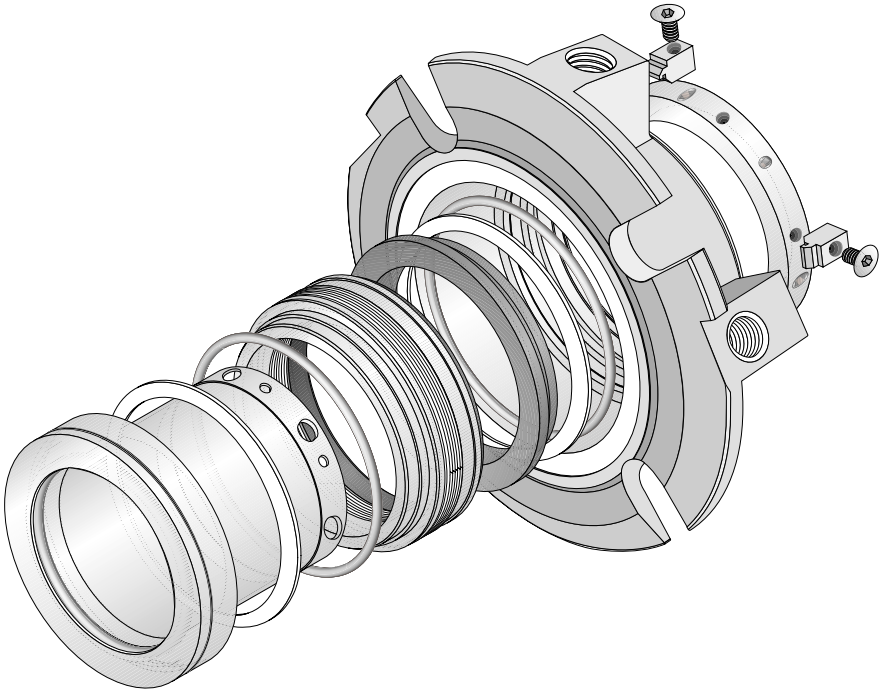


**ISC**

**ISC1BX  
Single Rotating Bellows Seal**



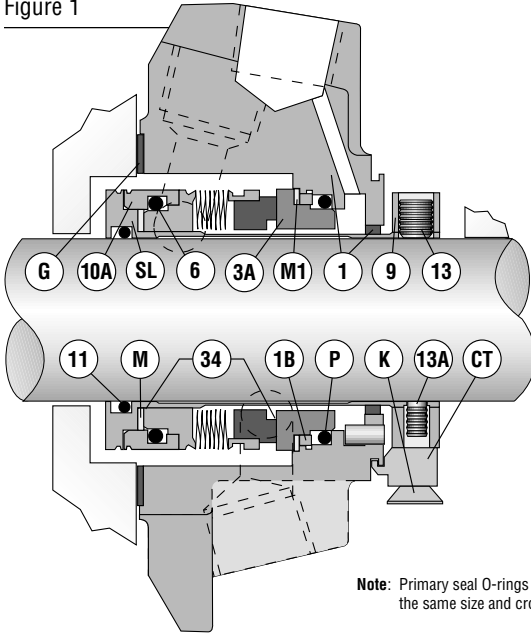
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**Repair Instructions**

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 (P and 6) are the same size and cross section.

Table 1

34	Bellows Assembly
3A	Mating Ring
P	Mating Ring O-Ring
6	Bellows O-Ring
11	Sleeve O-Ring
G	Gasket
1	Gland Assembly
1B	Gland Drive Ring
CT	Centering Tab
K	Centering Tab Cap Screw
SL	Sleeve Assembly
M	Vibration Dampener
M1	Bellows Vibration Dampener
10A	Driver Ring
9	Sleeve Collar
13	Cup Point Set Screw
13A	Quarter Dog Set Screw

## 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

- Bellows Assembly (34)
- Mating ring (3A)
- All O-rings (P), (6), (11)
- Gland gasket (G)
- Vibration dampener (M)
- Bellows Vibration dampener (M1)
- Centering tabs (CT) and cap screws (K)
- Cup point and quarter dog set screws (13) and (13A)

### Reconditionable Seal Parts

- Gland assembly (1)
- Sleeve assembly (SL)
- Sleeve collar (9)

### 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 ① (Figure 2)

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

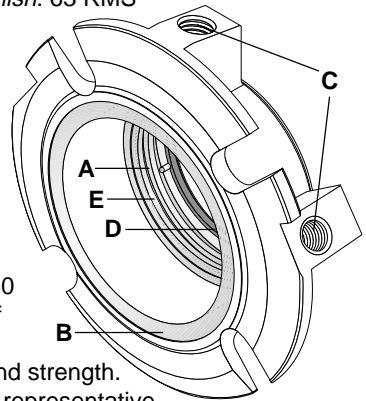
Figure 2

**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®<sup>1</sup> 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. If worn or corroded, contact your Flowserve representative.

