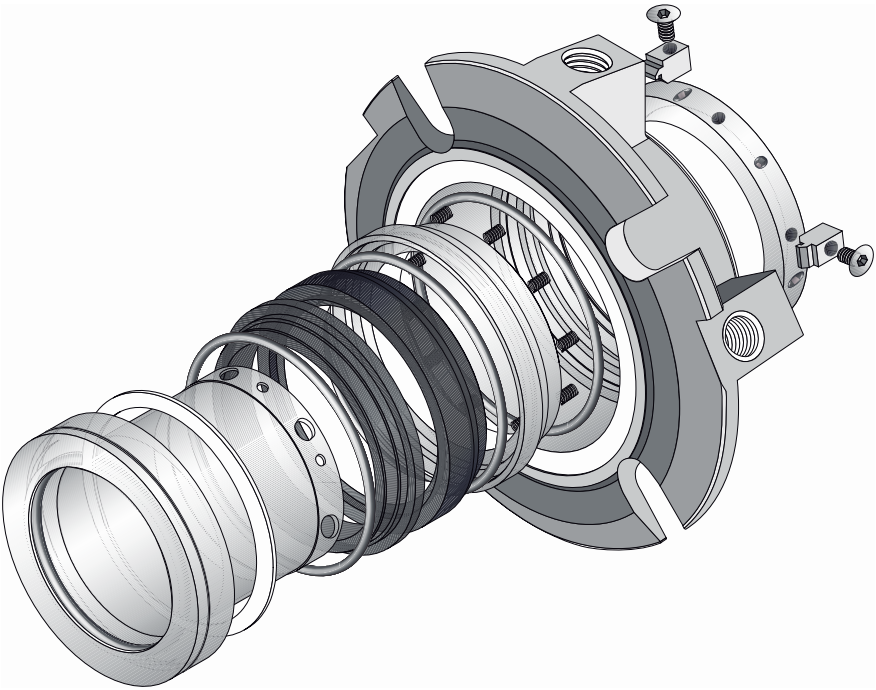
FLOWSERVE

Repair Instructions

ISC

ISC1PX
Single Pusher Seal

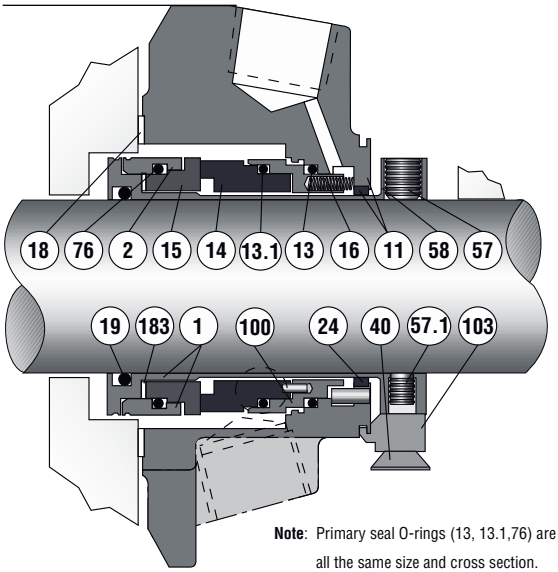


Experience In Motion

These instructions are written for trained, experienced technicians familiar with the basic principles and tools involved in the installation, care and service of mechanical seals and seal support systems. A complete reading of these instructions by personnel in contact with the equipment is essential to safety. Incorrect installation, operation or maintenance can result in personal injury or death to personnel and damage to the equipment.

1 Nomenclature

Figure 1



Note: Primary seal O-rings (13, 13.1,76) are all the same size and cross section.

Table 1

14	Stationary Face
15	Rotating Face
16	Springs
100	Stator Face Support
13	Dynamic (seat gasket)
13.1	Stator (seat gasket)
76	Rotating Face Gasket
18	Gland Gasket
11	Gland Assembly
24	Gland Bushing
103	Setting Device
40	Cap Screw
1	Sleeve Assembly
2	Seal Drive
183	Vibration Dampener
58	Drive Collar
57	Cup Point Set Screw
57.1	Quarter Dog Set Screw
19	Sleeve Gasket

2 Disassembly

When disassembling seal, inspect for conditions which may have caused the need for the seal to be removed from service. If seal was removed due to premature failure, determine what conditions caused that failure and correct any problems prior to returning the repaired seal to service. For assistance with seal failure analysis, please contact your Flowserve representative.

