INSTALLATION, OPERATION AND MAINTENANCE MANUAL

Model 731X - Rubber Lined Butterfly Valve
ANSI 125/150lb BS/DN PN10/16/25

TOMOE

INTRODUCTION

This instruction manual provides general information on the installation, inspection and maintenance of the Tritec double offset butterfly valve.

CONTENTS

This manual covers pressure ranges 150 - 300lb pressure classes.

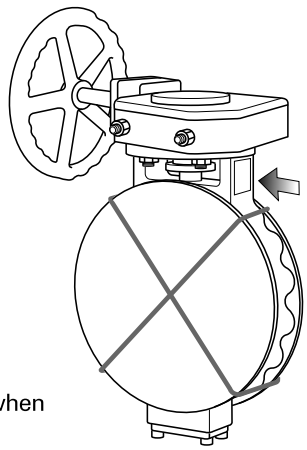
1. STORAGE

The 731X butterfly valve is dispatched with the disc cracked off the seat and the flange faces and valve internals protected with covers. Machined ferrous surfaces are protected with an approved rust preventative. If the valve is for clean gas duty and is being supplied “degreased”, a label is attached stating this and the valve sealed in a polythene covering. It is suggested that the valve is kept packed until it is to be installed in the pipeline.

2. INSTRUCTIONS

Packing

1. All valves will be dispatched with wooden covers attached to the flange faces to protect the gasket sealing surfaces and internal trim.
2. The valve disc is cracked off the seat in the almost closed position.
3. The name plate shown in the picture contains information such as size, pressure class, materials and the unique serial number which must be quoted when ordering spare parts.



Transportation

1. Use crates or packing cases for ocean transportation.
2. For overland Transportation a covered vehicle is recommended with protective sheets covering the valves.

Storage

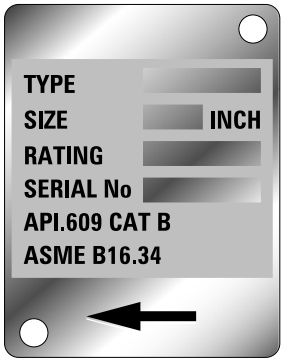
1. Store the valves indoors in a cool temperature between -10°C to +60°C. Do not remove the wooden covers until ready to install valves.
2. When storing valves unpacked, take care in protecting valves and actuators from excessive loads. Do not stack unpacked valves.

Unpacking:

1. Unpack valves just before installation.

3. SPARE PARTS ORDERING

When ordering spare parts or discussing matters concerning this valve with the factory, it is essential to quote the unique serial number of the valve which is to be found on the stainless steel nameplate attached to the valve body adjacent to the operating gear.



4. INSTALLATION

Machinery Directive - Declaration of Incorporation

Tomoe valves must not be put into service until the machinery into which they are to be incorporated has been declared in conformity with the provisions of the Machinery Directive. Tomoe valves must not be used as Safety Components (Emergency Shutdown Valves) within the meaning of the Machinery Directive without prior notification to Tomoe.

The valve is designed to seal against bidirectional flow and can therefore be installed with flow in either direction. However enhanced sealing life will be obtained with upstream flow against the shaft side of the disc. This preferred flow direction is shown on the nameplate attached to the valve body adjacent to the

operating gear and also on the GA drawing. The valve may be installed in the pipeline with the valve shaft in a horizontal, vertical or intermediate position.

Prior to installation the pipeline must be cleaned from dirt and welding residues to avoid damage to the valve during operation.

Ensure that the valve is closed prior to installation to avoid the risk of damage to the sealing surfaces.

The valve must only be lifted by the eyebolt or lifting eyes provided with the valve.

