

Installation, Operation, and Maintenance Manual

This manual is intended as a guide to assist in the installation, operation, and maintenance of the STH High Performance butterfly valves. For best performance the process application of the butterfly valve must be in accordance with the pressure and temperature ratings for the valve body and seals. Installation and valve operation must comply with municipal codes and regulations.

Storage

Proper storage is required if the butterfly valves are not for immediate usage. The valves should remain packaged in the closed position. .

- The valves must be stored in a dry environment with no dust or water droplets while avoiding direct sunlight, low or high temperature and humidity. Recommend to store indoors under room temperature range with humidity 60% or less without removing the bubble wrap & carton box packaging or the protective material attached to the valve.
- If the valves are to be stored for long term storage they should be operated open/close once every three months.
- Over time rust can appear on inside metal surface. This will not affect valve performance. Special care should be taken to prevent damage to the disc edge and sealing surface.
- Do not drop, vibrate or apply a heavy load to the valves during storage.

Packaging

All STH High Performance BFV's are shipped in the full-closed position. All valves are packed with bubble wrap and carton box protection around the main valve body for valves up to 12". For sizes 14" and up bubble wrap and plywood protection is used. This packaging should remain on the valve until actual installation into piping. Be careful not to damage the product with a cutter when unpacking.

- Individual carton box protection packing include all necessary information which you can verify information such as the pressure class, nominal size and materials.

Transportation & Handling

Protect the valve sufficiently before transportation to avoid damage. Valves that weigh over 20kgs should be transported using equipment and not a man power alone. The valves should be secured during transport to avoid shifting or falling. Do not drop or apply a heavy load on top of the valves.

Pre-Installation

Determine the valve orientation. The STH High Performance butterfly valves are unidirectional and valve can be installed in any position or direction. Install the valve in the flow direction matching the direction arrow cast in the valve body. Preferred flow direction is with the seat retaining ring facing

upstream. This allows better protection for the seat from particles flowing in the media and from sediment build-up at stem base giving optimal valve service life. This is very important for stem service application due to the high travel velocities.

Prior to installing the valve, it is important to make sure the ID of the pipe and pipe flanges are large enough to allow the disc edge to swing into the opening without interference. Damage to the disc edge can severely affect the performance of the valve.

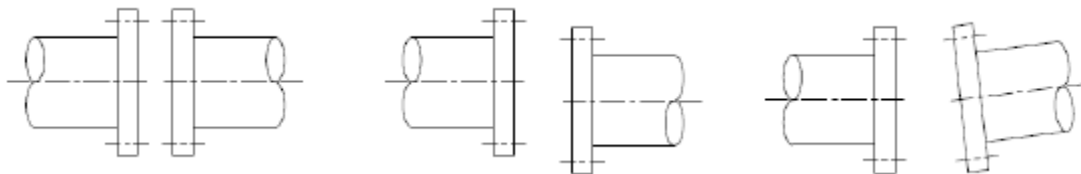
Make sure that levers, gear operators, or actuators are properly installed and that the stops are properly set for open and close positions. The valve is supplied with an internal over-travel stopper, there may be clearance between the back of the disc and stop. **WARNING:** Do not use the over-travel stopper to position the disc or limit the travel of actuators, it may result in leakage to the seat & damage the valve.

Before installing the valve, ensure that the lever or gear operator is installed such that the position indication matches the position of the valve disc. For lever operated valve, the lever should be in parallel with the disc. For gear operated valves, the dial indicator on the gear should match the position of the valve disc.

Inspect the valve body port and associated equipment for any damage that may have occurred and for any foreign matter that may have collected in shipping or storage. Make certain the body interior is clean, the seat facings and disc edge surface are undamaged.

Prior to installing the valve, inspect the piping and remove all dirt, welding slag, rust and scale from the piping and flange faces that could cause leakage. It is advisable to install a strainer upstream of the valve to prevent contamination from entering the valve. It is very important for long trouble free service to keep the valve free of all contamination that may damage the sealing surfaces.

Ensure that the pipe line and mating flanges are properly aligned, Align the primary side pipe with the secondary side pipe properly and make sure the pipes are parallel and there is no distortion. If the alignment is not proper, external leakage, seat leakage, or faulty operation may occur.



Properly aligned

Poor centering alignment of the pipe

Poor Parallel Alignment

When installing, do not stand on the valve nor insert the valve by forcing or heating it. There should be at least 1 inch extra space between piping more than valve face to face sizes.

