


CHEMAT

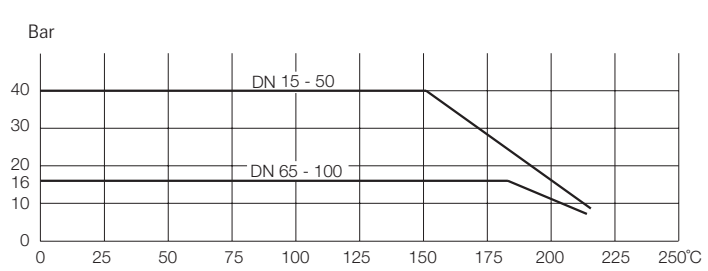
1. Contents	
2 General	1
3 Intended use	1
3.1 Restriction of use	1
4 Hazard warnings	2
4.1 General hazard warnings.....	2
4.2 Warnings for user	2
4.3 Special hazards	2
4.4 Hazard warnings for maintenance	2
4.5 Marking.....	2
5 Conformity assessment referred to directive 94/9/EC (ATEX)	3
5.1 Special note	3
6 Transport and storage	3
7 Installation instructions	3
7.1 Installation position of ball valve	3
7.2 Installation into pipeline	3
8 Valve operation	3
8.1 Operation by hand lever.....	3
8.2 Operation by actuator or gear box	3
9 Repair	3
9.1 Replacement of ball, seat and body seal of ball valve with adjustable shaft seal.....	3
9.2 Replacement of adjustable shaft seal.....	4
9.3 Replacement of ball, seat and body seal of ball valve with low-maintenance shaft seal.....	4
9.4 Replacement of low-maintenance shaft seal.....	5
9.5 Replacement of ball, seat and body seal of ball valve with maintenance-free shaft seal	5
9.6 Replacement of maintenance-free shaft seal.....	6
9.7 Replacement of ball, seat and body seal of ball valve with maintenance-free shaft seal in Fire-Safe and Fugitive Emissions version	6
9.8 Replacement of maintenance-free shaft seal in Fire Safe and Fugitive Emissions version	7
10 Spare parts	7
Tightening torque values table	7

2. General

- Chemat GmbH belongs to the Pentair international Ltd. group. Their products are manufactured and distributed exclusively by Pentair Valves & Controls Distribution GmbH.
- The operating instructions do not govern the scope of supply. They apply to a number of possible sizes, versions, special features and additional equipment. Their content therefore generally goes beyond the contractual scope of supply agreed in each case. These instructions contain the information necessary for safe and correct installation and operation of the valve in the prescribed manner. If any difficulties are encountered during installation or operation which cannot be solved with the aid of the installation and operating instructions, please contact the supplier/manufacturer for more information.
- We recommend to instruct operators according to these operating instructions.
-  This symbol indicates important messages and safety instructions.
- **Exemption from liability**
Pentair Valves & Controls Distribution GmbH does not take any liability of damages and breakdowns caused by non-observance of both, these operating and maintenance instructions and the operating and safety instructions.

3. Intended use

- Chemat ball valves type CAPRO 327/627 and 328/628 are two piece ball valves in flanged version for assembling between flanges related to the indicated nominal pressure.
- Chemat ball valves are exclusively used within their temperature and pressure ranges to isolate media, to which carbon steel and stainless steel are resistive.
- CAPRO ball valves can be used for fluids of group 1 and 2 related to appendix II diagram 6 of pressure equipment directive 97/23/EC up to category III.
- Ball valves are intended for ON/OFF applications only. Do not use them for modulating applications.
- Valves suitable for oxygen applications are identified with a blue sticker and shrink-packed. A warning is given on the package.
- Range of operation temperature is -60°C to +225°C depending on operating pressure and sealing materials.



In case of applications outside the scope of the diagram, contact Pentair Valves & Controls Distribution GmbH.

- Intended use presupposes to consider safety instructions given in article 4.

