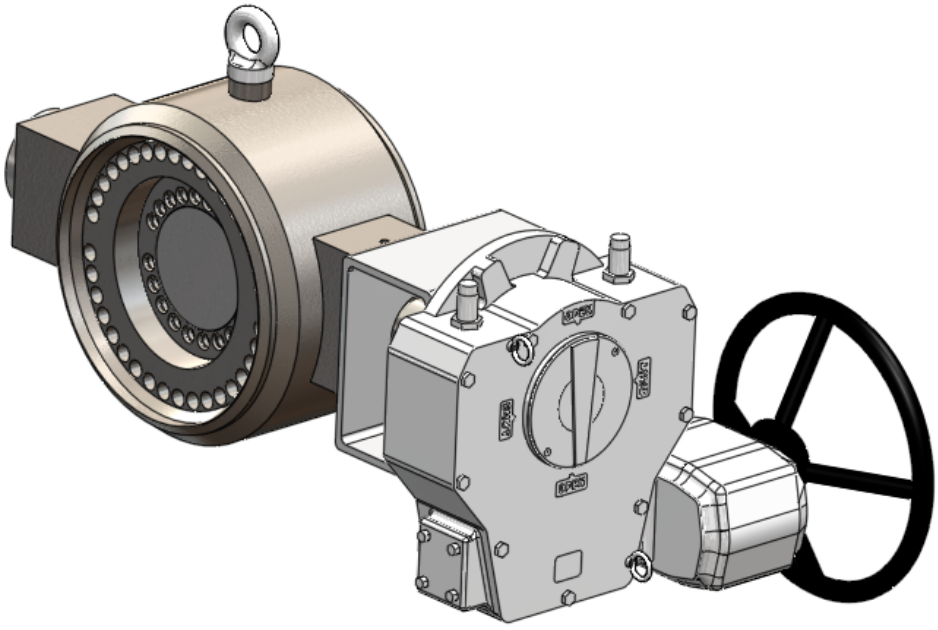
TOMOE
PROCESS VALVES &
CONTROL SYSTEMS

OPERATING AND MAINTENANCE INSTRUCTION MANUAL

Tomoe Valve Ltd Buttweld End Valves



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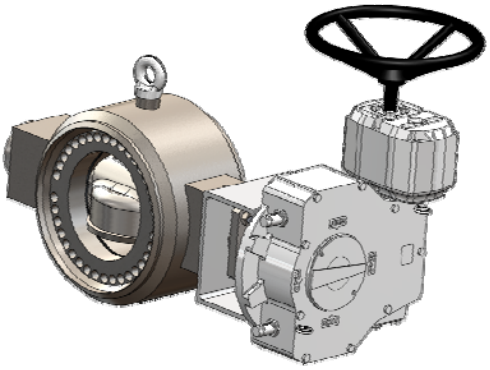
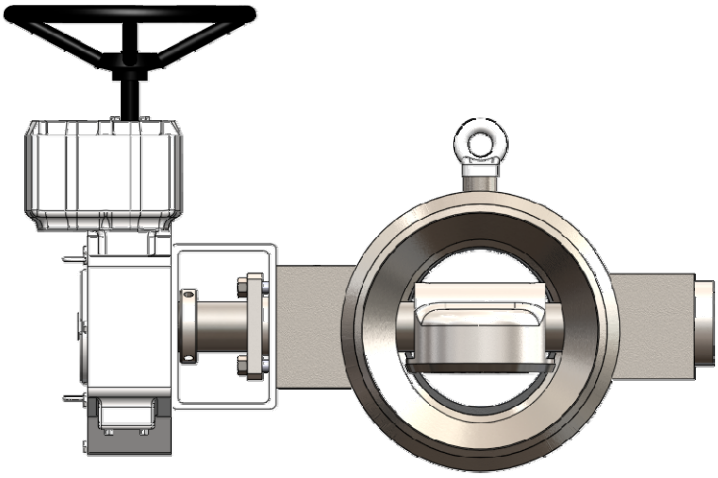
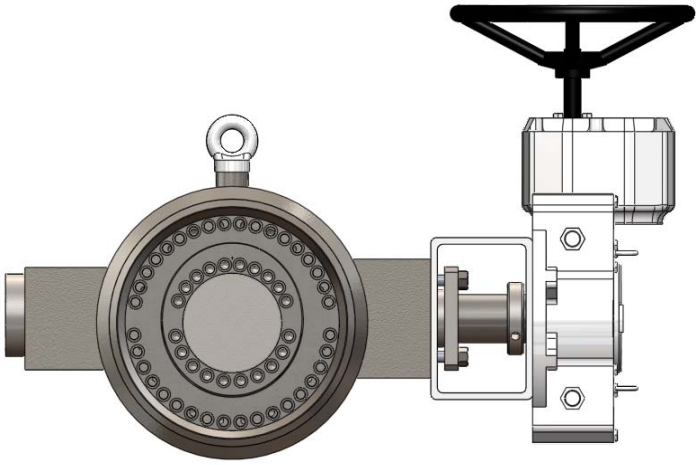
1. INTRODUCTION

