WOODWARD

Component Maintenance Manual
Bronze Level

Product Name: LESV Gas Fuel Control Valve (LELA Actuator)

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General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.

Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26455*, *Customer Publication Cross Reference and Revision Status & Distribution Restrictions*, on the *publications page* of the Woodward website:

www.woodward.com/publications

The latest version of most publications is available on the *publications page*. If your publication is not there, please contact your customer service representative to get the latest copy.

Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty, thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

1. GENERAL INFORMATION

INTRODUCTION

This Component Maintenance Manual is intended to be used by customers and Woodward authorized service centers for repair or service of the LELA Actuator.

Bronze level service is preventative and routine maintenance that requires little to no specialized tooling, testing, or calibration procedures to maintain product between normal overhaul intervals. The manual is written with the assumption that the reader has access to the product manual and other Woodward documents referenced within this document.

1.1 Regulatory Compliance

The LELA is subject to safety regulatory certifications. See product manual 26419 for additional details. The service center performing the work on the LELA must not alter the construction such that the certifications are invalidated.

In particular, O-rings on the LELA gearbox are part of ingress protection for Zone 2 protection.

⚠WARNING

Explosion Hazard —Do not remove covers or connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

Substitution of components may impair suitability for Class I, Division 2, or Zone 2 applications.

1.2 Warnings and Notices

Important Definitions

This is the safety alert symbol used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER** - Indicates a hazardous situation, which if not avoided, will result in death or serious injury.
- **WARNING -** Indicates a hazardous situation, which if not avoided, could result in death or serious injury.
- **CAUTION** - Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
- **NOTICE** - Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT** - Designates an operating tip or maintenance suggestion.

⚠WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes, but is not limited to:

- **Eye Protection**
- **Hearing Protection**
- **Hard Hat**
- **Gloves**
- **Safety Boots**
- **Respirator**

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠WARNING

Disconnect Power Supply

Before doing maintenance, always disconnect power and any hazardous voltages that may be connected, follow all appropriate lockout/lockdown procedures.

⚠WARNING

Hazards due to insufficiently qualified personnel!

If unqualified personnel perform work on the product, hazards may arise which can cause serious injury and substantial damage to property. Therefore, all work must be carried out by appropriately qualified personnel.

⚠WARNING

To prevent possible serious personal injury, or damage to equipment, be sure all electric power and gas pressure have been removed from the valve and actuator before beginning any maintenance or repairs.

⚠WARNING

Lift or handle the valve only by using the eyebolts.

1.3 Electrostatic Discharge Awareness

NOTICE

Electrostatic Precautions

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible, as these do not store static electric charges as much as synthetics.

1.4 List of Woodward Literature

Required documents	
Product Manual **26419** –	LESV Gas Fuel Control Valve Note: Product manual may vary depending upon LESV configuration
Drawing **8923-1186-**	Parts Kit Installation Drawing
Reference documents	
Manual **26455** –	Customer Publication Cross Reference and Revision Status & Distribution Restrictions
Manual **51269** –	Re-greasing Procedure for LELA Actuator
Manual **82715** –	Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, & Modules

Woodward software-download section website (www.woodward.com/searchpublications).

If unable to access Woodward documentation, refer to contact list at the end of this manual.

1.5 List of Required Hardware or Materials

Special Tool(s)	N/A
Torque wrench(es)	• Torque wrench(es) to cover 30 in-lb to 1800 in-lb (150 Ft-lb) torque range
Basic Hand Tools	• Wrenches; size from 1/2 to 1-1/2 inch • Sockets; size from 1/2 to 1-1/2 inch • Allen hex key; sizes 5/32, 3/16, 5/16 inch • Allen hex bit sockets; sizes 3/16 and 5/16 inch
Others	• Isopropanol cleaning fluid • Slip-on flanges (check the correct flange size and class for each valve, one per flange size required). • Blind flanges with ¼ inch SAE straight thread port (check the correct flange size and class for each valve, two per valve required for leakage testing). • Pipe spool at least 12-inches long (check the correct flange size and class for each valve, one per valve required for leakage testing). • Air or nitrogen pressure source capable of 700 psig (48 bar)
Measuring Equipment	• Calipers or scale (ruler) • Air flow meter to cover 0 to 100 cc/min flow (overboard vent leakage testing) • Air flow meter to cover 0 to 25000 cc/min flow (seat leakage testing) • Pressure gauge(s) to cover 0-800 psig (0-55 bar)

1.6 Woodward Required Software

This valve will only operate with a Woodward Digital Valve Positioner (DVP) and will require access to Service Tool software. If you need an updated version of the Service Tool, it is available on the Woodward website (www.woodward.com/software).

1.7 General Instructions

- Review this CMM and the installation drawing before starting the replacement to be sure that all necessary tools are available and instructions are clear.
- Check the replacement parts kit to verify all replacement parts listed in the installation drawing are present. For questions, contact Woodward.
- Sort all parts for easy assembly.
- If not all parts are used, the unit or units must be inspected for completeness.
- Contact Woodward if an error is found during the replacement process.
- Clean the exterior of the LELA by hand prior to disassembly to prevent dirt and debris from contaminating the interior.
- O-rings:
    - Use the correct tool to install or remove O-rings. If using a protective cone on small O-rings, lubricate the O-ring and slide it onto the part being sure it does not twist.
    - If a cone is not used on large O-rings, use a pick under the O-ring to lift it onto the part until it is in the desired location.
- Helicoils:
    - To prevent damage to mid-grip helicoils, install screws at a slow speed. DO NOT USE A HIGH-SPEED TOOL. Stainless steel screws MUST be lubricated with an anti-seize lubricant before turning them into mid-grip helicoils or aluminum parts.
- Disassembly:
    - Parts that have been disassembled and will be reused must be inspected closely for damage and replaced if necessary. Parts that have been disassembled should be kept in a clean container such that they can be readily identified against this procedure, reference drawings or visual aids for proper reassembly.
- Screws:
    - All screws loosen with counterclockwise direction. In other situations, the direction will be specified.

