



IOM - Instructions for installation,
operation and maintenance of:

Swing Check Valves

according to BS 1868/API 594/API 6D

[CSBS]



**“TERMOVENT” SC
Temerin**

Republic of Serbia

Table of Contents

1. General safety information's	3
2. Product description	3
3. Storage and handling.....	4
4. Installation and start-up.....	5
5. Usage and maintenance	7
6. Service and repair.....	8
7. Possible malfunctions and solutions	10
8. Guarantee	10

1. General safety information's

- Instructions for installation, start-up and maintenance during the period of exploitation of valves manufactured in the "TERMOVENT" SC should be used as a manual intended for all personnel directly or indirectly involved in dealing with the aforementioned goods.
- These instructions are only related to Swing Check Valves.
- Operators in charge of installation, operation and maintenance of swing check valves during the period of use, should be fully trained for the correct / optimal performance of these tasks.
- Information about temperatures and allowable working pressures shown in our technical data sheets are according to ASME B16.34, Table 2. Under no circumstances should the valves be operated at conditions outside these tables.
- Because swing check valves in working conditions have hot parts (body and cover) and may cause burns, the operator has an obligation to undertake all necessary precautions to avoid such by using protective facilities.
- Before the service or reinstallation of the valves, the plant or installation should be taken out of operation (pressure 0 bar, temperature of valves should be the same temperature as the environment).
- These products are recyclable. No ecological hazard is anticipated with the disposal of these products providing due care is taken.

2. Product description

- The main purpose of the Swing Check Valves is to stop fluid flow through pipeline in one direction.
- If anything is unclear at the time of installation, start-up or during use, and not covered in these instructions, the departments of the "TERMOVENT" SC should be contacted directly in order to obtain the required support.

All Swing Check Valves manufactured in "TERMOVENT" SC are marked with following marks:

- Identification of manufacturer ("TERMOVENT" SC logo);
- Nominal diameter of valve NPS (inch) or DN(mm);
- Nominal pressure class rating (#);
- Material designation of body and cover;
- Body and cover melt identification/heat number;
- Trim identification- material grade for disc and seat;
- Unique serial number;
- Arrow mark for allowable direction of flow;
- Date of manufacture (month and year) ;
- Maximum allowable pressure at maximal temperature according to ANSI B16.34
- The product standard designation: i.e. BS 1868
- Valve ends flanges and body/bonnet flanges grooved with ring joints corresponding ring number;
- API marking (if it is manufactured in accordance with API Specification)
- Other marks in accordance with customer request or product standard.