This Operating and Maintenance manual provides general information on the installation, inspection and maintenance of the Tomoe Valve Ltd Buttweld End (BWE) valves.



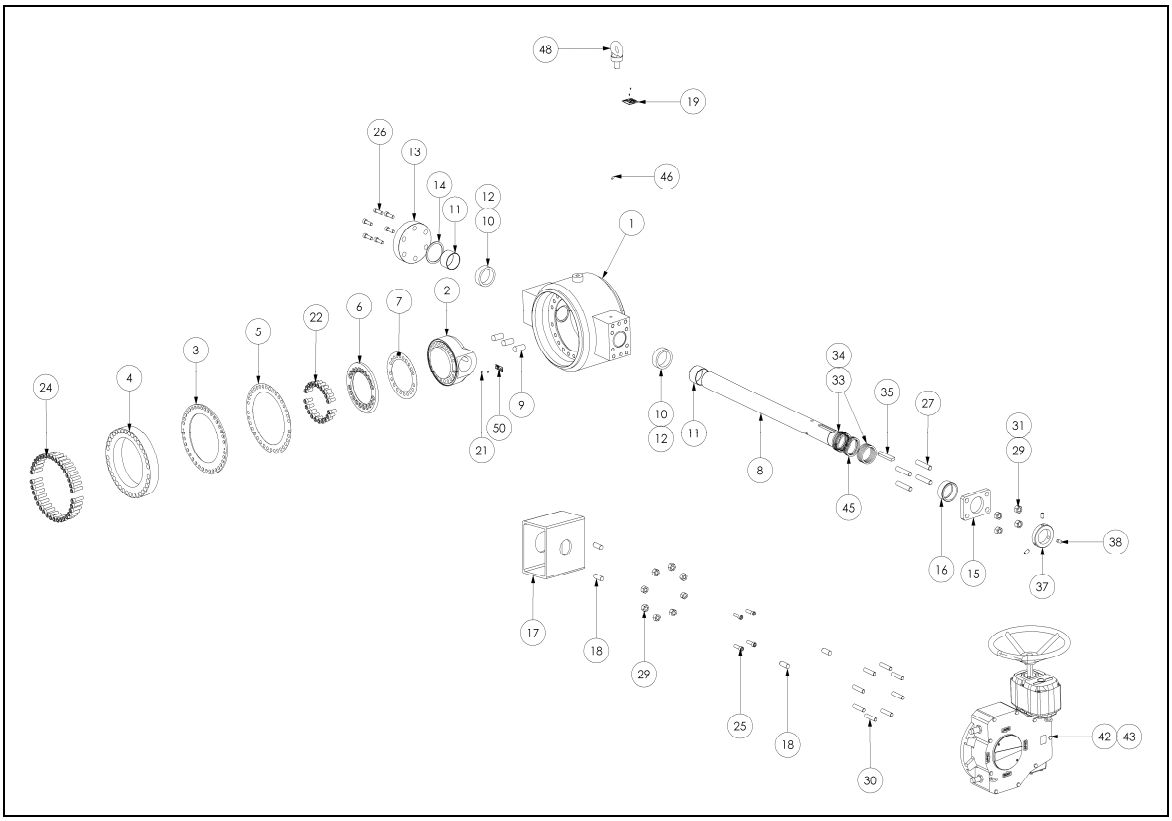




BUTTWELD VALVE

2. EXPANDED VALVE VIEW

1. Body
2. Disc
3. Body Seat
4. Body Seat Retaining Ring
5. Body Seat Gasket
6. Disc Seal
7. Disc Seal Gasket
8. Shaft
9. Shaft Pins
10. Combination Bearing
11. Standard Bearing
12. Bearing Protector (not shown)
13. End Cover
14. End Cover Gasket
15. Gland Plate
16. Gland Plate Spigot
17. Mounting Box
18. Dowel Pin
19. Nameplate
20. Not applicable
21. Nameplate Screw
22. Disc Seal Screws
23. Not applicable
24. Body Seat Screws
25. Mounting Box Screws
26. End Cover Screws
27. Gland Studs
28. Not applicable
29. Gearbox/Gland Nuts
30. Gearbox Studs
31. Live Loading Springs
33. Gland Packing (Passivated)
34. Gland Packing (Braided)
35. Gearbox Key
36. Not applicable
37. Anti-Blowout Collar
38. Anti-Blowout Collar Screws
39-41. Not applicable
42. Gearbox
43. Handwheel
44. Not applicable
45. Lantern Ring
46. Bleed Plug
47. Not applicable
48. Eyebolt Collar
49. Not applicable
50. CE Label



3. INSTALLATION

3.1. Packing

All valves will be despatched with plastic covers attached to the weld ends to protect the weld prep and internal trim.

The valve is shipped with the disc in the closed position for bareshaft valves and valves fitted with a gearbox and 'fail close' actuator. For valves fitted with a 'fail open' actuator the valve will be shipped with the disc in the open position.

The nameplate (located on the valve body near the operator) contains information such as size, pressure class, materials and the unique serial number which must be quoted when ordering spare parts.

3.2. Transportation

Use crates or packing cases for ocean transport.

For overland transportation, a covered vehicle is recommended with protective sheets covering the valve.

