4410 TwinHydrostatic™ Gas Seal

Installation, Operation and Rebuild Instruction

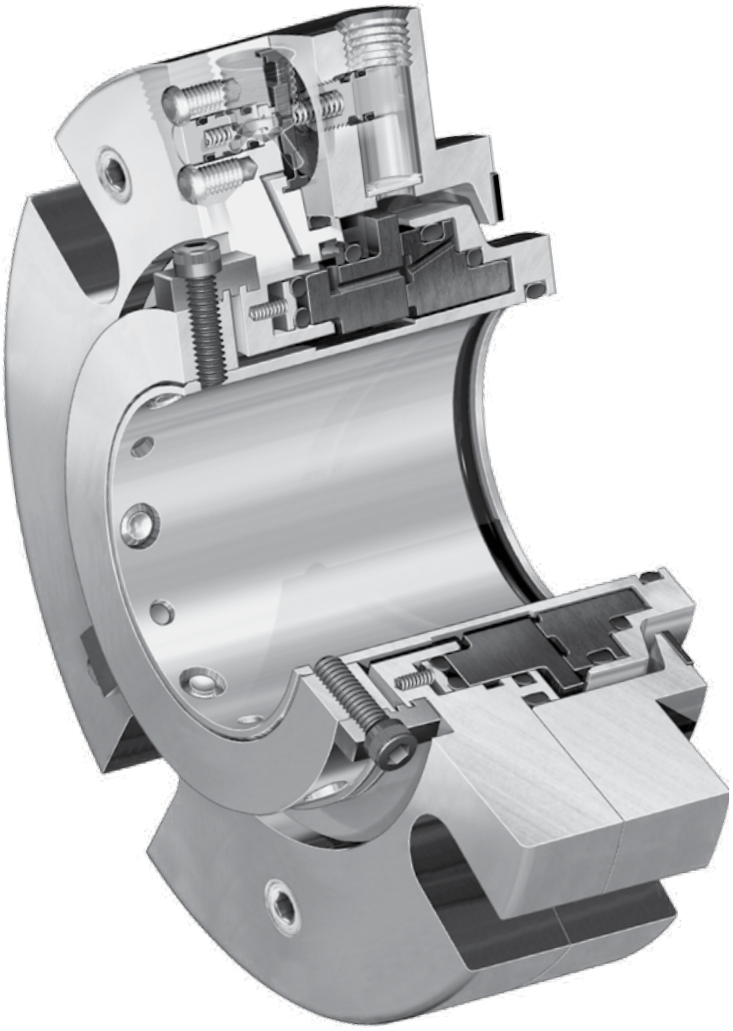


TABLE OF CONTENTS

Seal Data Reference

(Insert seal and equipment data here for future reference)

ITEM # _____

SEAL _____

(Example: 4410 – 50 mm SSC/CB/FKM/S)

INSTALLATION DATE _____

1.0 CAUTIONS

These instructions are general in nature. It is assumed that the installer is familiar with seals and certainly with the requirements of their plant for the successful use of mechanical seals. If in doubt, get assistance from someone in the plant who is familiar with seals or delay the installation until a seal representative is available. All necessary auxiliary arrangements for successful operation (heating, cooling, flushing) as well as safety devices must be employed. These decisions are to be made by the user. The decision to use this seal or any other Chesterton seal in a particular service is the customer's responsibility.

Do not touch the mechanical seal for any reason while it is operating. Lockout or uncouple the driver prior to personal contact with the seal. Do not touch the mechanical seal while it is in contact with hot or cold fluids. Ensure that all the mechanical seal materials are compatible with the process fluid. This will prevent possible personal injury.

2.0 TRANSPORT AND STORAGE

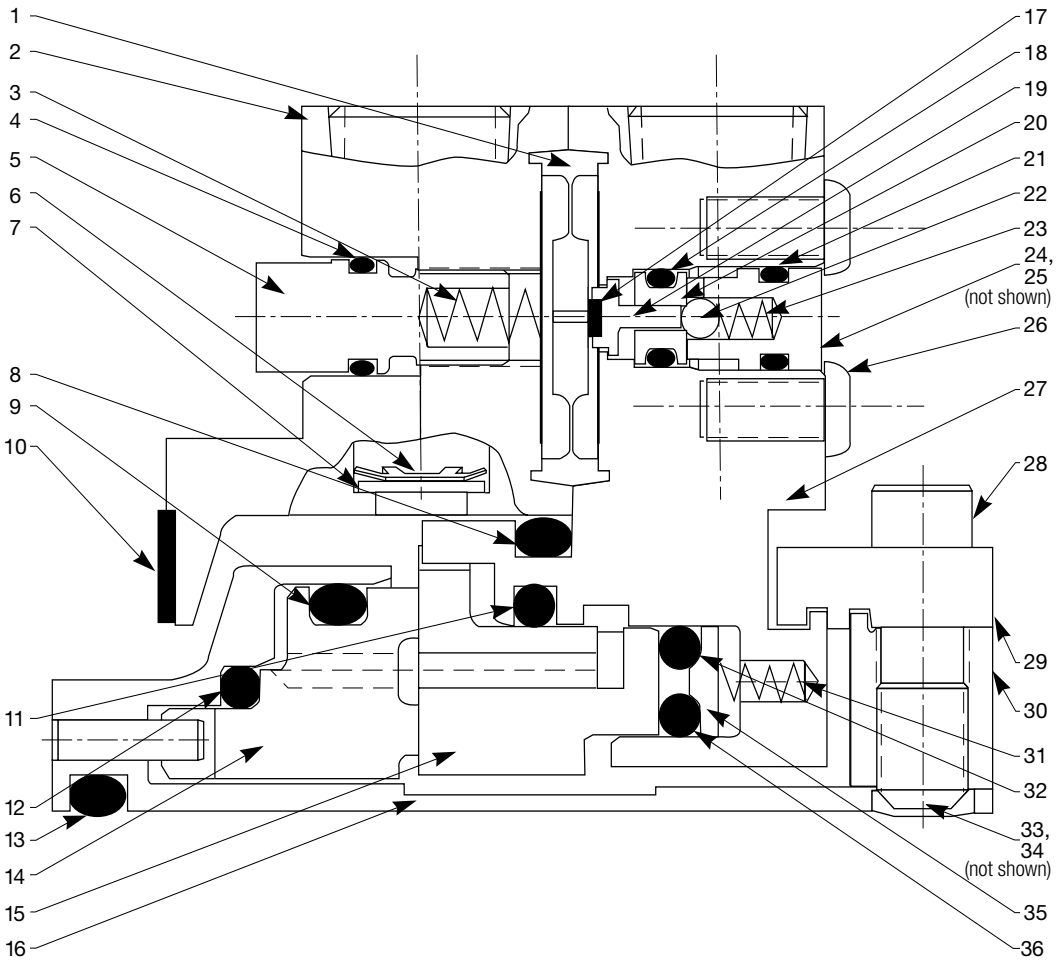
Transport and store seals in their original packaging. Mechanical seals contain components that may be subject to alteration and ageing. It is therefore important to observe the following conditions for storage:

- Dust free environment
- Moderately ventilated at room temperature
- Avoid exposure to direct sunlight and heat.
- For elastomers, storage conditions according to ISO 2230 should be observed.

