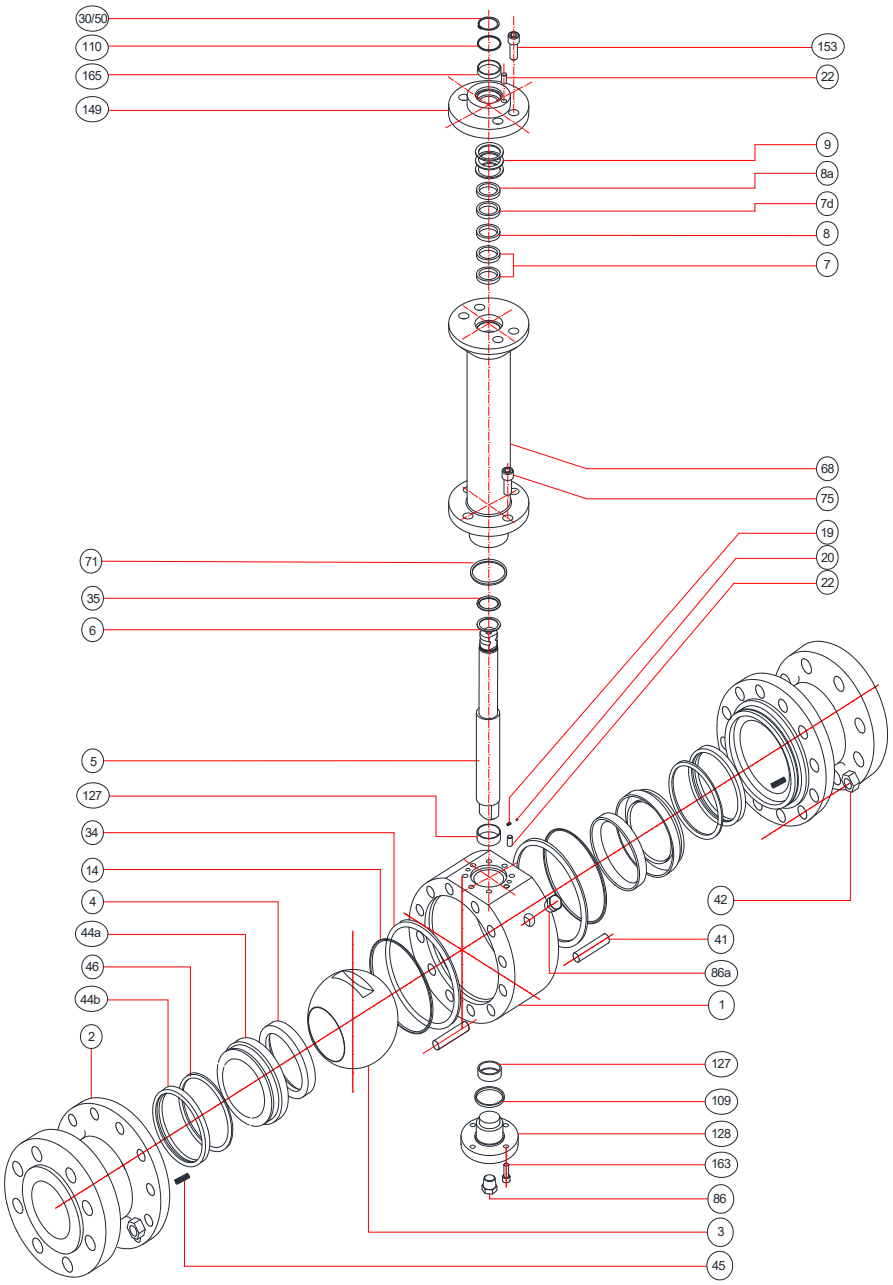

Table 1

Pos.	Quant.	Description
1	1	*Body 1*
2	2	*Body 2*
•• 3	1	*Ball*
• 4	2	*Seat*
•• 5	1	*Stem*
• 6	1	*Stem seal*
• 7	1	*Stem packing*
• 7d	1	*Stem packing d*
8	1	*Gland packing*
8a	1	*Gland packing a*
9	3	*Spring washer*
• 14	2	*Body seal 1*
•• 19	1	*Spring*
•• 20	1	*Antistatic ball*
22	-	*Stop pin*
•• 30 (1)	1	*Subjection washer ring*
• 34	2	*Body seal 2*
• 35	1	*Stem O-ring*
41	-	*Stud*
42	-	*Nut*
• 44a	2	*Ring seat 1*
44b	2	*Ring seat 2*
45	-	*Spring seat*
• 46	2	*Seat seal*
•• 50 (2)	1	*Subjection ring*
68	1	*Casing extension*
75	-	*Bolt extension*
• 71	1	*Housing seal*
86	1	*Drain plug*
86a	1	*Vent plug*
• 109	1	*Cover seal*
• 127	2	*Stem bearing*
128	1	*Body cover 2*
149	1	*ISO cover*
153	-	*ISO Cover bolt*
163	-	*Body cover 2 bolt*
• 165	1	*Stem bearing*

