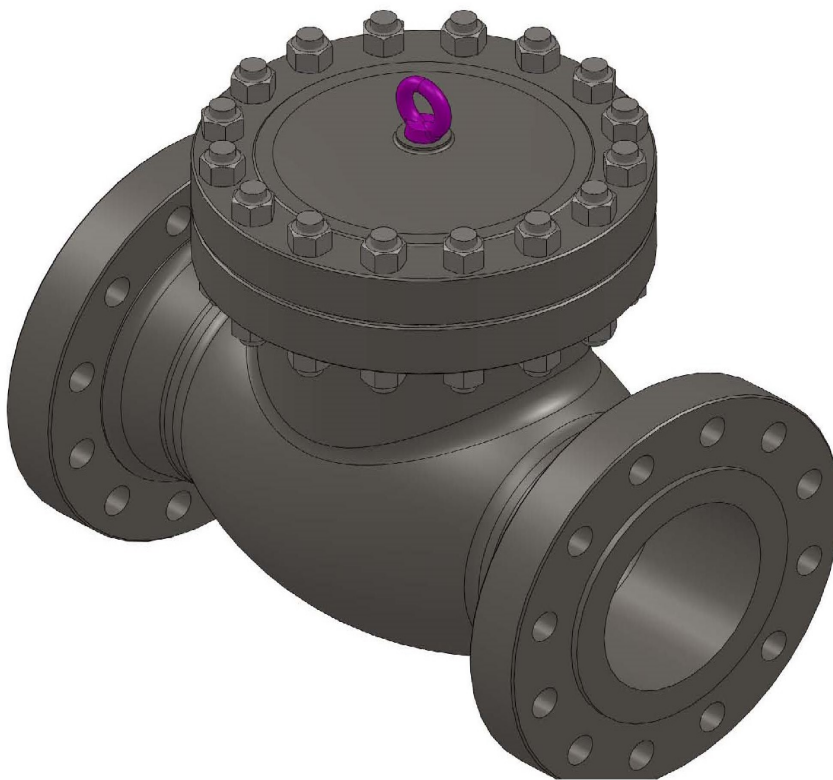




Swing Check Valve

Installation and Operation

Manual



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I Standard

Design /manufacturing/testing: API 594 and/or BS 1868, BS 5352/ISO 15761,API 598,BS 5146

Connection dimension: ASME B16.5, ASME B16.11,ASME B16.25

Face to Face: API 594, ASME B16.10,BS 2080

Pressure/Temperature curve: ASME B16.34

II Application and selecting principle

1. Application

Check valve is used in a pipeline to stop fluid backflow.

Check valve only allows the media to flow in one direction, stop to flow in other direction, normally, this type valve works automatically. Under the pressure working of fluid in the preferred direction, the disc opens; when the fluid flows in the reverse direction, the fluid pressure and disc weight cause the disc effect to seat and stop flow. Service: water, steam, oil etc.

Generally speaking, a check valve is used in power industry, petroleum refining, offshore oil, municipal water supply in urban construction, chemical industry etc.

2. Selecting principle

- 1) To stop fluid reverse flowing in pipeline.
- 2) High temperature/pressure media, eg. High pressure steam,high temperature/pressure oil.
- 3) Low temperature (cool) media, e.g. Liquid nitrogen, liquid hydrogen, liquid oxygen etc.
- 4) Low pressure big size, e.g. tap-water supply of urban construction, sewage disposal.

Install position: a. conventional construction could be mounted on horizontal and vertical pipeline.

b. check valves with hammer or damper only can be mounted on horizontal pipeline.

III Installation

1. Cleaning and note before and after installing

- 1) Remove the wrappings off the valve carefully, to inspect material, size, description list, tag or nameplate;
- 2) Attention shall be paid to any warning label on valve or with valve;
- 3) Valve inside shall be checked and made sure it is clean before installing,
- 4) After installation, the pipe shall be flushed to remove all possible contaminates from installation to avoid seal area damage.
- 5) The flow direction marking shall be checked whether it is in accordance with actual media flow direction before installation.
- 6) Lift check valve shall be installed on horizontal pipeline. Swing check valves can be installed on horizontal pipeline or vertical pipeline, but the flow direction shall be upward while installed vertically to the pipeline.
- 7) The check valve with a damper shall be installed on horizontal pipeline.
- 8) All debris shall be removed from valve (including dust) after installation.