3.0 DESCRIPTION

3.1 Parts Identification

Figure 1



KEY

1 – Diaphragm
2 – Adapter
3 – Adjustment Spring
4 – Adjustment Screw O-Ring
5 – Adjustment Screw
6 – Retaining Clip
7 – Filter Disk
8 – Inner Gland O-Ring
9 – Rotary Outside Diameter O-Ring
10 – Gasket
11 – Stationary O-Ring
12 – Rotary Support O-Ring
13 – Sleeve O-Ring
14 – Rotary Seal Face
15 – Stationary Seal Face
16 – Sleeve Assembly
17 – Gasket (Diaphragm)
18 – Seat O-Ring
19 – Actuator
20 – O-Ring Seat
21 – Spring Cylinder O-Ring
22 – Ball
23 – Ball Spring
24 – Spring Cylinder
25 – Gland Bolts (Not shown)
26 – Button Head Cap Screw
27 – Gland
28 – Socket Head Cap Screw
29 – Centering Clip
30 – Lock Ring
31 – Load Spring
32 – Pusher Outside Diameter O-Ring
33 – Cup Point Set Screw
34 – Dog Point Set Screw (Not shown)
35 – Pusher
36 – Pusher Inside Diameter O-Ring
37 – 1/4" Pipe Plug (Not shown)
38 – 1/4" Pipe Plug (Large) (Not shown)
3/8" Pipe Plug (Extra Large) (Not shown)
39 – 1/4" Cap Plug (Not shown)

3.2 Operating Parameters*

Speed Limits:

0 to 1500 FPM (8 mps) Wet Operation

0 to 360 FPM (2 mps) Dry Operation

Pressure Limits:

Vacuum to 10 bar g (150 psig)

Temperature Limits:

150°C (300°F) EPDM

205°C (400°F) FKM; FEPM

260°C (500°F) FFKM

Gas lubricated WET Operation
has liquid product in contact with the seal components.

Gas lubricated DRY Operation
has gas product in the vicinity of the seal components.

** Consult Chesterton Mechanical Seal Application Engineering for conditions beyond these limits.*

3.3 Standard Materials

Faces:

Carbon Rotary Seal Ring/Sintered Silicon Carbide Stationary Seal Ring *(Wet or Dry Operation)*

Graphited Silicon Carbide Rotary Seal Ring/ Graphited Silicon Carbide Stationary Seal Ring *(Wet Operation Only)*

Elastomers:

FKM, EPDM, FEPM, FFKM

Metal Parts:

316 SS/EN 1.4401 body

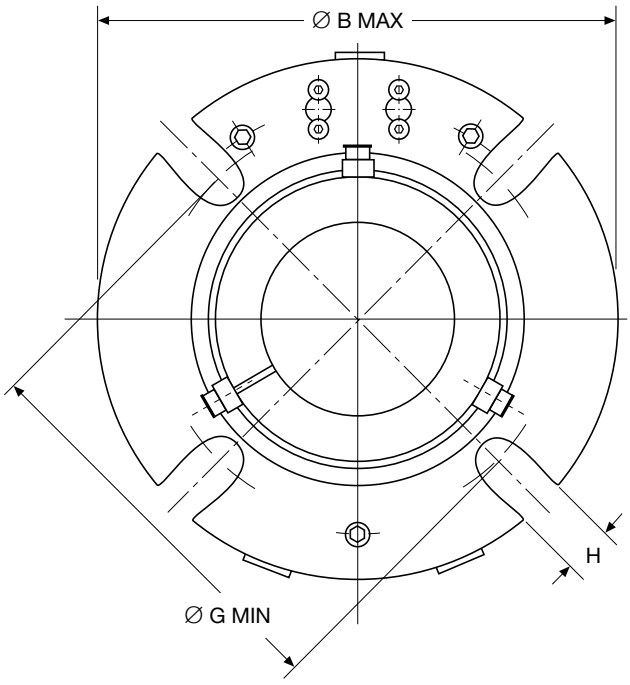
Alloy C276/EN 2.4819 springs and drive pins

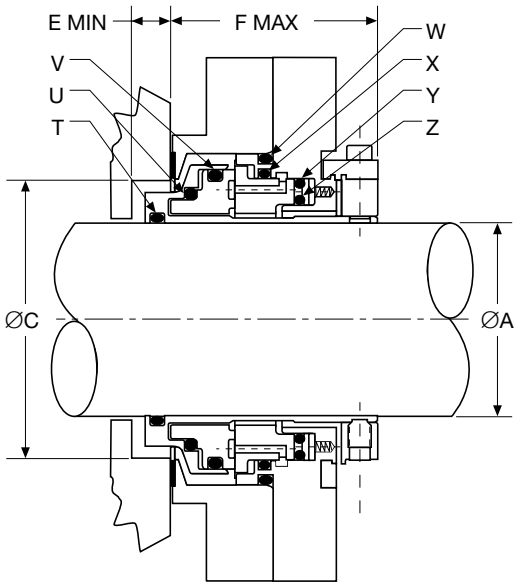
Hardened set screws (standard)

3.4 Intended Use

The mechanical seal is specifically designed for the intended application and is to be operated within the operating parameters as specified. For use beyond the intended application and/or outside the operating parameters, consult Chesterton to confirm the suitability of the mechanical seal prior to putting the mechanical seal in operation.

3.5 Dimensional Data (Drawings)





KEY (drawings and charts)

A – Shaft Size
B – Maximum Gland Diameter
C – Stuffing Box Inside Diameter
E – Required Stuffing Box Depth
F – Outboard Seal Length
G – Minimum Bolt Circle by Bolt Size
H – Slot Width
T – Sleeve O-Ring
U – Rotary Support O-Ring
V – Rotary (outside diameter) O-Ring
W – Inter Gland O-Ring
X – Stationary O-Ring
Y – Pusher (outside diameter) O-Ring
Z – Pusher (inside diameter) O-Ring