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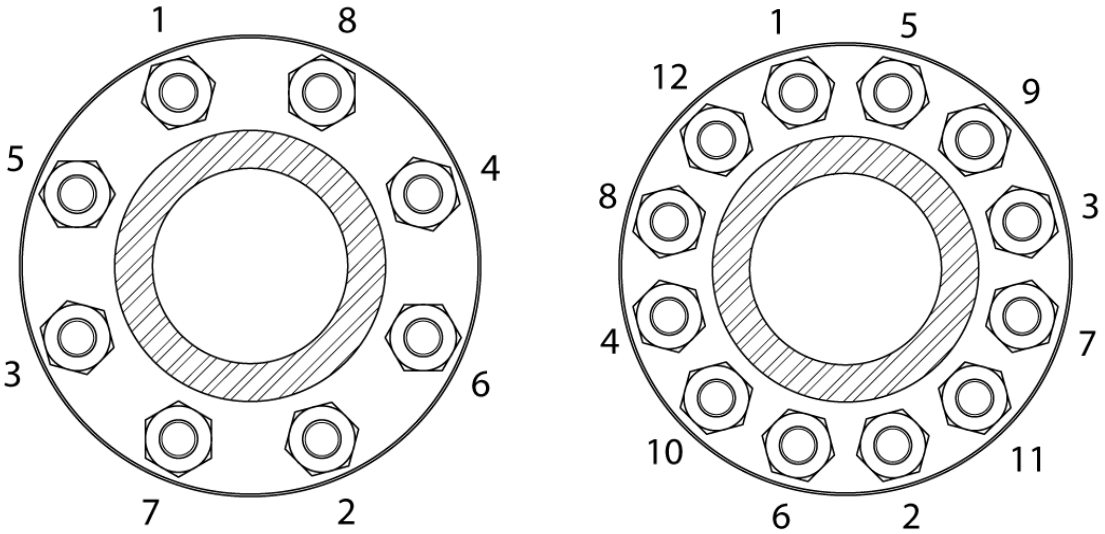
1.8 Bolt Tightening Sequence for 8 and 12-Bolt Flanges

During all of the following steps, keep any gap between flanges even around the circumference.

1. Hand tighten all nuts and bolts.
2. First time around, tighten the nuts to 25% recommended torque following the sequence in figures below.
3. Second time around, tighten the nuts to 75% recommended torque following the sequence in figures below.
4. Third time around, tighten the nuts to 100% recommended torque following the sequence in figures below.
5. Continue tightening nuts all around until nuts do not move under 100% recommended torque.



2. LELA LUBRICATION

2.1 Kit Description

The purpose of this procedure is to show the correct sequence and method of ball screw and bearing lubrication:

- KIT P/N: 8923-1186 – LELA LUBRICATION

Lubricating the ball screw and bearing every 12 months is required maintenance for the LELA.

NOTICE

Review this CMM before starting the lubrication to be sure that all necessary tools are available and instructions are clear. For any questions, contact Woodward.

⚠WARNING

Wear protective gloves to avoid contact with the grease during the lubrication procedure.

2.2 Ball Screw Lubrication Procedure

⚠WARNING

To prevent possible serious personal injury or damage to the equipment, be sure all electric power and gas pressure have been removed from the valve and actuator before beginning any maintenance or repairs.

A. Clean and dry the exterior of the actuator by hand to minimize debris intrusion inside the actuator during the lubrication process. Any debris on the ball screw will reduce its life.

IMPORTANT

Diagrams and pictures are for representative purposes only and may not depict actual component appearances.

B. Remove the ball screw access plug located on the top of the gear cover with a 5/16-inch Allen wrench.
C. Remove the ball screw port plug with a 3/16-inch Allen wrench.

Step B

Step C

Figure 2-1. Access Plug Removal

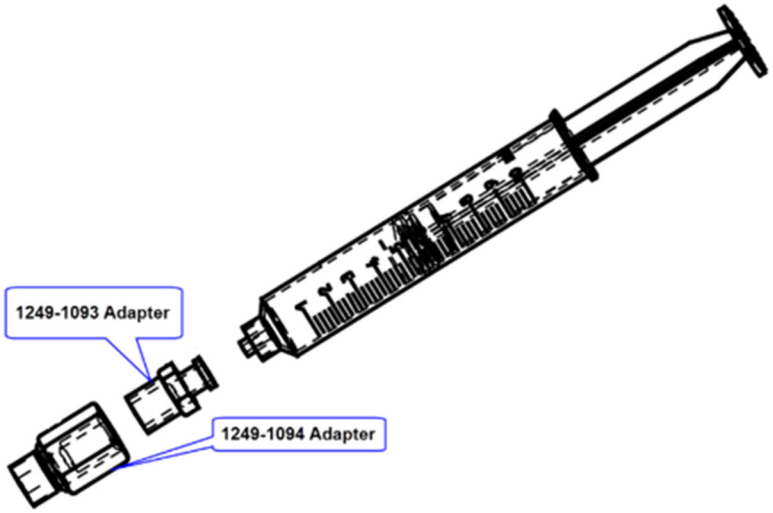
D. Set the ball screw access and port plugs aside and keep them clean. Ensure that they are not scratched or marred.

E. If not already assembled, attach the adapters to the grease syringe.

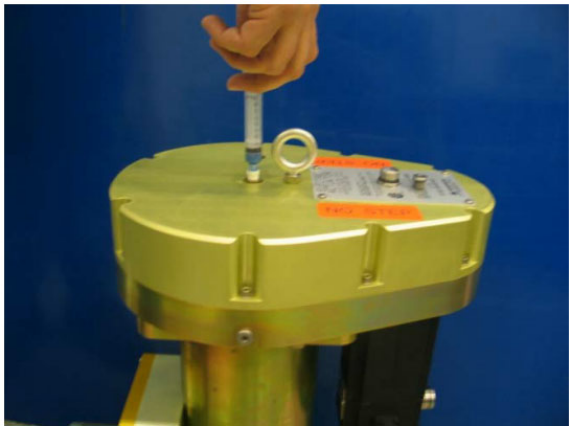
F. Attach the thread connector of the grease syringe to the threaded grease port of the ball screw. The fitting should be fully seated.

G. Inject 2 cm³ of Woodward provided grease into the ball screw grease port.

H. Remove the grease syringe from the ball screw grease port and install the ball screw port plug using a new 1355-197 O-ring on the plug. Do not torque the port plug during this step.



Step E



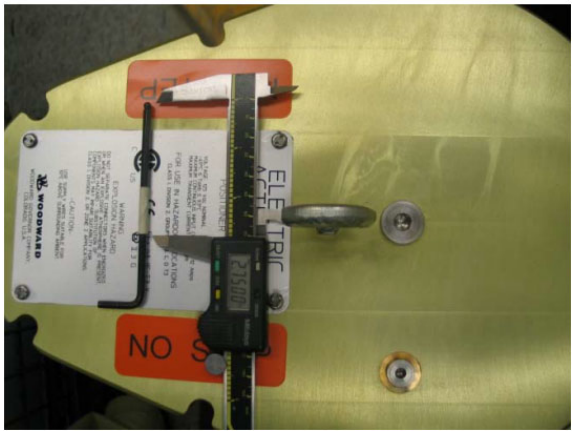
Step F

Step H

Figure 2-2. Grease Injection

I. Using a 3/16-inch Allen wrench, remove the gear locking access plug (adjacent to the ball screw port), set aside, and keep clean. Ensure the plug is not scratched or marred.
J. Using a permanent marker or tape, mark a 5/32-inch Allen wrench at 2.75 inches from the bottom. Make sure the top of the marking is at 2.75 inches.

