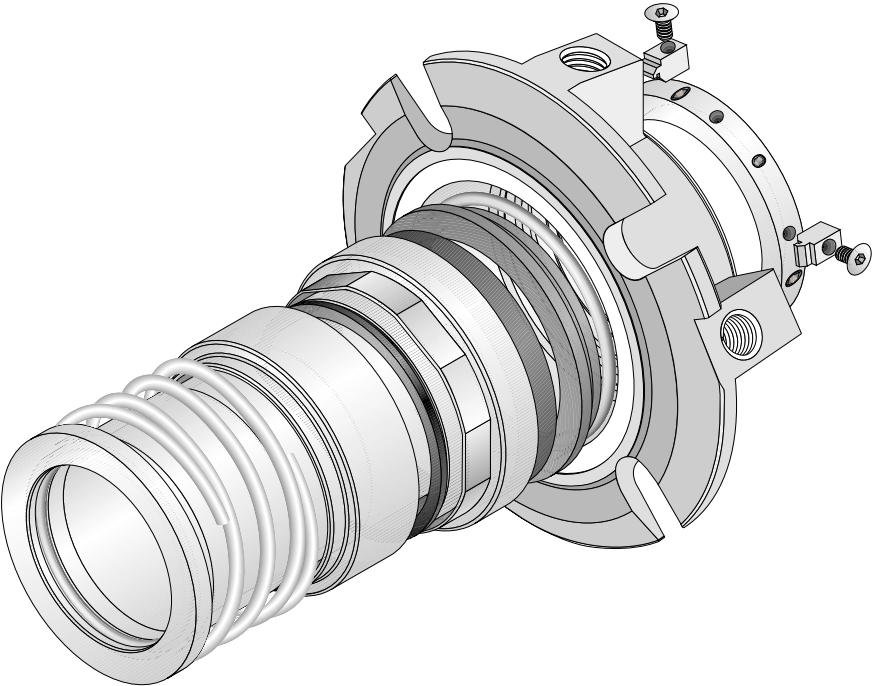


**ISC**

**ISC1EX  
Single Elastomer Bellows**



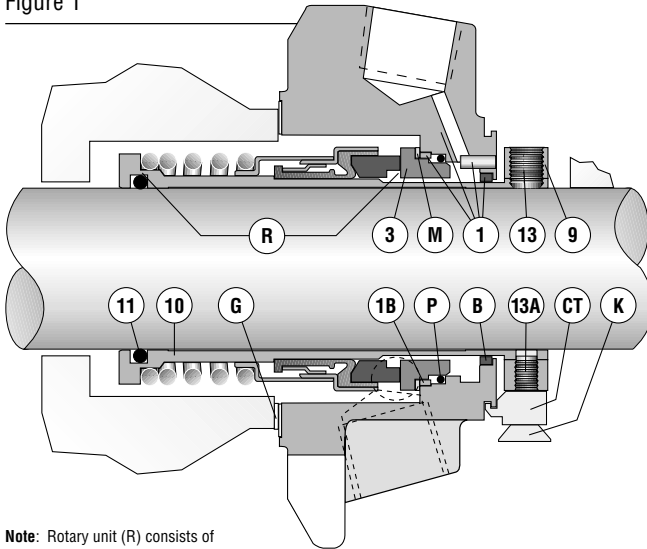
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**Repair Instructions**

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:** Rotary unit (R) consists of elastomer bellows rotary unit and single coil spring.

Table 1

<b>R</b>	Rotary Unit
<b>3</b>	Mating Ring
<b>P</b>	Mating Ring O-ring
<b>11</b>	Shaft O-ring
<b>G</b>	Gasket
<b>1</b>	Gland Assembly
<b>1B</b>	Gland Drive Ring
<b>B</b>	Carbon Bushing
<b>CT</b>	Centering Tab
<b>K</b>	Centering Tab Cap Screw
<b>10</b>	Sleeve
<b>M</b>	Bellows Vibration Dampener
<b>9</b>	Sleeve Collar
<b>13</b>	Cup Point Set Screw
<b>13A</b>	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

- Rotary unit (R)
- Mating ring (3)
- All O-rings (P) (11)
- Gland gasket (G)
- Bellows vibration dampener (M)
- Centering tabs (CT) and cap screws (K)
- Cup point and quarter dog set screws (13) (13A)

### Reconditionable Seal Parts

- Gland assembly (1)
- Sleeve (10)
- 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 listed areas 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 critical area listings for finish requirements). 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*

**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® 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 Gland drive ring ①B** - Inspect for wear or corrosion, especially at drive flat surfaces on ID of drive ring.