3.1 Restrictions of use

- Restrictions of use may not be exceeded.
- The valve is not suitable for use with liquids with a proportion of solids of hard consistency. This can lead to damage to the sealing elements and thus to leakage in the valve.
- Ball valves have to be used only according to the resistance of the used materials.

4. Hazard warnings

4.1 General hazard warnings

Ball valves are liable to the safety instructions of the pipe line system they are built in. Safety instructions named in this literature are additional instructions for ball valves only.

4.2 Warnings for user

End user and not manufacturer of ball valves is responsible to ensure that

- ball valves are used only in accordance with the intended use (see part 3)
- pipe line is installed professional and will be inspected regularly
- ball valve has been installed professional
- a retrofitted actuator has been both, sized and adjusted correct, latter in the end positions of the ball valve, especially in its open position
- usual velocities of flow will not be exceeded during continuous duty and abnormal conditions (e.g. vibrations, cavitations, water-hammer) do not appear
- ball valve will not be used outside its pressure and temperature range



Disregarding of this warning can cause both, danger for the operator and damage of pipe line.

- ball valves used within a temperature range of $>+50^{\circ}\text{C}$ and $<-20^{\circ}\text{C}$ have to be protected against contact by isolation



Disregarding of this warning can cause danger for the operator.

- competent personal handles and maintains the valves.

4.3 Special hazards



When the valve is to handle hot fluids or fluids where exothermic reactions may take place, it should be ensured that the hot surface of the valve cannot provide a source of danger for both, people and the surrounding atmosphere.

- Operation temperature and ignition temperature of dust have to be attended in dust applications.
- If ball valve is used as dead-end valve, special precautions have to be taken. Lever operators should be locked (e.g. padlock) or outlet connection should be plugged.



Open ball valve very carefully if it is used as dead-end valve and pipe line is pressurized. In this case, you have to take care that medium spread out does not cause damages.

4.4 Hazard warnings for maintenance work



Shaft of ball valve is tightened by a shaft seal. Pipe line has to be de-pressurized, before loosening locking ring to avoid leakage of medium.



Before removing the valve from the pipeline system, ensure that the pipeline is de-pressurized thus no medium can spray out undefined.



When opening and dismantling the valve, residues of medium can still escape or be trapped in the clearance volumes of the valve. There may be further discharge from the system even when it is de-pressurized



Tooling appropriate to the working area is used for installation or maintenance only, especially in plants where explosive atmosphere can occur.

4.5 Marking

Manufacturer:	CHEMAT
Type:	CAPRO
Nominal diameter:	DN
Nominal pressure:	PN
Material:	e.g. 1.4408
Cast no.:	e.g. H5426
Serial no.:	e.g. 07488
Year of manufacture:	P = 2003; Q = 2004; R = 2005
Conformity ¹⁾ :	CE
Code no. ¹⁾ :	0685 (Notified Body acc. directive 97/23/EC; DEKRA)

Note:

1) DN32 and bigger

5. Conformity assessment referred to directive 94/9/EC (ATEX)

A systematic procedure to identify ignition hazards according to EN13463-1:2001 has been done with the result that no potential ignition source is available. Therefore, CAPRO ball valves are not within the scope of directive 94/9/EC (ATEX) and may not be marked.

Use of ball valves within its intended use is possible in areas, where explosive atmospheres can occur.

5.1 Special note

All metallic parts of the ball valve including the ball are connected to each other thus the electric resistance is $<10^6$ Ohm. The ball valves can be used for all flammable media in any explosive atmosphere.

However, we draw attention to the fact, that ball valves have to be part of potential equalisation procedures, if a potential (static electricity) can occur in case of use within specific media and velocities of flow, which is liable to operating conditions and therefore within responsibility of end user.

6. Transport and storage

Valves must be stored at a temperature of -20°C to $+65^{\circ}\text{C}$ in a dry place protected from the effects of weather.