**E Gland drive ring** - Inspect for wear or corrosion, especially at drive flat surfaces on ID of drive ring. If worn or corroded, contact your Flowserve representative.



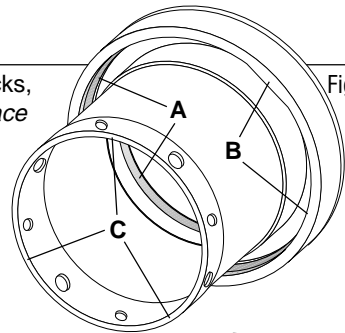
#### 3.3 Sleeve Assembly ② (Figure 3)

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

Figure 3

**B Drive Ring ⑩A** - 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 Sleeve Collar ⑨ (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.

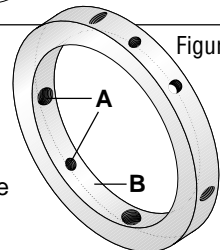


Figure 4

## 4 Seal Assembly Instructions

### 4.1 Tools Required

- $\frac{3}{32}$ " ,  $\frac{1}{8}$ " hex key wrenches (Sizes < 2.625");  $\frac{1}{8}$ " ,  $\frac{3}{16}$ " hex key wrenches (Sizes 2.625" and larger)
- Silicone grease (included in repair kit)
- Ethyl alcohol or acetone 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 ethyl alcohol or acetone 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: two of the largest size (O-rings **(P)** and **(6)**), and one of the smallest size (O-ring **(11)**). Prior to installing each O-ring at its respective step, lightly lubricate with silicone grease and stretch slightly.

4.4 Place the sleeve assembly **(SL)** on a flat surface with the collar end facing up. Install the vibration dampener **(M)** into sleeve end housing. Place the bellows O-ring **(6)** in sleeve O-ring groove behind surface with drive flats in sleeve. (Figure 5)

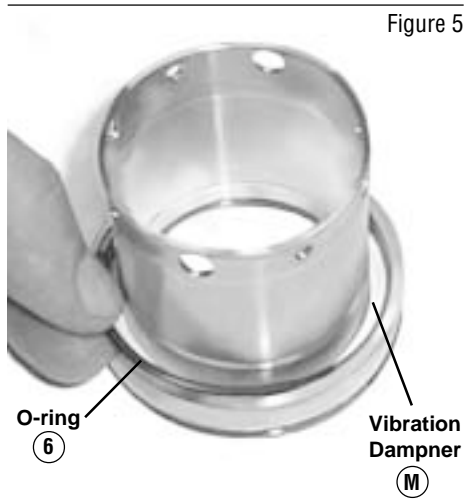


Figure 5

4.5 Align the two flats on the bellows assembly **(34)** with the two flats on the inside of the drive ring **(10A)** in the sleeve end housing, and press the bellows assembly into place using finger pressure only. **Caution:** Be careful not to over compress the bellows assembly. (Figure 6)

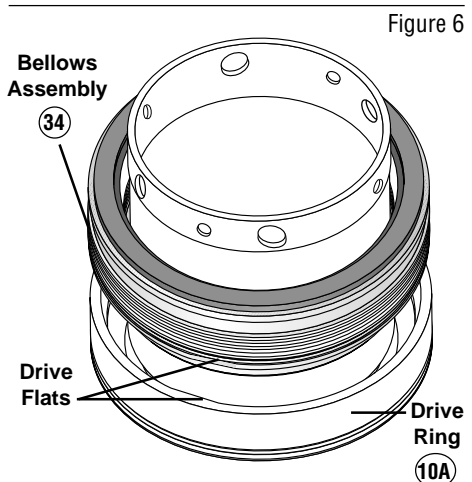
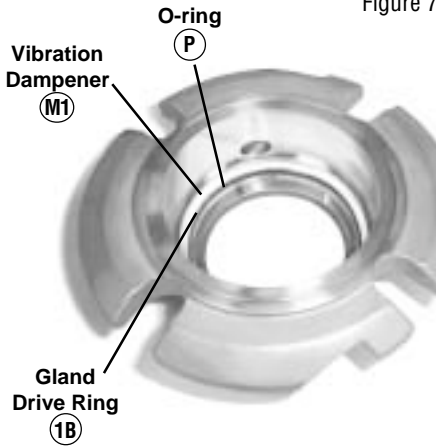