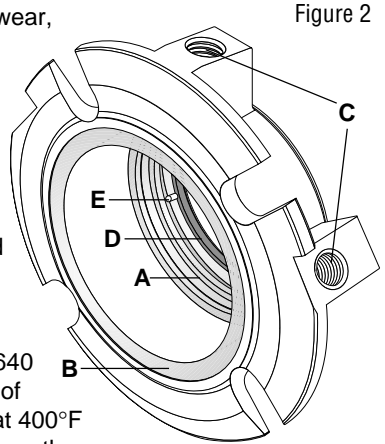


Figure 2

#### 3.3 Sleeve Assembly ⑩ (Figure 3)

**A O-ring surfaces** - Inspect for wear, nicks, scratches, or corrosion.

*Required surface finish: 63 RMS.*

**B Elastomer boot sealing surface** - Inspect for wear, nicks, or corrosion.

*Required surface finish:  
55 to 80 RMS*

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

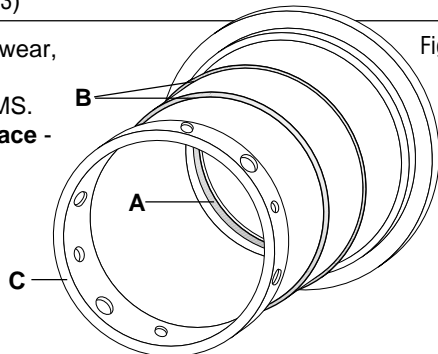


Figure 3

### 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.

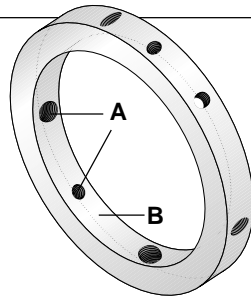


Figure 4

## 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)
- Pac-Ease™<sup>2</sup> lubricant (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 is a blind fit of the drive flats. It may be helpful to mark the locations of the 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 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: one of the largest size (O-ring ①), and one of the smallest size (O-ring ②). Prior to installing each O-ring at its respective step, lightly lubricate with silicone grease and stretch slightly.

4.4 Place the mating ring O-ring ① in the gland assembly in behind the gland drive ring ③. Place the bellows vibration dampener ④ into the groove at the front surface of the gland drive ring. (Figure 5)

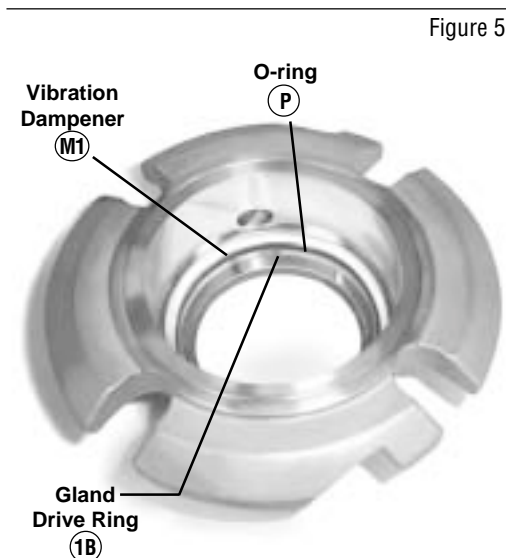
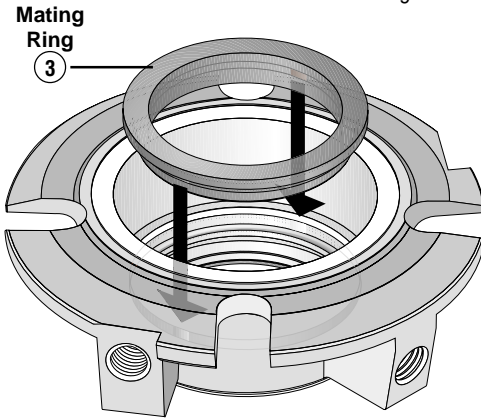


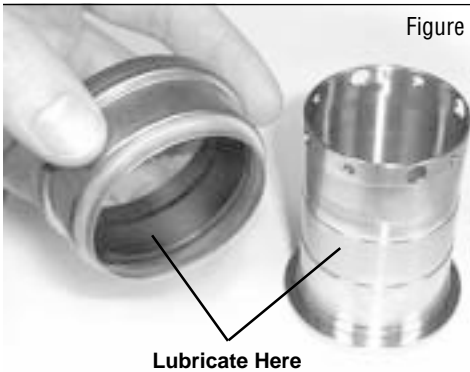
Figure 5

Figure 6



- 4.5 Align the two flats on the mating ring (3) with the two flats on the inside of the gland drive ring in the gland assembly, and press the mating ring into place using finger pressure only. (Figure 6)

Figure 7



- 4.6 Lubricate the elastomer boot drive surface of the sleeve (10) and the inside diameter of the elastomer boot on the elastomer bellows rotary unit using Pac-Ease lubricant. (Figure 7)

**Caution:** Do not use silicone lubricant or other types of lubricant, as this may cause slippage between the sleeve and the elastomer boot during operation of the seal.