In order to prevent damage during loading and unloading, the valves must be handled manually or using suitable lifting equipment. Valves must be protected from external force (impact, shock, vibration) during transportation. We recommend a leak test before commissioning after a long period of storage.

Flanges are provided with protective caps to prevent dust and dirt ingress and to prevent damage to the sealing surfaces during transportation.

Remove protective caps only about to install valves in the pipe line.

7. Installation instructions

7.1 Installation position of ball valve

The ball valve can be installed in the pipeline in any position. The flow direction is not specified unless the ball is provided with a discharge hole.

7.2 Installation into pipeline

After removal of the protective caps make sure that the interior of the ball valve remains clean and free of fouling.

The valve can be installed directly in to the pipeline system. Insert the valve and align it that it can be fitted without any stress.

8. Valve operation

8.1 Operation by hand lever

Hand levers are fitted as standard on ball valves up to DN 100; and here the position of the hand lever indicates the position of ball bore. The closing direction is clockwise.

Make sure that enough space is available to operate the ball valve.

8.2 Operation by actuator or gear box

On the CAPRO type ball valve, the mounting flange for 90° drives is designed in accordance with ISO 5211. Refer to operating torques of valves published in catalog sheet for actuator sizing.

9. Repair

Article 4 in this brochure has to be considered before starting repairs.

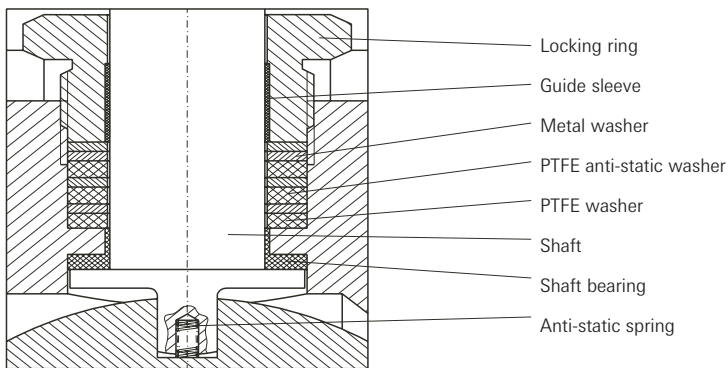
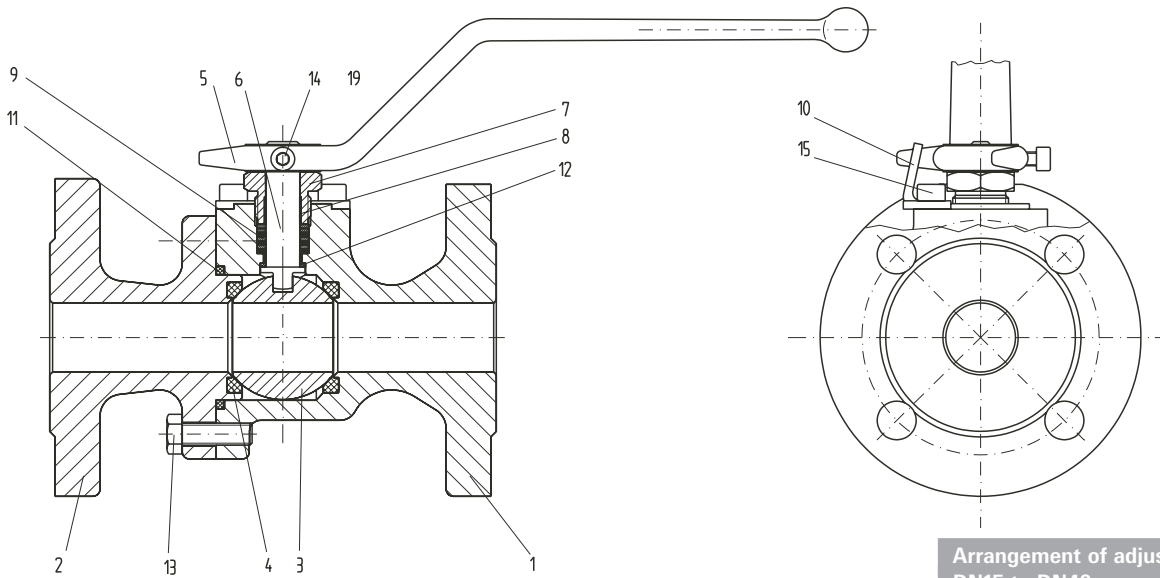
9.1 Replacement of ball, seat and body seal of ball valve with adjustable shaft seal

