

INSTALLATION, OPERATING AND MAINTENANCE MANUAL



UNIFLOW® BV BT-B9

TRUNNION BALL VALVES

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1. GENERAL INFORMATION ON THE MANUAL

- This Manual provides information on safely using the product, being binding for preservation, storage, handling, transport, installation, commissioning, operation, maintenance, repair and disposal, and must be thoroughly observed at any step.
- Please contact the supplier or the manufacturer in case of issues which cannot be solved by reference to this Manual.
- Any deviation from this Manual and sound engineering practice or modification on the product shall be notified to manufacturer for advice or approval.
- In addition, regional safety requirements must be always applied and observed at any step.
- All the work related to the product must be carried out, supervised and inspected by specialist personnel. It is the owner's responsibility to define areas of responsibility and competence and to ensure the proper monitoring.
- This Manual is in accordance with Directive 2014/68/EU on Pressure Equipment (PED) and Machinery Directive 2006/42/EC.
- For ATEX applications, please refer to ATEX Specific instructions.
- The manufacturer reserves the right to make technical modifications at any time.

2. NOTES ON POSSIBLE DANGERS

2.1 Significance of symbols



Warning of general danger.

2.2 Explanatory notes on safety information

In this Manual dangers, risks and items of safety information are highlighted to attract special attention.

Information marked with the symbol above describes practices, which if fail to comply with, can result in serious injury or danger of death for users or third parties or in material damage to the system or the environment. It is vital to comply with these practices and to monitor compliance.

The rest of information not specifically emphasized in this Manual, along with Data Sheet and product marking, must also be observed and complied with for safely using the product.

3. PRESERVATION, STORAGE AND TRANSPORT



- Protect against external force (impacts, vibrations, etc.).
 - Allow only skilled personnel; suitable handling and lifting equipment must be used. See Data Sheet for weights or consult manufacturer.
 - Always use suitable protection equipment, and minimize the use of human body force at any step to avoid injuries.
 - During handling make sure that operating device is well attached to the valve or removed to avoid danger of detachment. Levers or actuators must not be used to take up external forces that they are not designed for: e.g. do not use them as climbing aids, or as connecting points for lifting gear, etc.
 - Do not lift from the top flange or actuation devices only. The valve should be lifted by using certified straps considering the weight of the assembly and according to the following schemes:
-
- There is a risk of body member (hand, finger, arm...) crushed against any other solid element (wall, pipe, floor, etc.) during handling. Take this into account and handle with care.
 - There is a risk of body member trapped between valve ball and seat during operation of the valve. Make sure no operation / supply to actuator disconnected if access to the interior of the valve.
 - There is a risk of body member injury in case there is any exposed moving part between valve and actuator (special arrangements). Take appropriate measures and set warning notes when required.
 - Check correct position of nameplate and handle with care to avoid personnel cuttings.

- Use proper packing for transportation.
- Keep storage protection before installation.
- Keep the valves in full open (preferable) or full close position.
- In order to prevent damage, corrosion or rust on the surface, avoid extreme temperatures (keep at 5°C to 50°C), avoid high environmental humidity or corrosive environment. Keep the valves away from direct sunlight, dust, flames or rain. Do not pile up excessive weight. In case of severe bumping inspect the material for any damage and replace if necessary.

4. DESCRIPTION

4.1 General Description /

BT series Trunnion ball valves are featured by the upper and lower ball guidance. Valve diagram with parts can be seen at the last page of the Manual.

4.2 Area of Application

Trunnion Ball valves are devices to stop the flow in a piping system. Ball valves are not suitable for regulating purposes. Operation of the valve in intermediate position to be avoided since this would lead to increased wear.

4.3 Operating principles

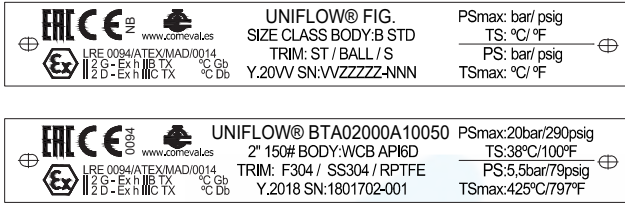
The valves close by turning the handle 90° clockwise, with tightness achieved by friction of the ball to the seats. When the handle is parallel to pipe the valve is open. Consult the manufacturer if a change of the actuation device is required.