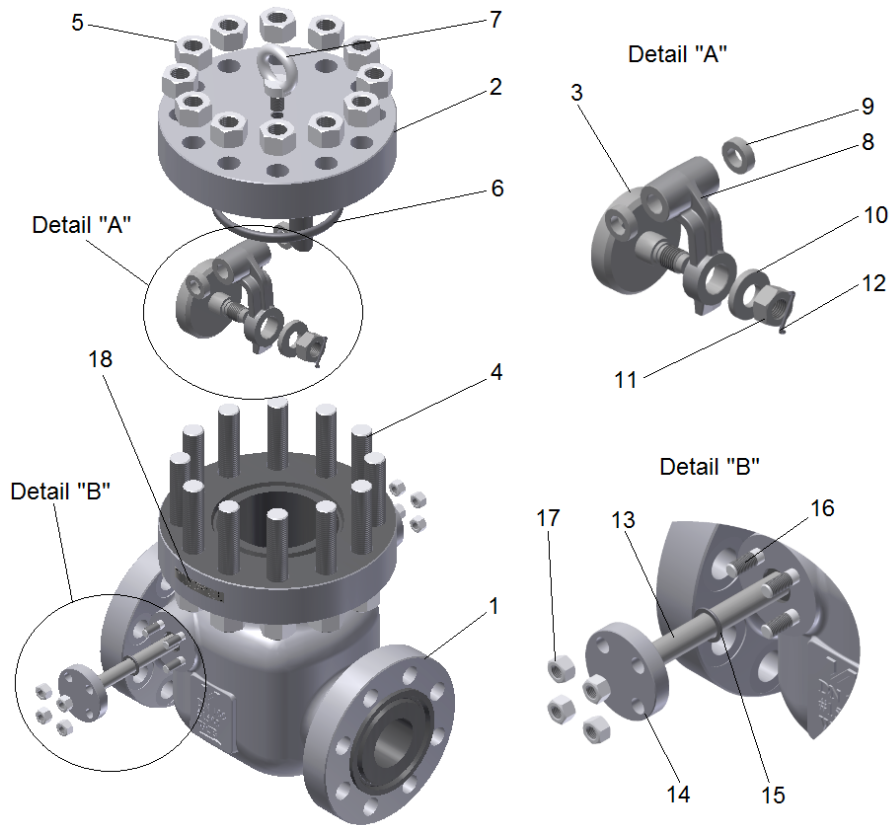


Fig. 1 Part

Table 1.

Pos.	Part Name	Quantity	Spare Parts	Pos.	Part Name	Quantity	Spare Parts
1	Body	1		10	Washer	1	
2	Cover	1		11	Disc Nut	1	
3	Disc	1		12	Tension Pin	1	
4	Stud bolts	*		13	Hinge Pin	1	
5	Nuts	*		14	Hinge Pin Plate	2	
6	Gasket	1	YES	15	Gasket	2	YES
7	Lifting Eye Bolt	1		16	Stud Bolts	*	
8	Hinge	1		17	Nuts	*	
9	Bearing Spacers	2		18	Nameplate	1	

* Quantity depend from NPS (DN) and Class

3. Storage and handling

General information

Valves are delivered in their disc in closed position with protective covers on their ends. During storage period protective covers shall not be removed.

3.1 Recommended storage facilities

- The valves have to be stored in closed, clean, dry and ventilated storage facilities.
- Storage conditions shall be: ambient temperature in the range +10°C to +35°C and the humidity up to 85%
- Store the valves in their original shipped packing.
- Valves should be taken out of crates or removed from the covering of a pallet just before installation.

3.2 Storage inspection

- Periodical inspection should be performed on all stored valves. At the minimum, all valves should be inspected every 3-4 months for dirt, moisture or any other type of contamination. If any is found the valves is to be thoroughly cleaned and dried.
- Slight external rusting may occur on valves. This will have no effect on their performance.
- If valves are stored for more than 6 months we recommend following:
 - Valves shall be cycled open to close 2-3 times every 6 months to keep packing from adhering to the stem and help lubricate the stem and stem nut.
 - Preservation of inner surfaces, inner parts, flange facing, butt welding ends and threads shall be repeated every 6 months with appropriate corrosion preventive coating
 - Re-tighten diametrically opposite all the bolts as per factory specifications to overcome possible bolt relaxation during long-term storage (Fig.5)

3.3. Handling requirements

- For valve handling and/or lifting the lifting equipment must be sized and selected while taking into account the valve weight indicated at packing list. Lifting and handling must be made only by qualified personnel. Caution must be taken during the handling to avoid that this equipment passes over the workers. For valve handling or lifting the lifting equipment must be sized and selected while taking or over any other place where a possible fall could cause damage.

WARNING!!!

- You must not lift the valves using the connection flange holes
- You must not remove the protection covers from the valve connection ends

4. Installation and start-up

- The swing check valves nominal diameter \geq DN 100 are supplied with blocked disc how to prevent damage to the sealing surfaces during transport. Before installation it is necessary to remove the safety fuse (Fig. 2)