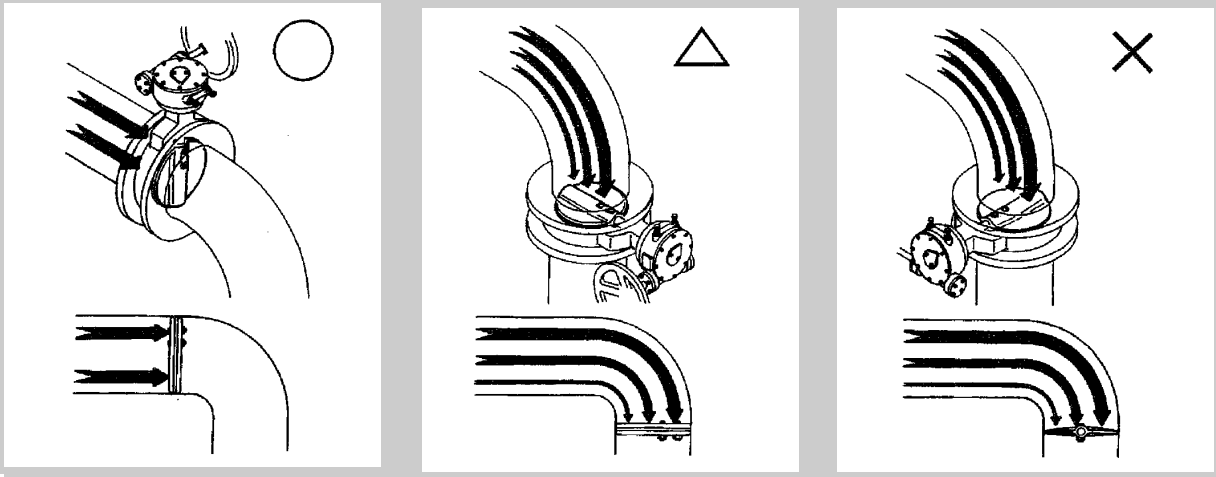
The valve must not be lifted by the gearbox, actuator or handwheel.

The valve must not be used for pipework alignment.

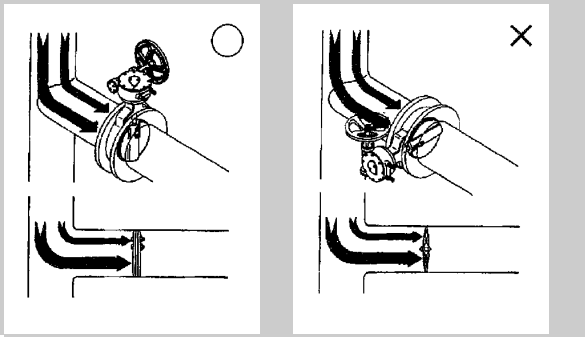
Dead end service- The valve is suitable for dead end service (end of line duty) in either direction to the full rating pressure of the piping system.

4. INSTALLATION (continued)

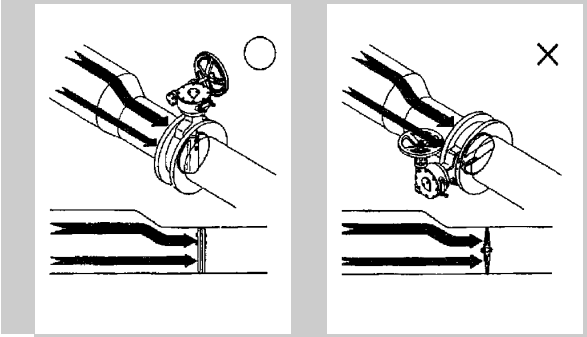
Installation of Butterfly Valve directly after a pipe bend



