Metal Samples
Corrosion Monitoring Systems

# Service Valve

# Operation and Maintenance Manual

**Metal Samples Corrosion Monitoring Systems**
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# Table of Contents

# 1. Introduction

The Metal Samples Corrosion Monitoring Systems (MSCMS) service valve is a high performance "floating ball " valve designed for severe service applications. When closed, the upstream pressure forces the ball against the downstream seat and effects a seal. This design also has fewer parts than conventional trunnion valves, which reduces the cost of repair kits and simplifies repair. All of our valves consist of a "body group" and an end connection kit. A variety of end connections are offered, including beveled for weld, slip-on weld, male and female threaded connections, API and ANSI flanged connections, and our split ring swivel flange connections. Each of these end connection kits bolt directly to our valve body group, eliminating the need for companion flanges, and allows for easy removal of the valve from the line for repair.

# 2. Safety First

1. The rated working pressure is 3600 psi. Exceeding the rated working pressure may result in failure, personal injury or death.
2. Valve choice must consider appropriate temperature ratings and materials for the intended service. MSCMS Service valves conform to the material requirements of NACE MR0175. Low temperature environments can lower the impact strength of ferrous materials. Use appropriate safety precautions when working with these materials at temperatures below freezing.
3. **NEVER** attempt to tighten or loosen valve components while the product is under pressure.
4. **Personal safety is no accident!** Always use proper safety equipment and procedures when working in high pressure, severe service or extreme temperature environments.

# 3. Service Valve Installation

MSCMS Service valves should be installed onto the access fitting and secured by tightening the hammer union.

**CAUTION!** The o-ring should be checked and lubricated prior to installation. The hammer union should be tightened by using a non-sparking hammer. Care should be taken not to over tighten the valve onto the fitting.

## 4. Ball Valve Operation

1. The MSCMS Service valve is designed for handle operation. The handle on the MSCMS Service valve is designed for several purposes:
   - The handle indicates the ball position at a glance. If the handle is in line with the piping, then the valve is in the open position. If the handle is transverse to the piping, then the valve is closed.
   - The "stub" design of the handle easily accepts the use of a "cheater" pipe. This is especially useful in higher working pressures.
   - The valve handle can be moved to operate the valve in any quadrant. This is useful when the valve is located in a congested area. The handle can only be repositioned 180°, so it will always be correctly aligned for open and closed positions.

2. MSCMS Service valves are lubricated at the factory with synthetic valve grease. This grease is a non-hydrocarbon base formula, and will resist dissolving into the line fluid. The MSCMS Service valve, like any other valve, should be placed on a routine valve lubrication schedule. If not, the valve should be lubricated any time the operating torque becomes noticeably higher. All MSCMS Service valves are equipped with a universal grease fitting located on the valve body.

   **WARNING!** If the valve is exposed to line pressure, this grease fitting is also exposed to full pressure. **DO NOT** try to remove the grease fitting from the valve body while valve is pressurized. Grease should be pumped into the ball cavity with the valve in the open position. The cavity should be filled until resistance to the pumping occurs, then rotate the ball and add additional grease. This procedure should be repeated several times to completely grease the seat seals.

   **CAUTION!** Dried mud or cement can cause high operating torque and possible valve damage. If the valve is used in mud, cement, or acid service the valve should be flushed after each job. To flush the valve thoroughly, remove the travel stop plate and rotate the ball 45° in both directions while flushing, to wash behind both sides of the ball. Dried mud or cement can cause high torque on the valves possible resulting in failure in the stem or seat rings.

## 5. Service Valve Repair

**CAUTION! MSCMS Service valve MUST BE ISOLATED FROM LINE PRESSURE PRIOR TO REMOVAL**. Also, rotate ball to mid-position before removal to insure that pressure is not trapped in body cavity.

1. The bolted bonnet design of the MSCMS Service valve allows for repair of stem leaks easily. The stem seal and back up ring can be replaced by removing the stem from the bonnet, if necessary.

2. All other leaks are repaired by removing the body from the line. The seat retainer, one seat and seat carrier, and ball can be removed without removing the stem. The non-retainer seat carrier can only be accessed after stem removal. The stem can be removed through the retainer end, or by removing the bonnet. If erosive action is present, we recommend that the seats, seat carriers, and ball be replaced. All soft seals should be replaced during the repair operation. MSCMS Service valve seal kits come with a silicone-based lubricant that should be applied to all seals prior to installation. This will help in installation of the seals, and prevent them from drying out and cracking. All other internal valve parts should be greased prior to re-assembly, using Desco 955 by Chemola, or equivalent.