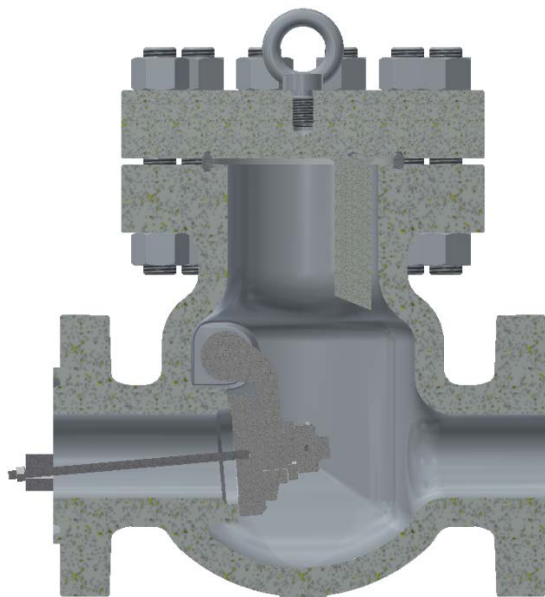


Fig. 2 Swing Check Valve with safety fuse

- After the removal of the protection covers it is necessary to thoroughly clean inside the valve with compressed air.
- Do not disassemble or modify a valve in any way prior to installation. This will void the factory warranty if it occurs.
- When installing valves with flanged ends it is necessary to take into consideration the selection of adequate bolt material and the appropriate type of gasket depending on the type of working fluid, pressure, temperature, and the type of flange facing. It is necessary to install gaskets strictly in accordance with instructions given from the manufacturer of the gaskets.
- Valves with welding ends should be welded onto the pipeline by an expert and with appropriate WPS. After welding, if necessary, local normalization should be performed and the inside of the pipeline should be cleaned to remove possible welding remains.
- At the moment of installation the influence of the load of the pipeline on the valve should be reduced. The same also applies for temperature oscillation, hydraulic impact and similar. The valve should not be used as a support for a pipeline.
- It is important to take care about the flow direction at the time of installation. The flow direction is indicated with the arrow mark casted or imprinted on the body of the swing check valve.
- Mounting position must be in accordance with the instructions in this guide (Fig. 3)