3.3. Storage

Store the valves indoors in a cool temperature between -10°C and +60°C. Do not remove the plastic covers until ready to install the valves.

When storing valves unpacked, take care in protecting valves and actuators from excessive loads. Do not stack unpacked valves.

3.4. Unpacking

Unpack valves just before installation. Care must be taken to avoid damaging the weld prep.

3.5. Handling

The Valve assembly must be lifted using slings of the correct lifting capacity (for weight of valve assembly please refer to GA drawing). Position the slings as shown on the GA drawing ensuring the assembly remains parallel to the floor.

Only properly trained personnel should carry out handling and lifting of the assembly.

IMPORTANT NOTE – Do **not** use the eyebolts provided on the Actuator/Gearbox for lifting as these are rated only for the individual components and **not** the complete assembly.

3.6. Installation

The valve has a preferred direction of sealing. This preferred flow direction is shown on the nameplate attached to the valve body and also on the GA drawing. The arrow on the nameplate should be aligned with the normal direction of flow.

Prior to installation the pipeline must be cleaned from dirt and welding residues to avoid damage to the valve during operation. The valves will be shipped with a rust preventative on the weld preps. This should be removed prior to welding into the line.

- 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.

4. SPARE PARTS

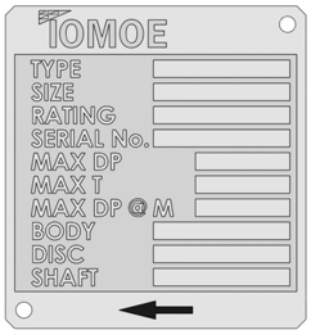
When ordering spare parts or discussing matters concerning this valve with the factory, it is essential to quote the unique serial number of the valve which is to be found on the stainless steel nameplate (19.) attached to the valve.

4.1. Recommended Spare Parts

When disc seals/body seats are due for renewal, the replacement items will be supplied as a matched pair.

