



Repair Instructions

ISC2

Single metal bellows seal



1 Nomenclature

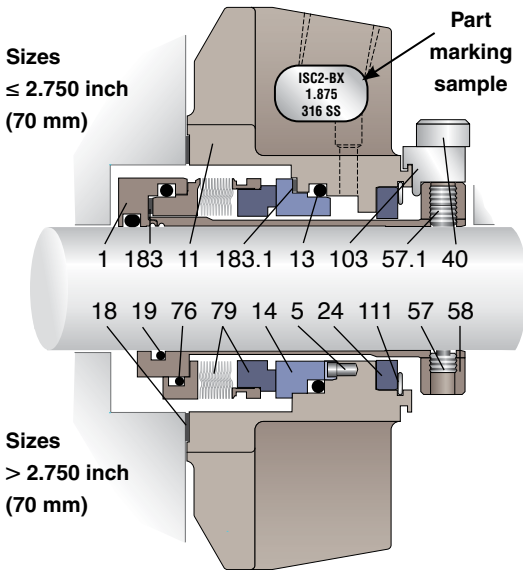


Figure 1

Part Ref.	Description
1	Sleeve Assembly
5	Drive Pin
11	Gland
13	Seat Gasket O-ring
14	Stationary Face
18	Gland Gasket
19	Sleeve Gasket O-ring
24	Gland bushing
40	Cap Screw
57	Cup-point Set Screw
57.1	Quarter-dog Set Screw
58	Drive Collar
76	Rotating Face Gasket O-ring
79	Bellows Assembly
103	Setting Device
111	Snap Ring
183	Vibration Dampener
183.1	Vibration Dampener

Part references in this document are denoted in square parenthesis, e.g. [79] O-rings [13] and [76] are the same size and cross-section.

2 Disassembly

When disassembling the seal, inspect for conditions which may have caused 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.

3 Repair or Replace Guide

Seal parts that are always replaced

- Bellows assembly [79]
- Stationary face [14]
- All gaskets (O-rings) [13], [76], and [19]
- Gland gasket [18]
- Vibration dampener [183.1]
- Bellows vibration dampener [183]
- Setting devices [103] and cap screws [40]
- Cup-point [57] and quarter-dog set screws [57.1]
- Gland bushing [24] and snap ring [111]

Seal parts that are reconditionable

- Gland assembly [11]
- Sleeve assembly [1]
- Sleeve collar [58]

4 Inspection and Reconditioning

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 - 0.002 inch (0.025 - 0.05 mm), then the respective part should be replaced. If grit blasting is performed, 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.

4.1 Gland assembly [11] see Figures 2 and 3.

- A** Stationary face O-ring surfaces - Inspect for wear, 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 ports and lifting holes – Inspect for damaged threads or corrosion. Re-tap as necessary.
- D** Drive flats (sizes ≤ 2.750 inch, 70 mm) - Inspect for wear or corrosion.

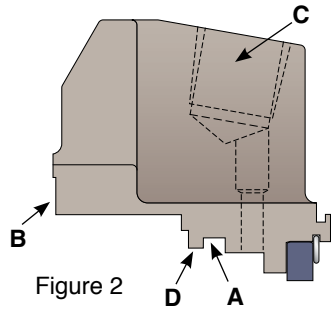


Figure 2

4.2 Sleeve assembly [1] see Figures 4 and 5.

- A** O-ring surfaces - Inspect for wear, nicks, scratches or corrosion. Required surface finish: 63 RMS.
- B** Drive flats or drive pin - Inspect for wear or corrosion. Replace pin as necessary.
- C** Drive end roundness - No greater than 0.001 inch (0.025 mm) TIR (Total Indicated Reading), under the bushing.
- D** Inspect ID of sleeve at weld point for corrosion.

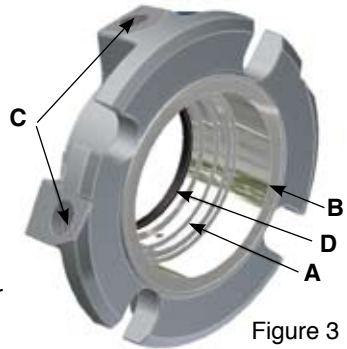


Figure 3

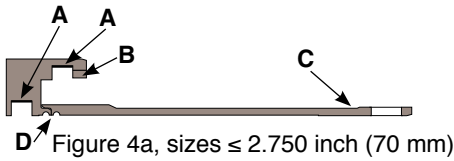


Figure 4a, sizes ≤ 2.750 inch (70 mm)