## 6. Service Valve Disassembly Procedure

1. Make sure that the valve is in the closed position before disassembling the hammer union. Remove the hammer union and then the lower flange.
2. Remove the upper seat assembly and ball from the body group. The stem will need to be removed to access the lower seat assembly.
3. If bonnet removal is necessary, unscrew the bonnet bolting. Remove the bonnet/stem/handle assembly by rotating the bonnet while pulling. If this does not dislodge the bonnet, it may be necessary to insert a screwdriver under the bonnet and gently pry.
4. If the stem has not already been removed as per above paragraph, remove the handle and remove the stem from the bonnet by pushing the stem from the top of the bonnet until it drops free.
5. Remove the stem seal back-up ring, stem seal, and thrust washer from the stem.
6. Remove the lower seat assembly.

## 7. Service Valve Component Inspection & Replacement

1. Inspect the ball valve stem for evidence of any wear. Check the thrust washer on the bearing face, and on the stem shoulder. The stem seal and Teflon backup ring should be replaced unless the valve has seen limited service.

2. Clean and inspect all component parts, paying special attention to wear or corrosion. Inspect the body cavity, especially areas of the body where any seals contact the body.

3. Remove the seat seal rings from the seat carriers if they are damaged in any way. If the carriers are to be used again, care should be taken not to scratch any of its sealing surfaces. A nail or small Allen wrench, accessing through the bypass holes of the seat carrier, may be used to pry and loosen the seat. Then, a nail head can be utilized as a pry tool if needed to fully dislodge the seat from the carrier.

## 8. Service Valve Lubricant Selection

Valve lubricants can be grouped into several categories depending upon their basic materials of manufacture.

- **Caster Oil base lubricants.** These have been developed specifically as a valve grease to minimize washout and serve well as a ball and seat lubricant. We recommend two brands:
  - Desco 955
  - VAL-TEX 972

- **Petroleum base lubricants.** These are acceptable for assembly purposes, but are not generally recommended in hydrocarbon service because of limited life due to “wash out”.

- **Silicone based lubricants**. These are very stable in many fluid stream components. Resists “washout”, but they are very expensive compared to Caster Oil based lubricants. Silicone lubricants also resist oxidation, which is an advantage over Caster Oil based greases in applications exposed to atmosphere such as stem and bonnet regions. Dow Corning 111 Silicone lubricant is often specified for valve lubrication.

## 9. Service Valve Assembly Procedure

1. Install the new seats into the seat carriers, then install the L-seals on the seat carriers.

2. Insert the downstream seat assembly into the body. The seat of the downstream seat assembly should be facing you. Note: the downstream seat assembly cannot be installed into the valve body unless the stem is removed. All valve components should be lubricated with a light grease prior to installation.

3. Install the thrust washer on the valve stem. The flat face of the thrust washer should be against the shoulder of the stem, with the stepped face of the washer facing the keyed end of the stem. Slide the stem seal onto the stem all the way until it engages the thrust washer. Note: the flared end of the stem seal should be facing the thrust washer. Install the Teflon stem backup ring on top of the stem seal.

4. Apply a liberal amount of Dow Corning 111 Silicone lubricant to the stem assembly and bonnet stem journal. Install the stem assembly into the bonnet, and then install the bonnet on the body. Apply anti-seize to the bonnet bolts, thread them into the body, and make up to the proper torque (45 ft-lbs). The key of the stem should be rotated until it is parallel with the bore of the body.

5. Apply a light film of Desco 955 to the ball and insert in the body. Care should be taken to make sure the stem groove on the ball lines up with the key of the stem or the ball will not install.