3.5 Dimensional Data (cont.) – Table 1

METRIC - Millimeters

SHAFT SIZE METRIC	SHAFT SIZE INCH	GLAND OUTSIDE DIAMETER	STUFFING BOX BORE		STUFFING BOX DEPTH	OUT-BOARD LENGTH	BOLT CIRCLE BY BOLT SIZE			SLOT WIDTH	O-RINGS						
												ROTARY				PUSHER	
											SHAFT	SUPPORT	OUTSIDE DIAMETER	GLAND ADAPTER	STATIONARY	OUTSIDE DIAMETER	INSIDE DIAMETER
	A	B MAX	C MIN	C MAX	E MIN	F MAX	G MIN			H	T	U	V	W	X	Y	Z
							12 mm	16 mm	20 mm								
65 mm	2.559	180	91	106	10	71	133	136		18	-230	-236	-240	-244	-241	-238	-235
70 mm	2.756	183	95	109	10	71	137	140		18	-232	-237	-241	-245	-242	-239	-236
75 mm	2.953	190	101	116	10	71	144	148		18	-234	-239	-243	-247	-244	-241	-238
80 mm	3.150	196	107	122	10	71	151	154		18	-236	-241	-245	-249	-246	-243	-240
85 mm	3.346	199	111	125	10	71	153	157	160	21	-237	-242	-246	-250	-247	-244	-241
90 mm	3.543	206	117	132	10	71	160	163	166	21	-239	-244	-248	-252	-249	-246	-243
95 mm	3.74	209	120	135	10	71	162	165	168	21	-240	-245	-249	-253	-250	-247	-244
100 mm	3.937	215	126	141	10	71	170	173	176	21	-242	-247	-251	-255	-252	-249	-246
110 mm	4.331	225	136	151	10	71	179	182	186	21	-245	-250	-254	-258	-255	-252	-249
120 mm	4.724	234	145	161	10	71	189	193	196	21	-248	-253	-257	-260	-258	-255	-252
							22 mm	24 mm	28 mm								
125 mm	4.921	283	160	192	15	102	233	236	239	†	-353	-361	-363	-263	-364	-362	-360
130 mm	5.118	289	167	198	15	102	239	242	246	†	-354	-362	-364	-264	-365	-363	-361
135 mm	5.315	296	173	204	15	102	246	249	252	†	-356	-363	-365	-265	-366	-364	-362
140 mm	5.512	296	173	204	15	102	246	249	252	†	-358	-363	-365	-265	-366	-364	-362
145 mm	5.709	302	179	211	15	102	252	255	258	†	-359	-364	-366	-266	-367	-365	-363
150 mm	5.906	309	186	217	15	102	258	261	265	†	-361	-365	-367	-267	-368	-366	-364
155 mm	6.102	315	192	224	15	102	265	268	271	†	-362	-366	-368	-268	-369	-367	-365
160 mm	6.299	321	199	230	15	102	271	274	277	†	-362	-367	-369	-269	-370	-368	-366
165 mm	6.496	321	199	230	15	102	271	274	277	†	-363	-367	-369	-269	-370	-368	-366
170 mm	6.693	328	205	236	15	102	277	281	284	†	-364	-368	-370	-270	-371	-369	-367
175 mm	6.89	334	211	243	15	102	284	287	290	†	-365	-369	-371	-271	-372	-370	-368
180 mm	7.087	340	218	249	15	102	290	293	296	†	-366	-370	-372	-272	-373	-371	-369
185 mm	7.283	347	224	255	15	102	296	300	303	†	-366	-371	-373	-273	-374	-372	-370
190 mm	7.480	347	224	255	15	102	296	300	303	†	-367	-371	-373	-273	-374	-372	-370
195 mm	7.677	353	230	262	15	102	303	306	309	†	-368	-372	-374	-274	-375	-373	-371

† **Note:**1. Bolt Circle Manufactured to Customer Specifications

3.5 Dimensional Data (cont.) – Table 1

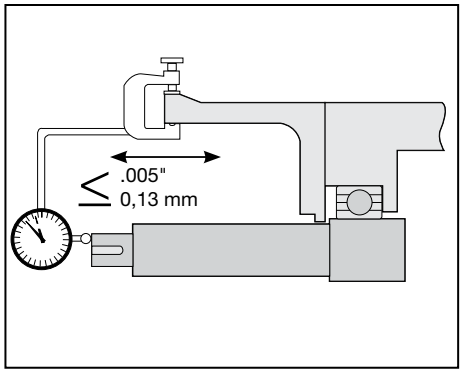
INCH

SHAFT SIZE METRIC	SHAFT SIZE INCH	GLAND OUTSIDE DIAMETER	STUFFING BOX BORE		STUFFING BOX DEPTH	OUT-BOARD LENGTH	BOLT CIRCLE BY BOLT SIZE			SLOT WIDTH	O-RINGS						
											SHAFT	ROTARY		GLAND ADAPTER	STATIONARY	PUSHER	
												SUPPORT	OUTSIDE DIAMETER			OUTSIDE DIAMETER	INSIDE DIAMETER
	A	B MAX	C MIN	C MAX	E MIN	F MAX	G MIN 12 mm	G MIN 16 mm	G MIN 20 mm	H	T	U	V	W	X	Y	Z
-21	2.625	7.1	3.6	4.16	0.4	2.8	5.25	5.37		0.69	-231	-236	-240	-244	-241	-238	-235
-22	2.75	7.22	3.73	4.29	0.4	2.8	5.38	5.5		0.69	-232	-237	-241	-245	-242	-239	-236
-23	2.875	7.35	3.85	4.41	0.4	2.8	5.49	5.62		0.69	-233	-238	-242	-246	-243	-240	-237
-24	3	7.47	3.98	4.57	0.4	2.8	5.69	5.81		0.69	-234	-239	-243	-247	-244	-241	-238
-25	3.125	7.6	4.1	4.68	0.4	2.8	5.8	5.92		0.69	-235	-240	-244	-248	-245	-242	-239
-26	3.25	7.72	4.23	4.82	0.4	2.8	5.94	6.06		0.69	-236	-241	-245	-249	-246	-243	-240
-27	3.375	7.85	4.35	4.93	0.4	2.8	6.04	6.17	6.29	0.81	-237	-242	-246	-250	-247	-244	-241
-28	3.5	7.97	4.48	5.07	0.4	2.8	6.18	6.31	6.43	0.81	-238	-243	-247	-251	-248	-245	-242
-29	3.625	8.1	4.6	5.19	0.4	2.8	6.29	6.42	6.54	0.81	-239	-244	-248	-252	-249	-246	-243
-30	3.75	8.22	4.73	5.3	0.4	2.8	6.38	6.51	6.63	0.81	-240	-245	-249	-253	-250	-247	-244
-31	3.875	8.35	4.85	5.41	0.4	2.8	6.5	6.62	6.75	0.81	-241	-246	-250	-254	-251	-248	-245
-32	4	8.47	4.98	5.57	0.4	2.8	6.68	6.81	6.93	0.81	-242	-247	-251	-255	-252	-249	-246
-33	4.125	8.6	5.1	5.69	0.4	2.8	6.79	6.92	7.04	0.81	-243	-248	-252	-256	-253	-250	-247
-34	4.25	8.72	5.23	5.82	0.4	2.8	6.93	7.05	7.18	0.81	-244	-249	-253	-257	-254	-251	-248
-35	4.375	8.85	5.35	5.94	0.4	2.8	7.05	7.18	7.3	0.81	-245	-250	-254	-258	-255	-252	-249
-36	4.5	8.97	5.48	6.07	0.4	2.8	7.18	7.3	7.43	0.81	-246	-251	-255	-259	-256	-253	-250
-37	4.625	9.1	5.6	6.19	0.4	2.8	7.3	7.43	7.55	0.81	-247	-252	-256	-259	-257	-254	-251
-38	4.75	9.22	5.73	6.33	0.4	2.8	7.46	7.59	7.71	0.81	-248	-253	-257	-260	-258	-255	-252
							7/8"	**1"**	**1 1/8"**								
-40	5	11.15	6.32	7.55	0.6	4	9.17	9.3	9.42	†	-353	-361	-363	-263	-364	-362	-360
-42	5.25	11.4	6.57	7.8	0.6	4	9.42	9.55	9.67	†	-355	-362	-364	-264	-365	-363	-361
-44	5.5	11.65	6.82	8.05	0.6	4	9.67	9.8	9.92	†	-357	-363	-365	-265	-366	-364	-362
-46	5.75	11.9	7.07	8.3	0.6	4	9.92	10.05	10.17	†	-359	-364	-366	-266	-367	-365	-363
-48	6	12.15	7.32	8.55	0.6	4	10.17	10.3	10.42	†	-361	-365	-367	-267	-368	-366	-364
-50	6.25	12.4	7.57	8.8	0.6	4	10.42	10.55	10.67	†	-362	-366	-368	-268	-369	-367	-365
-52	6.5	12.65	7.82	9.05	0.6	4	10.67	10.8	10.92	†	-363	-367	-369	-269	-370	-368	-366
-54	6.75	12.9	8.07	9.3	0.6	4	10.92	11.05	11.17	†	-364	-368	-370	-270	-371	-369	-367
-56	7	13.15	8.32	9.55	0.6	4	11.17	11.3	11.42	†	-365	-369	-371	-271	-372	-370	-368
-58	7.25	13.4	8.57	9.8	0.6	4	11.42	11.55	11.67	†	-366	-370	-372	-272	-373	-371	-369
-60	7.5	13.65	8.82	10.05	0.6	4	11.67	11.8	11.92	†	-367	-371	-373	-273	-374	-372	-370
-62	7.75	13.9	9.07	10.3	0.6	4	11.92	12.05	12.17	†	-368	-372	-374	-274	-375	-373	-371
-64	8	14.15	9.32	10.55	0.6	4	12.17	12.3	12.42	†	-369	-373	-375	-274	-376	-374	-372