Step I



Step J

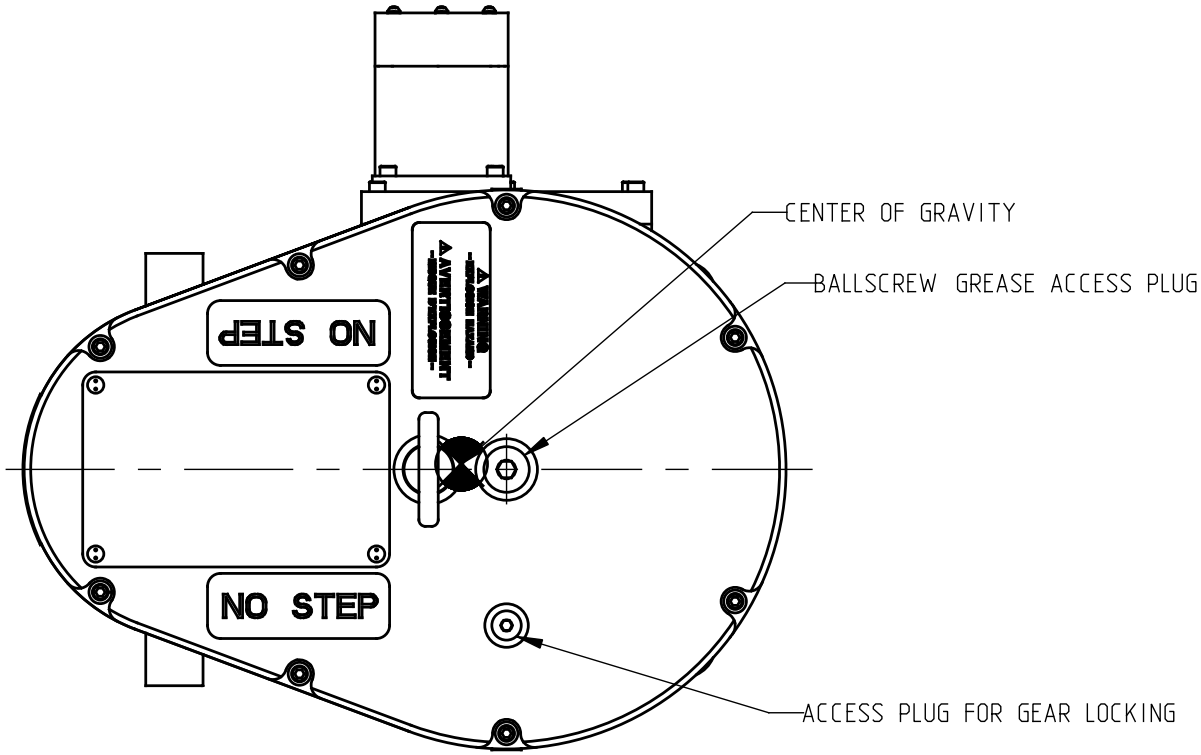


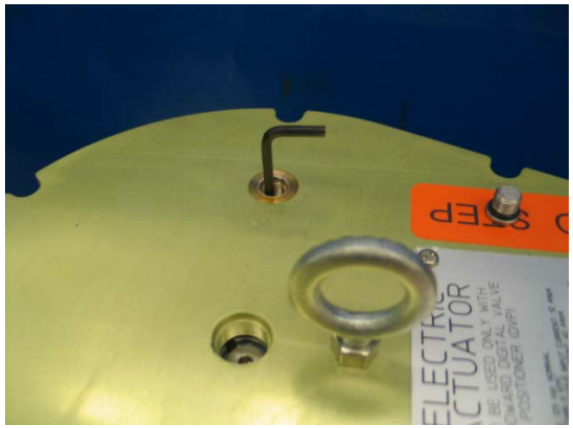
Figure 2-3. Gear Locking Access Plug Removal

K. Insert the Allen wrench into the gear access port located adjacent to the ball screw port. The Allen wrench is seated if the marking is below the top surface of the gear cover.

IMPORTANT

If the Allen wrench is not seated, rotate the gears using a 3/16-inch hex wrench on the ball screw port plug and rotate clockwise until the 5/32-inch Allen wrench is seated.

L. Once the 5/32-inch Allen wrench is seated, torque the ball screw port plug to 38–42 lb-in (4.3–4.7 Nm).



Step K

Step L

Figure 2-4. Seating the Allen Wrench

M. Remove the 5/32-inch Allen wrench from the port. Install the gear access port plug into the gear access using a new 1355-197 O-ring on the plug. Torque the plug to 38–42 lb-in (4.3–4.7 Nm).
N. Install the ball screw access plug using a new 1355-167 O-ring on the plug and torque to 145–155 lb-in (16.4–17.5 Nm).

Step M

Step N

Figure 2-5. Ball and Gear Access Port Plug Installation

2.3 Bearing Lubrication Procedure

A. Clean and dry the exterior of the actuator by hand to minimize debris intrusion inside the actuator during the lubrication process. Any debris on the bearing will reduce its life.

B. Remove the bearing port plug with a 3/16-inch hex wrench.

NOTICE

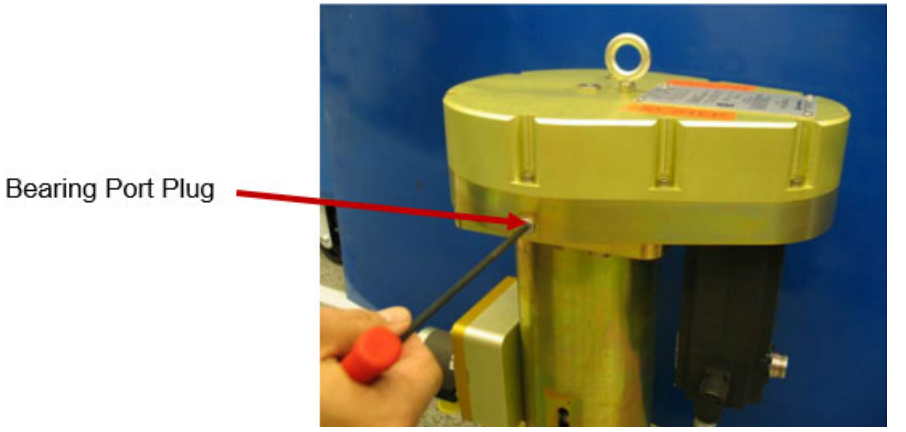
Some actuator models have bearing port plugs on both sides of the gearbox housing to allow for access from either side. For these models, the following greasing procedure only needs to be performed on one grease port. Leave the plug installed in the other port that is not being greased.