4.4 Technical data – remarks

Check valve selection, material compatibility, pressure and temperature limits and other essential parameters. Ensure proper safety devices/measures are implemented to prevent exceeding intended use of the product. Contact the manufacturer for advice in case of pressure tests exceeding the intended use. Refer to Data Sheet for data such as main features, duties/limits of use, dimensions, weights, etc. and consult the manufacturer for further information.

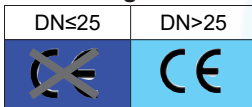
4.5 Marking/nameplate

Nameplate description of the valve:



Mark	Description
	CE-Marking
NB	Number of notify body
	EAC marking (compliance with TR/CU 032/2013 & TR CU 010/2011)
	Manufacturer logo
	Explosion protected mark for EU free circulation (see separate instructions for code)
www.comeval.es	Website of manufacturer
UNIFLOW®	Brand
PED 2014/68/EU	Directive 2014/68/EU
FIG.	Valve code*
SEP	Sound Engineering Practice
Y.20VV	Manufacturing year
SN: VVZZZZ-N	Batch / Serial no.
SIZE	Valve size
CLASS	Valve class
B	Body material
STD	Main manufacturing standard
ST	Stem material
BALL	Ball material
S	Seat material
PSmax	Max. pressure
TS	Max. temperature at max. pressure
PS	Max. pressure at max. temperature
TSmax	Max. temperature

4.6 marking



* See coding system on Data Sheet.

5. INSTALLATION

5.1 General remarks on installation

The following points should be taken into account in addition to the general principles governing installation work:



ATTENTION!

- Before installation, make sure previous chapters are thoroughly followed.
- Ensure safe access and working conditions for proper performance.
- Only operate the valve while observing all the safety measures.
- Remove flange covers or any other remaining packing/storage protection if present.
- Lay pipelines such that damaging transverse, bending and torsional forces are avoided.
- Protect valves from dirt during construction work. The interior of the valve and the pipeline must be free of foreign particles.
- Protect the valve soft parts from heating caused by welding works at the plant during commissioning.
- Avoid mechanical damage to the seats and ball.
- Valves are normally bidirectional. Some special designs are unidirectional, in such a case please follow the arrow in the body for flow direction. Valve optimal position is horizontal with stem pointing upwards. Valves can alternatively be installed in vertical pipelines. Try to avoid the stem pointing downwards.
- When using the valve as an end seal, the employers' liability insurance association of the gas and waterworks specifies the use of a safety precaution such as a plug-in disc, blind flange, etc. With a medium jet that freely exists, you must secure the exit area.
- Valves should be installed with ball in open position
- When the valve is operated, there is a crushing hazard between the ball and the seats. Ensure the valve is not under operation in case hands are introduced inside the valve.
- When installing the valve, there is a crushing hazard between valve and pipe system. Mind the hands to avoid it.

Flanged ends valves:

- Make sure that counterflanges are compatible with the standard of the valve flanges. When matching up flanges, avoid gradients, rotation and pipe misalignment that could cause pipe and valve stress and leakage once installed. Flanges should fit smoothly. Select the proper flange face gaskets according to duty and centre them on the flange face properly. Do not force the counterflanges and do not try to tighten the bolts when a gap exists between valve and pipe or if misalignment is observed. Tighten in a crosswise, moderate and uniform manner.



ATTENTION!

Welded ends valves:

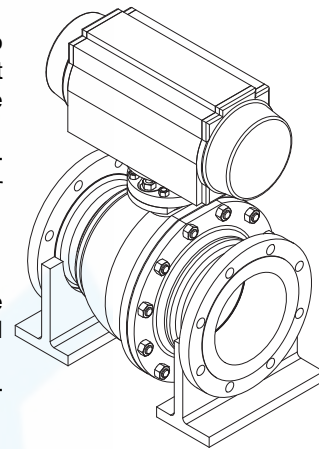
- Ensure compatibility of ends; clean valve and pipe ends carefully, tack-weld the valve on the pipe in four points on both end caps, putting trim away to prevent heat exposure when soft parts, if any, could be affected by heat. Once the welding process is finished, wait until system cools down before inserting the trim back. The installer should take the necessary precautions to prevent thermal stressing/ overheating the valve during welding process. **ACTUATOR:**
- If the valve requires pneumatic, electric or hydraulic actuator, separate actuator Manual shall be also followed. To avoid unnecessary stress and risk of valve break, consider the weight and the relative position of actuator to evaluate its support. Make sure that the actuator is suitable for service particular requirements, valve adaptability, function needed, adequate torque for the valve, adequate speed, need for limit switches, etc. Contact our Technical Department for advice. In case of actuator mounted, disconnect the energy supply before starting work.