When connecting the valve to the piping, actuator facing downward is not allowed. Be careful of the stem direction when piping conditions are as shown.

Installing a valve at a pump outlet

Installing at a elbow or a reducer

Incorrect Installation

Correct Installation

Incorrect Installation

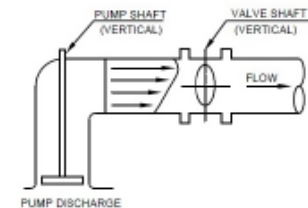
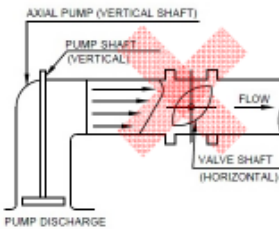
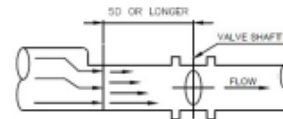
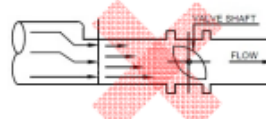
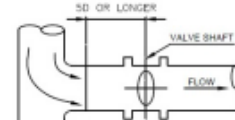
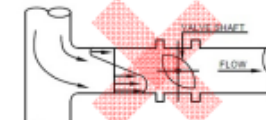
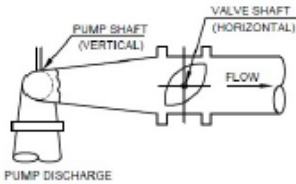
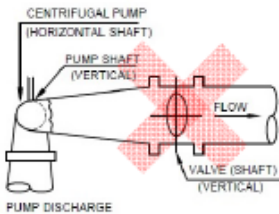
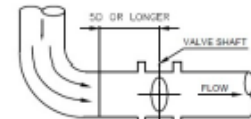
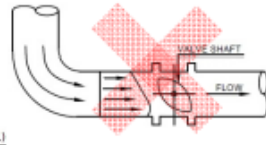
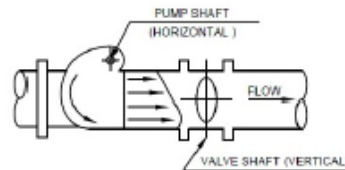
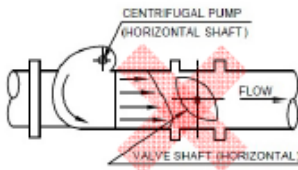
Correct Installation

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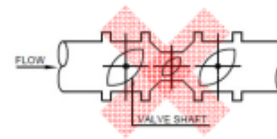
Combination of a control valve and stop valve

Incorrect Installation

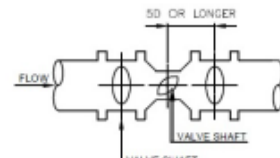
Correct Installation

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ALL THE VALVE SHAFTS HAVE THE SAME ORIENTATION



THE ORIENTATION OF THE VALVE SHAFTS IS ALTERNATING

- Do not remove the locking lever, gear or other actuators while the valve is under pressure.

WARNING : Personnel should take precautions to wear the appropriate personal protection equipment such as safety shoes with toe protection, gloves, safety glasses and hard hat. Personnel installing the valves should have the mechanical and handling training of such equipment including rigging and hoisting techniques. Any Process in the pipe lines should be identified to be safe to work prior to starting. The line should be depressurized and drained before installing the valves.

Installation

Clean the flange face that will make contact with valve. If there is rust or some other foreign material clean with a suitable cleaning fluid (alcohol, neutral detergent, etc.).

Before installation set the valve disc in the full-close position.