Figure 8



- 4.7 Install the single coil spring onto the sleeve assembly. The spring should seat over the small shoulder on the sleeve. (Figure 8)
- 4.8 Slide the elastomer bellows rotary unit onto the sleeve/coil spring assembly, but do not compress. Ensure that the coil spring is seated on the small lip of the elastomer bellows rotary unit. (Figure 8)

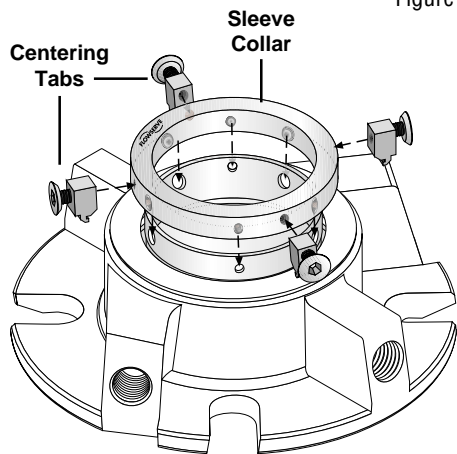
4.9 Place the gland/mating ring assembly face down over the sleeve/rotary unit assembly. Do not compress. (Figure 9)

Figure 9



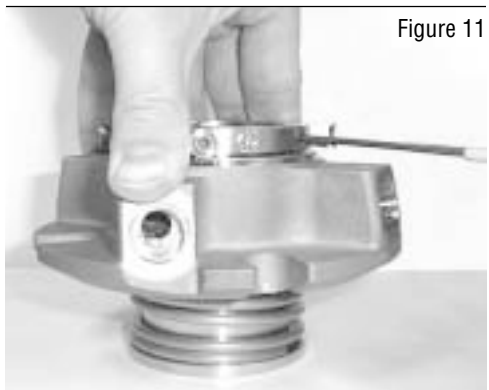
4.10 Place the sleeve collar **(9)** onto the gland assembly with the "Flowserve" logo facing up. Align the quarter dog set screws with the smaller holes in the end of the sleeve. On smaller seal sizes, one of the quarter dog set screws will be offset by 15 degrees. Align this quarter dog set screw with the corresponding offset hole in the end of the sleeve. Do not tighten any set screw at this time. Install the centering tabs **(CT)** and flat head cap screws into the collar while engaged with the gland. (Figure 10)

Figure 10



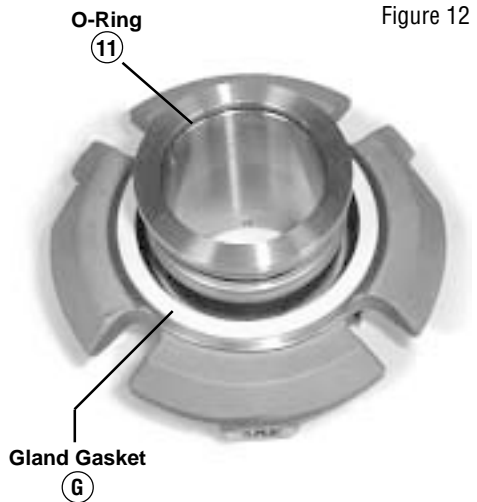
4.11 Using firm hand pressure press down the gland assembly/collar until the elastomer boot is fully seated on the step of the sleeve. This will result in the collar being pressed slightly beyond the end of the sleeve (approx.  $1/16$ "). Release the gland assembly/collar until it is even with the end of the sleeve, and tighten the quarter dog set screws until they are snug. Be careful not to distort the sleeve by over tightening the quarter dog set screws. (Figure 11)

Figure 11



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

4.13 Apply an even coat of 3M<sup>®</sup> Super 77 spray adhesive, free of bubbles and nodules, to the gland gasket (G). Adhere the gasket to the gland gasket surface. (Figure 12)



## 5 Static Testing

5.1 The ISC single elastomer bellows seal may be static tested at pressures up to 150 psi prior to installation on the equipment. Flowserve manufacturing typically tests the ISC at 25 psig. 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 centering tabs due to axial loads. The seal may be pressureized 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.

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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