1 Good | Acceptable, if inevitable | Worst case

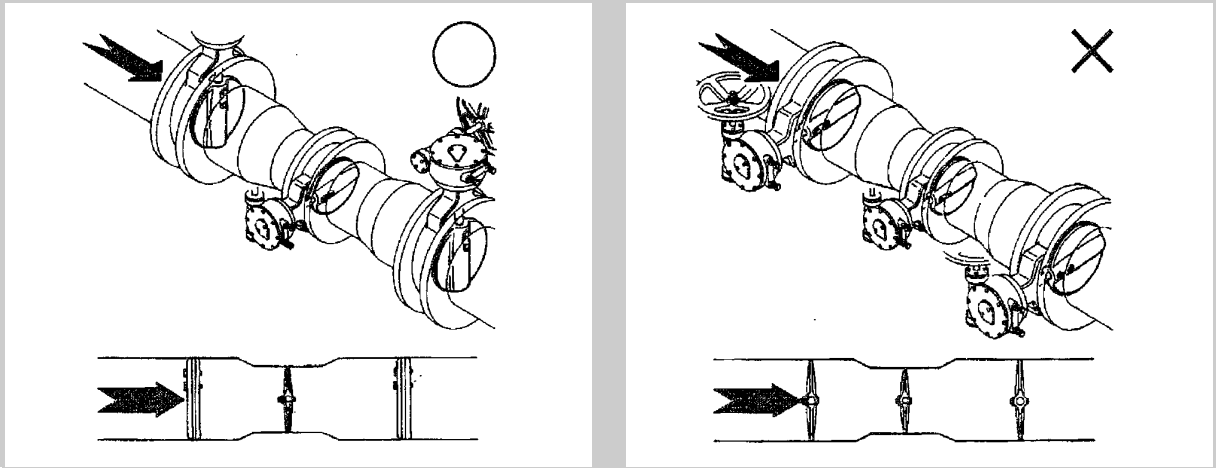


2 Good | Worst case



3 Good | Worst case

Installation of Butterfly Valve with Stop Valve



4 Good | Worst case

4. INSTALLATION

1 Before installation of the valve, check and ensure that the seat ring and disc materials are correct. The seat ring material is indicated, coloured or embossed at the position as shown with the arrows in the illustration. (Fig.4)

Blue: NBR	Orange: EPDM
Red: CR	Yellow: IIR
Green: Hi-NBR	Grey: FKM

(Note)
The letter of EPDM is embossed at the position as shown with the arrows in the illustration, for Fig. 700G, 705G and 702Z.

2 If required, the valve should be picked up with a nylon sling on its neck. (Fig.4)

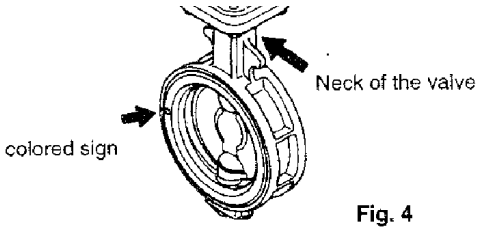
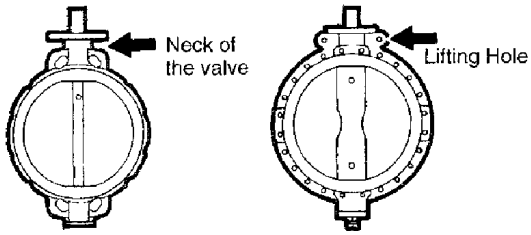
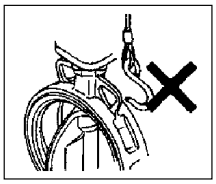


Fig. 4



Caution:
In the case of valves from size 200 to 300mm, do not use the as-cast lugs for carrying of the valves. The as-casts lugs are for alignment purposes only and
cannot take the heavy weight of the valves.