- 9.1.1 Remove ball valve in open position by loosening the body bolts (13).
- 9.1.2 Close ball valve, remove ball (3) from the body, remove ball seats (4) and body seal (11).
- 9.1.3 Anti-static spring has to be checked during repair. Eventually existing pollutions and/or deposits have to be removed. Inspect spring for defects and replace it if necessary.
- 9.1.4 Replace defective parts, reassemble in reverse order.
- 9.1.5 Functional and pressure tests have to be done after reassembling. In case of leakage of ball passage, repeat reassembly.

The tightening torque values for the body bolts are given in the table.

9.2 Replacement of adjustable shaft seal

- 9.2.1 Dismantle ball valve as described under 9.1.
- 9.2.2 Remove hand lever (5) and stop (10) by loosening bolts (14 and 15). (bolt 15 in the hand lever nut)
- 9.2.3 Remove locking ring (7) with guide sleeve (8) and take out shaft (6) through the body.
- 9.2.4 Remove and replace defective packing (9) including shaft bearing (12). (In many cases only the PTFE washers in the packing need replacing. The metal washers can be reused.) The arrangement of the packing is shown in the table (Fig. 1).
- 9.2.5 Insert shaft with new shaft bearing through the body taking care not to damage the new packing.
- 9.2.6 Screw in the locking ring (7) and tighten hand tight with a spanner.
- 9.2.7 Fit hand lever (5).
- 9.2.8 Bring shaft in the close position, fit ball (3) and seals as described under point 9.1.
- 9.2.9 Functional and pressure tests have to be done after reassembling. In case of leaking shaft seal, tighten locking ring (7) till shaft seal is tight.



Arrangement of adjustable shaft seal
DN15 to DN40

Sequence from top to bottom

Material	DN15	20; 25	32	40	40*
Metal	1	1	2	2	1
TF4220	1	1	1	1	1
Metal	1	1	1	1	1
TF4220	1	1	1	/	1
Metal	1	1	1	/	1
PTFE	1	1	1	1	1
Metal	1	1	1	1	1
PTFE	/	/	/	/	/
Shaft bearing	1	1	1	1	1

Arrangement of adjustable shaft seal
DN50 to DN100

Sequence from top to bottom

Material	DN50	65; 80; 100	100*
Metal	1	2	2
TF4220	1	1	1
Metal	1	1	1
TF4220	1	1	1
Metal	1	1	1
PTFE	1	1	1
Metal	1	1	1
PTFE	/	/	1
Shaft bearing	1	1	1

* Face to face dimension acc. EN558-1 row 27 (F4)

Ball valves with nominal diameters of 125 to 200 feature a different sealing system for the control shaft. Please request separate instructions if required.