5.2 Assembling additional modules

Optional accessories (limit switches, extensions, etc.) that are supplied with valves must be fitted as required for their functions as shown in the system plan.

5.3 Requirements at the place of installation

- Aggressive environmental conditions may reduce the life span of the product. Consider special construction/protective measures in such a case.
- Consider the interaction between the system and the equipment. Foresee elements to absorb vibrations, pipe dilata- tions, guides and anchoring. Valves shall be supported at both ends. Otherwise, tensions in the pipe system may lead to deformations and damage and affect the performance of the valve.
- The system and operation protocol should be conceived in such a way to avoid high velocities and cavitation. Prevent pulsing flow or water hammers, which are very harmful for valves and the rest of the components.
- Flooding of the product is not recommended.
- Allow enough space for valve installation, operation and maintenance.
- It is highly recommended to install a properly sized mesh strainer upstream of the valve in order to prevent damage to the internal trim parts and seals of the valve that could lead to leakage or malfunctioning.
- Planners / construction companies or the owner are responsible for positioning and installing products.



6. COMMISSIONING & OPERATION



ATTENTION!

- Before commissioning the valve, check the material, pressure, temperature and other essential parameters. Always use the product within the scope of intended service and operating duties.
- Before commissioning, make sure previous chapters have been thoroughly followed.
- Regional safety instructions should be adhered to.
- It is essential to flush the pipe system thoroughly to eliminate all the particles and impurities which could remain in the pipes and particularly welding residue, chips, tool remains, etc. that could damage the equipment during start-up. Ensure that during cleaning of the pipe system, any chemicals used and temperature are compatible with the valve construction.
- Temperatures above 50°C or below 0°C may cause personnel injuries if valves are touched.
- Leakage of media through valve, between counterflanges or at closing (end of pipeline) may also cause scalding, health harm, pollution, fire or damage to other parts of the installation depending on the media. Use suitable protection equipment when approaching the valve, ensure that the corresponding warning signs are displayed on the valve or surrounding area, and/or isolate the equipment in case of danger.
- Before commissioning a new plant or restarting it after repairs or modification, always ensure that:
 - All work has been completed correctly.
 - The valve is in the correct position for its function.
 - Safety devices/measures have been implemented.
- Valve operation, filling, warming-up and starting-up shall be gradual so as to avoid any inadmissible stress. Check for tightness in valve connections, body halves parts union, and stem, and retighten crosswise and gradually if necessary until leakage elimination. When retightenning body halves bolting make sure the valve is in fully open position.



ATTENTION!

- Packing gland is tightened at factory in a moderate way to pass the pressure tests. After a while before installation, packing rings experiment a relaxation and some retighten of the gland could be needed during start-up. Over tightening will increase operating torque and will reduce life of the packing. Also after several open and close manoeuvres of the valve the stem gains some play with the packing rings, thus packing tightness should be checked periodically and retighten gradually when necessary.

- Ensure valve surface is in good condition and retouch coating protection when needed.
- Once the valve installed, make an initial opening and closing operation to check its proper operability, without additional tools.
- Bear in mind the valve is for on/off service only, and not suitable to work in intermediate position nor throttling service.
- In case of risk of media freezing inside the valve, take due measures to avoid it. Prior to exposure to freezing temperatures, we recommend to drain the valve, since the liquid trapped in the body cavity could freeze and impair the operation or damage the valve.

6.1 Self relieving seats feature

Trunnion ball valves have the so-called body cavity, a closed volume where the medium can stay and pressure build up due to increase in temperature of degradation of the product, causing a potential danger. Valves can be provided with self-relieving seats feature, to release automatically a pressure excess in the body cavity until nearly equalizing with the pressure of the pipeline.

6.2 Venting

Purpose: release the gases from the body cavity.

