has been corrected.
2. The gaskets should be suitable for the operating conditions and maximum pressure/temperature ratings. The gaskets should be checked to ensure freedom from defects or damage.
3. Care should be taken to provide correct alignment of the flanges being assembled. Suitable lubricant on bolt threads should be used.
4. In assembly, bolts are tightened sequentially to make the initial contact of flanges and gaskets flat and parallel followed by gradual and uniform tightening in an opposite bolting sequence to avoid bending one flange relative to the other, particularly on flanges with raised faces.
5. Parallel alignment of flanges is especially important in the case of the assembly of a valve into an existing system. Flanged joints depend on compressive deformation of the gasket material between the flange surfaces.
6. The bolting must be checked for correct size, length, material and that all connection flange bolt holes are utilized. Certain sizes of valves have tapped bolt holes in the connecting flanges where there is no room for nuts behind the flange.
7. Rubber components in valves, or provided as spares, should not be exposed to heat or direct sunlight, as this accelerates the aging of the rubber. Ozone in the air around electrical appliances also accelerates the aging of certain elastomeric materials.
8. Prior to installing the valve, note which is the ‘Seat End’. For ease of identification it is cast into the flange edge. Generally, the valve will be installed with the pressure applied from the opposite end to the ‘Seat End’ i.e. with the seat downstream. This will cause pressure-assisted closure. If the valve is required for reverse flow conditions i.e. pressure assisted opening, then this should be stated at the time of order.
9. In cases where shut-off is required in both directions, the valve should be installed so that the highest differential pressure at shut-off is that which assists closure.
10. Where the fluid is a slurry likely to cause material build up in the valve body, it is preferable to install the valve in reverse flow (pressure assisted opening). For heavy duties, the valve should be installed with the valve stem horizontal with the plug rotating to the top of the body during opening.

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OPERATING INSTRUCTIONS - WRENCH OPERATED

Wrench operated eccentric plug valves close by turning the valve stem 90 degrees clockwise.

TORQUE COLLAR

All wrench operated eccentric plug valves are equipped with a multi-function device referred to here as a torque collar. This device serves as:

- Wrench Adapter-2" square
- Position Indicator
- Open Position Memory Stop
- Closed Position Stop
- Running Torque Adjustment

RUNNING TORQUE ADJUSTMENT

The cam action of eccentric plug eliminates the majority of the torque prior to seating. To prevent the plug from creeping open or slamming closed, the torque collar maintains constant frictional resistance on the shoulder of the valve cover. This component is factory set. However, once the valve has been installed, it is recommended that the torque adjustment nut be further tightened to ensure adequate friction exists to prevent unwanted closure.

To prevent the plug from unnecessary movement turn the hexagonal headed bolt clockwise until there is a substantial resistance on the plug but not an excessive amount to prevent operating the valve with the appropriate wrench.

POSITION INDICATOR

Cast onto the torque collar is an indicator mark which corresponds to a graduated scale cast on the cover of the valve. This scale is divided into 15 degree lines and indicates the exact valve opening from full open to full closed.

OPEN MEMORY STOP

The torque collar also incorporates an open position memory stop feature. The plug can be set after the correct flow is achieved by slackening the open memory stop adjustment bolt and sliding it up to the travel stop in the cover and then tightening. The valve can then be closed for maintenance and reopened to the set position without resetting the flow.

CLOSED POSITION STOP

The closed position stop is provided to allow for adjustment to compensate for wear of either the plug coating or the seat. The closed stop is pre-set at the factory and should not require readjustment unless wear occurs.

To adjust the plug to compensate for plug or seat wear simply turn the closed position stop screw two turns counter-clockwise then rotate the plug (clockwise) further into the seat and check the flow. Should this movement fail to shut off the flow repeat the above step. Afterward re-tighten the lock nut to prevent the position from being altered.

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OPERATING INSTRUCTIONS - GEAR OPERATED

Gear operated eccentric plug valves are intended for use above ground or in valve chambers, they are not designed for buried service unless fitted with a gear operator suitable for buried service.

Gear operated eccentric plug valves close by turning the handwheel clockwise until closed.

Excessive force is not required. The number of turns varies with valve size and gearbox.

To open the valve turn the handwheel counter-clockwise up to a positive stop position. Excessive force is not required.

POSITION INDICATOR

The top of the gearbox has an indicator plate to show the plug position. A scale is cast onto the gear housing, which is divided into 15 degree lines and indicates the exact valve opening from full open to full closed.

CLOSED POSITION STOP

The closed position stop is provided to allow for adjustment to compensate for wear of either the plug coating or the seat. The closed stop is pre-set at the factory and should not require re-adjustment unless wear occurs.

To adjust the plug to compensate for plug or seat wear simply turn the closed position stop screw two turns counter clockwise then rotate the hand wheel (clockwise) to move the plug further into the seat and check the flow. Should this movement fail to shut off the flow repeat the above step. Afterward re-tighten the lock nut to prevent the position from being altered.

The eccentric plug valve is designed and manufactured to have a long life under normal circumstances. It does not require any routine maintenance.

The valve should be at zero pressure and ambient temperature prior to any maintenance.