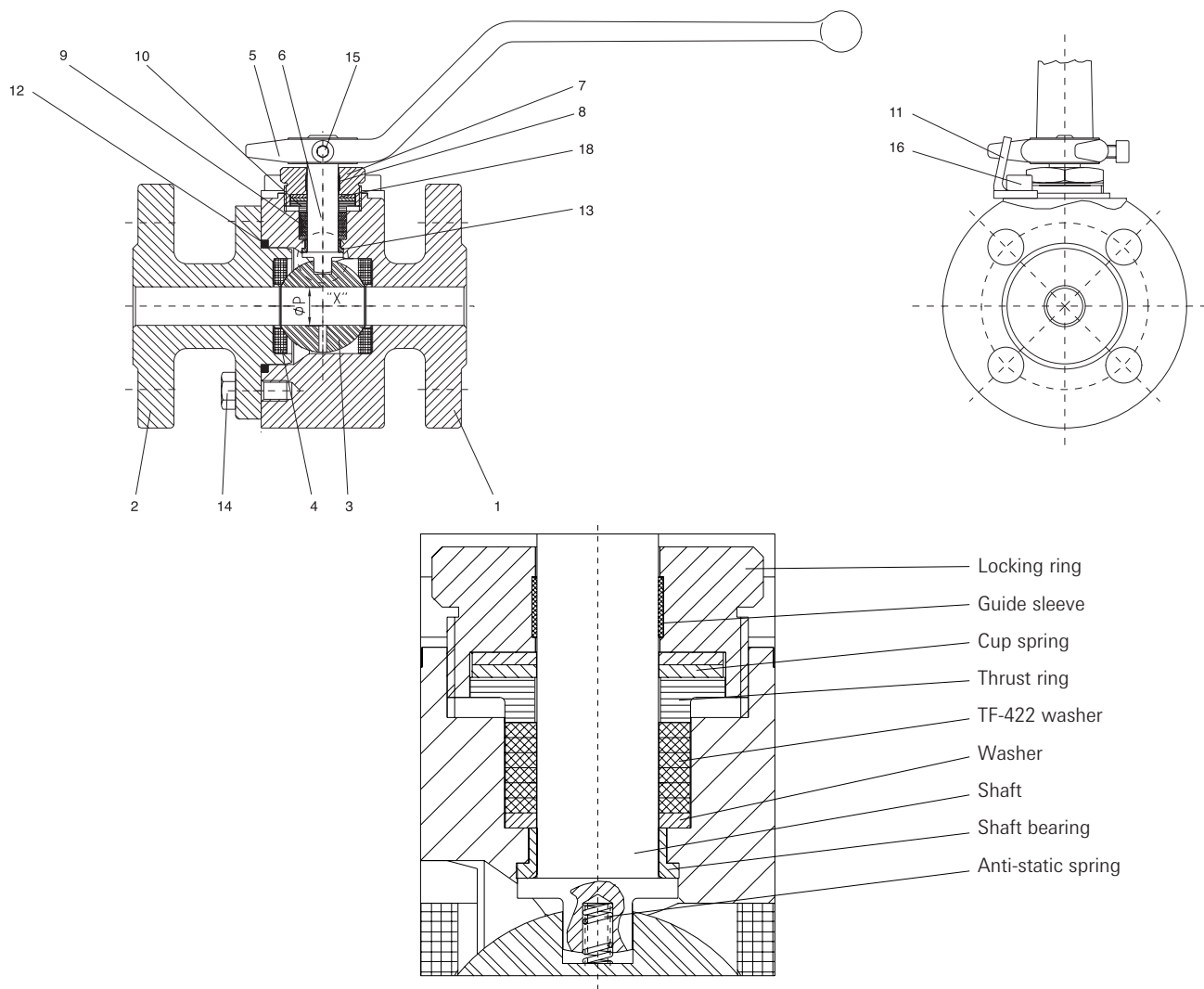
9.3 Replacement of ball, seat and body seal of ball valve with low-maintenance shaft seal

- 9.3.1 Remove ball valve in open position by loosening the body bolts (14).
- 9.3.2 Close ball valve, remove ball (3) from the body, remove ball seats (4) and body seal (12).
- 9.3.3 Anti-static spring has to be checked during repair. Eventually existing pollutions and/or deposits have to be removed. Inspect spring for defects and replace it if necessary.
- 9.3.4 Replace defective parts, reassemble in reverse order.
- 9.3.5 Functional and pressure tests have to be done after reassembling. In case of leakage of ball passage, repeat reassembly. In case of leaking shaft seal, tighten locking ring (7) till shaft seal is tight.