- Turn the ball valve to fully open or close position.
- Loosen the vent fitting (part 31) located at the top area of the body to release cavity pressure.
- Continue venting until body cavity pressure is fully released, which may take a while depending on the size of fitting, body cavity and media compressibility. If venting does not stop after a while, and valve is in open position there could be a damage either at the upstream or downstream seat. If venting does not stop after a while, and valve is in closed position, there could be a damage at the upstream seat.

6.3 Draining:

Purpose: bleed out the liquid or condensate from the body cavity

- Operate the valve to fully open or close position.
- Loosen the head of the drain plug fitting (part 21) or open drain valve if any at the bottom area of the body, to bleed the liquid present in the body cavity. It may take a while to drain the body cavity, depending on the size of fitting, pressure in the cavity, etc.

It is advisable to drain with a drain valve, especially in case of dangerous media.

Attention! The process must be carried out carefully, taking into account the pressure, temperature and media, and that eventually seat tightness performance could be damaged.

6.4 Emergency sealing injection nipples

Use:

Trunnion ball valves may be delivered with emergency sealant injection nipples for seats and/or stem, consisting on a check valve that allows the injection of sealant or grease into seats area or stem area respectively.

Valves are supplied without grease through the emergency sealant injection nipples. In emergency situation, i.e. when seat is worn down or damaged, to temporarily prevent or reduce leakage, seats can be injected with sealant through emergency sealant injection nipples. This emergency sealant injection system is to be used only when valve is not able to achieve the desired shutoff and it is not possible to take the valve off the line for repair and maintenance. Always flush the sealant port with suitable cleaner/solution, before injecting sealant. Sealant and cleaning agents shall be selected based on service fluid and condition.

Grease injection in the seat area is recommended only in the event of valve being difficult to operate. If no leakage it is usually not recommended to lubricate seat sealant injection nipples as the grease may attract debris that could damage the seats and may also cause stuck of the spring loaded seats within their seat pockets, and a not suitable grease could solidify and make operation harder. There are some users depending on particular service or own experience that are in favour of applying from the start-up grease injection on the seats through the sealant nipples, arguing that by filling and refilling the grease channels the dirt trapped in the grease is gradually pushed out of the seats. In case of grease injection and refilling, regular cycling is also important to prevent seats stuck and to distribute lubricant over the seating surfaces of the ball and seats. For example, in case of corrosive media, light synthetic grease may help to reduce corrosion to the seat sealing areas. In case of use of grease, always make sure it is compatible and does not react chemically with the media.

Sealant injection nipples are under line pressure. Do not unscrew completely from body.

Type of sealant:

For seat sealant injection nipples:

In the case of use of sealant, a suitable one should be selected in relation to the service. Field experience and grease

sealant supplier knowledge is essential to determine the right type for each case. Main features to fulfil as follows:

- Able to offer sealant performance.
- Insoluble, resistant to breakdown or shearing of the gel structure under high pressure injection and under the pressure between seating surfaces.
- Stable and not freezing over the entire range of temperatures. Not drying out or form a gum within the range of temperatures.
- Suitable for the media, not reacting chemically with the fluid (not become solid or polymerize).
- Not disrupting the operation of the seat and seal arrangement.

Normally it is better to start by a light grade sealant, and if no success gradually try with heavier sealants. Ask sealant supplier for advice.

For stem injection nipple:

In case of stem injection nipple feature, it can optionally be greased for lubrication purpose with molybdenum sulphide anti-seize grease or any other suitable grease to ease smooth operation of the stem.

The stem injection nipple for sealant purpose can optionally be applied with suitable sealant (same as for seat sealant).

Injection of sealant

Sealant injection should be applied at a higher pressure than that of the pipe system, never exceeding 1,5 times the pipeline pressure at operating temperature.

For seat sealing injection, apply sealant firstly in closed position, then open the valve and inject sealant again. Close the valve back to ensure a proper distribution of the sealant and repeat the operation several times. Last injection shall be carried out in closed position.

For stem sealant injection, after injection cycle the valve several for a good distribution on the stem.

7. CARE AND MAINTENANCE

The operator must define maintenance and maintenance-intervals to meet requirements.

- Check for body and seat tightness and valve smooth operation without additional tools.



ATTENTION!