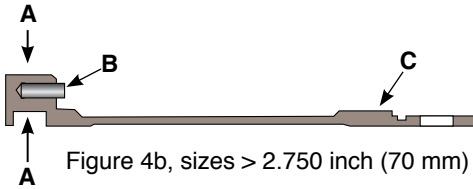


Figure 4b, sizes > 2.750 inch (70 mm)

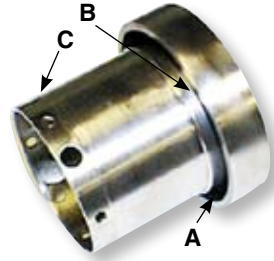


Figure 5

4.3 Drive Collar [58] see Figure 6.

- A** Threaded holes - Inspect for thread damage and re-tap as necessary.
- B** ID bore roundness - No greater than 0.002 inch (0.05 mm) TIR.
- C** Set screws - Replace cup-point and quarter-dog set screws with those included with the repair kit. Make sure the same threaded holes are used.

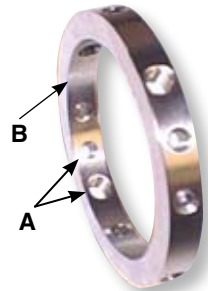


Figure 6

5 Seal Assembly Preparation

Tools Needed:

- Sizes ≤ 2.750 " : 3/16", 1/8" hex key wrenches
- Sizes > 2.750 " : 1/8", 3/16" and/or 7/32" hex key wrenches
- Sizes ≤ 65 mm : 3 mm hex key wrench
- Sizes > 65 mm : 5 mm hex key wrench for standard bore
- Sizes > 65 mm : 6 mm hex key wrench for enlarged bore
- Silicone grease (included in repair kit)
- Ethyl alcohol and clean, lint-free towel for cleaning seal faces
- Needle nose pliers or tweezers

6 Seal Assembly Instructions

Some assembly steps include blind fits of pins and drive flats. Mark the locations of the pins or drive flats with a felt tip marker, or align the feature with another visible feature on the seal to assist with assembly. All seal faces should be cleaned with ethyl alcohol prior to placing the faces together at each respective step in the assembly process.

- 6.1 Arrange O-rings by diametrical size. There are two sizes: quantity 2 of the largest size [13] and [76], and quantity 1 of the smallest size [19]. Prior to installing each O-ring at its respective step, lightly lubricate with silicone grease, unless an alternative lubricant is specified, and stretch slightly.
- 6.2 Place the sleeve assembly [1] on the work surface with the drive end (set screw holes) positioned upward. For sizes ≤ 2.750 inch (70 mm), install the vibration damper [183] into the back counterbore of the sleeve assembly.

- 6.3 Select O-ring [19] and stretch slightly. Lightly lubricate the O-ring using silicone grease.

For sizes ≤ 2.750 inch (70 mm) install the O-ring into the sleeve assembly, on the inner diameter groove of the sleeve. See Figure 7.

For sizes > 2.750 inch (70 mm) install the O-ring into the inner diameter groove of the bellows assembly.



Figure 7

- 6.4 Select bellows assembly [79] and lightly lubricate O-ring surface using silicone grease. Install the bellows assembly [79] into the sleeve/O-ring assembly. See Figure 8. Use hand pressure to press the bellows assembly fully into place.

For sizes ≤ 2.750 inch (70 mm) ensure that the flats on the bellows assembly and the flats on the sleeve are aligned.

For sizes > 2.750 inch (70 mm) ensure that the drive slots on the bellows assembly and the drive pins on the sleeve are aligned.



Figure 8

- 6.5 Clean the sealing face of the bellows assembly [79] to remove any dirt, dust, fingerprints, grease or any other residue using alcohol on a clean cloth or tissue.

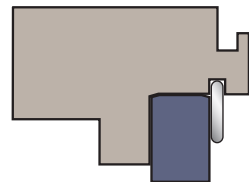


Figure 9

- 6.6 Select gland assembly [11] and use a parallel-plate press to install the bushing [24] into the outboard side of the gland. Once the bushing is fully pressed in the gland assembly [11] (i.e. no gap behind bushing), insert the snap ring [111] into the groove on the inner diameter of the gland to retain the bushing. See Figure 9.

6.7 Select O-ring [13] and stretch slightly. Lightly lubricate with silicone grease. Install O-ring [13] into the gland assembly [11]. See Figure 10.

6.8 *For sizes ≤ 2.750 inch (70 mm)* install the vibration dampener [183.1] onto the gland surface where the stationary face [14] will be installed. See Figure 11.