3 The valve should not be installed immediately after any welding works on the pipe flange. The heat generated can cause damage to the seat of the valve.
Allow the weld to cool, remove any spatters, then install the valve. Welding on a pipeline with the valve installed is strictly prohibited. (Fig.5)

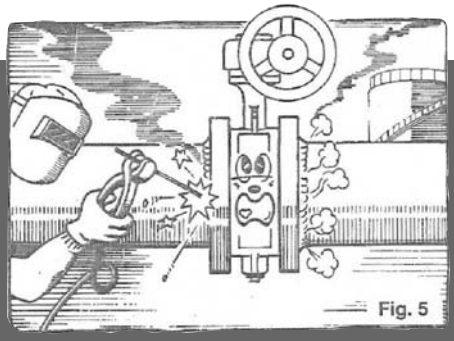
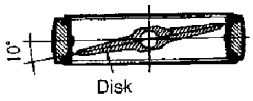


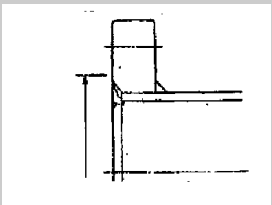
Fig. 5

4 Installation or removal of the valve should be carried out with the valve open about 10° from the closed position.

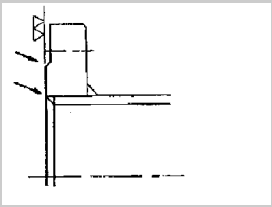


5 If a flange is in any of the 3 following conditions, damage of the seat ring or flange leakage is likely to occur.

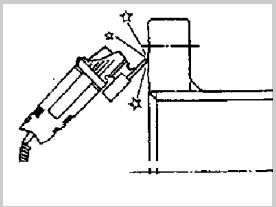
a **Excessive Weld Penetration**
This will cause a flange leak in the case of a large bore.
(See the paragraph of "size of Pipe adaptable to Valve").



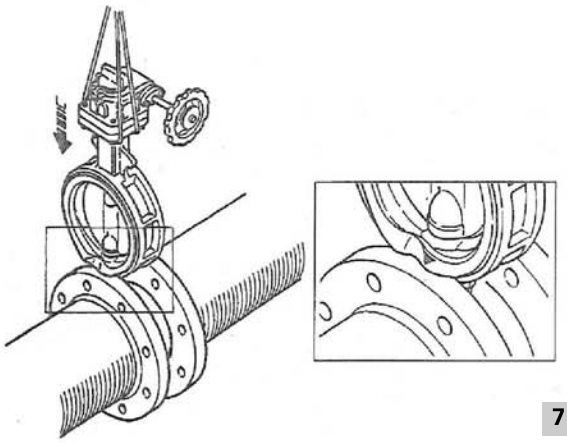
b **Sharp Edge of Flange**
This will give damage to the seat ring.



c **Rough Surface grinding**
This will cause a flange leak.



4. INSTALLATION



6 If a valve is forcibly pushed in between the piping flanges, the seat ring will be damaged and this will result in a flange leak. The piping flanges should be wide open to give the valve enough space during installation. (Fig.6)

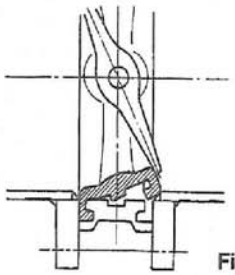


Fig. 6

7 Where as a gasket may be required between an ordinary pipe-to-pipe joint, (Fig.7), a Tomoe valve requires no gasket between the valve and piping flange. A soft gasket such as rubber will cause the valve to malfunction.

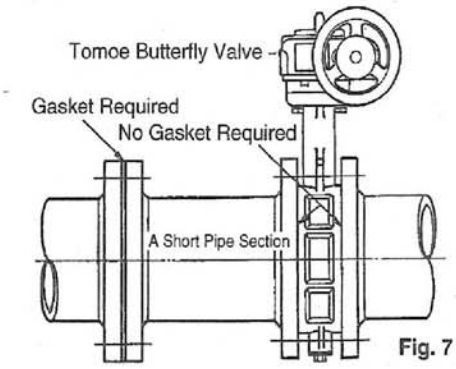


Fig. 7

8 Do not apply shock/damage to the handwheel or hand lever, by throwing the valve, or by having any heavy objects on it, etc.