C. Set the plug aside and keep clean, ensuring that the inside plug surface is not scratched or marred.

D. Attach the threaded connector of the grease syringe to the threaded bearing grease port. The fitting should be fully seated in the housing.

E. Inject 2 cm^3 of Woodward provided grease into the bearing grease port.

F. Remove the grease syringe from the bearing port.



Step B

Step D

Figure 2-6. Plug Removal and Bearing Lubrication

G. Install the bearing port plug using a new 1355-197 O-ring on the plug. Torque to 38–42 lb-in (4.3–4.7 Nm).

Step G

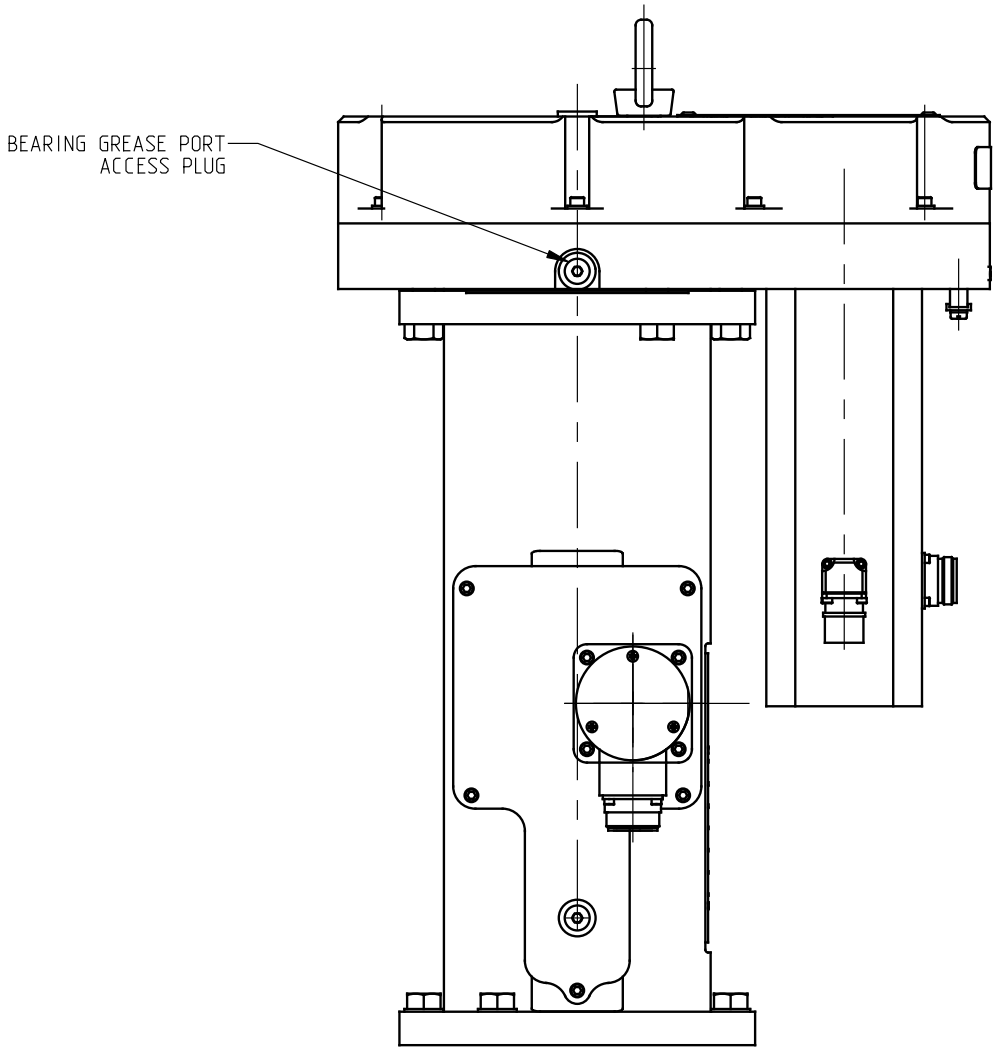


Figure 2-7. Plug Installation

2.4 Verification & Calibration

A. Install a slip-on flange or pipe spool to the valve outlet in order to retain the diverging sleeve. Tighten and torque bolts using procedure in section 1.8.

⚠WARNING

Do not operate the valve without proper support for the diverging sleeve. The diverging sleeve can only be properly supported by bolting and torquing the outlet flange to either piping or an equivalent flange. Do not place hands inside valve body during inspection, cleaning, or operation.

⚠WARNING

Never place hands inside the valve without ensuring that the power is disconnected and the position indicator shows the valve is at the closed position.

⚠WARNING

EXPLOSION HAZARD

Do not connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

B. Connect the valve to a DVP and power up the valve using the DVP service tool. Reference the DVP product manual for additional information.

C. Ensure no errors or alarms are present.

D. Command the valve open and then command the valve closed. Ensure no errors or alarms are present.

3. VALVE OBSTRUCTION REMOVAL

3.1 Procedure Description

The purpose of this procedure is to show the correct sequence and method of obstruction removal from the valve.

NOTICE

Review this CMM before starting the obstruction removal to be sure that all necessary tools are available and instructions are clear. For any questions, contact Woodward.

3.2 Obstruction removal

NOTICE

This is a method to actuate the valve manually. Disconnect the LESV from the DVP during this procedure.

⚠WARNING

To prevent possible serious personal injury or damage to equipment, be sure all electric power and gas pressure have been removed from the valve and actuator before beginning any maintenance or repairs.

⚠WARNING

Do not operate the valve without proper support for the diverging sleeve. The diverging sleeve can only be properly supported by bolting and torquing the outlet flange to either piping or an equivalent flange. Do not place hands inside the valve body during inspection, cleaning, or operation.

A. Install a slip-on flange (check the correct size and class based on the installation drawing) onto the outlet flange. Tighten and torque bolts using procedure in section 1.8. The flange will clamp the diverging sleeve in place while still allowing access to the inlet and outlet of the valve. Install the flange on the valve outlet to prevent the sleeve from moving or becoming dislodged in a scenario where the valve trips closed.