- *In the event of infrequent use, operate the valve as frequently as possible to avoid deposits of dirt and valve blocking.*
- *Before disassembling the valve, note chapters 3, 10 & 12.*
- *When using the valve as an end seal, the employers' liability insurance association specifies the use of a safety precaution such as a plug-in disc, blind flange, etc. With a medium jet that freely exists, secure the exit area.*
- *When the valve is operated, there is a crushing hazard between the ball and the seats. Ensure the valve is not under operation in case hands are introduced inside the valve.*
- *Only carry out maintenance work in the pipework when the valve has been secured from operation (in case of actuator, ensure it has been disconnected from the mains supply and secured from reactivation).*
- *Check the valve seat surface and the flow passage as well as the stem packing.*
- *Check the valve surface inside and outside and retouch coating protection when needed. If advanced corrosion or erosion is observed, double check service and valve features and replace the valve properly.*

- Check the valve surface inside and outside. Keep valve surface is in good condition and retouch coating protection if any when needed. If advanced corrosion or erosion is observed, double check service and valve features and replace the valve properly.

- Inspect regularly for any visible deterioration or leakage.
- Operate the valve frequently to avoid jamming or corrosion.

7.1 Parts disassembly and assembly

- Packing, seats, ball and stem can be easily dismantled by using common tools.

VALVE DISASSEMBLY

- Place the valve in horizontal position so the bottom cover (part 3) leads flat to the floor. Place supports on both flanges so the valve would be lifted from the ground and steady to allow to disassemble the valve properly.

- Release any pressure that may be retained in the body cavity by using carefully the drain valve (part 21) and vent valve (part 31) and by opening / closing the main valve. Leave the valve in the closed position to continue the disassembly.

- Remove the stem and the trunnion. In order to do so dismantle the actuation device and the yoke (29) if present. Release the stem (14) by remove the bolts of the gland flange (15) and the packing gland (28). Remove carefully the packing (20) and the seal ring (25) to prevent damages on the stem's housing. Lift the stem (14). To remove the trunnion (4) unscrew the bolts of the bottom cover (3). Screw a bolt on the trunnion (4) and use it to stretch the trunnion out of its housing.

- Place the valve vertically so one of the flange leads on the working table. Remove body bolting (parts 8 & 9) that retains the body halves (parts 1 & 7), remove the ball by lifting it with certified fabric straps to prevent damage on the ball (12). Remove the seats (10) carefully in order to not damage the seals sittings.

- All the parts to be used in the assembly must be cleaned and stored in a dry and secure place. All the sealing surfaces on the ball, seats, packing and metal faces must be carefully checked for corrosion and or erosion. Seats should have no metal particles. All damaged parts must be replaced.

VALVE ASSEMBLY

- Before assembly all the sealing surfaces on the ball, seats, seals and metal faces must be carefully checked for dirt, corrosion or erosion.

- Follow the above steps in the reverse order to reassemble the valve. Seats should perfectly fit; if necessary slightly strike with a soft hammer. Once mounted, slowly operate the valve till a complete manoeuvre is covered, to allow perfect adjustment between ball and seats.
 - Seats, stem seals and ball must be lubricated with suitable lubricant. Please contact lubricant supplier for advice. This will improve overall performance and torque due to less friction.
 - After assembly check for leaks and the correct opening and closing of the valve.
- After any maintenance work please refer to chapters 5 and 6 for installation / commissioning.

Recommended Spare parts:

Use only original spare parts.

It is advisable to keep packing rings (9), body seats (7), gasket (8) and body union gasket (5) as spare parts. Type and number of each spare part to be stored according to many factors: service level, valves quantity, etc. In many cases a good choice is to keep complete valves as spare part.

8. TROUBLESHOOTING

In the event of malfunction or faulty operating performance, check that the installation and adjustment work has been carried out and completed in accordance with this Manual.



ATTENTION!

- It is essential that the safety regulations are observed when identifying faults.

9. TROUBLESHOOTING TABLE



ATTENTION!

- It is essential that the safety regulations are observed when identifying faults.