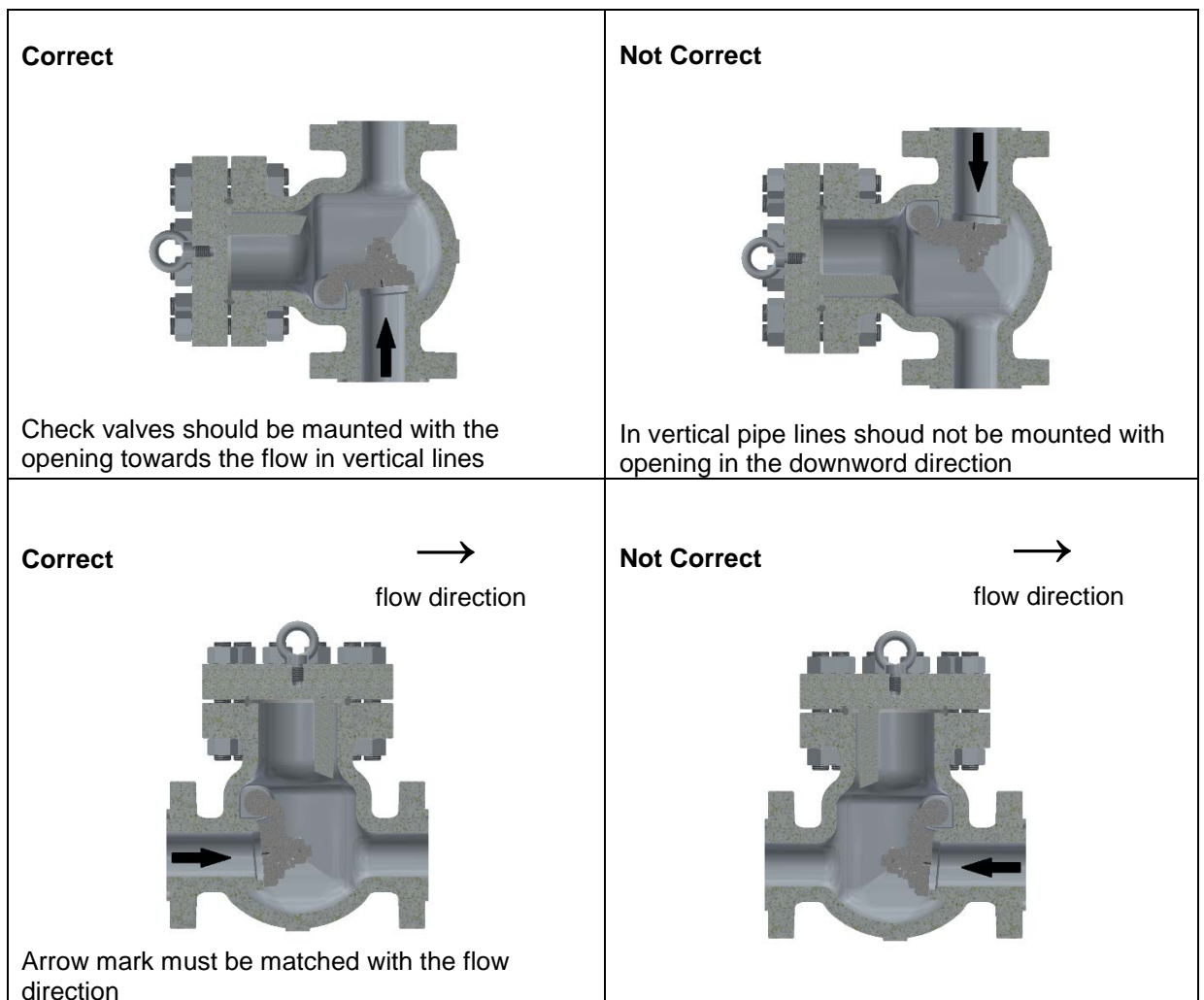


Fig. 3 Allowed mounting position

WARNING!!!

- Do not disassemble or modify a valve in any way prior to installation. This will void the factory warranty if it occurs.
- You must not lift the valve using the connection flange holes at the moment of the installation on the pipeline – you should use lifting straps to secure the check valve to the lifting equipment;
- Before installation the impurities should be removed from the pipeline or from the appliance;
- Remove protecting covers from the valve ends, degrease and clean the inside of the valve, and in case of a flanged connection, carefully clean the sealing surfaces;
- Confirm that the marks on the swing check valve correspond to the projected parameters of the plant (e.g. size, pressure, material etc.) and installation is according to allowable flow direction;
- Confirm that the velocity of the fluid at the place of the installation is in range of the recommended velocity;
- At the moment of testing of a pipeline or an installed appliance valve; take care about the predicted maximal differential pressure.
- **The valve should not be used as a support for a pipeline.**

5. Usage and maintenance

- It is convention during usage of the valves that all minor defects, if operating conditions allow, should be repaired on the spot. If not, the valve should be dismantled from the site in order to perform a full repair. If the valve is severely damaged it should be replaced with a new one. Such repairs protect valves against further deterioration, being permanently out of work and being the cause of severe accidents in the plant.
- In case of leakage through gaskets between valve connection flanges or between the bonnet and body, it is necessary to make replacements of the gaskets as soon as possible to prevent damage of the sealing surfaces due to erosion.
- On the dumper (Fig. 4) of the valve there is a hydraulic cylinder (Pos.1) that serves to regulate the opening and closing force, which serves the function of control of the pressure and flow of the fluid. There is a flow damping valve in the hydraulic cylinder (Pos. 2). By closing the valve, the flow of oil in the cylinder is dampened, which causes a slower closing-opening of the valve. Adjust the damping valve according to the valve operating conditions. On the cylinder there is a plug (Pos.3) through which the level of oil is checked and through which it can be added. The oil level is controlled every year. The Ø6 mm hole is provided on the piston, which serves as a safety element, in case of complete closing of the valve (Pos. 2), the valve closing position (Pos.4) is not blocked. In the case of leakage of the fluid from the pipeline through the shaft (Pos. 5), the seal (Pos.6) must be tightened through the screw plate (Pos.7).