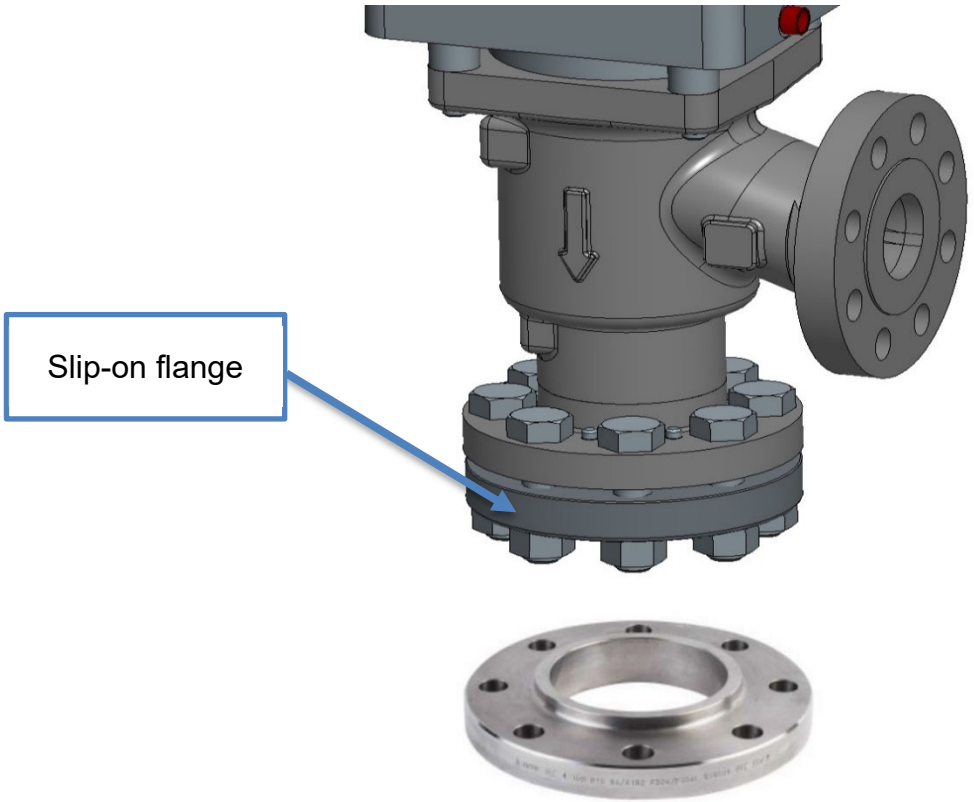


Figure 3-1. Slip-on Flange Installation

B. Using a permanent marker or tape, mark a 5/32-inch Allen wrench at 2.75 inches from the bottom. Make sure the top of the marking is at 2.75 inches.

C. Remove the ball screw access plug located on the top of the gear cover with a 5/16-inch Allen wrench and remove the gear locking access plug (adjacent to the ball screw port) with a 3/16 Allen wrench. Set both plugs aside and keep clean, ensuring that they are not scratched or marred.

Step B

Step C

Figure 3-2. Access Plug Removal

⚠CAUTION

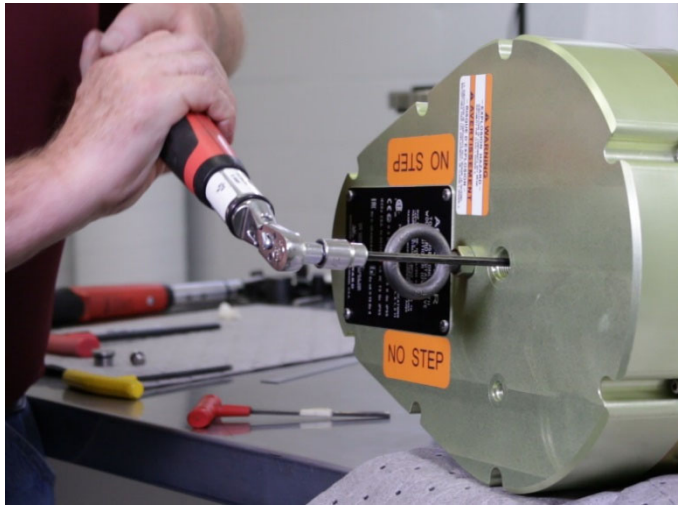
When rotating the ballscrew, the return spring force is being resisted and an equivalent counterforce is required.

D. Insert a 3/16-inch hex bit attached to a lever arm (such as a torque wrench or ratchet) into the ball screw port plug and rotate the ball screw CLOCKWISE 6 to 7 turns for 1.5-inch stroke valves and 12 to 13 turns for 3-inch stroke valves until the valve is at the 100% full open position. Verify the valve is at the 100% full open position using the actuator's indicator sight glass.

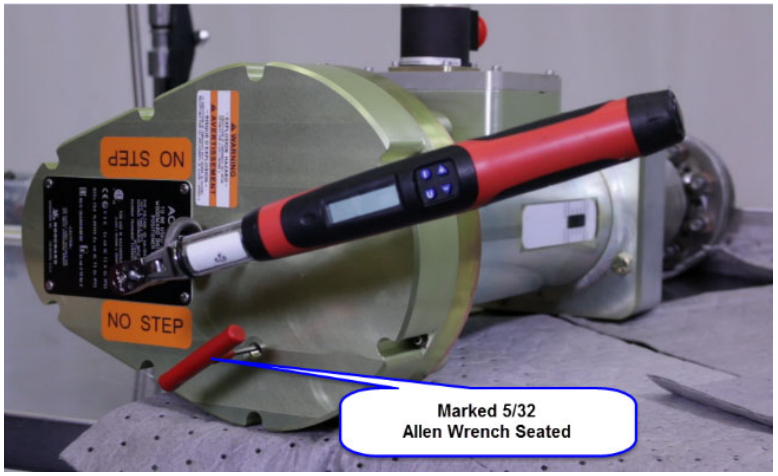
E. While holding the valve at the full open position with the 3/16 hex bit and lever arm, insert the marked 5/32 Allen wrench into the gear access port to hold the valve at the full open position. The Allen wrench is seated if the marking is below the top surface of the gear cover. The 3/16 hex bit can now be removed.

IMPORTANT

If the 5/32 Allen wrench is not seated, rotate the ball screw clockwise until seated.



Step D



Step E

Figure 3-3. Manually Rotating Ballscrew and Holding in Place at Full Open

⚠WARNING

Be careful not to dislodge the 5/32 Allen wrench as doing so will trip the valve closed. If the lever arm is attached, it will quickly spin and cause personal injury.