The tightening torque values for the body bolts are given in the table.

9.4 Replacement of low-maintenance shaft seal

- 9.4.1 Dismantle ball valve as described under 9.3.
- 9.4.2 Remove hand lever (5) and stop (10) by loosening bolts (15 and 16).
- 9.4.3 Remove locking ring (7) with guide sleeve (8) and take out shaft (6) through the body.
- 9.4.4 Remove and replace defective packing (9) including shaft bearing (13). (In many cases, only TF-422 washers in the packing need replacing. The metal washers can be reused.)
- 9.4.5 Insert shaft with new shaft bearing through the body taking care not to damage the new packing.
- 9.4.6 Screw in the locking ring (7) till stop. Re-screw it a quarter turn back. (This action offers a safety adjustment if required.)
- 9.4.7 Fit hand lever (5).
- 9.4.8 Bring shaft in the close position, fit ball (3) and seals as described under point 9.3.
- 9.4.9 Functional and pressure tests have to be done after reassembling.



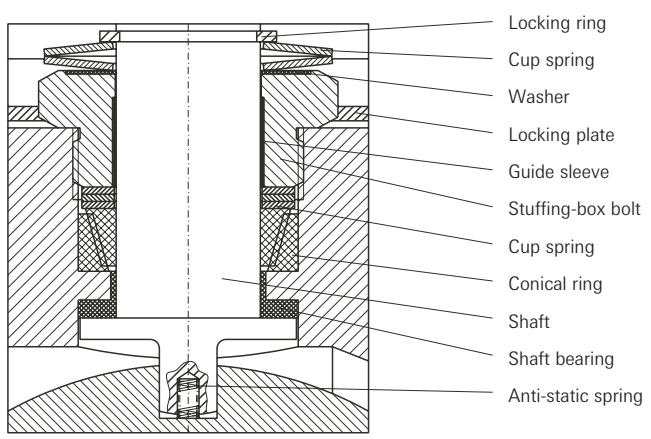
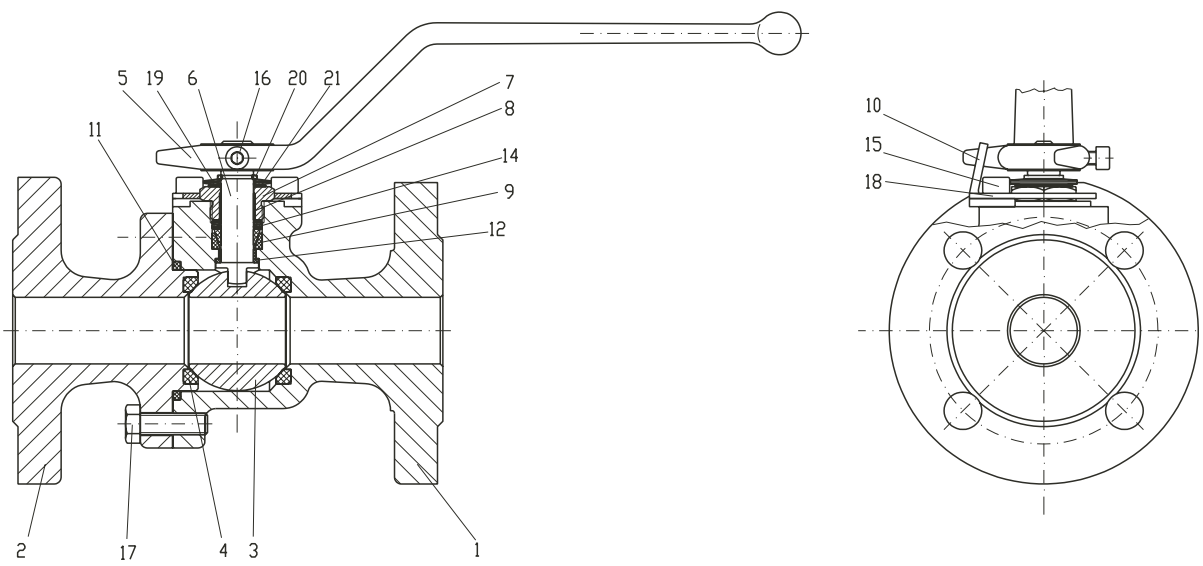
9.5 Replacement of ball, seat and body seal of ball valve with maintenance-free shaft seal