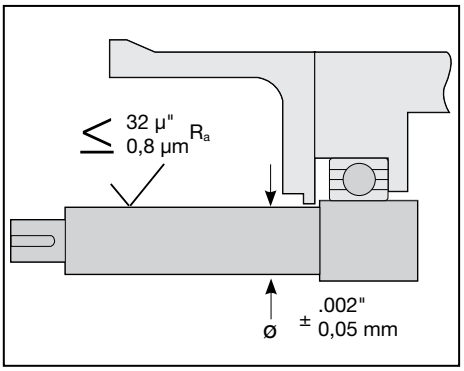
† **Note:**1. Bolt Circle Manufactured to Customer Specifications

4.0 PREPARATION FOR INSTALLATION

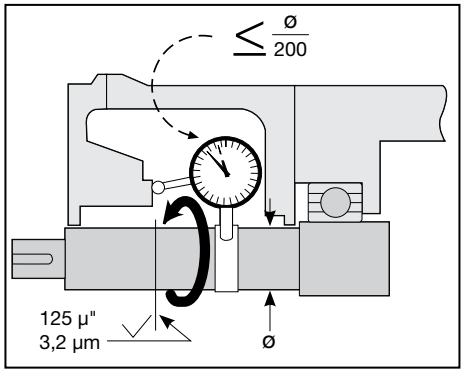
4.1 Equipment



1 If practical, place the dial indicator tip on the end of the shaft sleeve or on a step in the shaft to measure end play. Alternately push and pull the shaft in the axial direction. If the bearings are in good condition, end play should not exceed 0,13 mm (.005").

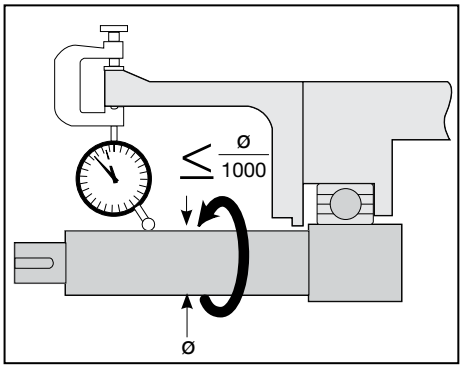


3 Remove all sharp corners, burrs, and scratches on the shaft, especially in areas where the O-Ring will slide, and polish if necessary to achieve a 0,8 micron (32 microinch) Ra finish. Make sure the shaft or sleeve diameter is within 0,05 mm (.002") of nominal.



2 If possible, attach a base dial indicator to the shaft and rotate both the indicator and shaft slowly while reading the runout of the stuffing box face. Misalignment of the stuffing box face relative to the shaft should not exceed 0,005 mm TIR per mm (.005 in per inch) of shaft diameter.

The stuffing box face must be flat and smooth enough to seal the gland. Surface roughness should be 3,2 microns (125 microinch) Ra maximum for gaskets and 0,8 micron (32 microinch) Ra for O-Rings. Steps between halves of split case pumps should be machined flat. Make sure the stuffing box is clean and clear along its entire length.



4 Use a dial indicator to measure the shaft runout in the area where the seal will be installed. Runout should not exceed 0,001 mm TIR per millimeter (.001 inch TIR per inch) of shaft diameter.

5 Protect the shaft O-Ring by lubricating the shaft with a clean silicone based lubricant, such as that provided with the seal.

6 Check availability of clean dry barrier gas. The seal uses gas (Nitrogen) to seal the product from the environment and lubricate the seal faces. 7.4 NL/m (15 SCFH) of barrier gas must be available at 2 bar (30 psi) over the maximum stuffing box pressure and filtered to a maximum particle size of 3 microns with a dew point of <-29°C (-20°F). Alternate gas can be used for barrier gas supply if it is compatible with the product and the environment.

4.2 4410 TwinHydrostatic™ Gas Seal

1. Review seal packaging ensuring no damage or shortage has occurred to the contents.
2. Review the seal fit dimensions in Table 1 to ensure the equipment to be sealed has the required dimensions.
3. On the cover page, record the seal Item Number and Name found on the label for referencing when contacting A.W. Chesterton Application Engineering.
4. Check the chemical listing to determine if the O-Rings installed in this seal are compatible with the fluid being sealed.
5. The dog point set screws go into the small holes in the sleeve. Do not disengage these screws from the sleeve when positioning the seal.

   The cup point set screws go through the larger holes in the sleeve.