A full risk assessment and methodology statement, including highlighting any potential hazards, must be compiled prior to any maintenance. Appropriate tools and equipment should be used and appropriate personal safety equipment should be worn when undertaking any maintenance.

The valve should be included in a planned maintenance programme to identify potential conditions early which could lead to failure.

The valves should however, be cycled from fully open to fully closed once every 6 months, which will increase the life of the valve and operator.

In systems where corrosion could be a potential hazard, wall thickness checks on the body and cover should be made. This requires either the removal of the valve from the pipeline or removal of the cover with the system at zero pressure. If the wall thickness has reduced by 25%, the valve must be replaced.

If maintenance is required, due to unusual wear or service conditions the following procedure should be followed:

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MAINTENANCE - WRENCH OPERATED VALVE DISMANTLING

1) The eccentric plug valve is a top entry valve; therefore the body can remain in line during this operation.
2) Remove the washer fastening the torque collar to the plug stem.
3) Remove the torque collar and set aside.
4) With the valve de-pressurized, remove the hexagonal head cap screws that hold the cover to the valve body.
5) Remove the cover, leaving the plug in the body. It may be necessary to tap the plug stem down as the cover is lifted.
6) At this point the plug, PTFE thrust washers, journal bearings and cover "O" ring are accessible and can be removed and replaced.
7) Care should be taken not to damage the plug elastomer or cover "O" rings upon re-assembly.
8) Reverse the above process for re-assembling the valve.

REPLACING STEM SEALS

a) Remove the washer fastening the torque collar to the plug stem.
b) Remove the torque collar and set aside.
c) With the valve de-pressurized, using internal circlip pliers, remove the circlip and thrust washer.
d) The 'U' cup seals can now be pried out of the seal cavity taking care not to damage the plug stem or seal cavity.
e) A small amount of silicone grease applied to the new 'U' cup seals will help assembly.
f) The lips of the 'U' cup seal must be carefully entered into the bore to prevent damage.
g) To replace the torque collar reverse the above process.

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MAINTENANCE - GEAR OPERATED
VALVE DISMANTLING - REMOVING GEARBOX

1) The eccentric plug valve is a top entry valve; therefore the body can remain in line during this operation.
2) Remove the bolts holding the gearbox cover in place.
3) Remove the cover and remove the internal bolts fastening the gearbox to the valve body. It may be necessary to operate the handwheel to gain access to internal bolts beneath the quadrant gear.
4) Remove the gearbox and set aside; gently tap with a soft hammer to release any stiction.
5) Check the condition of the seal between the cover and gearbox, replace if damaged.
6) Follow the instructions for dismantling a valve with a torque collar from point 4 onwards, as above.

REPLACING STEM SEALS

a) Follow the instructions for removing the gearbox points 1 to 4 above.
b) Follow the instructions for replacing the stem seals for a valve with a torque collar from point ‘c’ onwards.

GEAR OPERATOR LUBRICANT

The manual worm gearboxes should not require any type of periodic lubrication. Should the unit need to have the lubricant replaced or topped up, it is recommended that Shell “Alvania” grease is used.

STORAGE

Eccentric plug valves are despatched with the plugs in the open position. Care should be taken to maintain this position while the valves are in storage prior to installation in the pipework.

Flanged valve end protectors (if supplied) should remain on the valves until they are ready for installation.

Valves should be stored in dry conditions and site storage should minimise airborne or other debris from entering the valves.

Care should be taken to avoid direct sunlight on the plug elastomer during storage.

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TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	ACTION
Valve will not open Valve will not close	Broken or incorrectly set torque collar	Adjust or replace torque collar
	Gearbox seized or damaged	Service gearbox and/or replace damaged componen
	Obstruction in valve body	Remove obstruction
	Excessive line pressure	Reduce pressure
	Elastomer damaged	Replace plug
	Incorrectly set torque collar	Adjust closed stop
	Incorrectly set gearbox	Adjust closed stop
Valve will not isolate	Obstruction in valve body	Remove obstruction
	Excessive line pressure	Reduce pressure
	Elastomer damaged	Replace plug
Leakage from plug stem	Damaged 'U' cup seal	Replace 'U' cup seal
Leakage from cover joint	Damaged 'O' ring seal	Replace 'O' ring seal

Derwent - AVFI
ACN 096 997 152 ABN 48 096 997 152
EMAIL: sales@derwentindustries.com.au
WEB: www.derwentindustries.com.au

Brisbane:
Unit 2F
405 Newman Road
Geebung QL D 4034
Ph: 1300 789 256

Melbourne:
19 Antonella Court
Dandenong South, Vic 3175
Ph: 61 - 3 - 9792 1509

Melbourne - AVFI:
54 Enterprise Drive
Bundoora, Vic 3083
Ph: 1300 789 256

Sydney:
2 Ross Place
Wetherill Park, NSW 2164
Ph: 61 - 2 - 9136 0466

Tasmania:
102 - 104 Sunderland St
Derwent Park, Tas, 7009
Ph: 61 - 3 - 6273 0729

Wodonga:
36 Moloney Drive
Wodonga, Vic 3690
Ph: 61 - 2 - 6014 0100

Auckland:
Derwent Industries NZ Ltd
36 Rangi Road
Takanini, Auckland 2245
Ph: 64 - 9 - 218 4959

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