

THREE PIECE BALL VALVE, 1000 WOG & 1500/2000 WOG

TCI ball valves have been designed and engineered to provide you with long lasting trouble free service when used in accordance with the instructions and specifications mentioned herein.

INSTALLATION

1. TCI three piece ball valves are bi-directional and may be installed for flow in either direction. During installation it is recommended that the valve ball be in the open position in order to prevent any possible damage.
2. After installation, cycle valve several times before putting into service.
3. Valves can't be used on unstable gases.
4. Max. working pressure : TC-3000T/B/S & TC-3000TC:1000 psi (69bar),
TC-4000 (FS)/4100 (FS):1/2"~1" is 2000 psi(138 bar), 1 1/4"~2" is 1500 psi(103.5 bar).
5. Max. working temperature is 200°C(392°F).

Caution for Brazing, Soldering, or Welding

If TC-3000T/B/S valve is to be brazed, soldered, or welded, the seats and body seals must be removed before installation in the following manner:

- (a) Rotate valve ball into open position.
 - (b) Remove four body bolts.
 - (c) Rotate valve ball back to closed position and remove seats and ball.
 - (d) Remove body seals from pipe ends.
 - (e) Place ball, seats, and body seals in a clean suitable container during installation.
 - (f) Reassemble pipe ends to body.
1. When brazing, follow standard brazing procedures minimizing a direct flame on the valve body (center section).
 5. When welding, it may be desirable to wrap a damp towel around the center section.
 5. After brazing or welding allow the valve to cool. Reassemble the seats, seals, and ball with the valve.
 4. Carefully tighten the body bolts diagonally across from each other before securing to the following recommended torque:

VALVE SIZE	RECOMMENDED BOLT TORQUE
DN8~DN10 (1/4"~3/8")	6 - 8 N-M
DN15~DN25 (1/2"~1")	11 - 14 N-M
DN32~DN50 (1-1/4"~2")	16 - 19 N-M
DN65 (2-1/2")	40 - 45 N-M
DN80~DN100 (3"~4")	74 - 80 N-M

5. After installation, cycle valve several times before putting into service.

TC-4000/TC-4100(FS) valves have tongue-and-groove body seals enable valves with high-temperature seals to be welded in line without disassembly when the following precautions are taken:

- (a) The installer is responsible for all welding procedures and qualifications.
- (b) Weld to clean pipes with valve in the fully OPEN position throughout the entire welding process.
- (c) Weld by applying a recommended 1/8" (3.2 mm) max. weld bead per pass around each end cap.
CAUTION: DO NOT heat the center section over **350°F (176.7°C)**. Use a temperature stick and a wet cloth wrapped around the center section to prevent overheating.
- (d) Remove or protect the handle or actuator from weld splatter or arc strikes.
- (e) For welds that require multiple passes to achieve weld size, stop after each pass and carefully monitor the valve body temperature.
- (f) After sufficient cooling of the valve, replace the handle or actuator.
- (g) Installer must flush any slag, splatter, or debris before operating valve.
- (h) When valve has cooled, confirm torque on body bolts match above torque values.
- (i) When possible, perform a final seat test before placing the valve in service

OPERATION

1. A quarter turn of the handle clockwise closes the valve and a quarter turn counterclockwise fully opens the valve. Visual indication of the ball position is determined by the handle position: when the handle is in line with the piping the valve is open, cross line the valve is closed. Also, the stem flats indicate the direction of the ball port.
2. Soft seated ball valves perform best with the ball either fully open or fully closed in accordance with TCI Valve published pressure/temperature chart. Consult the factory regarding characteristics of the media or pressure drop for applications other than fully open or closed.
3. Any media that might solidify, crystallize or polymerize should not be allowed to stand in the ball valve

cavities. In the event that this should happen, **DO NOT** forces the valve in either direction; disassemble and clean before resuming service.

4. Force required to break-away (i.e., force which must be exerted to begin motion of ball) will vary depending on the media, pressure and length of time between cycles.