IMPORTANT: There are three (3) ¼" dog point set screws and 6 cup point set screws for sizes from 2 ⅝" to 4 ¾" (65 mm – 120 mm) and three (3) ¼" dog point set screw and 9 cup point set screws for sizes from 5" to 8" (125 mm – 200 mm).

6. To reposition or remove the seal, make sure all the centering clips and socket head cap screws are engaged.

IMPORTANT: There are 3 centering slips for sizes from 2 ⅝" to 4 ¾" (65 mm -120 mm) and 6 centering clips from sizes from 5" to 8" (125 mm – 200 mm).

7. Centering clips have been preset at the factory. If for any reason you loosen or remove the centering clip cap screw, retighten as follows prior to installing the seal on the equipment: Tighten the cap screw finger tight.; then using a hex wrench, tighten the cap screw an additional 1/8 turn. This will approximate the 40 inch-pounds of torque for 5" to 8" (125 mm – 200 mm) set at the factory.
8. Make sure that the lip on the end of the gland is inside the inner centering clip groove and the lock ring lip engages the outer centering clip groove.

CAUTION: The cup point set screw installed in the lock ring are hardened steel to ensure that the seal maintains position with the higher axial loads associated with the use of gas seals. Slide the seal onto the shaft making sure the dog point set screws are engaged in and not through the sleeve.

5.0 SEAL INSTALLATION

1. Slide the completely assembled 4410 seal onto the shaft by pushing on the lock ring. Make sure that all the set screw are engaged in the sleeve but do not protrude into the sleeve inside diameter bore.
2. Reassemble the pump and make necessary shaft alignments and impeller adjustments.
3. Orient the flush and barrier gas supply connection to the location required ***(see TABLE 2).*** The ports are plugged prior to shipping. ***CAUTION: Shipping plugs limit the dirt and contamination which could enter the seal and cause seal malfunction. When plugs are removed ensure that dirt, liquid and contamination do not enter the seal ports.***

TABLE 2 – Gland Port Functions

PORT LABEL	PORT FUNCTION
"S"	Barrier Gas Supply
"F"	Flush - Environmental
"BG"	Monitor Face Pressure
"CG"	Monitor Closing Pressure
"X"	Manufacturing Port (Do Not Use)

4. Piping connections should not be made prior to tightening the stuffing box bolts.
5. Tighten the stuffing box bolts evenly. ***IMPORTANT: The stuffing box bolts must be tightened before tightening the set screws onto the shaft.***
6. ***IMPORTANT: All the dog point set screws must be tightened FIRST in order. See Seal Maintenance and Repair step 14 for location of dog point set screws.*** If rotation of the lock ring is required for tightening set screws, loosen or remove one centering clip. Once the dog point set screws are tightened, evenly tighten the cup point set screws to the shaft in order, with the hex key provided. After all set screws have been tightened by hand, retighten the set screws with a torque wrench to values shown in TABLE 3.

TABLE 3 – Recommended Torque Values

Seal Size	Dog Point & Cup Point Set Screws		Stuffing Box Bolts*
	Torque	Wrench Size	
65 mm to 120 mm (2.625" up to 4.875")	7,3 - 8,3 N-m (65 - 75 in-lbf)	4 mm	34 - 48 N-m (25 - 35 ft-lbf)
125 mm to 200 mm (5.00" to 8")	13.5 - 15.2 N-m (120 - 135 in-lbf)	5 mm	34 - 48 N-m (25 - 35 ft-lbf)

* Typical Values; to be adjusted for each application.

7. Remove socket head cap screws and the centering clips. Retain for later use.
8. ***IMPORTANT: It is important to make sure that the gland is properly centered over the sleeve.*** To do this, turn the shaft by hand to make sure the seal turns freely. If you hear metal to metal contact within the seal, it was improperly centered. Re-install the centering clips finger tight. Loosen the gland bolts. Fully tighten clips. Loosen the set screws. Re-tighten the gland bolts. Re-tighten the set screws. Remove the clips. If metal to metal contact still exists check the centering of the stuffing box.
9. ***THE GAS SUPPLY PORTS ARE 1/4" NPT. THE FLUSH CONNECTIONS ARE 1/4" NPT FOR SIZES FROM 2 5/8" TO 4 3/4" (65 mm –120 mm) AND 3/8" NPT FOR THE SIZES FROM 5" TO 8" (125 mm – 200 mm).***
10. Determine if a flush/recirculation port is required. The flush (marked "F") connection is the NPT port on the outer diameter of the adapter housing (inner gland). If so, remove the shipping plug and connect the pump discharge or suction to the flush port using a recirculation line(bleed from discharge [API Plan 11] or connect to suction [API Plan 13]). This is recommended in seal applications where the gas supply may be lost during operation. Plug the flush port if no connection is used. This connection may also be used to monitor stuffing box pressure by installing a connection to a pressure gauge.
11. The gas supply port is marked with an "S" on the outer diameter of the gland. See Seal Assembly and Repair steps 22 and 24 for location of the gas supply port. Supply gas is to be connected to the gas supply port by removing the shipping plugs and installing a 1/4" NPT connection from the gas supply system. Purge the gas supply line prior to connecting to the seal port to insure it is free of contamination, dirt and liquid. Insure no burrs, restrictions or liquid legs are present in the supply line. Opposite the gas supply port are two 1/4" NPT gauge ports marked with "BG" and "CG" on the outer diameter of the gland, which may be utilized for monitoring the barrier and closing pressure respectively. See Seal Assembly and Repair step 25 for location of the pressure gauge ports. I***MPORTANT: The gas supply must be on whenever the pump is pressurized or contains product.***

    Full pressure supply gas can be piped directly to the gas supply port. The seal Dual In-Gland Control System (DIGCS) will maintain the preset differential pressures between the barrier gas and process fluid (~ 20 psi), and between closing gas and process fluid (~ 25 psi) respectively. ***IMPORTANT: The pressure differentials can be adjusted by tightening or loosening the hex head adjustment screws on the side of the adapter (inner gland housing) for desired flow consumption. Make sure the closing pressure IS EQUAL OR HIGHER than the barrier pressure AT ALL TIMES or seal failure may result. CAUTION: Operation without sufficient gas supply can cause a loss in seal performance or failure.***
12. Take all necessary precautions and follow normal safety procedures before starting the equipment.
13. The 4410 Barrier and closing pressure controls may be adjusted at startup to obtain optimum seal performance and gas usage. The hex head adjustment screws (5/16" for

5.0 SEAL INSTALLATION cont.

sizes from 2 5/8" to 4 3/4" (65 mm-120 mm); 7/16" for sizes from 5" to 8" (125 mm-200 mm) are located on the inner side of the seal housing and are marked with a “B” and “C” for barrier and closing adjustment respectively. The barrier gas pressure as referenced above must be above the vessel or stuffing box pressure in the range of 11 to 23 psi (0,7-1,6 Bar) differential. The closing pressure monitored on the “CG” port must always be higher than the barrier pressure monitored on the “BG” port. The flowmeter installed in the barrier gas supply line should indicate a flow (1 SCFH/0.5 Nl/min minimum to 5 SCFH/2.5 Nl/min) to the seal during operation.