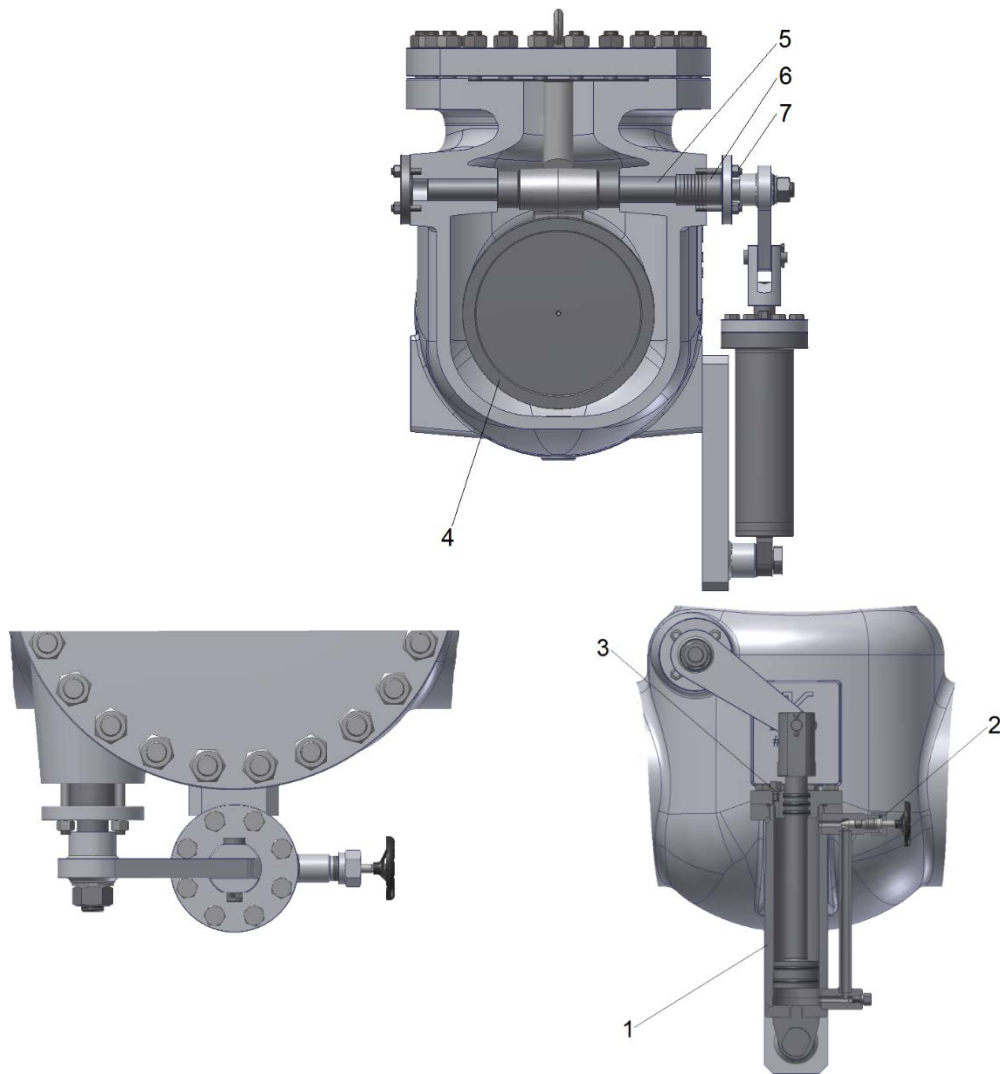


Fig. 4 Instructions for regulating the opening closing force

WARNING!!!

- If, when a valve is overhauled, a decrease of wall thickness of more than 30% is detected at any of the ports (due to erosion) the valve should stop being used;
- Any time when a valve is dismantled or reinstalled the gaskets should be replaced with new ones with the appropriate quality;
- Valve maintenance and manipulation during use should be done only by experts and persons well trained for such purpose;
- At the moment of installation of the plant sudden and extreme change of pressure and temperature should be avoided;
- A Strainer being installed before the swing check valve will increase its reliability and proper working

6. Service and repair

- Only authorized persons should perform service and repair with appropriate tools and, if it is possible, using original spare parts. Personal protection should be applied in accordance with valid regulations and legalizations.
- Attention should always be paid to the reliability of the valves and parameters of the working implementation / plant, and only materials which can successfully replace those originally installed should be used.
- For highly reliable valves (valves which work with high temperatures, high pressures or with dangerous fluids) any service, repair or replacement should be done

professionally and responsibly in accordance with valid regulations for safe working conditions at the plant.