- 9.5.1 Dismantle the ball valve in the open position by loosening body bolts (17).
- 9.5.2 Close ball valve, remove ball (3) from the body, remove ball seats (4) and body seal (11).
- 9.5.3 Anti-static spring has to be checked during repair. Eventually existing pollutions and/or deposits have to be removed. Inspect spring for defects and replace it if necessary.
- 9.5.4 Replace defective parts, assemble in reverse order.
- 9.5.5 Functional and pressure tests have to be done after reassembling.

Tightening torque values for the body bolts are shown in table.

9.6 Replacement of maintenance-free shaft seal

- 9.6.1 Dismantle ball valve as described under 9.5.
- 9.6.2 Remove hand lever (5) and stop (10) by loosening bolts (15 and 16).
- 9.6.3 Remove locking ring (20), cup springs (19) and washer (21).
- 9.6.4 Loosen bolts (15), remove stuffing box bolt (7) with guide sleeve (8) over the shaft.
- 9.6.5 Take out shaft (6) and shaft bearing (12) inwards through the body.
- 9.6.6 Remove cup springs (14) and defective seal (9).
- 9.6.7 Insert shaft with new shaft bearing (12) through the body.
- 9.6.8 Place new seal into the body taking care to ensure that the seal is not damaged in the process.
- 9.6.9 Assemble in reverse order.
- 9.6.10 Functional and pressure tests have to be done after reassembling.



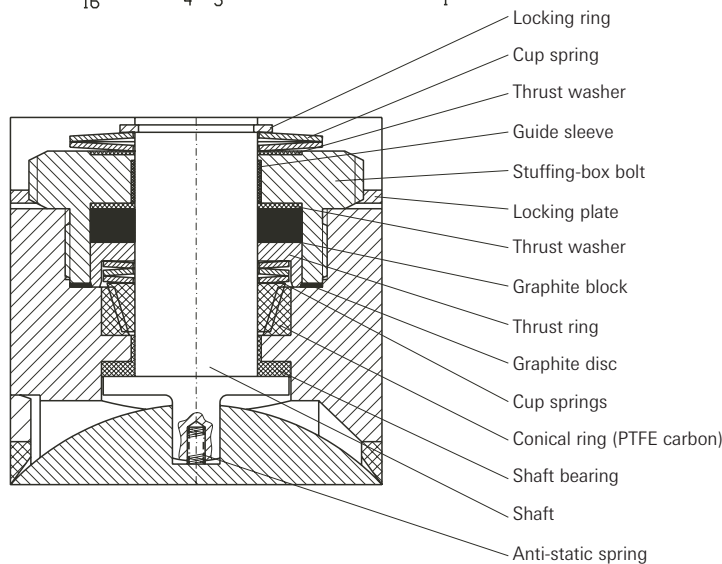
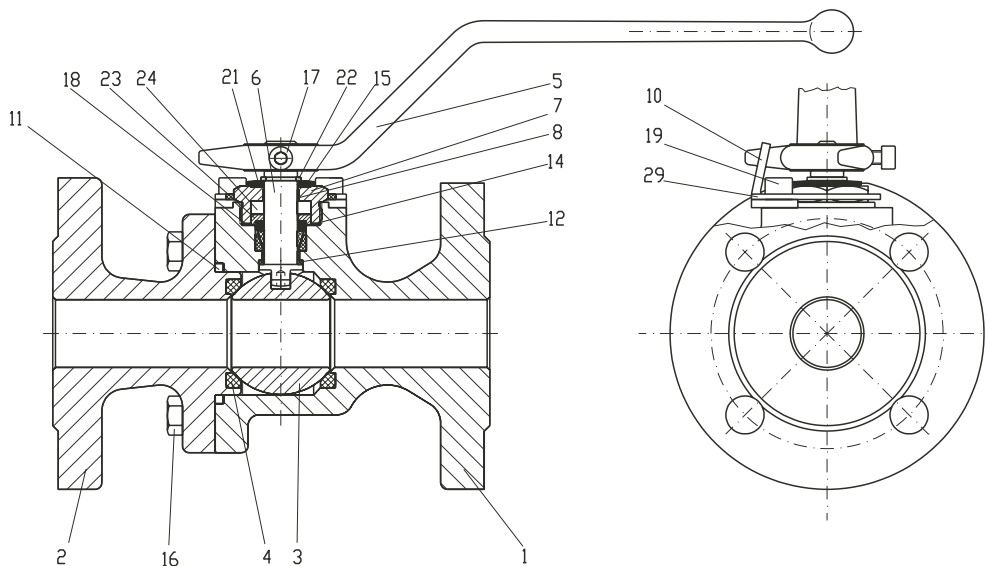
9.7 Replacement of ball, seat and body seal of ball valve with maintenance-free shaft seal in Fire Safe and Fugitive Emissions version