FAULT	POSSIBLE CAUSE	CORRECTING MEASURES
No flow Not enough flow	Flange covers or protection not removed	Clear valve entrances
	Valve closed or almost closed	Check valve position
	Piping clogged	Check piping system
Broken flange	Bolts not properly tightened	Re-align piping and fit new valve
	Mating flanges not properly aligned	Check pipe system anchoring, guiding, vibration and thermal changes
	Tensions in the pipe	
Leakage between body halves	Bolts loose or gasket damaged	Check alignment
	Parts not well aligned	Retighten bolts or change gasket
	Metal sealing surfaces damaged	Repair or change damaged surfaces
	Too much pressure or temperature	Check the system
	Weight not properly supported	Prevent proper support
Leakage through the stem	Normal wear after cycles or long time without use	Retighten bolts
	Packing or stem worn out or damaged	Replace parts
	Metal sealing surfaces damaged	Repair or change damaged surfaces
	Too much pressure or temperature	Check the system
Valve not tight at closing	Valve is not in closed position	Check correct handwheel rotation
	Dirt trapped between ball and seats	Open and close the valve under pressure to sweep the dirt trapped. Clean the system and set a strainer upstream of the valve. Repair or replace the valve if needed
	Seats damaged	Replace seats
	Ball surface damaged	Repair or change ball
	Weight not properly supported	Prevent proper support
	Too much pressure or temperature	Check the system
Too high operating torque, handle hard to turn	Wrong turn direction (opposite)	Turn in the correct direction Valve open being handle parallel to pipe, clockwise direction to close
	Packing gland too tightened	Check packing gland tightening
	Packing rings damaged or with dirt	Inspect and replace/clean parts
	Seats damaged or deformed	Inspect and replace if needed Recheck valve duty
	Body halves union bolts too tightened	Check bolts tightening
	Stem seizure	Clean/lubricate/replace stem
	Stem is bended	Replace stem
	Weight not properly supported	Prevent proper support
	Impurities or deposits deposited on ball/seats/cavities	Check and clean the system, prevent a strainer
	Ball or seats damaged	Check and service/replace needed parts
	Too much pressure or temperature	Check the system
Too viscous or sticky fluid		

FAULT	POSSIBLE CAUSE	CORRECTING MEASURES
Tensions in the pipe	Weight not properly supported	Prevent proper support

Technical support always available through our website www.comeval.es or your local distributor.

10. DISMANTLING THE VALVE



ATTENTION!

The following points must be observed:

- Pressureless pipe system.
- Medium must be cool.
- Plant must be drained.
- Note chapter 3 for proper handling and lifting.
- Additionally, in case of toxic, corrosive, flammable or caustic media:
 - Purge pipe system carefully.
 - Use proper protection equipment to avoid health harm.
 - Adopt proper actions to avoid pollution of the environment.