The barrier gas usage may vary during start-up and changing conditions and should not exceed 10 SCFH (5.0 Nl/min). In the event of high barrier gas usage readings, after the gas seal system has stabilized, an adjustment of the “B” adjustment screw can be made to decrease the barrier gas pressure and therefore the usage. In the event of low barrier gas usage readings on the flowmeter an adjustment of the “C” adjustment screw can be made to decrease the closing gas pressure and therefore increase the gas usage. Do not decrease closing gas pressure below the barrier gas pressure.

6.0 COMMISSIONING / EQUIPMENT START UP

1. If possible, turn the shaft by hand to ensure free rotation with no shaft binding. A slight drag may be found due to the seal faces but the shaft should rotate freely.
2. Ensure the pump is primed and all piping connections are correctly fitted and fittings are leak-free. Fill and vent the equipment in accordance with the instructions of the equipment manufacturer. Ensure barrier gas is connected and available to the 4410 gas seal.
3. Before starting the equipment, ensure all nuts and screws are securely fastened.
4. Take all necessary precautions and follow normal safety procedures before starting the equipment.

Please Contact Chesterton Mechanical Seal Application Engineering for assistance regarding gas seals.

7.0 DECOMMISSIONING / EQUIPMENT SHUT DOWN

Ensure that the equipment is electrically isolated. If the equipment has been used on toxic or hazardous fluids, ensure that the equipment is correctly decontaminated and made safe prior to commencing work. Ensure that the pump is isolated and check that stuffing box is drained from any fluid and pressure is fully released. Dismantle the equipment according to the equipment instruction manual and remove the seal in the reverse order to installation. In case of disposal, ensure the local regulations and requirement for disposal or recycling of the different components in the seal are adhered to.

8.0 SPARE PARTS

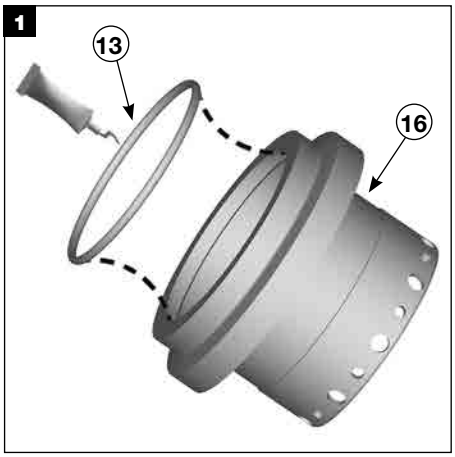
Use only Chesterton original spare parts. Use of non-original spare parts represents risk of failure, danger to persons/equipment and voids the product warranty.

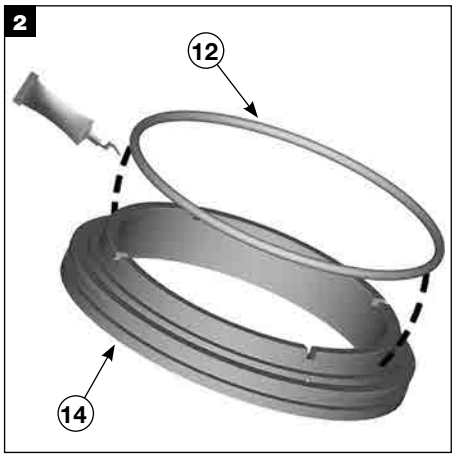
Spare Parts Kit can be purchased from Chesterton, referencing the recorded seal data from cover page.

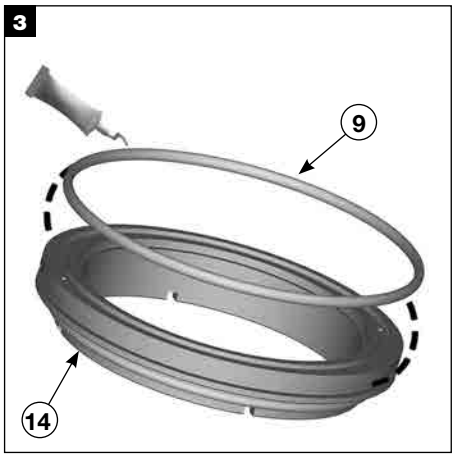
In Gland Control System Rebuild/Spare Parts Kit must be ordered separate from 4410 TwinHydrostatic Gas Seal Rebuild/Spare Parts Kit. Reference the recorded seal data from cover page when ordering IGCS Rebuild/Spare Parts Kit.