The following data will act as a guide regarding break-away torques:

Item No.: TC-3000T/B/S

VALVE SIZE	MAXIMUM BREAK-AWAY TORQUE
Dn15 (1/2")	4.5 N-M
DN20 (3/4")	8.5 N-M
DN25 (1")	11.0 N-M
DN32 (1-1/4")	15.0 N-M
DN40 (1-1/2")	24.0 N-M
DN50 (2")	32.0 N-M
DN65 (2-1/2")	45.0 N-M
DN80 (3")	65.0 N-M
DN100 (4")	100.0 N-M

TC-3000T/B/S & TC-3000TC & TC-4000 (FS)/4100 (FS)**Item No.: TC-3000TC**

VALVE SIZE	MAXIMUM BREAK-AWAY TORQUE
Dn15 (1/2")	4.5 N-M
DN20 (3/4")	10.7 N-M
DN25 (1")	23.5 N-M
DN40 (1-1/2")	31.8 N-M
DN50 (2")	53.9 N-M
DN65 (2-1/2")	78.5 N-M
DN80 (3")	112.8 N-M
DN100 (4")	148.0 N-M

Item No.: TC-4000 (FS)/4100 (FS)

VALVE SIZE	MAXIMUM BREAK-AWAY TORQUE
DN15 (1/2")	5.9 N-M
DN20 (3/4")	8.8 N-M
DN25 (1")	14.7 N-M
DN32 (1-1/4")	19.6 N-M
DN40 (1-1/2")	39.3 N-M
DN50 (2")	49.1 N-M

The above figures were obtained at 25 degrees C., 7 bar after 24 hours.

1. The only mechanism of the valve that is adjustable is the stem packing. If adjustment is required the gland may be taken up on by first loosening the handle nut. Adjustment of the gland should be no more than one quarter turn at a time. Over tightening will produce high torque and a shortened seal life.

MAINTENANCE

A repair kit containing two seats, two body seals, one thrust washer and stem packing is available for rebuilding each size and style valve.

Be sure to specify size, style, seat and seal materials when ordering. Optional components are also available (ball, stem, handle, etc.).

Refer to illustration on last page for part identification and assembly.

REBUILDING**WARNING- Ball Valves Can Trap Fluids in Ball Cavity When Closed**

If the valve has been used to control hazardous media, it must be decontaminated before disassembly. It is recommended that the following steps are taken for safe removal and disassembly:

- Relieve the line pressure.
- Place the valve in half-open position and flush the line to remove any hazardous material from valve.
- All persons involved in the removal and disassembly of the valve should wear protective clothing such as face shield, gloves, apron, etc.



CAUTION: Exercise caution that sealing and all surfaces are not damaged during disassembly, cleaning or reassembly.

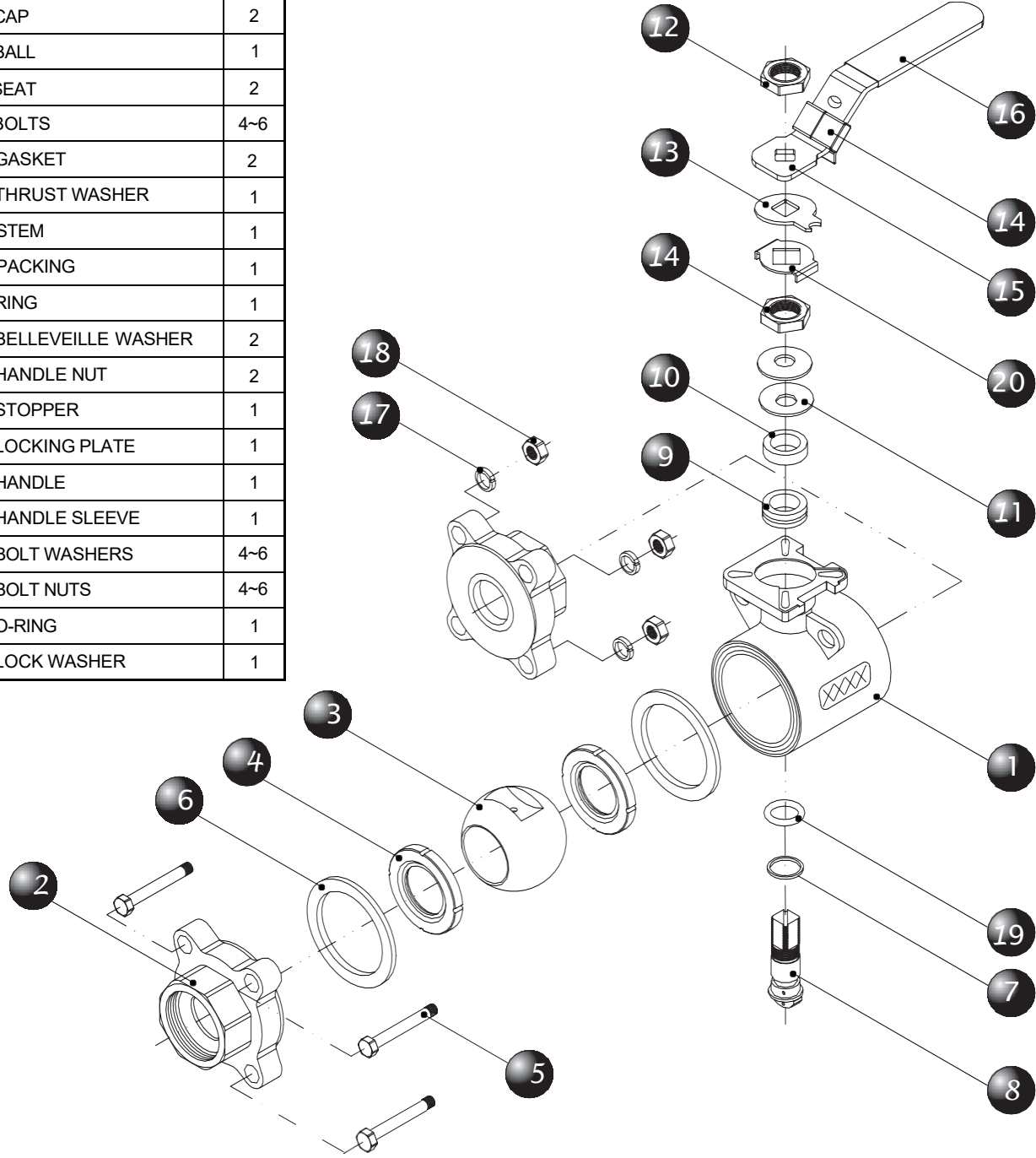
1. Before removing valve from line, rotate ball into the open position.
2. Remove body bolts and disassemble from line, allowing sufficient pipe end clearance for center section removal. Remove body end seals from pipe ends.
3. Rotate ball into the closed position. Remove seats and ball.