- Before the service or reinstallation of the valves, the plant or installation should be taken out of operation (pressure 0 bar, temperature of valves should be the same temperature as the environment).
- Every Swing Check Valve serviced or repaired should be subject to all necessary tests usually performed for a newly produced Swing Check Valve.
- Bolts for connection between body and cover should be tightened evenly and crosswise applying appropriate torque.
- For high temperature and high pressure applications after 24 hours of operation, all nuts shall be re-tighten diametrically opposite up to design stresses (Fig.5). This action compensate any relaxation or creep. Periodic inspection is recommended, thereafter.

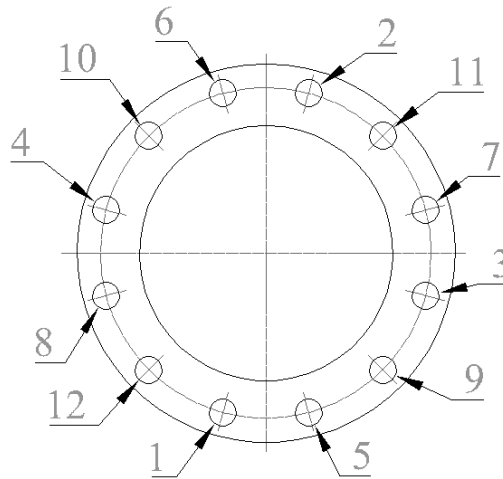


Fig. 5 Recommended re-tighten order

Possible torques for tightening are listed in Table 2 and the selection of torque depends on the material grade of bolts and nuts used, as Table 2.

Nominal bolt diameter	Material of bolts: B7	Material of bolts: B16	Material of bolts: B8
	Torque [Nm]	Torque [Nm]	Torque [Nm]
M10	55	55	20
M12	90	90	30
M14	140	140	45
M16	215	215	65
M18	270	275	85
M20	410	415	125
M22	555	555	170
M24	700	705	215
M27	1015	1020	310
M30	1375	1385	420
M33	1850	1865	570
M36	2380	2395	730
M39	2885	2905	885
M42	3555	3580	1090
M45	4430	4460	1360
M48	5310	5345	1630
M60	10620	10695	3260

WARNING!!!

➤ Gaskets between the body and cover should be manipulated with high precautions because they could contain stainless steel wire which can cause severe injuries.

7. Possible malfunctions and solutions

During the period of usage of the installed valve malfunctions may occur. Only experts in the premises of the user should undertake repairs. The most common cause of malfunctions and how to overcome such situations is listed in Table 3.

Table 3.

Failure	Possible cause	Troubleshooting
Absence of flow	Protection covers are not removed	Remove protection covers from connection ends
	Improperly installed product in relation to the allowed flow	Install valve in allowed flow direction
Leakage on gasket	Nuts (Pos.5) are not tightened	Tighten Nuts (Pos.5)
	Gasket (Pos.6) is damaged	Disassemble cover (Pos.2) and replace gasket (Pos.6) with new one
Leaking on the seat	Mechanical damages of seat or disc (Pos.3)	Contact the manufacturer
	Working medium contains solid particles	Clean Valve thoroughly. We recommend installation of Strainer before Check Valve

8. Guarantee

- The Guarantee issued by “TERMOVENT” SC confirms the safe working of its products under conditions when these products are properly installed in accordance with the instructions in the documentation given to the customer, and usage is in accordance with approved technical conditions and working parameters.
- The Guarantee is void if inappropriate parts from other manufacturers are implemented, if the user changes construction, or if there is any decline in function or malfunction due to natural wear and tear.

Guarantee conditions:

- The Guarantee is valid for defective parts or defective products, when any such defect is confirmed by an expert engaged by the customer and approved by experts from our company. In such a situation “TERMOVENT” SC will replace the defective part(s) or defective product(s).
- Replacement of defective part(s) or defective product(s) with new one(s) should be done only by an expert engaged by the customer upon approval or by instruction of our experts and in accordance with the instructions for installation.
- The Guarantee period is not valid if installation and manipulation of the valves isn't in accordance with these instructions. The Guarantee period for all replaced parts or product(s) starts from the moment the replacement(s) is/are done.

The Guarantee is valid only if the valves are handled, stored, installed, used and maintained in full accordance to the Instructions and recommendation listed in this Document.

WARNING!!!

- After detection of mistakes “Termovent” SC should be informed immediately.
- Claims must be made in writing.