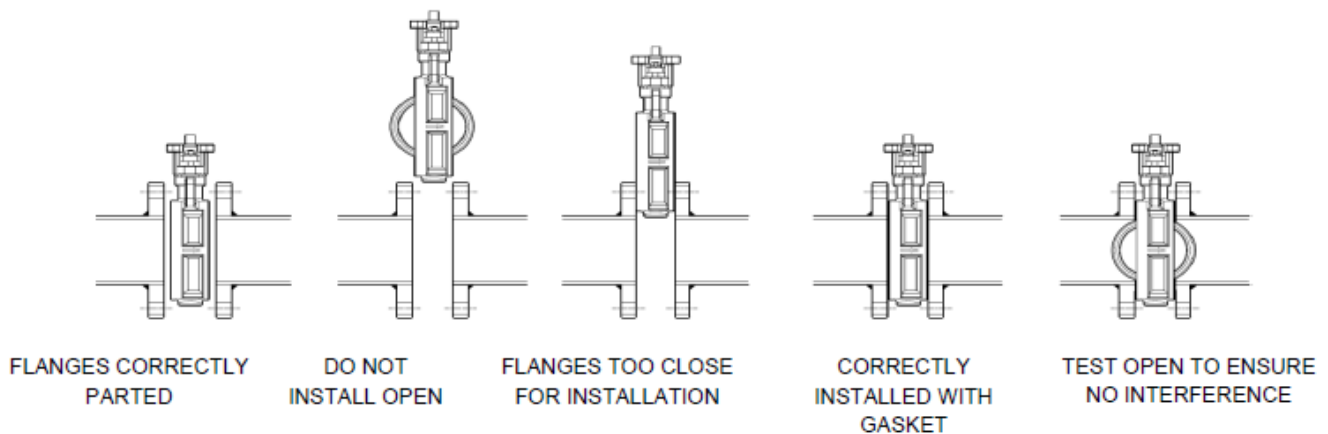
After aligning both flanges, insert the piping bolts and secure the product to prevent it from dropping.

Insert jack bolts in the position to widen the distance between the flanges. Push the flanges and make the distance between the flanges 6 to 10 mm longer than the valve face-to-face dimension. Do not remove the jack bolts until all the piping bolts are installed.

A pressure direction (flow direction) is on the valve. Ensure that the pressure direction of the valve matches the direction indicated by the arrow on the valve body. Insert the valve while taking care not to damage the valve flange face. If the valve is forcibly pushed between the flanges the face will be damaged and cause leakage. Insert piping gaskets between the end faces of the valve and the pipe flanges.

When valve inserted completely, insert the piping bolts to support the alignment rib. After all the piping bolts are installed, remove the jack bolts.

Accurately align the flanges with the valve. Tighten the piping bolts with the following procedures so as not to tighten the bolts on one side too much or too little. For these valves the fluid is sealed by the seat ring compressed with the force as a result of the pipe flange compressing the gasket. The alignment for piping work becomes easy by using the alignment rib. If this product is operated while the centers are not aligned, breakage, faulty operation, external leakage or seat leakage may occur.

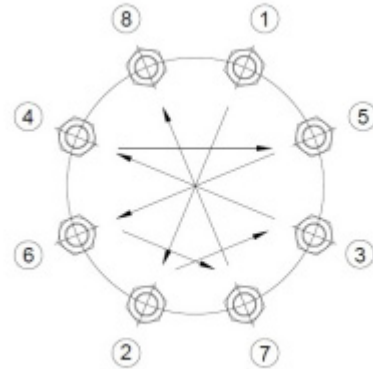


After installation, open and close the product to verify that the operations from/to full-open to/from full-close are smooth.

CAUTION: When installing a non-return valve, pump, or flexible joint made of rubber with this product, insert a short pipe between the part and this product. Otherwise, the disc may make contact with the other device during operation, resulting in faulty operation and leakage.

Bolt Tightening Procedure

- Clean the bolts and nuts and apply lubricant to them. Do not use rusty or damaged bolts and nuts.
- Tighten the bolts and nuts by hands. Tighten the bolts and nuts in any desired order with approximately 20% of specified tightening torque.
- Tighten the bolts and nuts, alternate diagonally with approximately 70% of the specified tightening torque.
- Tighten the bolts and nuts, alternate diagonally with 100% of the specified tightening torque.
- Bolts that are tightened once may become loose due to stress relaxation of the piping gaskets. Be sure to perform retightening repeatedly until the bolts and nuts are tightened evenly



Stop Adjustment

Manual lever, gear operator or actuators can be used with these valves. For any types of operation methods, it is critical that the actuator closed travel limit stop is properly set to match valve disc / seat orientation for proper seal. The open stop adjustment is not critical, plus or minus $\pm 5^\circ$ travel is adequate.

The closed actuator stop should be set before the valve is installed into piping so the disc is centered in the seat. Disc front face is parallel with seat retainer faces. Note that the valve has an "over-travel stopper" that stops at the disc edge. This "over-travel stopper" is only to keep disc from rotating too far thru the seat. When the disc is properly centered in the seat, the disc edge usually does contact the "over-travel stopper"

Operation

The valve can be opened or closed by the manual lever, gear operator, or actuator. Turning the valve (as viewed from top) clockwise closes the valve. Counter-clockwise opens the valve.