9 Refrain from touching the adjuster bolt on the gearbox. The adjuster bolt is for adjustment of the closed position of the valve, any change of adjustment may cause a valve leak. (Fig.8)

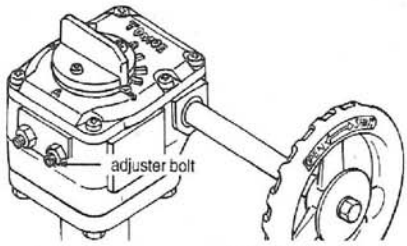


Fig. 8

10 Any flange joints should be air purged. Rust and dirt should be removed with some neutral detergent. Before installing the valve, the pipeline should be connected with a temporary spacer pipe in place of valve and air purged to eliminate any foreign material inside the pipeline.

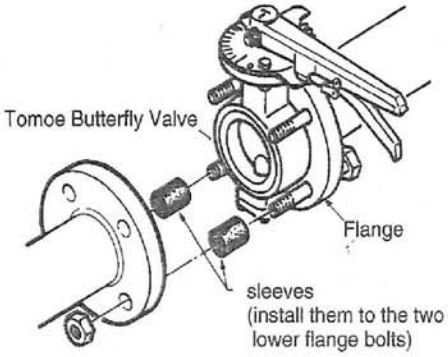
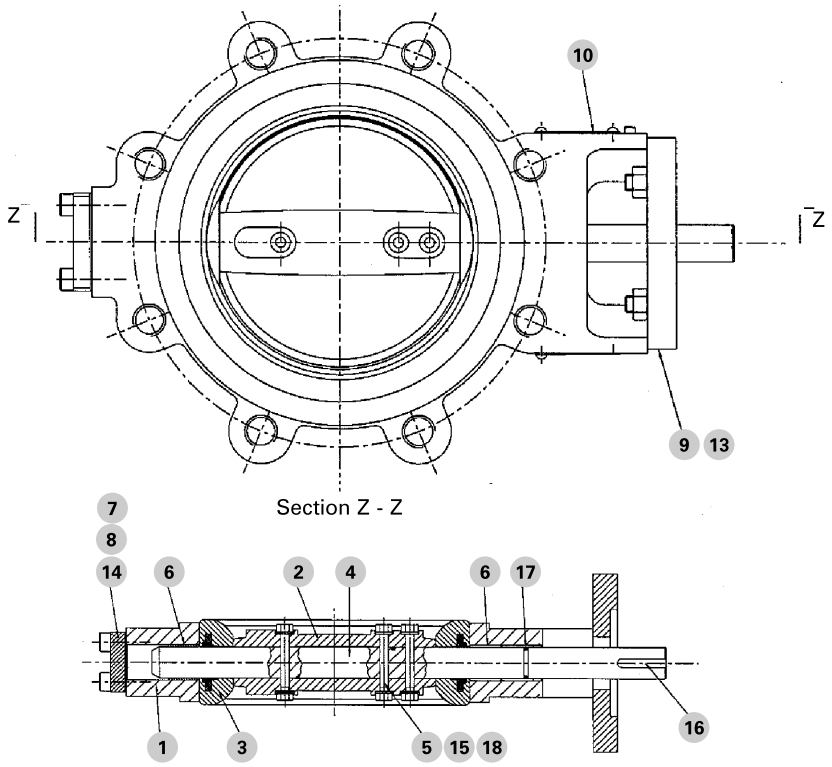


Fig. 9

11 Alignment of the valve to the flange should be done accurately. (In case of tapped holed). Do not install the valve to one side with the 4 setting bolts. The 4 setting bolts are used for alignment of the pipe. Tighten the setting bolts after the valve is secured with the flange bolts and nuts.