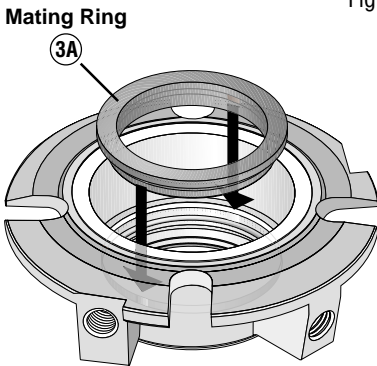
Figure 6

Figure 7



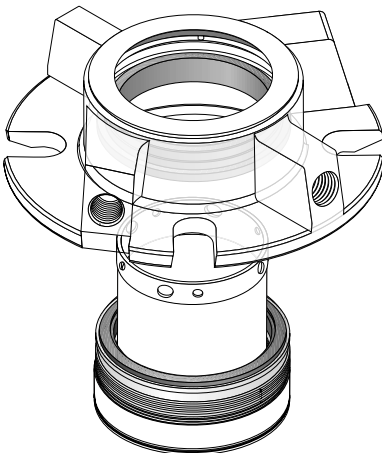
- 4.6 Place the mating ring O-ring (P) in the gland assembly behind the gland drive ring (1B). Place the vibration dampener (M) into the groove at the front surface of the gland drive ring. (Figure 7)

Figure 8



- 4.7 Align the two flats on the mating ring (3A) with the two flats on the inside of the gland drive ring in the gland assembly, and press the mating ring in place using finger pressure only. (Figure 8)

Figure 9



- 4.8 Place the gland/mating ring assembly face down over the sleeve/bellows assembly. (Figure 9)

4.9 Place the sleeve collar ⑨ onto the end of the sleeve with the "Flowserve" logo facing up. 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 centering tabs ① and flat head cap screws into the collar while engaged with the gland. Be sure to keep the collar aligned. (Figure 10)

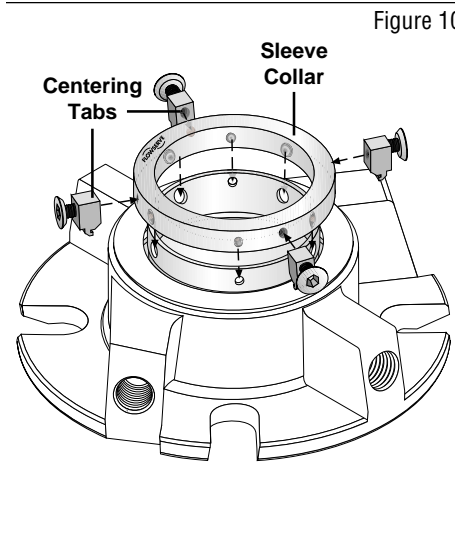


Figure 10

4.10 Using firm hand pressure, press down on the collar to be even with the end of the sleeve assembly. This will in turn press down the gland and inner gland, compressing the springs. While holding the collar even with the end of the sleeve assembly, tighten the quarter dog set screws into the holes in the sleeve until snug. **Be careful not to distort the sleeve by over tightening the quarter dog set screws.** (Figure 11)



Figure 11

4.11 Install the shaft O-ring ⑪ into the inside diameter groove of the sleeve assembly. (Figure 12)

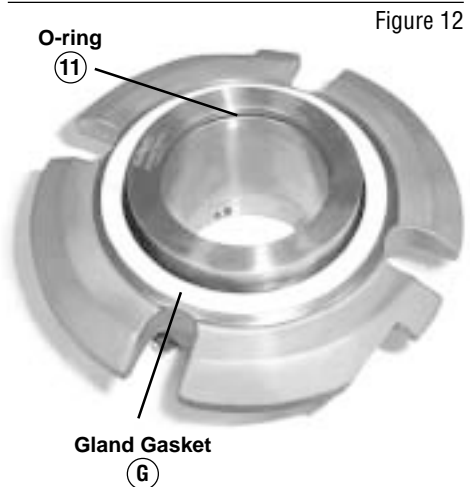


Figure 12

4.12 Adhere the gland gasket ⑥ to the gland gasket surface with a spray adhesive such as 3M Super 77<sup>®2</sup>. (Figure 12)

## **5 Static Testing**

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- 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 help prevent deformation of the centering tabs due to axial loads. The seal may be pressurized through either of the tangential flush ports, identified with the letter "F" cast into the gland. 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**

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

TO REORDER REFER TO

B/M # \_\_\_\_\_

F.O. \_\_\_\_\_

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The information and specifications presented in these repair instructions are believed to be accurate, but are not guaranteed by Flowserve as to completeness or accuracy. Although Flowserve Corporation can provide general application guidelines, it cannot provide specific information for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper selection, installation, operation and maintenance of Flowserve products. Because Flowserve Corporation is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice.

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United States	Canada	Netherlands	Argentina	Australia	
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