Due to the double offset design of STH High Performance butterfly valves, the different pressure over the disc can cause sufficient torque to open the valves spontaneously. For this reason it is important not to remove the lever, gear or actuator from a valve that is or will be pressurized.

Lever operated valves should always be locked securely in desired 10 position indicate plate notch to prevent unexpected disc movement.

Maintenance

Typical maintenance consists of periodic inspection and cycling of the valve to assure proper function. Valve parts are subject to normal wear and should be inspected and replaced as necessary. Inspection and maintenance frequency depends on the severity of the service conditions. The following periodic preventative maintenance practices are recommended.

- Operate the valve from full open to full close to assure operability
- Check flange bolting for evidence of loosening and correct as needed
- Inspect the valve surrounding area for previous or existing leakage at flange faces or stem.
- Check piping and /or wiring to actuator and related equipment for looseness and correct as needed

Inspection Descriptions	Inspection Points	Inspection Procedure	Countermeasure
Fluid External leakage	Pipe joints	Visual Check	Retightening the piping bolt and nuts. Align the valve center with the pipe center and retighten the piping bolts.
	Bottom & Valve surface	Visual Check	Disassembly and maintenance. Spare part replacement if required. Valve replacement
	Gland area	Visual Check	Retighten the bolts.
Abnormal noise, Vibration	Appearance of the valve and actuator, Piping around the valve bolts and nuts	Listening Check by touch	Change the valve opening. Review the flow rate and pressure. Retightening the bolts and nuts. Remove the source of vibrations. Disassembly and maintenance. Check for damage of the parts.
Looseness of the bolts and nuts	Bolts and nuts	Visual Check Check by touch	Retighten the bolts and nuts. Retighten the pressure part after reducing pressure.
Seat leakage	Presence or absence of leakage from the secondary side (Flow meter, pressure gauge, drain	Listening, Visual Check, Measurement	Check the opening and closing positions are correct with the indicator. Remove foreign material. Remove the valve from

			the piping and perform check and cleaning. Replace spare parts.
Valve operation check	Check of opening and closing positions	Visual Check, Operation check	Check that the opening and closing positions are correct with the indicator.
Corrosion and damage of the disc	Disc	Remove the valve from the piping and perform visual check	Valve replacement.
Abrasion and damage of the seat	Seat	Remove the seat ring from the piping and perform visual check.	Clean the disc and seat. Replace the parts. Valve replacement if required.

If repair parts or service information is required, please locate valve identification information and supply following information:

- Valve Figure Number
- Valve size / class
- Valve serial Number
- Type of Actuator
- Purchase order number

Removal of Valve from Pipeline

Appropriate protection like gloves and a face shield should be worn when maintenance and disassembly is performed. If harmful or flammable media was being used in the piping system the valve must be decontaminated prior to disassembly. Caution is needed when removing the valve from the pipeline since fluids can be trapped.

- Never remove the operator from the valve while the valve is in the pipeline under pressure

Check to confirm piping has been depressurized and drained.

Put the valve in the fully closed position.

Attach appropriate lifting strap or sling to valve neck. Attach other end of strap or sling to secure point weight.

Remove the bolts and nuts with the exception of the two lowest sustaining the valve.

Spread the flanges with proper tools and remove the valve.

Remove old gaskets and clean piping flange seal surfaces. Note that any time the valve is removed from between flanges, it if necessary to re-torque seat retainer ring with hex socket bolt.

Seat Replacement Procedure

Place valve on bench with seat retainer ring face up, Remove hex socket bolt (13) from retainer ring (06).

Push retainer ring (06) from valve body (01).

Remove old seat (07) and discard.

Clean seat cavity and retainer ring (06).
Clean and inspect seal surfaces on disc (02).

Polish edge to remove any small scratches that may interfere with disc (02) and seat (07).

With valve disc (02) in partial open position. Install new seat (07) into valve body.

Install retainer ring (06) onto seat and align screw holes. Install hex socket bolt (13) and snug.

Position valve disc to closed position.
Torque hex socket bolt using "cross-over" diagonal method

Open and close the valve to ensure that the seat and retainer ring is properly secured to the body.