4.1.1. Spares for BWE valve:

- Body Seat (3)
- Body Seat Gasket (std) (5)
- Disc Seal (6)
- Disc Seal Gasket (7)
- Gland Packing (33) - 3 OFF
- Gland Packing (34) – 2 OFF



5. MAINTENANCE

Due to the nature of buttweld end valves once they are welded into the line it is not possible to access the internal components without cutting the valve out of the line. However, Tomoe Valve Ltd triple offset butterfly valves are designed for minimum maintenance. It is recommended that the valve is cycled several times from fully open to fully closed every three months. Should the valve need to be removed from the line and maintenance is required then the following instruction should be followed. To carry out maintenance as detailed below no special tools are required other than a torque wrench covering the required torque range. Before carrying out any of the maintenance detailed below, please ensure that a copy of the relevant GA drawing (along with this operating and maintenance instruction) is available to facilitate the identification, location and required torque of the component parts.

It is recommended that only TVL personnel or persons who have adequate training perform any maintenance on these valves.

It is imperative that the valve/line is depressurised prior to any maintenance being undertaken.

5.1. Body Seat/Disc Seal Replacement Procedure

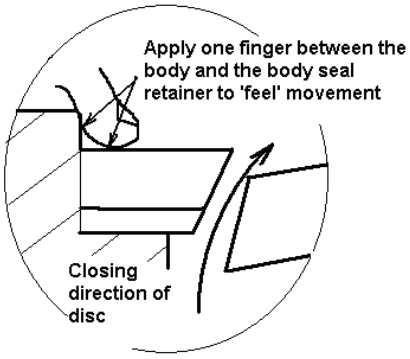
The laminated body seat (3) and disc seal (6) are readily field replaceable with no special tools meaning that both parts of the sealing mechanism can be replaced with out sending the valve back to the factory.

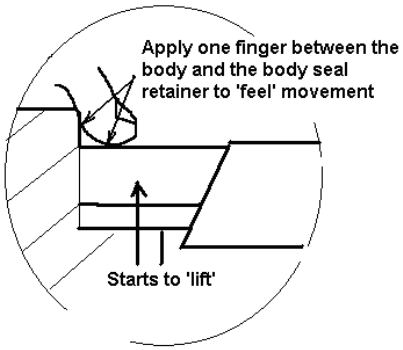
Due to the triple offset geometry inherent of Tomoe valves, the body seat and disc seal must be installed in the valve with the correct radial alignment. To aid initial alignment of these components and also correct alignment of the body seat and disc seal gaskets, the drillings are spaced irregularly and can only be aligned in one orientation. It is essential to tighten the body seat and disc seal screws to the torques detailed in the valves GA drawing.

- Open valve so that disc (2) is cracked off body seat (3)
- Remove body seat screws (24)
- Remove body seat retaining ring (4)
- Remove body seat (3)
- Remove body seat gasket (5)
- Remove disc seal screws (22)
- Remove disc seal (6)
- Remove disc seal gasket (7)
- Before replacing components ensure that the disc (2) is in the central float position by pushing the disc as far as possible towards the valve operator
- Ensure the gasket sealing faces on the disc (2) and body are clean and free from gasket debris etc
- Apply light coating of graphite grease to the gasket sealing face on disc (2) and body (1)
- Place **new** disc seal gasket (7) on disc (2) ensuring correct alignment with tappings
- Place **new** disc seal (6) on top of disc seal gasket (7) again ensuring correct alignment
- Replace disc seal screws (22) after applying a small amount of graphite grease to each and leave screws finger tight
- Place **new** body seat gasket (5) into body (1) ensuring correct alignment

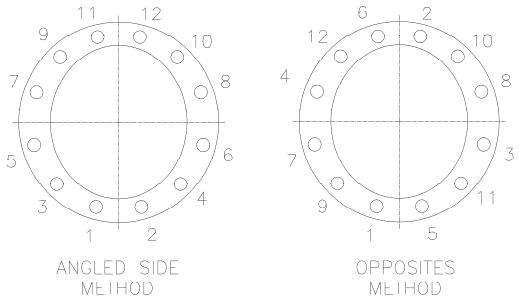
- Place **new** body seat (3) on top of body seat gasket (5) ensuring alignment is correct both radially and vertically (see below)

- Replace body seat retaining ring (4) ensuring alignment is maintained
- Place one finger on top of the body seat retaining ring (4) while making contact with the body (1) (as shown below)
- Slowly close the valve until movement is felt between the retaining ring (4) and body (1). Movement will be felt just as the disc seal (6) touches the body seat (3)