2. Installation of all kinds of connections

1) The installation between flanged end valves and pipelines

- a. Flange mating surfaces shall be checked and repaired before installation if any flaws are found which may cause leakage.
- b. The studs and nuts size, length, and material shall be checked whether they are suitable for requirement.
- c. Gasket material and size should be checked whether according with ASME B16.5 and ASME B16.20 specification.
- d. Gaskets shall be checked for damage.
- e. Lubricant shall be properly applied on the threads of bolting. During the assembly, the bolting shall be matched, for smooth and parallel the initial contact between flange and gasket. Bolting shall be matched and tightened symmetrically, to avoid the distortion for two flanges each other. Using

torque wrench is helpful to ensure the correctness and symmetrical tightness of flange bolted connection. To install the valve on the initial pipeline, the parallel and symmetry of flange is quite important.

Note: If the bolting is bent and it shall be rejected and replaced. This is determined when the torque increases gradually for a while, maintains for a while, or increases only a little when the bolting is being tightened.

2) Installation of welded end valve.

The strength of the joint between pipe and valve shall not be lower than that of body. And the joint shall not have “gap” or weakness. The weld joint of BW end should be complete penetration and the thickness should be no less than wall thickness.

There should not be defect on the weld joint. All welds should comply with any specification for the pipeline system constructions or some regulation within scope of jurisdiction, and the approved welding procedure.

And they should be inspected according to the requirement for corresponding specification. The material marking of pipes and valve should be checked whether they are applied with the requirement stipulated.

- a. The welded end surface, size and cleanliness should be checked and the factors that will obstruct assembly and welding capability need to be cleared.
- b. The welding parameter should be confirmed according to the assessed welding technics criterion.
- c. The valve end and that of the pipe need to be checked whether they are aligned to assure the welding quality.
- d. Spot welding should be used for alignment.
- e. The welding joint will be cleaned and checked.
- f. Welding repair should be proceeded according to the approved welding procedures.

IV Testing and adjusting

Observe through cycle operation of valve switch, adjust if obvious problem was found.

The check valve with damper cylinder, which disc opening and closing speed could be adjusted

through adjusting needle valve which is on cylinder.

Shall be noted that valve cavity could be water storage of pipeline system,

V Using and maintenance

1. Check valve, which is a kind of block valve, is used to prevent fluid reverse flow.
2. Attention shall be paid to the valve whether there is noise and vibration, and the pipeline service pressure change to avoid water hammer effect in the pipes.
3. The mechanical noise and high intensity liquid noise may be the potential signal of severe accidents. The system project engineers, valve manufacturers or other experts should be invited to check the cause of this noise and measures will be taken if necessary.
4. The sealing capability of the valves with better sealing will be influenced by damage or normal abrasion.
5. Reasonable measures will be carried out to prevent poor valve performance caused by the mechanical damage, the corrosion by air contaminants, chemical substance or wet air.

VI Repair

1. Replace disc, gasket.
 - 1). Release the pressure in cavity, remove Cover stud and nut, take off Cover.
 - 2). Take off gasket, replace it if any damage.
 - 3). Remove fork type part, swing shaft, disc etc.
 - 4). Clean valve cavity and check seat seal surface, clean disc seal surface, replace or repair if any scratch or flaw which will affect seal.
 - 5). After part repaired and replaced, assembly valve according to removing procedure, full open and full close valve twice to observe whether the valve is working flexibly and easily.
 - 6).When hydraulic cylinder leaking or other fault and repair requested, unload the system before disassembling, move piston to cylinder bottom, prohibit to beat and fall off suddenly.
 - 7).Replacement hydraulic oil for system shall be same type, its quality class and viscosity shall be

same or approximate, otherwise the oil leakage would be caused by seal failure easily.

8). Conduct seal ability testing for valve.

VII Fault analysis and trouble shooting

Fault	Analysis	Trouble shooting
Disc could not be close or open	<ol style="list-style-type: none"> 1.Swing shaft and pin shaft fitting is too tight. 2. foreign matter block. 	<ol style="list-style-type: none"> 1. Check fitting 2. Remove foreign matter.
Leaking on joint between body and Cover.	<ol style="list-style-type: none"> 1. Bolt-on is not even 2.Flange seal surface damage 3. Gasket is broken 	<ol style="list-style-type: none"> 1.Tight bolt evenly 2. Repair 3. Replace gasket
Noise, vibration	<ol style="list-style-type: none"> 1. Valve mounted place is close to pump. 2.The medium flowing pressure is not stable. 	<ol style="list-style-type: none"> 1.Re-mounted proper position. 2.Eliminate pressure fluctuation.
Hydraulic cylinder outside leaking	<ol style="list-style-type: none"> 1. Piston rod is damaged or galling 	<ol style="list-style-type: none"> 1.Milling repaired by sand paper or replaced new one.
	<ol style="list-style-type: none"> 2. Dust ring lip is too sharp, shaving oil caused. 	<ol style="list-style-type: none"> 3. Milling the dust ring lip or replace new one.
	<ol style="list-style-type: none"> 4. The sealing part of piston rod or guide casing is damaged or wear out. 	<ol style="list-style-type: none"> 3. Replace seal ring.
Hydraulic cylinder inside leaking	<ol style="list-style-type: none"> 1.The inner surface of cylinder is galling which damage seal ring. 	<ol style="list-style-type: none"> 1.Light galling shall be milled by 10# sand paper, replace seal