If it is necessary to replace stem packing, remove handle nut, handle, stopper, stem nut, concave washer and

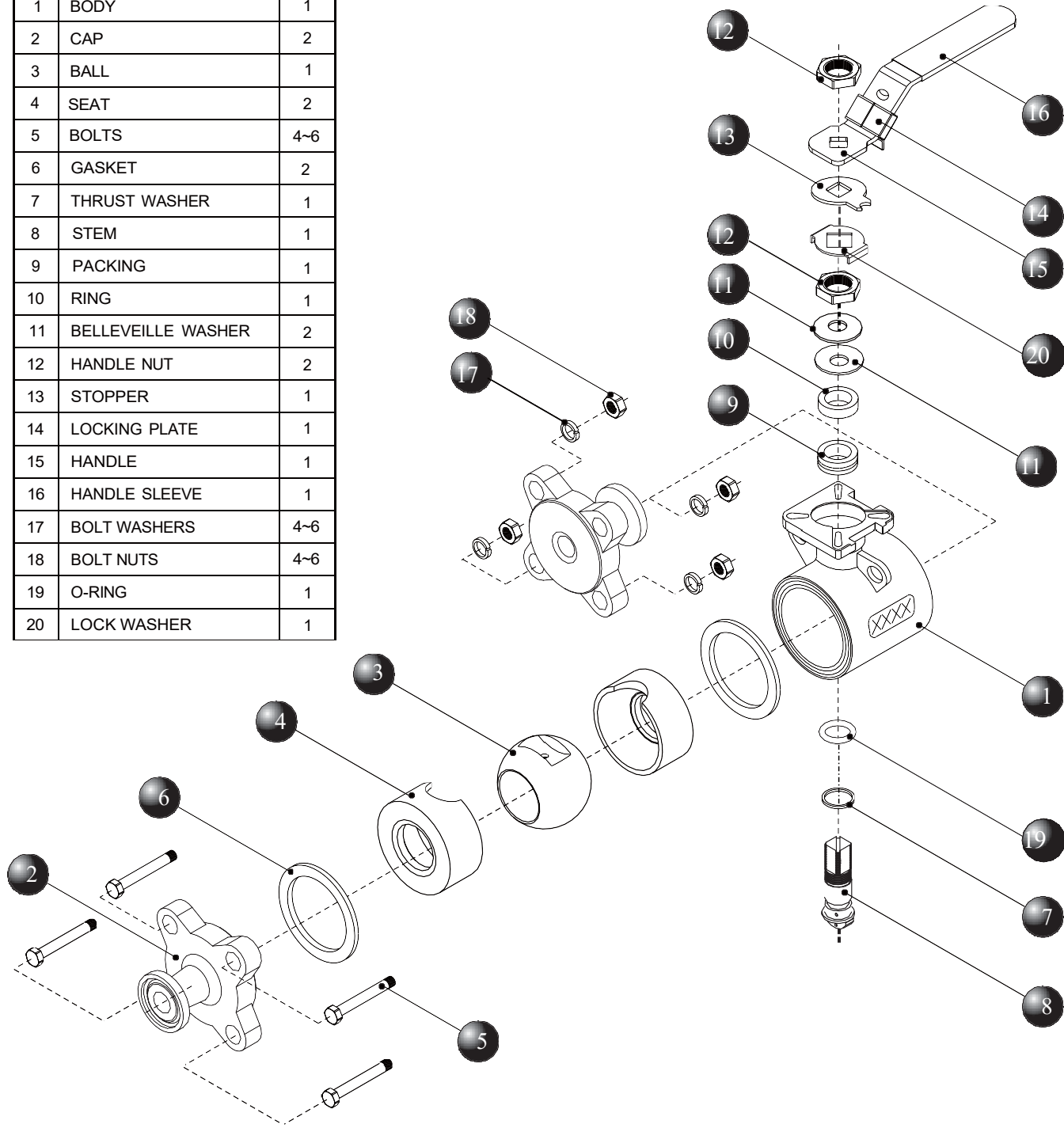
Ring. Lower stem into body cavity, Remove stem packing and thrust washer.

