Full View Flow Indicator

Threaded and Flanged Process Connection

Installation / Operation / Maintenance Manual

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Table of Contents

Warranty

L. J. Star warrants its Full View Flow Indicator against defects in material and workmanship for a period of eighteen months from the date of shipment. L. J. Star will, at its option, repair or replace those products that fail to perform as specified with the following exceptions. This warranty does not apply to glass breakage or any other liability other than materials and workmanship.

1.10 Exceptions

Products repaired or modified by persons not authorized by L. J. Star.

Products subject to misuse, negligence or accidents.

Products that are connected, installed or otherwise used in a manner not in accordance with the manufactures instructions.

1.20 Provisions

L. J. Star's responsibility hereunder is limited to repairing or replacing the product at its expense. L. J. Star shall not be liable for loss, damage or expense directly or indirectly related to the installation or use of its products, or from any other cause or for consequential damages. It is expressly understood that L. J. Star is not responsible for damage or injury caused to other products, building, property or persons by reason of the installation or use of its products.

This warranty is in lieu of any other warranty expressed or implied by any party other than L.J. Star. Repairs and/or replacements shall be at the sole discretion of L. J. Star based upon the terms and conditions.

2.00 Introduction

L. J. Star's Full View Flow Indicators are designed to provide a safe and dependable 360° viewing area for observing your process fluid. They are manufactured in two models and a variety of sizes.

Full View Flow Indicators utilize no accessories and are available in either threaded or flanged models. They are intended for low-pressure applications and can be mounted to detect flow in any direction.

Threaded models range in connection size from 1/8" through 2".

Flanged models range in connection size from 1" through 4".

2.10 Components

Each Full View Flow Indicator is comprised of six basic components.

Head - Two Per Unit
These are located at each end for the Full View Flow Indicator. They perform three important functions.

- provide the threaded or flanged process connections
- provide a recessed mounting surface for the seal gasket and glass cylinder
- evenly distribute the compressive force from the tie rods and nuts to the glass cylinder

Seal Gasket - Two Per Unit
These are placed between the heads and the glass cylinder to prevent the escape of process fluid during operation.

Glass Cylinder - One Per Unit
The transparent material which contains the process flow and allows visual access to the process fluid.

Protective Shield - One Per Unit
Transparent material that protects the glass cylinder from environmental damage.

Tie Rods - Three Per Unit [Threaded Models]
Four Per Unit [Flanged Models]
Responsible for connecting the two head pieces and providing unit rigidity.

Nuts - Twelve Per Unit [Threaded Models]
Sixteen Per Unit [Flanged Models]
Secures the tie rods in place and produces the proper compression to seal the unit and prevent leaks.

2.20 Accessories

Drip Tube
The dip tube is a factory-applied accessory. It is designed to assist in the detection of low or intermediate flows. The drip tube is most effective when installed vertically in downward flow applications.

2.30 Pressure / Temperature Specifications

The allowable pressure / temperature limitations for your Full View Flow Indicator are both material and size dependent. The combined effects of size and seal gasket material are displayed in Table 1.

DANGER

Do not exceed the listed design ratings. Operating beyond these limits could result in leaks, glass breakage or the sudden escape of process fluid or pressure. Should this occur you risk severe personal injury and property damage.

Full View Flow Indicator Operating Pressure / Temperature

Material	Model	Size	Gasket Material	Max Pressure (psig)	Max Temp (° F)
Carbon Steel Or 316 STS	Threaded	1/8" thru 3/4"	Neoprene	150	250
			Teflon® w/Non-Asbestos Insert		450
			Viton®		400
			Silicone		450
	Threaded And Flanged	1"	Neoprene	150	250
			Teflon® w/Non-Asbestos Insert		450
			Viton®		400
			Silicone		450
		1-1/2"	Neoprene	120	250
			Teflon® w/Non-Asbestos Insert		450
			Viton®		400
			Silicone		450
		2"	Neoprene	100	250
			Teflon® w/Non-Asbestos Insert		450
			Viton®		400
			Silicone		450
	Flanged	3"	Neoprene	100	250
			Teflon® w/Non-Asbestos Insert		450
			Viton®		400
			Silicone		450
		4"	Neoprene	70	250
			Teflon® w/Non-Asbestos Insert		450
			Viton®		400
			Silicone		450

Contact the factory before placing Carbon Steel in service below –20° F

Table 1

3.00 Installation

3.10 Unpacking

Upon receipt of your Full View Flow Indicator check all components carefully for damage incurred during shipment. If damage is discovered or suspected, do not attempt installation. Notify the carrier immediately and request a damage inspection.