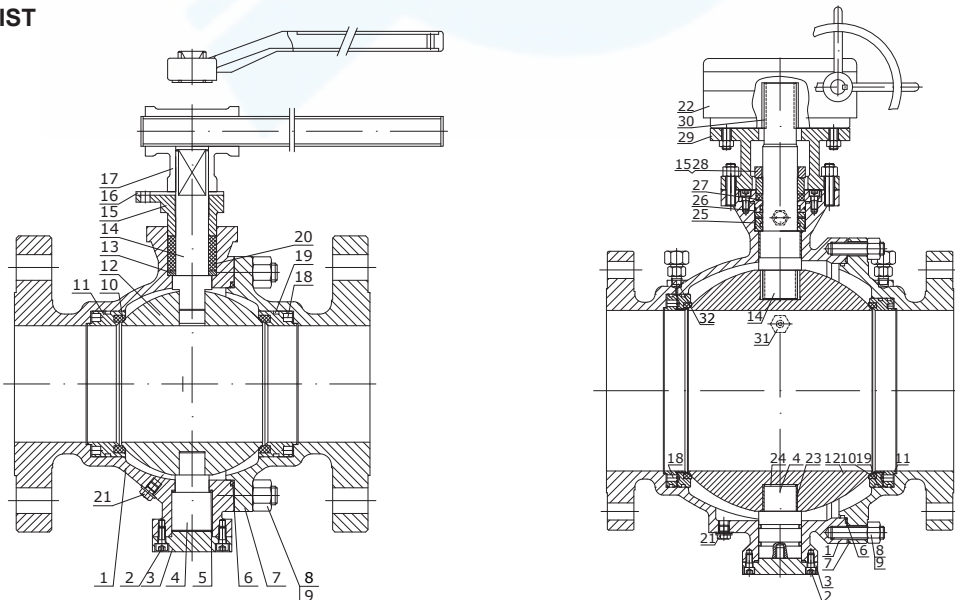
11. GOODS RETURN & DISPOSAL

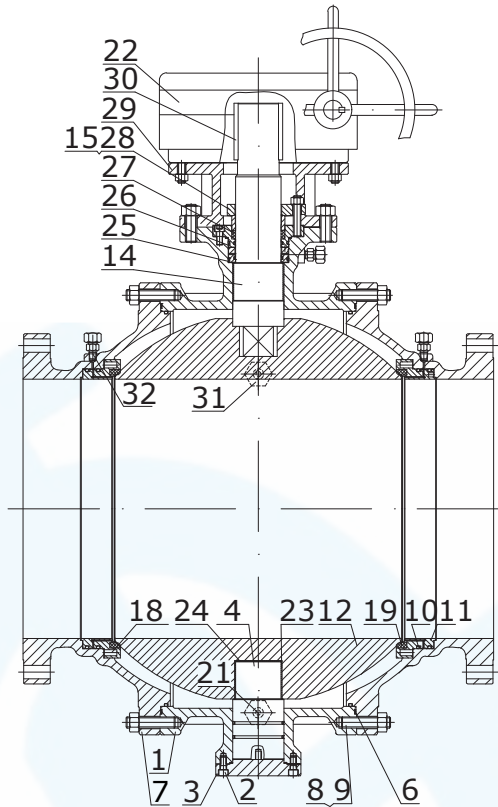
- For any returned goods, the issuing company must provide information in written on any hazards and the precaution in case of potentially polluting or harmful residues, or any mechanical damage that could present a health, safety or environmental risk, as enforced by EU Health, Safety and Environment Law, including the Safety Data Sheet of the substances identified as potentially hazardous.
- Valves are recyclable and not expected hazard to the environment, with the exception of soft parts (PTFE and rubber compounds) that should be disposed separately only by approved procedure, and no incineration is permitted.

12. WARRANTY / GUARANTEE

- The extent and period of warranty cover are specified in the "General Sales Terms" of COMEVAL VALVE SYSTEMS valid at the time of delivery or, by way of departure, in the contract of sale itself.
- We guarantee freedom of faults in compliance with state-of-the-art technology and the confirmed application.
- No warranty claims are accepted for any damage caused as the result of incorrect handling or disregard of this Manual, Data Sheet and relevant regulations.
- This warranty also does not cover any damage which occurs during operation under conditions deviating from those laid down by specifications or other agreements.
- Justified complaints will be eliminated by repair carried out by us or by a specialist appointed by us.
- No claims will be accepted beyond the scope of this warranty. The right to replacement delivery is excluded.
- The warranty shall not cover maintenance work.
- Our guarantee coverage does not cover for any commissioning, maintenance or installation of the product or external parts.
- Our guarantee does not cover products proved to have been tampered with or faulted by material wear and tear.
- The Purchaser is responsible for checking that the incoming product is received in good condition and conforms to the ordered specifications. In case of damage caused during transit it is necessary to immediately complain to the carrier within 24 hours. After this time carriers could not assume the derived costs. In case of any deviation in relation to order specifications, please contact us.

13. PARTS LIST





1	Body	17 ¹	Lever
2	Screw	18	Seat Spring
3	Bottom Cover	19	O Ring
4	Trunnion	20 ¹	Packing
5 ¹	Gasket	21	Drain Plug
6	Body Gasket	22	Worm Gear
7	Body Cap	23 ²	Slide Bearing
8	Body Bolt	24 ²	Thrust Bearing
9	Body Nut	25 ²	Seal Ring
10	Seat	26 ²	Top cover
11	Seat Retainer	27 ²	Packing
12	Ball	28 ²	Packing Gland
13 ¹	Packing Gasket	29 ²	Yoke
14	Stem	30 ²	Key
15	Gland Flange	31 ²	Relief Valve
16 ¹	Positioner Plate	32 ²	Grease Injector

¹ Up to 5" // ² from 6" to 36"

14. ANNEXES

14.1 Declaration of Conformity - DC20_16EN

14.2 Data Sheet - DS20

Updated documents on www.comeval.es