1. Clean and inspect all components to be sure they are free from foreign matter and pit marks, paying particular attention to areas that must maintain a seal (the surface against which the seats are installed, finished diameter on stem, ball, stem hole). These areas must be free from scratches and pitting.
2. Light marring from the action of the ball against the seats is normal and will not affect the operation of the valve.
3. Once all components have been cleaned inspected and replaced as necessary, the valve may be rebuilt with the appropriate factory repair kit.
4. Slide new thrust washer over stem and insert assembly through ball cavity and fully up into stem hole recess.
5. Assemble new stem packing, ring, concave washer and screw stem nut. Adjust stem packing to feel firm.
DO NOT over-tighten.
6. Lightly lubricate ball and seats with a lubricant compatible with the media for which the service is intended.
7. Replace ball into cavity with stem flats in perpendicular position, making sure that portholes are in desired position for operation. Once ball is engaged with stem, rotate to in-line position to prevent ball from falling out during assembly.
8. Insert new seats into body and body end seals on pipe ends.
9. Replace center section back into line, allowing sufficient clearance to avoid pipe end sealing surface damage.
10. Assemble body bolts and nuts to valve. Put stopper, handle and screw handle nut onto stem.
11. Reinstall into service following the installation procedure.
12. If practical, check leak tightness before reinstalling valve inline.

NO.	PART NAME	QTY
1	BODY	1
2	CAP	2
3	BALL	1
4	SEAT	2
5	BOLTS	4~6
6	GASKET	2
7	THRUST WASHER	1
8	STEM	1
9	PACKING	1
10	RING	1
11	BELLEVEILLE WASHER	2
12	HANDLE NUT	2
13	STOPPER	1
14	LOCKING PLATE	1
15	HANDLE	1
16	HANDLE SLEEVE	1
17	BOLT WASHERS	4~6
18	BOLT NUTS	4~6
19	O-RING	1
20	LOCK WASHER	1



NO.	PART NAME	QTY
1	BODY	1
2	CAP	2
3	BALL	1
4	SEAT	2
5	BOLTS	4~6
6	GASKET	2
7	THRUST WASHER	1
8	STEM	1
9	PACKING	1
10	RING	1
11	BELLEVEILLE WASHER	2
12	HANDLE NUT	2
13	STOPPER	1
14	LOCKING PLATE	1
15	HANDLE	1
16	HANDLE SLEEVE	1
17	BOLT WASHERS	4~6
18	BOLT NUTS	4~6
19	O-RING	1
20	LOCK WASHER	1



NO.	PART NAME	QTY
1	BODY	1
2	CAP	2
3	BALL	1
4	SEAT	2
5	BOLTS	4
6	GASKET	2
7	THRUST WASHER	1
8	STEM	1
9	PACKING	1
10	RING	1
11	BELLEVEILLE WASHER	2
12	HANDLE NUT	2
13	STOPPER	1
14	LOCKING PLATE	1
15	HANDLE	1
16	HANDLE SLEEVE	1
17	O-RING	1
18	LOCK WASHER	1
19	BOLT WASHERS	4
20	BOLT NUTS	4