Check each item against the enclosed packing list. Confirm that the attached identification tag lists the proper model and design rating for the intended application.

3.20 Visual Inspection

Insure your Full View Flow Indicator is free of any damage due to mishandling or improper storage before proceeding with installation. Specific areas of concern are the glass cylinder and pipe connections.

Examine the glass cylinder for evidence of scratches, chips or cracks. If any are present, do not proceed with installation. Surface abrasions weaken the cylinder and it will not be able to support the listed design rating.

The pipe connections, flanged or threaded, must be free of any foreign material. The presence of foreign material may prevent the unit from sealing.

3.30 Positioning the Full View Flow Indicator

Place your unit in an area free from excess mechanical or thermal stress. These forces will greatly reduce its serviceable life.

The following criteria should be used to determine the optimum location for your Full View Flow Indicator.

a) Do not impose system piping loads on the Full View Flow Indicator. The unit has not been designed as a load bearing component.
b) Protect it from objects that may come in contact with the glass cylinder. This includes environmental contaminants, tools and machinery.
c) Do not subject it to rapid temperature changes. Avoid exposing it to cold air blasts or cold wash down water.

3.40 Bolt Torque

The nuts on your Full View Flow Indicator were brought to the proper torque values at the factory. However, during shipment and handling they may have loosened. Therefore check all nuts before placing the unit in service. The proper sequence is displayed in Figure 1. The correct torque value is listed in Table 2.

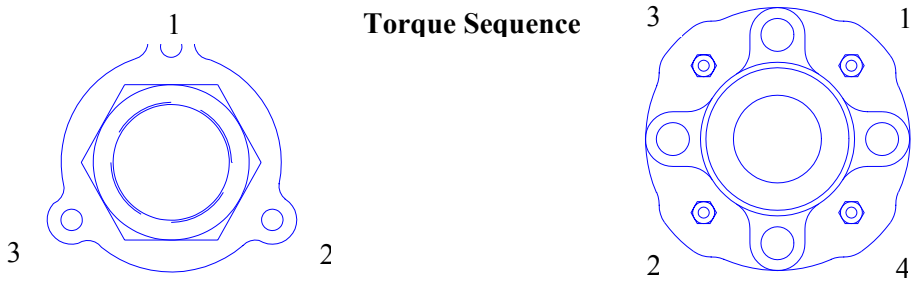

Figure 1

Torque Values (ft-lbs)
[Based Upon Seal Gasket Material]

Size (inches)	Threaded		Flanged	
	Neoprene, Viton® or Silicone	Teflon w/ Non-Asbestos Insert	Neoprene, Viton® or Silicone	Teflon w/ Non-Asbestos Insert
1/8 - 3/4	6	16		
1	10	14	8	8
1-1/2	12	14	12	16
2	12	22	12	16
3			20	25
4			25	30

Table 2

WARNING

Do not torque the nuts of your Full View Flow Indicator while it is under pressure. It will result in incorrect torque values and increase the likelihood of leaks. Before proceeding, insure the unit is free of pressure, allowed to reach ambient temperature and drained of all fluids. Failure to do so could result in personal injury and property damage.

4.00 Start Up

Prior to placing your Full View Flow Indicator into operation, insure all installation procedures have been completed. Verify the proper torque sequence and values have been applied. Check the unit for any damage that may have occurred during installation.

Bring the Full View Flow Indicator into service slowly. Rapid pressurization or temperature change will subject the cylinder to shock that could significantly shorten its service life or result in failure.

5.00 Maintenance

Periodic maintenance and inspection of your Full View Flow Indicator is recommended to insure the unit is in proper working order. The frequency of maintenance will vary with the application.

The end user must determine the appropriate maintenance schedule based upon their experience with the specific application. Realistic maintenance schedules can only be determined with full knowledge of the service and application involved.

WARNING

Do not proceed with any maintenance if the Full View Flow Indicator is still at operating pressure or temperature. Relieve the unit of pressure, allow it to reach ambient temperature and purge it of all fluids. Failure to do so could result in personal injury or property damage.

Any established maintenance procedure should include the following activities.
Check:

A) the glass cylinder for signs of damage or wear.
B) the Full View Flow Indicator for signs of leaks at gaskets or process connections.
C) the Full View Flow Indicator for signs of internal or external corrosion.
D) torque values.

5.10 Routine Maintenance Activities

WARNING

The use of personal safety apparatus when viewing the process fluid or during maintenance is highly recommended. This includes but is not limited to eye and skin protection. Failure to do so could result in personal injury.