F. With the valve open and ensuring that the 5/32 Allen wrench is secured in the gear and gearbox housing, the obstruction can now be removed from the valve.

⚠WARNING

Do not place hands directly into the valve to remove the obstruction! Doing so could cause serious injury if the valve trips closed. The return spring is at high tension.

G. Use a long, **soft (non-metallic)** tool to access the obstruction and avoid scratching the flow surfaces of the plug and sleeve. See image on right. The finish on these surfaces is critical to ensuring proper valve performance.

Figure 3-4. Proper Obstruction Removal

⚠WARNING

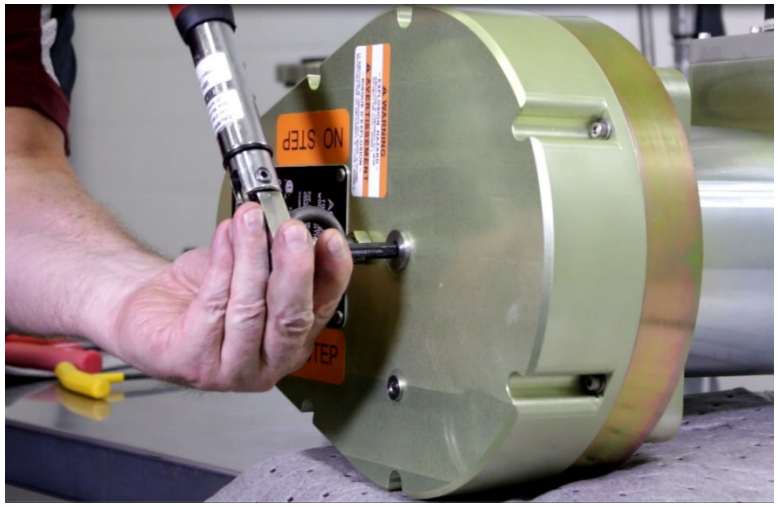
When removing the 5/32 Allen wrench, the spring will start to force the valve closed. Use the 3/16 hex bit and lever arm to resist this force. If you release the lever arm it will quickly spin and cause personal injury.

H. With the obstruction removed, insert the 3/16 hex bit and lever arm into the ball screw port and rotate the ball screw slightly clockwise to relieve the force on the 5/32 Allen wrench. With the force relieved, remove the 5/32 Allen wrench and allow the ball screw to rotate counterclockwise slowly by controlling the speed with the 3/16 hex bit and lever arm. This will close the valve.

I. Install the gear access port plug into the port located adjacent to the ball screw port using a new 1355-197 O-ring on the plug. Torque the plug to 38-42 lb-in (4.3-4.7 Nm). Install the ball screw access plug using a new 1355-167 O-ring and torque to 145-155 lb-in (16.4-17.5 Nm).

J. Remove the slip-on flange from the valve outlet.

Step H



Step I

Figure 3-5. Gearbox Cover Installation

3.3 Verification & Calibration

E. Install a slip-on flange or pipe spool to the valve outlet to retain the diverging sleeve. Tighten and torque bolts using procedure in section 1.8.

⚠WARNING

Do not operate the valve without proper support for the diverging sleeve. The diverging sleeve can only be properly supported by bolting and torquing the outlet flange to either piping or an equivalent flange. Do not place hands inside valve body during inspection, cleaning, or operation.

⚠WARNING

Never place hands inside the valve without ensuring that power is disconnected, and the position indicator shows the valve is at the closed position.

⚠WARNING

EXPLOSION HAZARD

Do not connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

F. Connect the valve to a DVP and power up the valve using the DVP service tool. Reference the DVP product manual for additional information.

G. Ensure no errors or alarms are present.

H. Command the valve open and then command the valve closed. Ensure no errors or alarms are present.

4. VALVE SEAT LEAKAGE TEST

4.1 Procedure Description

The purpose of this procedure is to show the correct sequence and method of the seat leakage test.

NOTICE **Review this CMM before starting the Seat Leakage Test to ensure that all necessary tools are available and instructions are clear. For any questions, contact Woodward.**

4.2 Seat leakage test

WARNING

To prevent possible serious personal injury or damage to equipment, be sure all electric power and gas pressure have been removed from the valve and actuator before beginning any maintenance or repairs.

A. Disconnect the electric cables and external interfaces.

B. Remove the valve from the piping system.

C. Place the valve in a safe location. Make sure the location is appropriate for the test being performed.

WARNING

This test requires special precautions. Compressed gas accumulates a large amount of energy which can cause serious injury.

D. Secure the pipe spool on the outlet of the valve. Secure blind flanges with threaded ports on the inlet of the valve and on the other end of the pipe spool. Tighten and torque bolts using the procedure in section 1.8.

⚠CAUTION

Ensure that flanges are correct for the test pressure and temperature. Install flanges appropriate for the valve. Refer to ANSI B16.5 for details of flange, gasket, and bolt types and dimensions.

⚠CAUTION

When installing the blind flanges and pipe spool on the valve, it is important to properly torque the studs/bolts in the appropriate sequence (see section 1.8) in order to keep the flanges of the mating hardware parallel to each other.

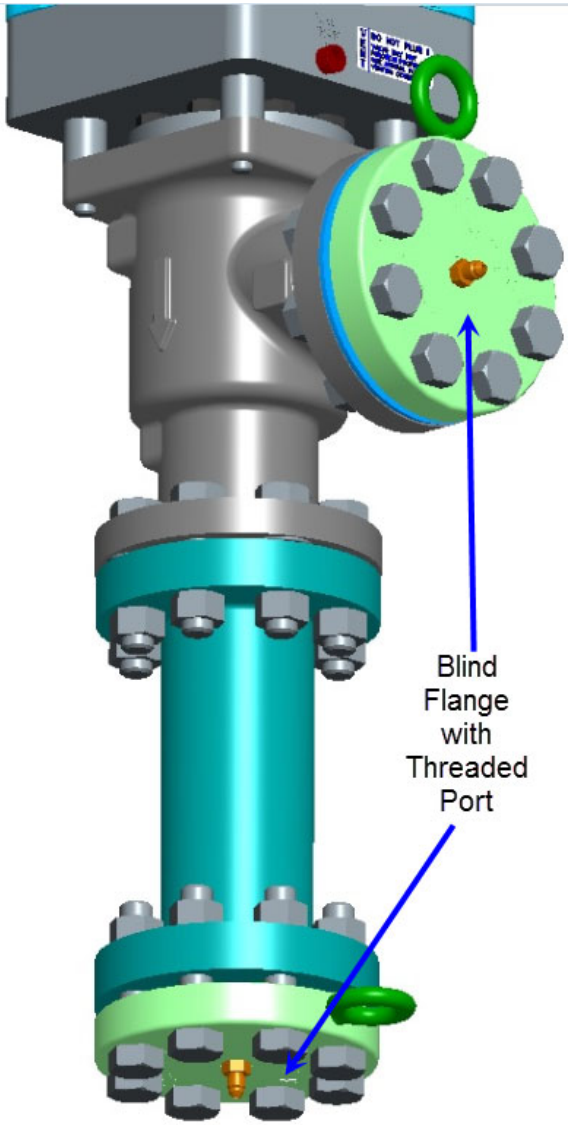


Figure 4-1. Seat Leakage Test Preparation

E. Verify the valve is closed using the actuator's indicator sight glass.
F. Attach a flow meter to the outlet flange/port.
G. Attach the pressure source to the inlet flange/port (forward pressure).