Seal Parts that are always replaced

- Stationary Face (14)
- Rotating Face (15)
- Springs (16)
- Stator Face Support (100)
- All O-rings (13), (13.1), (76), (19)
- Gland gasket (18)
- Vibration dampener (183)
- Setting Devices (103) and cap screws (40)
- Cup point and quarter dog set screws (57) and (57.1)
- Gland Bushing (24)

Reconditionable Seal Parts

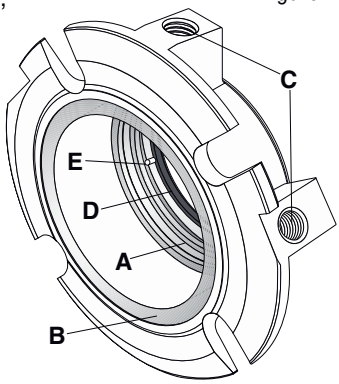
- Gland assembly (11)
- Sleeve assembly (1)
- Drive collar (58)
- Seal Drive (2)

3 Inspection and Reconditioning

3.1 There are certain critical areas of each part where special attention should be paid to the condition. If any of the areas listed in 3.2, 3.3 or 3.4 show signs of wear, corrosion, or other defects that cannot be removed without affecting the dimensional size of the surfaces by more than 0.001 to 0.002", then the respective part should be replaced. If grit blasting is performed, it may be necessary to polish the O-ring surfaces to achieve the required surface finish (see 3.2A and 3.3A for the required surface finish). If any parts require machining to correct damage, please contact your Flowserve representative for dimensional requirements, or for any other questions regarding repair.

3.2 **Gland Assembly** (11) (Figure 2)

Figure 2



A **Dynamic O-ring surface** - Inspect for wear, fretting, nicks, scratches, or corrosion. *Required surface finish*: 32 RMS

B **Gasket surface** - Remove the old gasket and clean the gasket surface. Inspect for nicks, scratches, or corrosion.

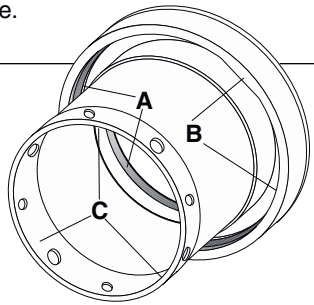
C **Pipe taps and other threaded holes** - Inspect for damaged threads or corrosion. Taps must be clean and free of debris and corrosion. Re-tap as necessary.

D **Bushing** - Inspect for wear, breakage, or loosened bond with gland. Replace using Loctite®[1] 7471 Primer T and Loctite RC™/ 640 or equivalent to adhere the bushing if any of these conditions exist. A ten minute cure at 400°F (204°C) is required to achieve full bond strength.

E **Anti-rotation pins** - Inspect for wear or corrosion. If worn or corroded, contact your Flowserve representative.

3.3 **Sleeve Assembly** (1) (Figure 3)

Figure 3



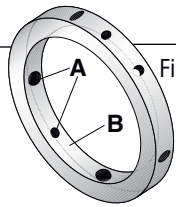
A **O-ring surfaces** - Inspect for wear, nicks, scratches, or corrosion. *Required surface finish*: 63 RMS.

B **Seal Drive** (2) - Inspect for wear or corrosion, especially at drive flat surfaces on ID of drive ring.

C **Drive end roundness** - No greater than 0.001" TIR

3.4 **Drive Collar** (58) (Figure 4)

Figure 4



A **Threaded holes** - Inspect for thread damage and re-tap as necessary.

B **ID bore roundness** - no greater than 0.002" TIR

C **Set screws** - Replace cup point and dog point set screws with those included with the repair kit. Make sure the same threaded holes are used with the same type set screws.

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4 Seal Assembly Instructions

4.1 Tools Required

- $^{3}/_{32}$", $^{1}/_{8}$" hex key wrenches (Sizes < 2.625"); $^{1}/_{8}$", $^{3}/_{16}$" hex key wrenches (Sizes 2.625" and larger)
- Silicone grease (included in repair kit)
- Ethyl alcohol and clean, lint free towel for cleaning seal faces

4.2 As part of the assembly of the seal, there are several blind fits of pins and drive flats. It may be helpful to mark the locations of the pins or drive flats with a felt tip marker, or to align the feature with another visible feature on the seal to assist with assembly. All seal faces should be cleaned with alcohol prior to placing the faces together at each respective step in the assembly process.

4.3 Arrange O-rings by diametrical size. There are two sizes: three of the largest size (O-rings (13), (13.1), and (76)), and one of the smallest size (O-ring (19)). Prior to installing each O-ring at its respective step, lightly lubricate with silicone grease and stretch slightly.