6. Insert the upstream seat assembly, with the seat ring facing the ball, into the valve.

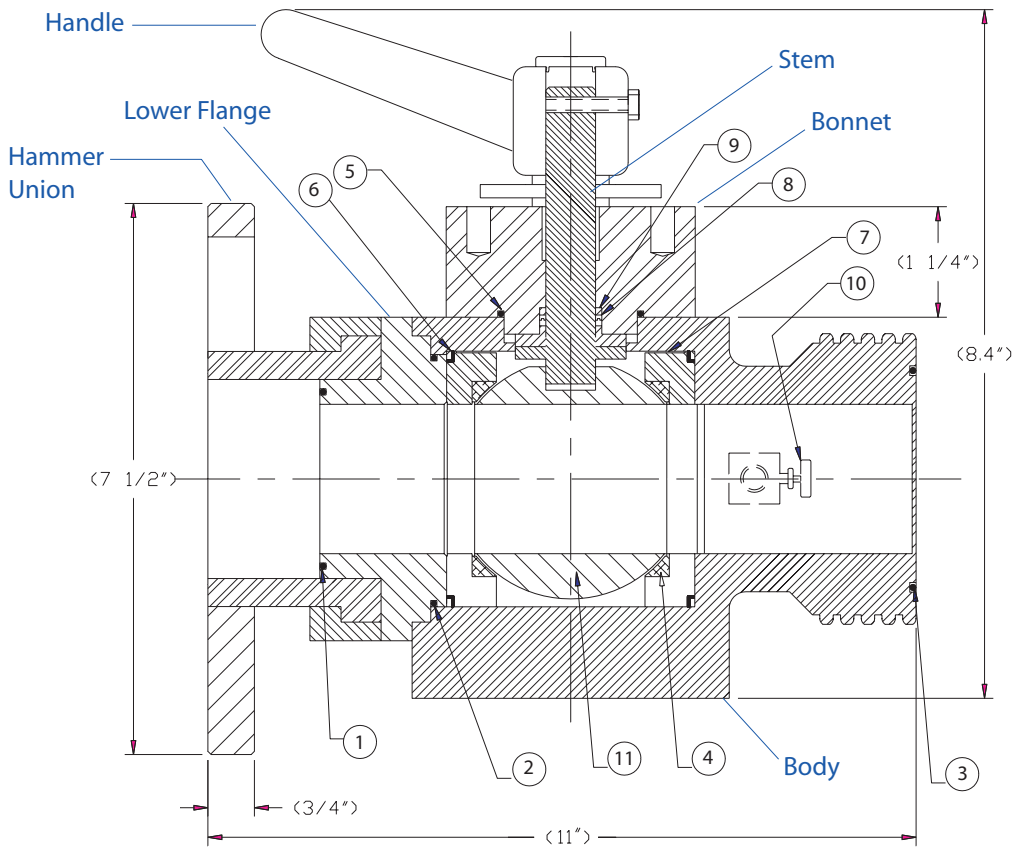
7. Install the o-ring on the lower flange, and insert it in the valve body.

8. Install the hammer union end, and make up with the provided bolting. Be sure to torque the connection bolts to their proper make-up torque (60 ft-lbs). Make up all bolts “hand tight” first to ensure that the two flanges are mated flush, tightening bolts that are 180 degrees apart while moving in a clock-wise direction. Failure to torque bolts properly may result in seal extrusion and ultimate failure.

## 10. Service Valve Long-Term Storage

For long-term storage of one year or more, MSCMS Service valves should be stored in the full open position. It is preferable, but not necessary, that they be filled with an inert gas or a non-corrosive, non-freezing liquid when installed in a piping system. Once every 12 months the valves should have several pumps of one of the recommended lubricants and should be operated from the full open position to the full close position and back to the full open position.

# 11. Parts and Material List for Service Valve




| Item | Low Temp Part No. | Standard Part No. | High Temp Part No. | Description | Low Temp Material | Standard Material | High Temp Material | Qty |
|---|---|---|---|---|---|---|---|---|
| 1* | HA700604370 | HA700604834 | HA700604834 | Viton O-Ring | Buna-N | Viton 70 | Viton 70 | 1 |
| 2* | --- | --- | --- | Viton O-Ring | Buna-N | Viton | Viton | 1 |
| 3* | PR6303370 | PR6303834 | PR6303834 | Viton O-Ring | Buna-N | Viton 70 | Viton 70 | 1 |
| 4* | --- | --- | PR6720A50 | Seat Seal | Celcon | Celcon | PEEK | 2 |
| 5* | --- | --- | --- | Viton O-Ring | Buna-N | Viton | Viton | 1 |
| 6* | --- | --- | --- | "L" Seal | Buna-N | Viton | Viton | 2 |
| 7** | --- | --- | --- | Carrier | 4130 | 4130 | 4130 | 2 |
| 8* | --- | --- | --- | Stem Seal | Polymyte/ Buna-N | Polymyte/ Viton | Polymyte/ Viton | 1 |
| 9* | --- | --- | --- | Ring, Back-Up | Teflon | Teflon | Teflon | 1 |
| 10 | --- | PR6359158 | --- | 316 6000 PSI Bleed Valve | 316 | 316 | 316 | 1 |
| 11** | --- | --- | --- | Ball | 17-4 PH SS | 17-4 PH SS | 17-4 PH SS | 1 |

* Parts included in Seal Kit / Repair Kit.
** Parts included in Repair Kit.

1. Seal Kit - P/N KR1009834 (Standard Temp)
2. Repair Kit - P/N KR1010 (Standard Temp)