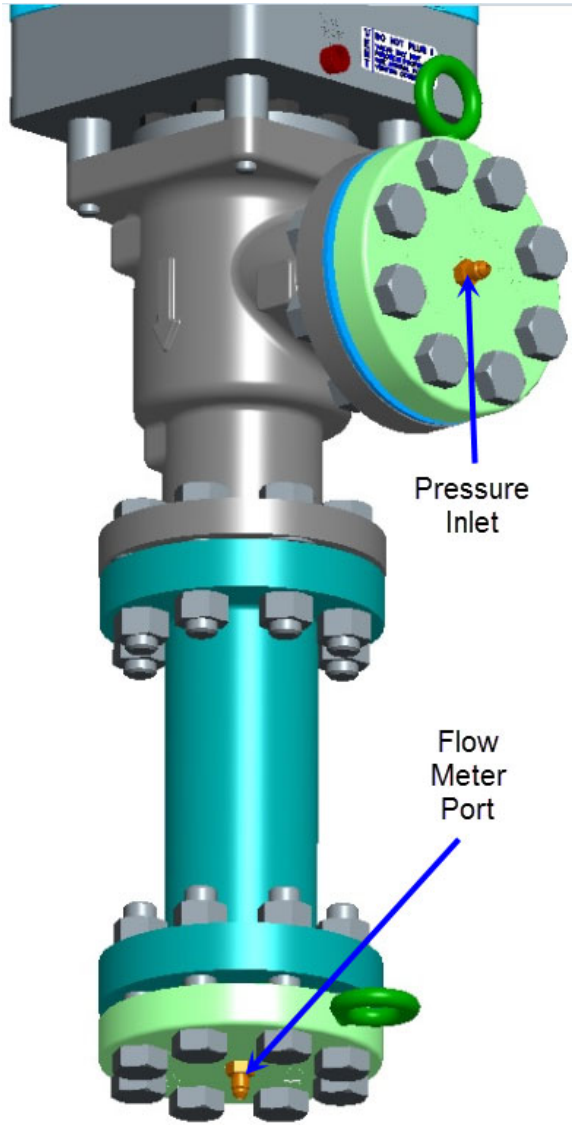


Figure 4-2. Pressure Inlet and Flow Meter Port Locations

H. With the valve in the fully closed position (0%), set the inlet pressure to stated target and tolerance. See tables in Figures 4-3 and 4-4.

I. Record the flow measurement. See table for maximum allowable leakage limits.

2-inch valve size (Forward Leakage Test)		
Max Cg	Inlet Pressure (psid)	Max Seat Leakage [cc/min]
25	50 ± 5	73
150	50 ± 5	436
300	50 ± 5	873
408	50 ± 5	1187
600	50 ± 5	1746
650	50 ± 5	1892
700	50 ± 5	2037
900	50 ± 5	2619
1200	50 ± 5	3493

3-inch Valve Size (Forward Leakage Test)		
Max Cg	Inlet Pressure (psid)	Max seat leakage [cc/min]
1500	50 ± 5	4366
2000	50 ± 5	5821
2500	50 ± 5	7277
2900	50 ± 5	8441

Figure 4-3. Leakage Specifications for 2- and 3-inch Valves

J. Relieve pressure from the valve.

⚠CAUTION

Remove pressure slowly during valve depressurization to avoid damaging seals.

4-inch Valve Size (Forward Leakage Test)		
Max Cg	Inlet Pressure (psid)	Max Seat Leakage [cc/min]
3300	50 ± 5	9606
3655	50 ± 5	10639
4100	50 ± 5	11934
4500	50 ± 5	13100

6-inch Valve Size (Forward Leakage Test)		
Max Cg	Inlet Pressure (psid)	Max Seat Leakage [cc/min]
4500	50 ± 5	13100
5775	50 ± 5	16808
6600	50 ± 5	19211
8000	50 ± 5	23286

Figure 4-4. Leakage Specifications for 4- and 6-inch Valves

4.3 Verification & Calibration

A. Install a slip-on flange or pipe spool to the valve outlet to retain the diverging sleeve. Tighten and torque bolts using procedure in section 1.8.

WARNING

Do not operate the valve without proper support for the diverging sleeve. The diverging sleeve can only be properly supported by bolting and torquing the outlet flange to either piping or an equivalent flange. Do not place hands inside valve body during inspection, cleaning, or operation.

WARNING

Never place hands inside the valve without ensuring that power is disconnected, and the position indicator shows the valve is at the closed position.

WARNING

EXPLOSION HAZARD

Do not connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

B. Connect the valve to a DVP and power up the valve using the DVP service tool. Reference the DVP product manual for additional information.

C. Ensure no errors or alarms are present.

D. Command the valve open and then command the valve closed. Ensure no errors or alarms are present.

5. OVERBOARD VENT LEAKAGE TEST

5.1 Procedure Description

The purpose of this procedure is to show the correct sequence and method of the overboard vent leakage test.

NOTICE

Review this CMM before starting the vent leakage test to be sure that all necessary tools are available and instructions are clear. For any questions, contact Woodward.

5.2 Overboard Vent Leakage Test

⚠WARNING

To prevent possible serious personal injury or damage to equipment, be sure all electric power and gas pressure have been removed from the valve and actuator before beginning any maintenance or repairs.

A. Disconnect the electric cables and external interfaces.

B. Remove the valve from the piping system.

C. Place the valve in a safe location. Ensure the location is appropriate for the test being performed.

⚠WARNING

This test requires special precautions. Compressed gas accumulates a large amount of energy which can cause a serious injury.

D. Secure the pipe spool on the outlet of the valve and secure blind flanges with threaded ports on the inlet of the valve and on the other end of the pipe spool. Tighten and torque bolts using procedure in section 1.8.