(1) Up to 1" (RB: 1 ½")
(2) 1 ½" valves (RB: 2")

- • Start-up: 5% of ordered quantity
- • SOFT PARTS KIT
- • • METALLIC PARTS

Suggested materials to be checked at least every five (5) year service.

See point 5 (Maintenance)

Torque screw tightness values for studs/nuts (Nr. 41 & 42) can be found attached in document DC-08-07-03 PF "Screw torque".

1. SCOPE

This manual is intended as a guide to assist customers or end-users in the correct storage, installation and maintenance of PEKOS ball valves.

2. APPLICABILITY

This manual is applicable to *cryogenic full trunnion* ball valves as per norm ANSI in the following pressures and sizes: Full Bore: NPS ½" – 1 ½", Class 300 – 1500 & Reduced Bore: NPS ¾" – 2", Class 300-1500.

3. STORAGE

3.1 Maintenance during the storage

a. Stainless steel and carbon steel valves should be stored separately, to protect the stainless steel against corrosion.
b. Valves must remain in open position with plastic end covers fitted.
c. If possible it would be advisable to leave the ball valves in their own packing cases.
d. Valves to be stored for a long time shall be checked by the quality control personnel every 6 months.

3.2 Environment conditions

a. Valves shall be stored in dry conditions. Other corrosive environment conditions must be also avoided.
b. Valves must be protected against ambient dust.

4. INSTALLATION

a. As the valves are degreased they have to be completely free of dirt. Handle carefully.
b. Verify that valves have not been damaged during transit. Inspect inside of the valves and the pipeline of the installation to be able to verify there are no strange particles.
c. It is advisable to use protective filters during the installation and check-in period while the possibility of dirt or even oxidation of the pipes exists. They have to be used until pipes are absolutely free of particles in suspension.
d. If possible, valve shall be mounted in such way to allow periodic inspections.
e. Valves are unidirectional, so fluid can run in only one direction (as it is indicated in the valve).
f. Valves can be mounted in any position (except valves in liquid service, only capable of operating with the valve stem 45º at or above the horizontal position).
g. It is necessary to obtain correct alignment and parallelism to avoid any kind of stress.
h. Once the installation is completed, valve must be operated for at least one opening and closing action to ensure perfect operation.
i. After cleaning, protective filters could be removed.
j. Protective filters should remain installed on dirty applications.

5. MAINTENANCE

Pekos recommends inspecting the valves at least every five (5) years. These inspection intervals could be affected by the process service (fluid, temperature, service, and cycles), and environmental condition.

5.1 Valves revision

PEKOS ball valves do not need lubrication and the packing does not need maintenance.
Seats (4), stem seal (6), stem packing (7 and 7d), body seals (14 and 34), bearing (127), stem o-ring (35), seat seals (46), cover seals (109), housing seal (71), stem bearings (127 and 165), ball (3) and *stem (5)* can be replaced easily using common tools. As replacement pieces is advisable to follow the instructions below table 1.
Prior to carrying out work on valves the pipeline must be completely empty, including the ball valve body cavity by half opening valve to allow any pressure build up to escape.
Care must be taken to avoid contact with dangerous or toxic chemical products. The valves must be thoroughly cleaned (see point 4a), in particular the body cavity, before handling and dismantling.

5.2 Stem leakage

a. Remove *subjection ring (50)* and *subjection ring seal (110).*
b. Remove *ISO cover (149)* by loosening *ISO cover bolts (153)*.
c. Remove the *spring washers (9),* the *gland packing (8 and 8a)*, the *stem packing (7 and 7d)* and the *stem o-ring (35)*. Replace the *stem packing (7 and 7d)* and the *stem o-ring (35)*.
d. Loosen the bolt *extension (75)*. Remove the *casing extension (68).*
e. Remove and replace the *stem seal (6)*, the *housing seal (71)* and the bearing (127) if necessary.
f. This process can be carried out with the valve under pressure due to the double block and bleed characteristic. The only condition is that the valve must be totally opened or totally closed.