- 9.7.1 Dismantle ball valve in open position by loosening body bolts (16).
- 9.7.2 Close ball valve, remove ball (3) from the body, remove ball seats (4) and body seal (11).
- 9.7.3 Anti-static spring has to be checked during repair. Eventually existing pollutions and/or deposits have to be removed. Inspect spring for defects and replace it if necessary.
- 9.7.4 Replace defective parts, assemble in reverse order.
- 9.7.5 Functional and pressure tests have to be done after reassembling.

Tightening torque values for the body bolts are shown in the table.

9.8 Replacement of maintenance-free shaft seal in Fire Safe and Fugitive Emissions version

- 9.8.1 Dismantle ball valve as described under 9.5.
- 9.8.2 Remove hand lever (5) and stop (10) by loosening bolts (17 and 19).
- 9.8.3 Remove locking ring (22), cup springs (21) and washer (15).
- 9.8.4 Loosen stuffing-box bolt (7) and remove it over the shaft with guide sleeve (8).
- 9.8.5 Take out shaft (6) through the body.
- 9.8.6 Remove thrust washer, graphite block, thrust ring and cup springs from the body.
- 9.8.7 Remove defective seal (14).
- 9.8.8 Insert shaft with new shaft bearing through the body.
- 9.8.9 Insert new seal in body taking care not to damage the seal.
- 9.8.10 Remaining assembly process is in the reverse order.
- 9.8.11 Functional and pressure tests have to be done after reassembling.



Tightening torque values for body bolts and nuts CAPRO 327/627

Bolt material: A2-70/A4

PN	DN	Thread	Torque (Nm)
40	15	M8	20
	20	M8	20
	25	M8	20
	32	M8	20
	40	M 10	35
50	M 12	55	
16	65	M 10	35
	80	M 12	55
	100	M14	80

Tightening torque values for body bolts and nuts CAPRO 328/628

Bolt material: A2-70/A4

PN	DN	Thread	Torque (Nm)
40	25	M10	35
	40	M10	35
	50	M12	55
	80	M14	80
	10	M14	80

10. Spare parts

Spare parts from Pentair Valves & Controls Distribution GmbH may be used only. Pentair Valves & Controls Distribution GmbH does not take any liability of damages and breakdowns caused by using non-original spare parts. Ordering spare parts, please name

- Serial number
- Type of ball valve
- Size of ball valve