For sizes > 2.750 inch (70 mm) install the long end of the ed drive pin [5] into the hole in the gland where the stationary face [14] will be located. Cut a 0.25 inch (6 mm) slot in the vibration dampener [183]. See Figure 11. Install onto the gland surface where the stationary face will be installed with the slot positioned around the drive pin.



Figure 10

6.9 Select stationary face [14] and lightly lubricate the O-ring surface using silicone grease. Install the stationary face [14] into the gland/vibration dampener assembly [183.1 and 11]. Use hand pressure only. See Figure 12.

For sizes ≤ 2.750 inch (70 mm) ensure that the flats on the stationary face [14] and the flats on the gland assembly [11] are aligned.

For sizes > 2.750 inch (70mm) ensure that the slot on the stationary face [14] and the square-headed pin [5] are aligned.



Figure 11

6.10 **Check for proper seating of the stationary face by measuring from the back of the gland assembly to the face of the stationary face with a caliper or depth gage. Measure in 3 equally spaced locations, measurement variations should not exceed 0.005 inch (0.127 mm).**



Figure 12

6.11 Clean the sealing face of the stationary face [14] to remove any dirt, dust, finger prints, grease or any other residue using ethyl alcohol on a clean cloth or tissue.

6.12 Install the gland [11] onto the sleeve assembly [1]. See Figure 13.



Figure 13

6.13 Thread set screws and quarter-dog set screws in proper, equally spaced locations in drive collar [58].

Note: Some sizes > 2.750 inch (70 mm) do not utilize quarter-dog set screws.

- 6.14 Perform a dry fit of the collar on the sleeve.
- 6.15 Install the drive collar [58] onto the sleeve assembly [1]. The drive collar may need to be rotated so that the set screws [57] line up with the large holes and quarter-dog set screws [57.1] line up with the two smaller holes.
- 6.16 Install the setting devices and cap screws [103] and [40] into the drive collar, engaging with the gland [11]. See Figure 14.
- 6.17 While compressing seal by pushing down on gland assembly [11], tighten the quarter-dog set screws [57.1] to engage into the two smaller holes of the sleeve assembly [1]. If the seal does not contain quarter-dog set screws then install the set screws [57] into the sleeve [1]. See Figure 15.



Figure 14

Caution: Over tightening will cause distortion of the sleeve assembly [1]. Check integrity of the sleeve with a plug of the appropriate size to ensure no distortion has occurred.



Figure 15

- 6.18 Install O-ring [19] into the ID groove of the sleeve assembly. See Figure 16.
- 6.19 The cartridge seal assembly is now ready for testing.
- 6.20 Adhere the gland gasket [18] to the gland gasket surface with a spray adhesive such as 3M Super 77®. See Figure 17.
- 6.21 Permanently mark the seal type ISC2-BX or ISC2-XB, seal size and gland ring material clearly on the gland surface. See Figure 1 for placement location.



Figure 16

ISC2-BX
1.875
316 SS

Example
inch
marking

ISC2-BX
M060
C-276

Example
metric
marking



Figure 17



TO REORDER REFER TO
B/M # _____
F.O. _____

8 Static Testing

The ISC2 single rotating bellows seal may be static tested at pressures up to 200 psi (13.7 bar) prior to installation on the equipment. Flowserve manufacturing typically tests the ISC2 at 25 psig (1.7 bar). 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 can be pressurized through the tangential flush port. If the seal does not pass, according to QP-B.28, the static pressure test, disassemble the seal and inspect for O-ring damage, as this is the most common cause of static test failure.

9 Installation

For installation instructions, reference FIS190eng ISC2 Series.

FIS193eng ORG 09/09 Printed in USA

**To find your local Flowserve representative
and find out more about Flowserve Corporation,
visit www.flowserve.com**

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only and should not be considered certified or as a guarantee of satisfactory results by reliance thereon. Nothing contained herein is to be construed as a warranty or guarantee, express or implied, regarding any matter with respect to this product. Because Flowserve is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice. Should any question arise concerning these provisions, the purchaser/user should contact Flowserve Corporation at any one of its worldwide operations or offices.

© Copyright 2009 Flowserve Corporation

USA and Canada
Kalamazoo, Michigan USA
Telephone: 1 269 381 2650
Telefax: 1 269 382 8726

Europe, Middle East, Africa
Essen, Germany
Telephone: 49 201 31937-0
Telefax: 49 201 2200-561

Asia Pacific
Singapore
Telephone: 65 6544 6800
Telefax: 65 6214 0541

Latin America
Mexico City
Telephone: 52 55 5567 7170
Telefax: 52 55 5567 4224