5. PARTS LIST



1.	Body
2.	Disc
3.	Body Seat Insert
4.	Shaft
5.	Pin Shaft
6.	Bearing
7.	End Cover
8.	Casket End Cover
9.	Mounting Plate
10.	Name Plate
11.	Pressure/Temperature Plate
12.	Screw Nameplate
13.	Screw Mounting Plate
14.	Screw End Cover
15.	Nut Shaft Pin
16.	Key Actuator
17.	O-Ring Seal
18.	Bonded Seal

6. MAINTENANCE

Body Seal Replacement

1. Prior to removal of the liner all actuators or gearboxes should be removed (Fig.31)
2. Making sure that the valve is securely held in a vice or fixture. (Fig.31)
3. Remove the shaft pins and tap out the pins using a soft mallet. (Fig.32/33)
4. After removal of the pins the shaft can be pulled free of the disc & body (Fig.34)
5. The disc can now be pulled out of the body and the liner can now be pushed out of the valve body. (Fig.35)
6. Assembly of the body seal and disc is the reverse of the removal procedure.

IF IN DOUBT PLEASE CONSULT THE TOMOE TECHNICAL DEPARTMENT ON THE FOLLOWING NUMBER: TEL: +44 (0)1633 274 707

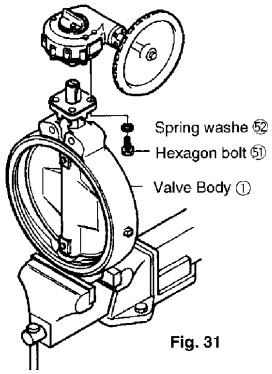


Fig. 31

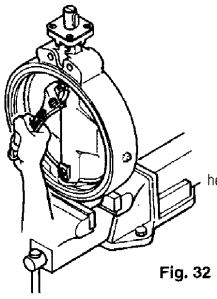


Fig. 32

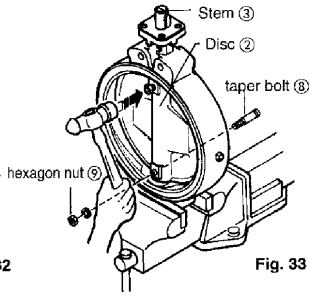


Fig. 33

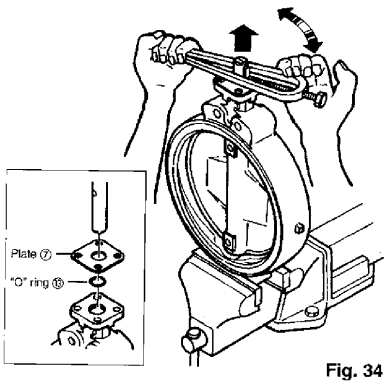


Fig. 34

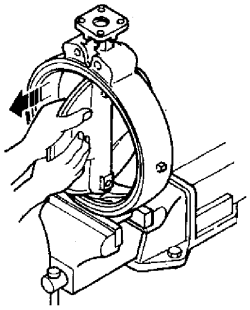


Fig. 35

6. MAINTENANCE (continued)

Tomoe 731X butterfly valves are designed for minimum maintenance, however, it is recommended thatthe valve is cycled several times from fully open to fullyclosed every 3 months. In addition it is recommended thatthe valve is removed from the pipeline every 2 years and is subjected to a thorough visual inspection particularly in the sealing areas for signs of damage and wear. To carry out maintenance as detailed below, no special tools are required, but it should be noted that a torque wrench covering the torque range required will be needed (refer to torque table opposite for details). Before carrying out any of the maintenance detailed below, please ensure that a copy of this operating and maintenance instruction manual or relevant GA drawing is available to facilitate identification and location of the component parts.

Shaft Seal Replacement

The shaft seal (item 17) on the 731X is designed to prevent the ingress of foreign matter into the area between the shaft and the body. The line pressure seal is an integral part of the body seat (item 3) and as such is automatically replaced when a new seat is fitted.

Replacement of the shaft seal will be done when the body seat is replaced and the new seal is fitted prior to the fitting of the new body seat (item 3) thus allowing easier access to the shaft seal (item 17).