4.4 Place the sleeve assembly (1) on a flat surface with the drive collar end facing up. Install the vibration dampener (183) into sleeve end housing. Place the rotating face O-ring (76) in sleeve O-ring groove behind surface with drive flats in sleeve. Install sleeve gasket O-ring in groove in ID of sleeve. (Figure 5)

4.5 Align the two flats on the rotating face (15) with the two flats on the inside of the seal drive (2) and press the rotating face into place using finger pressure only. (Figure 6)

Figure 5

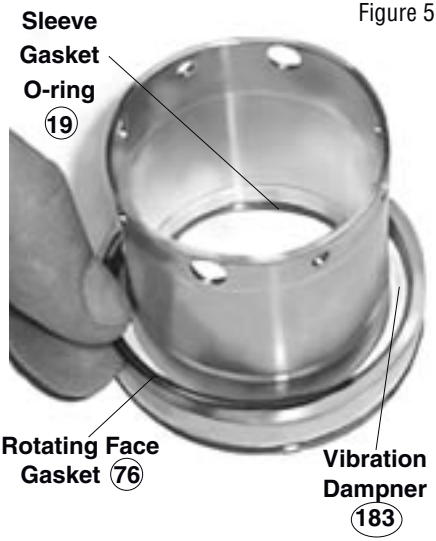


Figure 6

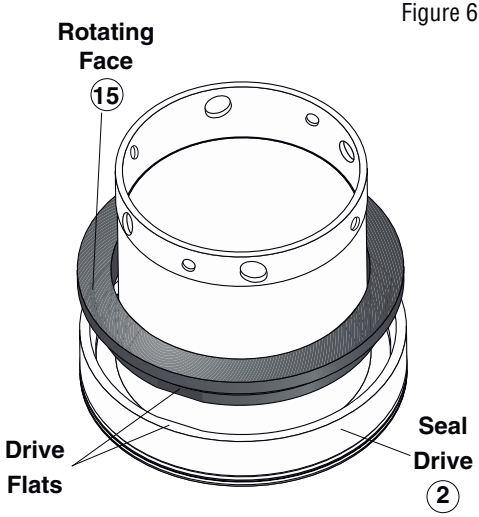


Figure 7

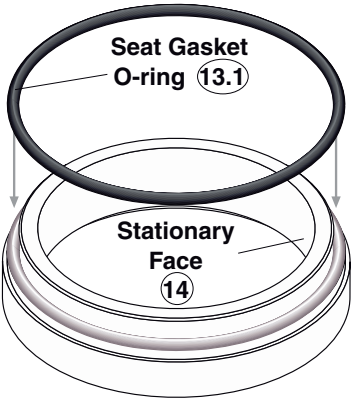
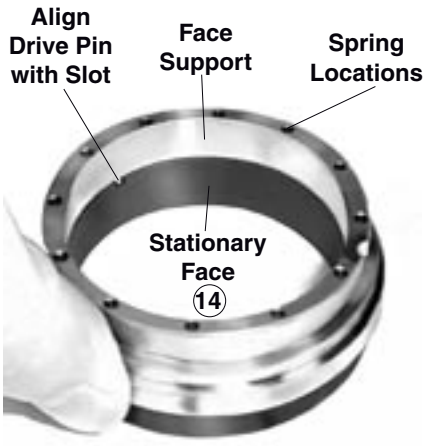


Figure 8



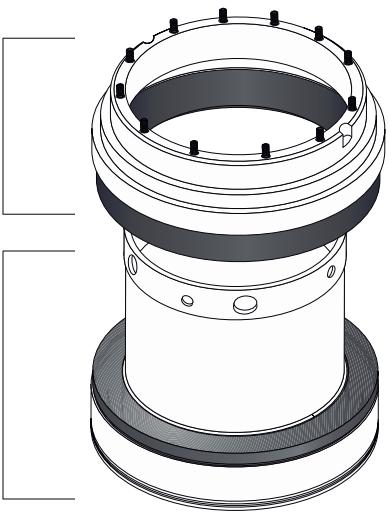
4.6 Place the seat gasket O-ring (13.1) on the O-ring surface of the stationary face (14), which is the smallest outside diameter. Place the stationary face with the sealing face down on a clean, flat surface. (Figure 7)

4.7 Align the stationary face drive pins in stator face support (100) with the drive slots in the stationary face and press the stationary face support in place using finger pressure only. (Figure 8)

4.8 Install the springs (16) in holes of stator face support.

4.9 Place the stationary face and stationary face support assembly face down onto the sleeve/rotating face assembly. (Figure 9)

Figure 9



4.10 Place the outboard dynamic seat gasket O-ring (13) in the dynamic O-ring surface of the gland assembly. (Figure 10)

4.11 Align the gland assembly drive pins (Figure 10) with the slots in the outside diameter of the stationary face support. Firmly and evenly press the gland onto the stationary face support. (Figure 11)

Caution: do not rotate the gland to align pins while pressing down. This could damage the springs. Once the gland is in the proper position do not rotate it until the seal is fully assembled to ensure that the pins remain engaged.