Gland Packing (Stem Packing) Replacement Procedure

Remove all hardware from top of valve to expose gland flange (4)

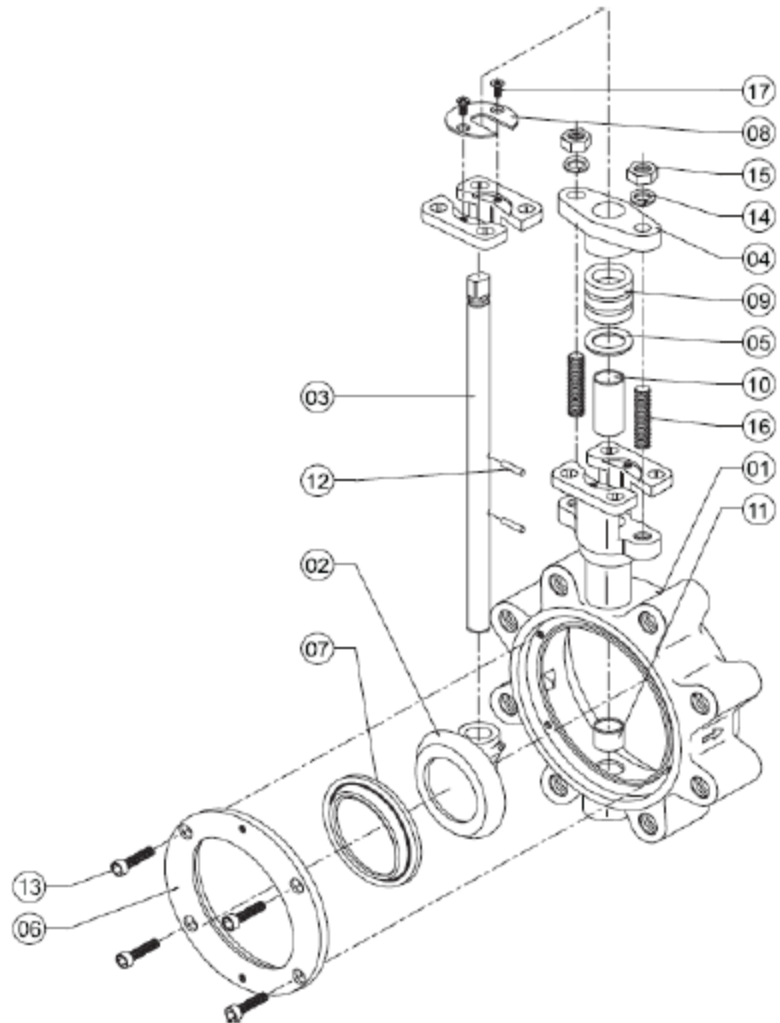
Remove Spring washer (14), Hex Nut (15), Flat head screw (17),

Fully open the disc and pull up stem and remove Top Retainer (08)

Push upward on studs bolts (16) and remove gland flange (04) from top of valve.

Be careful not to damage any seal surfaces. Remove graphite gland packing (09) from valve body (01).

Clean Packing cavity and Packing Retainer (05), Inspect for damage.



Install new Gland packing (09) into valve body (01), Gland Flange (04), install spring washer (14) and Hex Nut (15), stud bolts (16) evenly to gland flange (04).

Install Top Retainer (08) with Flat head screw (17).

Set the disc to the full close position and cycle the valve to verify that the operations are smooth.

Troubleshooting

Trouble	Probable Cause	Countermeasure / Remedy
Leakage from between the body and piping flange faces	The piping bolts are loose or they were not tightened evenly.	After reducing the pressure, loosen the piping bolts, and then retighten them by diagonal sequence. Refer to "Piping bolt tightening procedures"
	The piping flange face is scratched or there is waste material or other foreign material adhering	Remove the valve. Repair and clean the piping flange face. After cleaning, install the valve again.
	The flanges or pipes are misaligned	Remove the valve. Align the flange/pipes and make the flanges/pipes parallel.
	The valve is misaligned	Insert a proper gasket between the pipe flange and valve.
	No flange gasket is inserted, or improper gasket is inserted	Retighten the gland bolts. If leakage is not reduced, replace the gland packing
Leakage from the gland bottom	The gland bolts are loose. The gland packing has worn out or has deteriorated	Retighten the gland bolts. If leakage is not reduced, replace the gland packing.
	The bottom bolts are loose. The bottom gasket has deteriorated	If the hexagon bolts are loose, retighten them. If leakage is not reduced, replace the bottom gasket.
	The body and shaft have deformed.	When external force caused by a support secured to the valve body, etc. is applied to the valve in operation, deformation of the body is possible. Check visually for deformation of the shaft. If any deformation is observed, valve replacement is required
	The body is damaged.	If any cracks or breakage are observed on the body, stop use of the valve immediately and replace the valve.