Torque Table for Screw Tightening

Screw Size	St.Stl A4 Grade 80 Nm
M4	3.2
M5	6.5
M6	11.1
M8	26.9
M10	53.2
M12	92.9
M16	230.6
M20	449.8
M24	777.7
M30	1545.0
M36	2700.0

Note:
Torques given are the maximum allowable for the screw size. It is acceptable to use these maximum torques at all times, however if the GA is available, use the torques given on the drawing.

General Note:
All other components are available as spares. Please contact Tomoe for details quoting the valve serial number. Such spares will be dispatched with specific instructions on fitting.

7. OPERATOR / GEARBOX FITTING INSTRUCTIONS

When supplied with bareshaft valves, special care and attention needs to be given to the location and tightening of any top works operator. Failure to follow these instructions may lead to shaft, seat, seal and bearing damage and in the worst case cause shaft seizure.

1. All work to be carried out in a clean, dust free environment.
2. Location holes for dowels are supplied on the Tomoe mounting plate; corresponding holes must be available on the operator mounting plate.
3. Dowels must be fitted to these holes to ensure the operator is centralised and does not distort the vertical shaft plate.
4. The mounting kit location faces **MUST** be machined and parallel within a tolerance of not greater than 0.25mm (see diagram 2).
5. The valve **MUST** be in the fully closed position before fitting any operator.
6. When fitting the operator, the valve must be positioned with the shaft in the vertical position. If this is impractical, support must be given to the operator so that no bending force is applied to the shaft.
7. The operator **MUST NOT** be hammered or forced onto the shaft, as this will cause damage to the seat, seal and bearings within the closure mechanism of the valve, and will lead to failure. Remove the risk of force by relieving the location hole in the operator and / or the key in the valve. Any drive coupling should have an air release hole to allow air to escape as it is fitted over the valve shaft.
8. Once in place, the operator needs to be bolted into position with the relevant studs, screws and nuts. A steady and consistent pressure being applied.
9. If the shaft is located in the line in any position other than vertical, support should be given to the operator.
10. Cycling the valve open to closed and back to open again a few times will be beneficial to the valve seat, checking during this procedure is recommended to ensure the operation is smooth and no scuffing occurs between the disc seal and body seat.
11. When the valve is moved after fitting the operator. whether for testing, packing or delivery to site, the valve, where possible, should be in the fully closed position.
12. **Failure to follow these instructions may invalidate any warranty given by Tomoe.**