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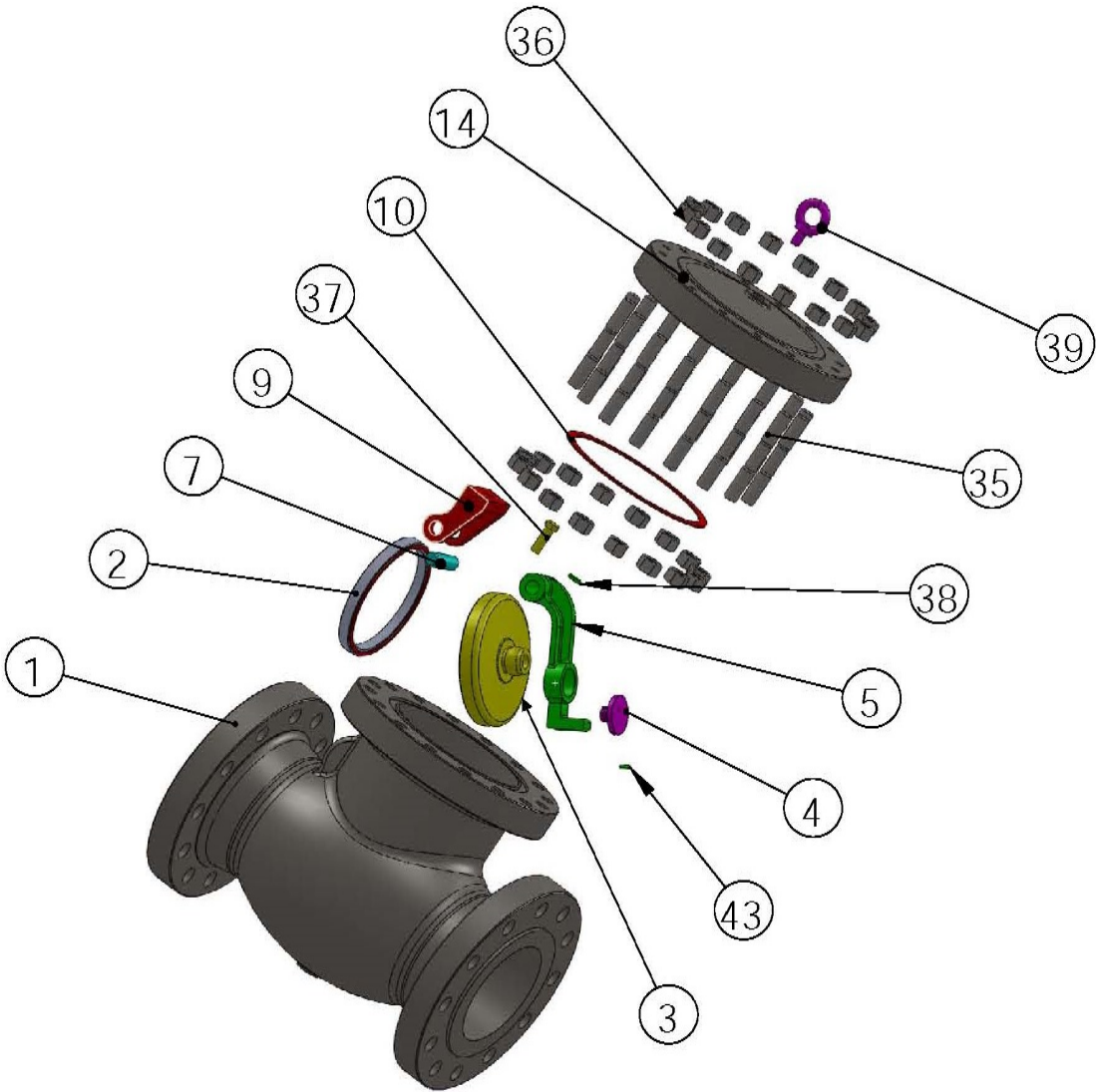
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		ring; terrible galling cylinder shall be replaced, check hydraulic system cleanness, replace hydraulic shaft if necessary.
	2.Piston seal damage or wear out.	2.Replace seal ring.

VIII Fig.



- 1. Body 2. Seat 3. Disc
- 4. Disc cover 5. Swing shaft 7. Pin shaft
- 9. Fork-shape part 10. Gasket 14. Cover
- 35. Stud 36. Nut 37. Bolt
- 38. Spring Gasket 38. Lifting bolt 43. Lock screw