- Replace body seat screws (24) after applying a small amount of graphite grease to each screw and leave finger tight
- Torque the body seat screws (24) to approximately 15% of final torque using the 'angled side' method (see below)



- Torque the body seat screws (24) in stages until full torque is reached (begin at 50% of full torque, next 80% and then apply final torque) using the opposites method.
- Torque the disc seal screws (22) to 50% of final torque using the 'opposites' method (see above) to the torques required on the GA drawing
- Torque the disc seal screws (22) to final torque using the 'opposites' method (see above) to the torques required on the GA drawing

5.2. Adjustment/Replacement of Gland Packing

The Tomoe Tritec butterfly valve is supplied with adjustable double graphite gland packing and a lantern ring which has been packed and adjusted for immediate use. However, during service, leakage may occur and it may be necessary to tighten the gland nuts (29). This can be done with the operator on the valve. Do not over-tighten the nuts however as this may cause damage to the valve and may lead to increased operating torque. If leakage persists then the gland packing (33 & 34) must be replaced and the following procedure followed:

- Remove gearbox nuts (30)
- Remove gearbox (32)
- Remove mounting plate screws (25)
- Remove mounting box (17)
- Remove gearbox key (35)
- Remove anti-blowout collar screws (38)
- Remove anti-blowout collar (37)
- Remove gland nuts (29)
- Remove gland plate (15)
- Remove gland plate spigot (16)
- Remove gland packing rings (33 & 34)
- Replace with new gland packing set (33 & 34) while taking care not to damage the rings on the keyway.
- Replace 2-piece gland plate/spigot (16 & 15) and tighten the gland nuts (29). Do not over-tighten the nuts as this will lead to increased operating torques.

- Replace the anti-blowout collar (37)
- Replace the anti-blowout collar screws (38)
- Replace gearbox key (35)
- Replace mounting box (17)
- Replace mounting box screws (25)
- Replace gearbox (42) as per **5.5** below
- Replace gearbox studs/nuts (30)

5.3. End Cover Gasket Replacement

- Remove end cover screws (26)
- Remove end cover (13)
- Remove end cover gasket (14)
- Ensure end cover face on body (1) is cleaned and free from gasket debris/graphite
- Place **new** end cover gasket (14) in position
- Replace end cover (13)
- Replace end cover screws (26) and torque to 50% of final torque using opposites method.
- Torque end cover screws (26) to full torque

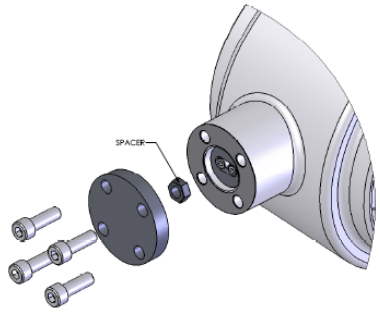
5.4. Torque Table for Screw Tightening

Screw (Size)	St.Stl A4 Grade 80 (Nm)	St.Stl 17/4 PH (Nm)
M4	3.2	3.9
M5	6.5	7.9
M6	11.1	13.4
M8	26.9	32.5
M10	53.2	64.3
M12	92.9	112.2
M16	230.6	278.6
M20	449.8	543.5
M24	777.7	939.8
M30	1545.0	1866.9
M36	2700.0	3262.5

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.

5.5. Operator Fitting Instructions

- Ensure base of operator and mating face of mounting plate is clean and free from dirt and swarf.
- Check number and spacing of holes on operator and mounting plate to ensure alignment.
- Ensure dowels are fitted to ensure the operator is centralised and does not distort the vertical shaft plane.
- The valve **MUST** be in the fully closed position before fitting any operator, unless actuated then it may be fully open or closed.
- Prior to fitting the operator a suitably sized spacer is to be fitted between the end cover and the end of the shaft/thrust pad (see below). This prevents the disc etc being forced into the body seat.



- 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.
- Once in place, the operator needs to be bolted into position with the relevant studs, screws and nuts.
- Once the operator is secured ensure the spacer is removed from between the end cover and shaft end. Re-fit end cover and tighten screws to torque specified on GA drawing.
- Failure to follow these instructions may lead to shaft, seat, seal and bearing damage and in the worst case cause shaft seizure.

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