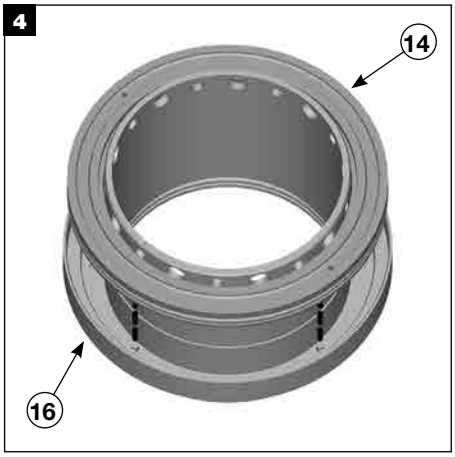
9.0 SEAL MAINTENANCE AND REPAIR

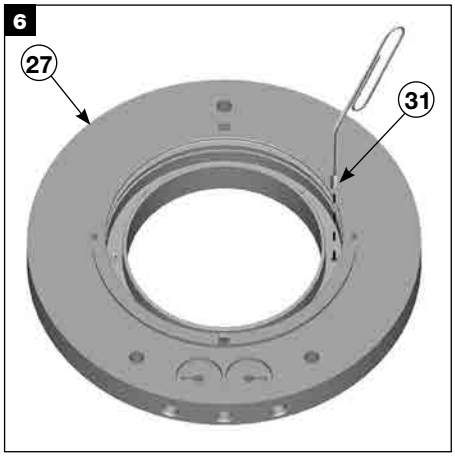
9.1 Rebuild Instructions

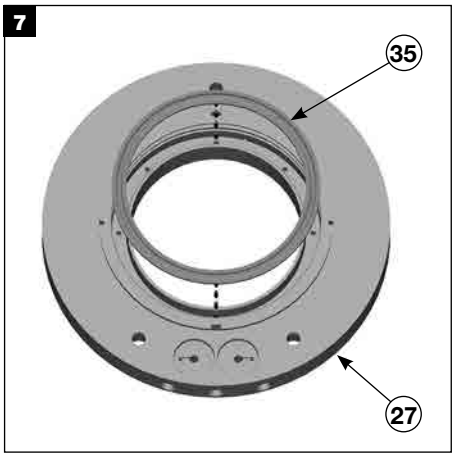


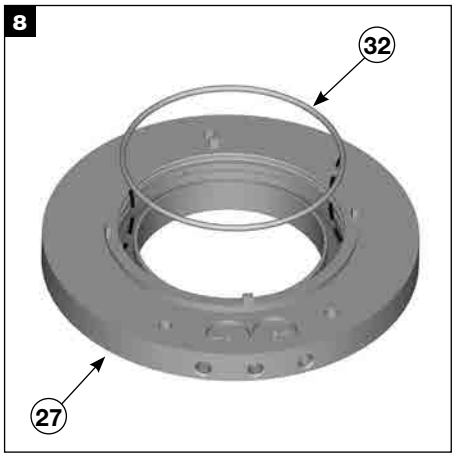


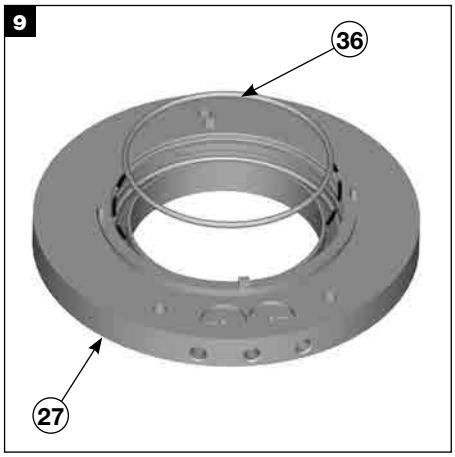












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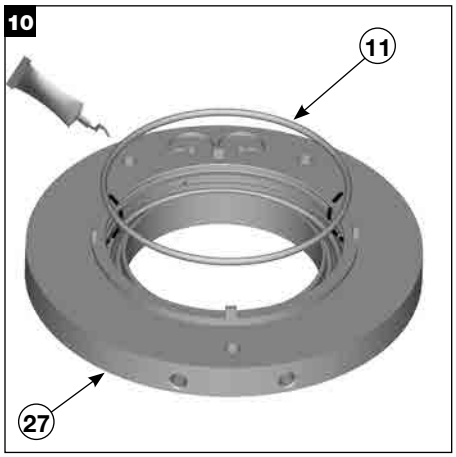

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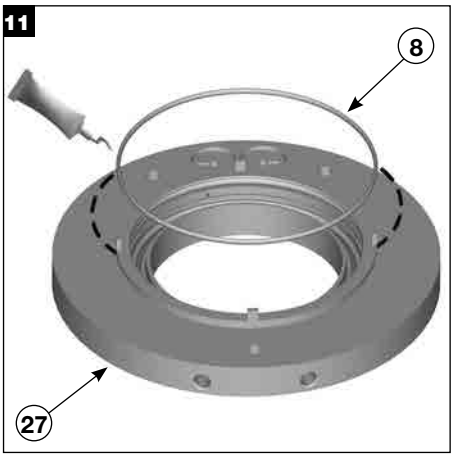

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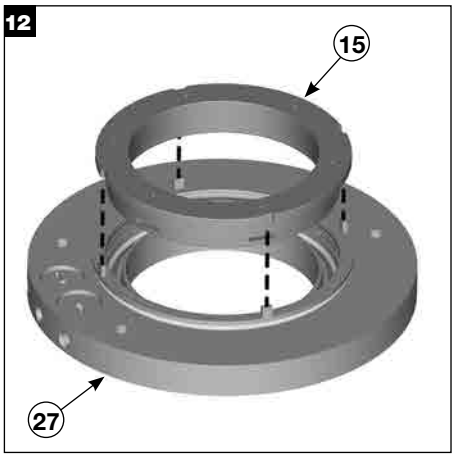

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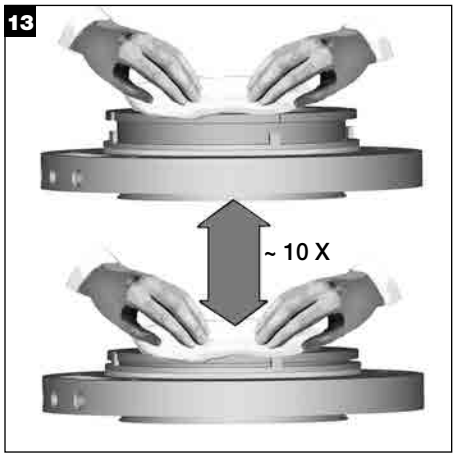

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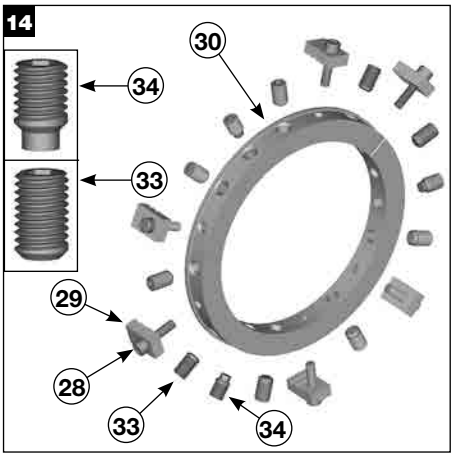

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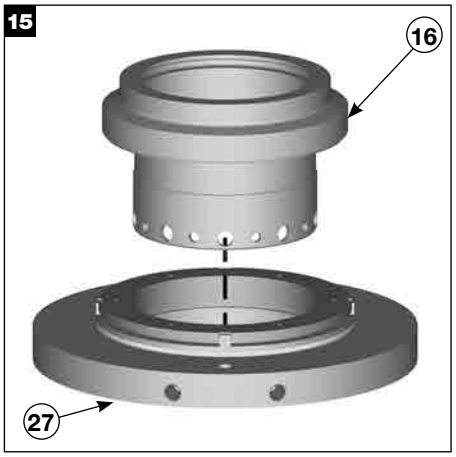

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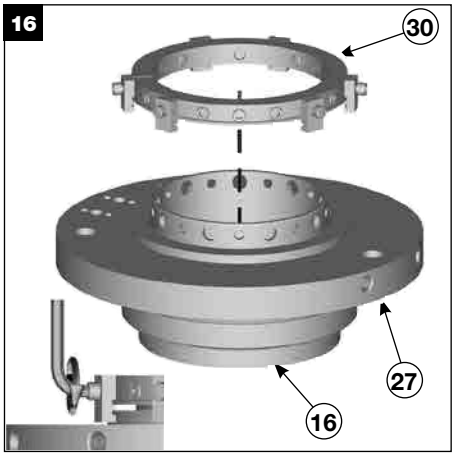

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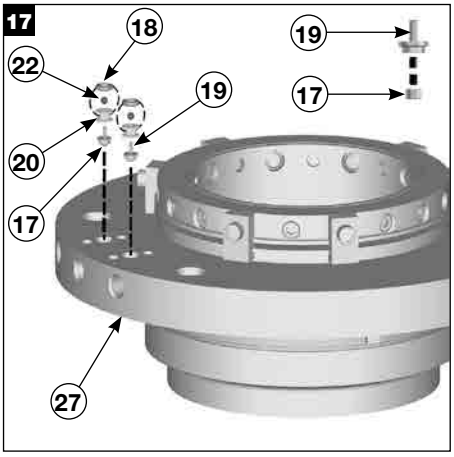