Trouble	Probable Cause	Countermeasure / Remedy
Valve seat leakage	Wrong material was selected for the fluid application and the parts are corroded.	Replace the valve with one made of the proper material.
	The product specification does not meet the requirement for the fluid.	Use the product within the product specifications (temperature, pressure, flow rate, fluid type.)
	There is damage to the disc or seat ring due to the presence of foreign material inside the piping.	Replace the seat when damaged. If any abnormality is observed on the disc edge, replace the valve.
	The full-close position of the disc is changed. The operator / actuator installation bolts are loose, etc.)	Clean the valve seat and body stopper (and adjust the full close position correctly. In addition, check that there is no problem with the operator / actuator.
	There is torsion of the shaft due to increase in the opening & closing torque.	Replace the valve.
	Pressure between the Seat and the disc is not even due to uneven tightening of the piping bolts.	Loosen the piping bolts and realign the valve and the flange. Then retighten the piping bolts. Refer to "Piping bolt tightening procedures".
	Wearing and deterioration of the seat & ring due to long period of use or high frequency of opening and closing operations.	Replace the Seat.
The valve does not work. Faulty operation	The disc interferes with the piping or other devices.	Insert a short pipe or spacer between the valve and flange to avoid interference. In this case, remove and check the disc sealing part because there is a high possibility that it is damaged.
	The valve is deformed or damaged.	Check the appearance of the body, disc and shaft to ensure that there is no deformation, dent, damage, corrosion, etc. If any of these are observed, replace the valve.
	The piping bolts are loose or tightened unevenly. The valve is misaligned. The pipe flanges are misaligned, are not parallel, or distorted.	If tightening force of the bolts is uneven or the contact areas are not equal, the valve seat compression is uneven. Loosen the bolts and retighten them by diagonal sequence. "Refer to Piping bolt tightening procedures".

Trouble	Probable Cause	Countermeasure / Remedy
<p>The valve does not work. Faulty operation</p>	<p>Increased torque due to presence of foreign material in the piping</p>	<p>Set the valve to the full-open position and flush the foreign material out to remove it. In this case, remove and check the disc sealing part because there is a high possibility that it is damaged.</p>
	<p>Powdered foreign material inside the piping enters the bearings.</p>	<p>If rust powder or powdered foreign material is inside the piping, any foreign material which entered the bearings may interfere with the shaft rotation. Remove the valve and clean it.</p>
	<p>The product specifications do not conform to the fluid specifications.</p>	<p>For automatic valves, the actuator size is selected in accordance with the working conditions (temperature, pressure, flow rate, fluid type). If the working conditions are changed, the valve may not work due to insufficient actuator torque.</p>
	<p>The actuator rated output is not available. (For automated valves)</p>	<p>For cylinders, check the following items.</p> <ul style="list-style-type: none"> • The pneumatic pressure and the supply amount. • The bypass valve is closed. • The operation air stop valve is open. • The speed controller is open properly. • The exhaust port plug has been removed. <p>For motors, check the following items.</p> <ul style="list-style-type: none"> • The rated power voltage is supplied. • Voltage is applied to the motor properly. • The thermal protector, etc. is not activated. • Two or more actuators are not operated with one switch. • No water is inside the motor. <p>For details, refer to the instruction manual of each actuator.</p>

Trouble	Probable Cause	Countermeasure / Remedy
The valve does not work. Faulty operation	The valve body is deformed because abnormal force is applied.	If a support is installed to the valve neck section or actuator, the support may produce a force that deforms the valve. Remove the support member and check the valve.
	Abnormal interference of the disc due to damage or deformation of the seat.	Replace the Seat. If any abnormality is observed on the disc edge, replace the valve.
	Parts, such as the disc, shaft, body and joint, are damaged.	If none of the above is applicable, the valve parts may be damaged, and replacement of the parts or valve may be required.

Warranty

The STH High Performance butterfly valves have a warranty of 12 months from the date of purchase that the valves will be free from defects in workmanship and materials. Warranty is void for improper installation, usage, application, maintenance, modifications, storage, shipping or handling. Under warranty identical valves, parts or a refund of the original price will be issued. Any extra installation, engineering or other coincidental costs incurred in connection with repair or replacement are not covered under warranty.