Diagram 1

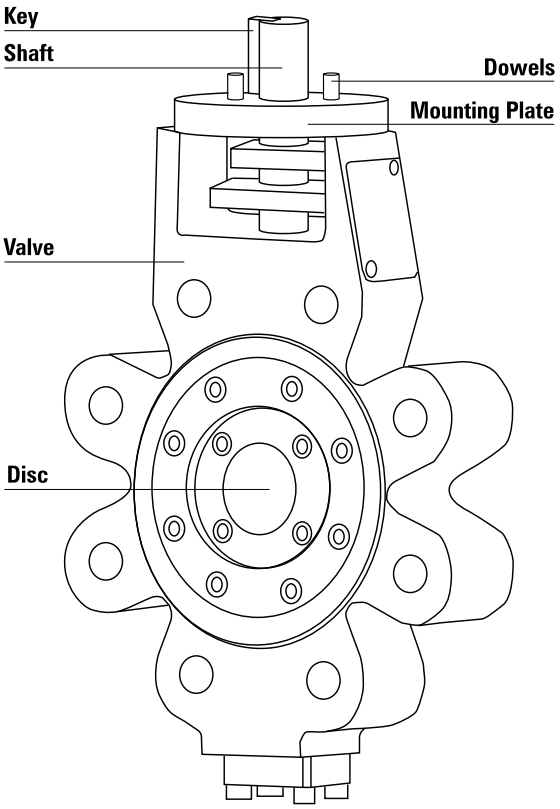
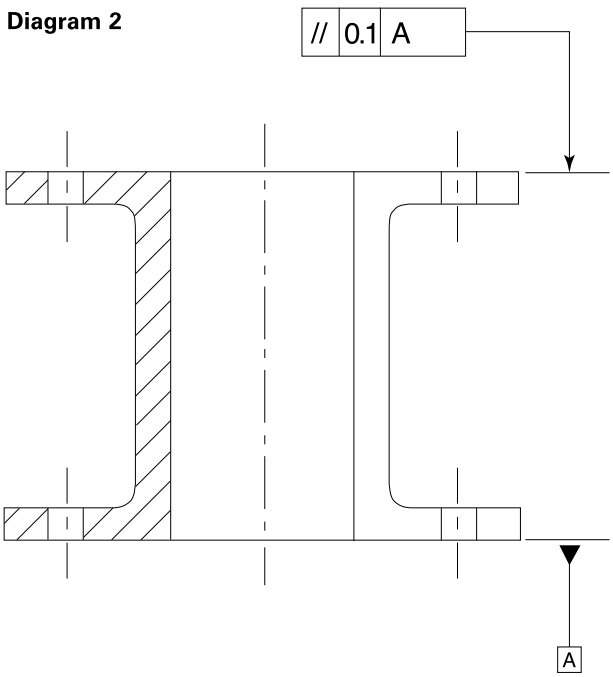
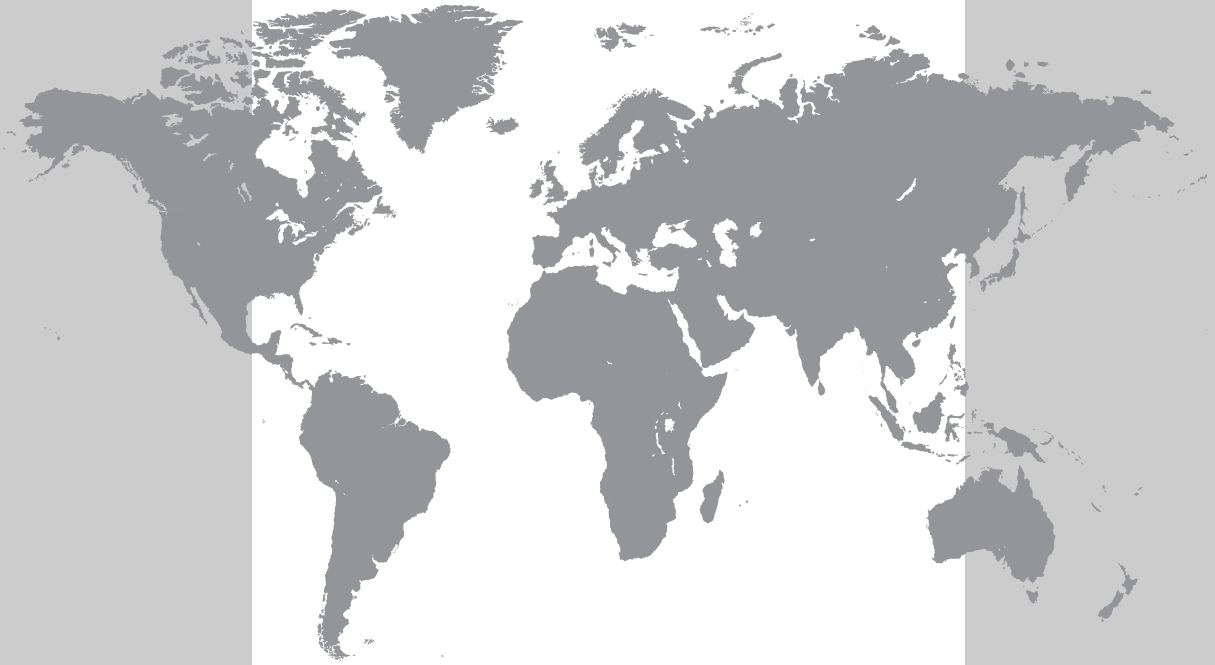


Diagram 2





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