4.12 Place the drive collar (58) onto the end of the sleeve with the "Flowserve" logo facing up. (Figure 12) Align the quarter dog set screws with the smaller holes in the end of the sleeve. On smaller seal sizes, one of the quarter dog set screws will be offset by 15 degrees. Align this quarter dog set screw with the corresponding offset hole in the end of the sleeve. Do not tighten any set screws at this time. Install the setting devices (103) and flat head cap screws into the drive collar while engaged with the gland. Be sure to keep the drive collar aligned and be careful not to rotate the gland.

Figure 10

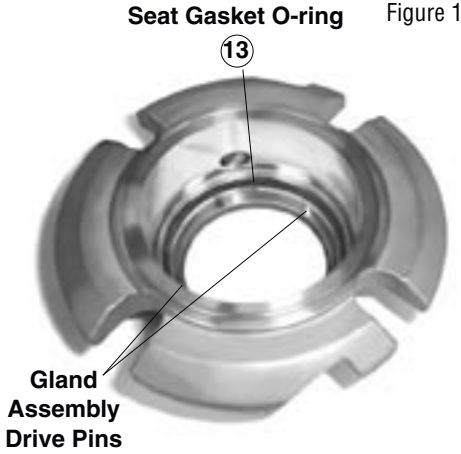


Figure 11

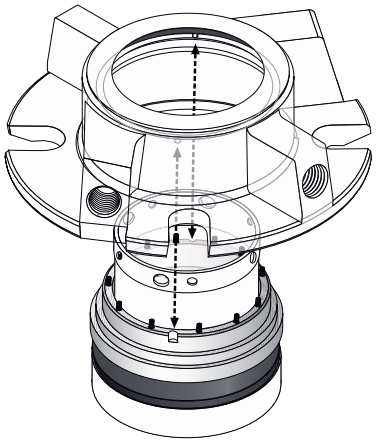
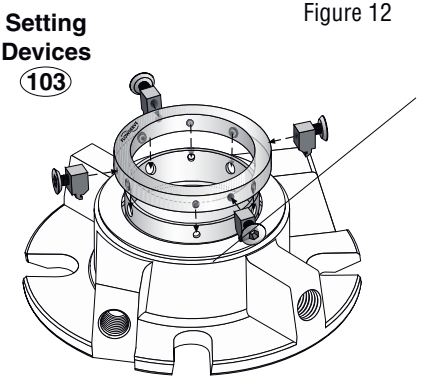


Figure 12



4.13 Compress the drive collar to be even with the end of the sleeve assembly. This will also compress the gland. While holding the collar in compression, tighten the quarter dog set screws into the holes in the sleeve until snug. (Figure 13) ***Be careful not to distort the sleeve by over tightening the quarter dog set screws.***

Figure 13

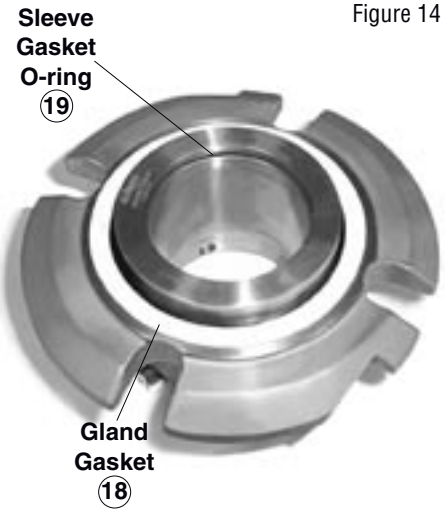


Note: if the drive collar cannot be compressed to be even with the end of the sleeve, the gland drive pins may not be aligned. *If this is the case, do not attempt to* ***rotate*** *the gland to align the pins.* The gland should be disassembled and re-aligned prior to proceeding further.

4.14 Install the sleeve gasket O-ring (19) into the inside diameter groove of the sleeve assembly. (Figure 14)

4.15 Apply an even coat of 3M® Super 77 spray adhesive, free of bubbles and nodules, to the gland gasket (18). Adhere the gasket to the gland gasket surface. (Figure 14)

Figure 14



5 Static Testing

5.1 Flowserve manufacturing typically air tests the ISC at 25 psig. A pressure drop of less than one pound at 25 psig is acceptable. To static test the seal, bolt it to a single seal test barrel or to the equipment. Secure the cup point set screws to the stub shaft or equipment shaft to prevent deformation of the setting devices due to axial loads. The seal may be pressurized through either of the tangential flush ports. If the seal does not pass the static pressure test, disassemble the seal and inspect for O-ring damage, as this is the most common cause of static test failure.

6 Installation

6.1 Refer to the ISC Installation Instructions, FIS120, for proper seal installation.

FLOWSERVE®

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FIS136eng 08/07 Printed in USA

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