⚠CAUTION

Make sure that flanges are correct for the test pressure and temperature. Install flanges appropriate for the valve. Refer to ANSI B16.5 for details of flange, gasket, and bolt types and dimensions.

⚠CAUTION

When installing the blind flanges and pipe spool on the valve, it is important to torque the studs/bolts properly and in the appropriate sequence (see section 1.8) to keep the flanges of the mating hardware parallel to each other.

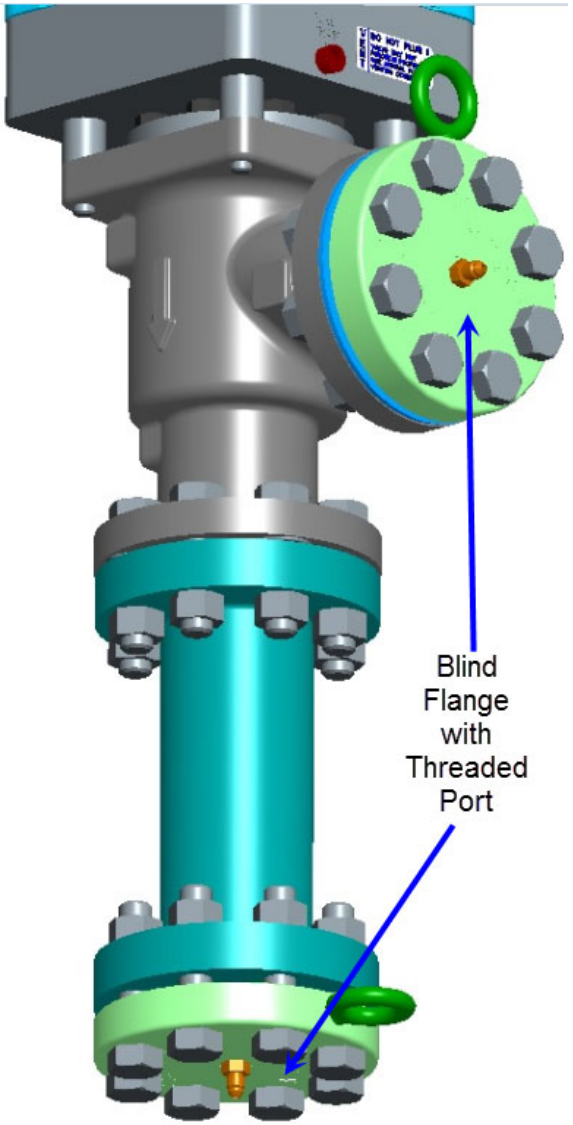


Figure 5-1. Blind Flanges

E. Verify that the valve is closed using the indicator sight glass.

F. Attach a flow meter to the OVBD Vent Port.

G. Pressurize both sides of the valve to the appropriate pressure limit. Pressurize the valve to the maximum operating pressure that the valve will see during operation.

⚠WARNING

Do not exceed the maximum working pressure on the valve nameplate.

H. Record the flow measurement from the overboard vent port. The allowable leakage limit is 100cc per minute.

I. Relieve pressure from the valve.

⚠CAUTION

Remove pressure slowly during valve depressurization to avoid damaging seals.

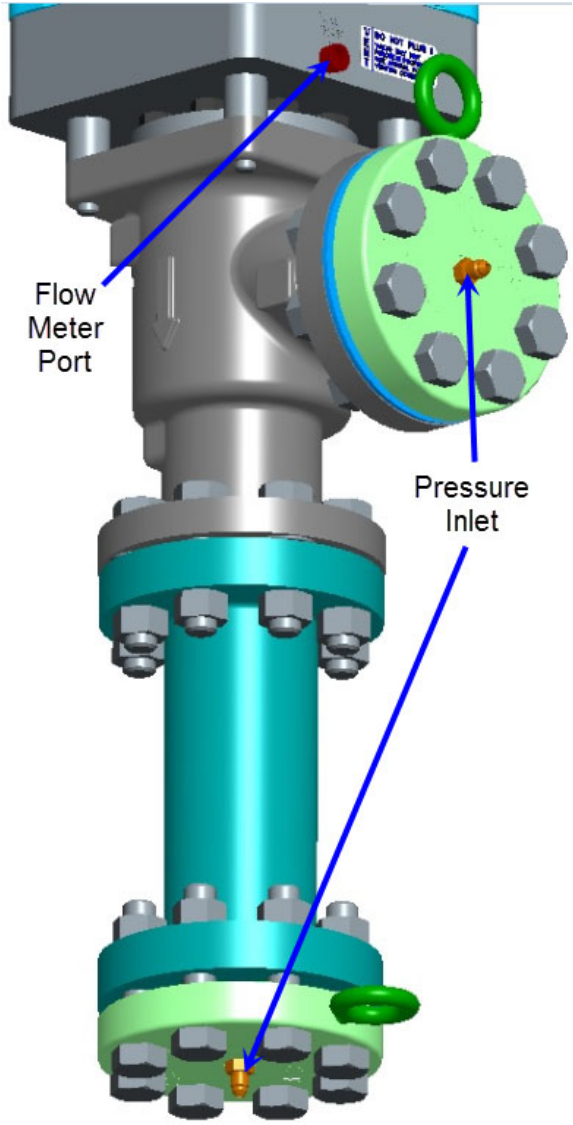


Figure 5-2. Flow Meter Port and Pressure Inlets

5.3 Verification & Calibration

A. Install a slip-on flange or pipe spool to the valve outlet to retain the diverging sleeve. Tighten and torque bolts using procedure in section 1.8.

WARNING

Do not operate the valve without proper support for the diverging sleeve. The diverging sleeve can only be properly supported by bolting and torquing the outlet flange to either piping or an equivalent flange. Do not place hands inside valve body during inspection, cleaning, or operation.

WARNING

Never place hands inside the valve without ensuring that power is disconnected, and the position indicator shows the valve is at the closed position.

WARNING

EXPLOSION HAZARD

Do not connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

B. Connect the valve to a DVP and power up the valve using the DVP service tool. Reference the DVP product manual for additional information.

C. Ensure no errors or alarms are present.

D. Command the valve open and then command the valve closed. Ensure no errors or alarms are present.

6. REVISION HISTORY

REVISION DATE	REVISION LETTER	DESCRIPTION OF CHANGE	PAGE #
2/18	B	Changed IMPORTANT box to NOTICE box and updated text	19
2/18	B	Imported clearer picture (upper right)	26
12/21	C	Updated language in Introduction section	5

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