5.3 Body leakage

These ball valves PEKOS ANSI are constructed in 3 pieces, *body* (1) and 2 *ends (2).* Body fasteners should be checked for tightness. If leakage occurs and if necessary, *body seals (14) and (34)* should be replaced as it is shown:

a. Make alignment marks on the *body (1)* and *ends (2)* prior to dismantling, to ensure a correct alignment when reassembling. Remove *studs (41)* and disassemble the *adapters (2).*
b. Substitute *body seal (14 and 34).*
c. Assemble the pieces accordingly as it is indicated in point 6.
d. This process has to be done in one *body end (2),* and later on, in the other one.

5.4 Seat leakage

a. Maintain the valve in the closed position, loosen and remove the *nuts (42),* remove the *bodies 2 (2)* from the body *(1).* Remove the *seat (4) – ring seat 1 (44a)* sets and change the seats (4). If necessary replace the *seat seals (46).*
b. The *bearings (127)* can be replaced removing the *ball (3)* from the *body 1 (1)*. To remove the *ball (3),* the *body cover 2 (128)* has to be removed loosening the *body cover 2 bolts (163).*
c. Reassemble the pieces accordingly as it is indicated in point 6.

5.5 Body cover 2 leakage

a. Loosen the *body cover 2 bolts (163)* to remove the *body cover 2 (128).*
b. Replace the *cover seal (109).*
c. If the *bearing (127)* is damaged, remove the *ball (3)* as it is indicated in the 5.4 point.
d. Reassemble the pieces accordingly as it is indicated in point 6.

6. RE-ASSEMBLY

The valves are made up of two main parts; the body and the extension. They have to be assembled separately and later on, joint them.
Prior to re-assembly, all components and body cavity should be totally cleaned and degreased.

First of all, assemble the extension:

a. Put the *stem seal (6)* and the *bearing (127)* into the *casing extension (68)*. Introduce the *stem (5)* together with the *stem o-ring (35)* through the *casing extension (68).*
b. Put the *stem packing (7 and 7d)*, the *gland packing (8 and 8a)* and the *spring washers (9)* into the *casing extension (68)* through the stem (5).
c. Insert the *stem bearing (165)* into the *ISO cover (149)*. Put the *ISO cover (149)* above the *casing extension (68)*. Join the *ISO cover (149)* with the *casing extension (68)* by means of *ISO cover bolts (153)* and *stop pins (22)*.
d. Place the *subjection washer ring (30)* and *stop pins (22)* into the *ISO cover (149).*

To continue, guide the ball by means of body cover 2 (128) and casing (68):

e. Place the *cover seal (109)* in the *body cover 2 (128)*.
f. Place the other *housing seal (71)* and the stop pins (22) in the *body 1 (1)*.
g. Insert the *bearing (127)* in the *ball (3)*, and introduce the *ball (3)* into the *body 1 (1).* Hold the *ball (3)* while the *body cover 2 (128)* and the *stem (5) – casing extension (68)* set are being introduced into the *body 1 (1)*. The *ball (3)* must be guided by *body cover 2 (128)* and *casing extension (68)*.
h. Joint the *body cover 2 (128*) tightening the *body cover 2 bolts (163)* and the *casing extension (68)* by means of *bolt extension (75).*

Finally, joint the main parts:

i. Lean one *body 2 (2)* above a flat surface and place the *spring seat (45)*, the *ring seat 2 (44b)*, the *seal seat (46)* and the *seat-seat ring 1 set (4 and 44a).*
j. Put the *body seals (14)* & (34) into their housing of the *bodies 1 (1)*. Joint the *body1 (1)* and the *body 2 (2)* by means of *studs (41)* and *nuts (42)* evenly tighten in diagonal using a torque wrench and the values indicated attached in document DC-08-07-03 PF "Screw torque".
k. Repeat the steps i and j with the other *body 2 (2).*
l. Screw the *vent and drain plugs (86 and 86a).*
m. Slowly cycle the valve until completing 1 cycle to ensure coupling between the *seats (4)* and *ball (3)*.
n. Carefully cycle the valve twice in order to check the correct working. Stem should rotate smoothly offering resistance as indicated by the manufacturers torque figures. Tests should be carried out according to API 598, at the pressure rating that corresponds to the valve, before reinstallation.

The end user is responsible, in case that the fluid is not communicated, checking the compatibility of the service media/ fluid with the valve materials.