5.11 Glass Cylinder

The glass cylinder should be carefully and regularly inspected. Examine it for evidence of scratches, clouding, etching or any other physical damage. A damaged cylinder has been weakened and is susceptible to breaking. Using a concentrated light at a 45° angle to the surface of the glass cylinder will help detect any of these conditions. Damaged areas will glisten more brightly than the surrounding surface.

Clean the surface of your glass cylinder. This can be accomplished by using standard commercial glass cleaner and a soft cloth. Never use an abrasive material, wire brush or scraper.

If damage to the cylinder is detected your Full View Flow Indicator should be taken out of service immediately. Do not continue with normal operation until the sight window has been replaced.

5.12 Gaskets

Regularly check your Full View Flow Indicator for evidence of leaks at the gasket surface. If leaks are detected remove the unit from service immediately. Once the indicator has reached ambient pressure and temperature verify the torque value on the nuts. If the torque is correct, replace the gaskets.

5.13 Corrosion

Evidence of either internal or external corrosion is an indication that the proper material of construction may not have been chosen for your application. The end user is responsible for determining the material that is compatible with both the process fluid and the surrounding environment. If corrosion is detected the Full View Flow Indicator should be removed from service and the material compatibility investigated by the end user.

6.00 Disassembly / Reassembly

Disassembly / reassembly of your Full View Flow Indicator should only take place after the unit has been removed from service. Conduct these procedures once you have secured the Full View Flow Indicator to a stable and clean worktable.

DANGER

Do not attempt to disassemble your Full View Flow Indicator while it is still in operation. Pressure increases the possibility of the sight window breaking and process fluid escaping. The unit must be relieved of pressure, allowed to reach ambient temperature and purged of all fluids prior to proceeding. Failure to do so could result in personal injury and property damage.

6.10 Disassembly

Place the Full View Flow Indicator in a vertical position. Remove the outer nuts from the tie rods. The same pattern used to torque the nuts should be followed to remove them. Once this is complete take off the head, seal gasket, protective shield and glass cylinder using appropriate safety precautions.

Note: On flanged Full View units the shield will need to be removed prior to the head.

The glass cylinder and gaskets should be disposed of immediately. They may contain hidden damage and pose a safety risk. Never attempt to reuse these components once they have been in service.

DANGER

Never attempt to reuse glass cylinders or gaskets that have been placed in service. Hidden damage or stress will greatly increase the possibility of the cylinder breaking and process fluid escaping. Failure to follow this procedure could result in personal injury and property damage.

6.20 Reassembly

Clean the gasket seating surface of the each head before proceeding with reassembly. This can be accomplished by using a soft metal scraper. Use extreme care to avoid damaging the seating surface. Failure to properly prepare the surface will result in leaks or glass cylinder breakage.

Check the flatness of both seating surfaces. They must be within 0.005 inches (0.13 mm) T.I.R. If the seating surfaces do not fall within this tolerance and cannot be corrected, the Full View Flow Indicator must be replaced.

Before finishing your reassembly complete the inspection process outlined in section 3.20. If any signs of damage exist, replace that component before proceeding.

Refer to the Exploded Cross Section View if needed.

a) Place one inner nut on each tie rod and turn it down approximately one inch.
b) Insert the nut end of each tie rod through the rod hole in the first head.
c) Install the outer nut on each tie rod until it is flush with the end.
d) Invert the semi-assembled unit so the process connection face of the head is in contact with the work surface.
e) Carefully place the seal gasket in the head counter bore. Follow this with the glass cylinder and insure both are seated properly.
f) **(Threaded Units Only)** Lower the protective shield over the glass cylinder. Center it within the casted shield tabs on the head.
g) Install the second set of inner nuts on the tie rods. They should go on far enough to allow the second head to make contact with the glass cylinder.
h) Place the second seal gasket in the second head's counter bore. Lower the second head over the tie rods. Insure the gasket and glass cylinder are seated properly.
i) Install the outer nuts on each tie rod and torque in small increments (3 ft-lbs or less) to the correct value. Use the torque sequence and value as shown in Figure 1 and Table 2 respectively.
j) Tighten the inner nuts finger tight against each head.
k) **(Threaded Units Only)** The protective shield should not be tightly compressed between the heads. It should freely rotate. This insures compression is being applied to the glass cylinder, not the protective shield.
l) **(Flanged Units Only)** After the unit has been securely installed in your system, attach the protective shield. This is accomplished by wrapping it around the head circumference and securing it with the supplied screws.

7.00 Telephone Assistance

For assistance with your L. J. Star Full View Flow Indicator contact your local representative or the factory. In order to answer your questions quickly and completely please have the following information available.

Model Number
- Serial Number
- Date the unit was placed in service
- Process media
- Operating pressure
- Operating temperature
- Brief description of problem(s)

8.00 Exploded Cross Section View