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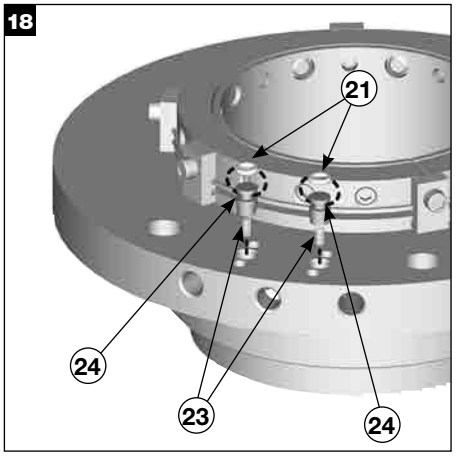

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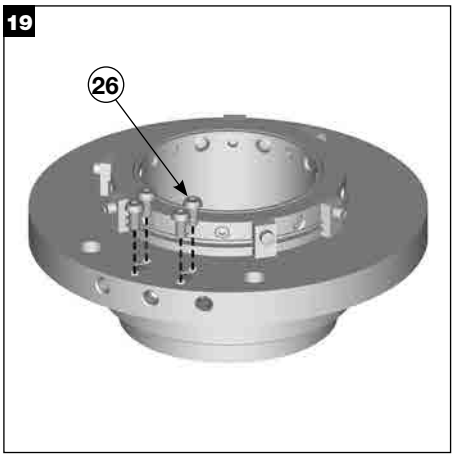

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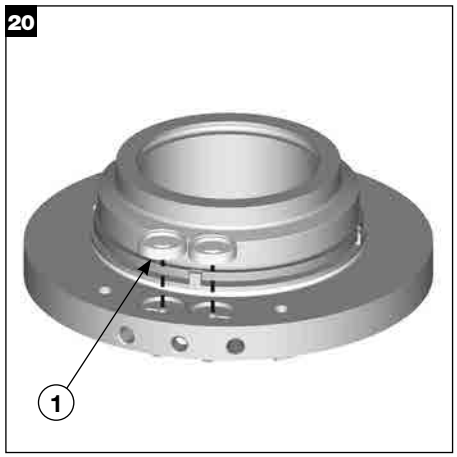

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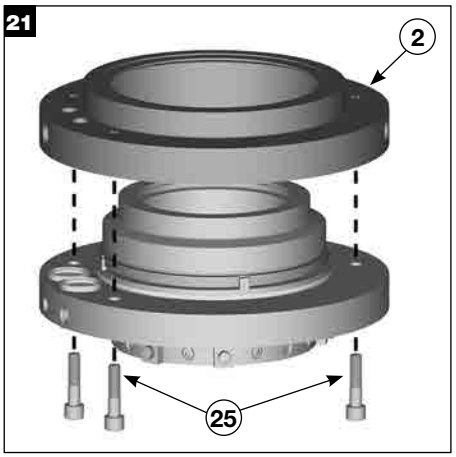

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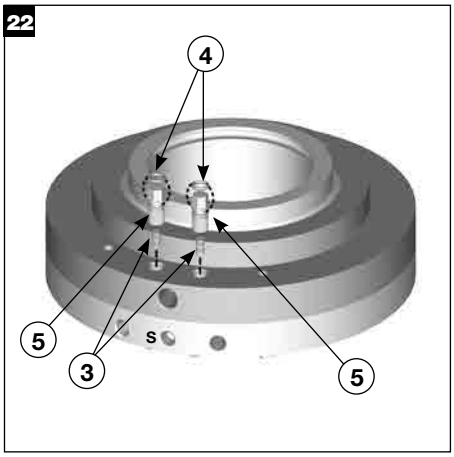

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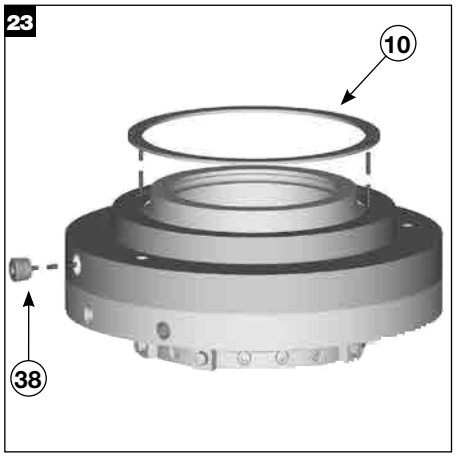

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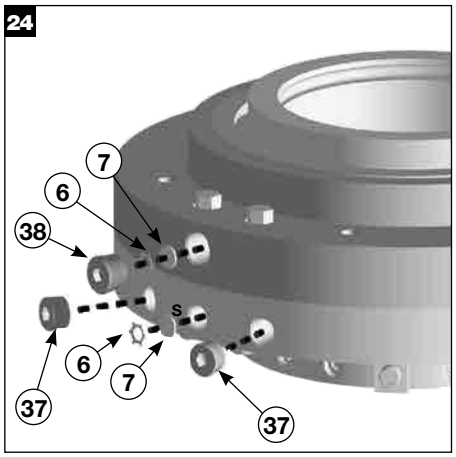

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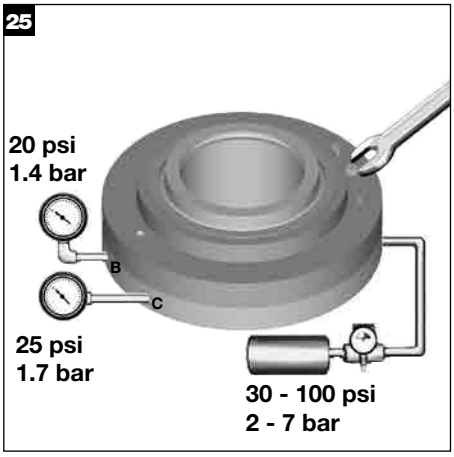

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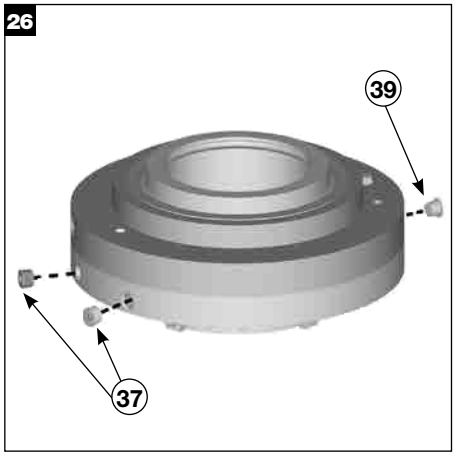

27

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