LJSTAR
INCORPORATED

Visual Flow Indicator

Threaded and Flanged Process Connection

Installation / Operation / Maintenance Manual

P.O. Box 1116
Twinsburg, OH 44087
Phone: 330/405-3040 • Fax: 330/405-3070
E-mail: view@ljstar.com • Web Site: www.ljstar.com

Table of Contents

1.00 Warranty

L. J. Star warrants its Visual 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 Visual Flow Indicators are designed to provide a safe and dependable system for observing your process fluid. They are manufactured in a variety of models and sizes. Available accessories allow you to tailor each Visual Flow Indicator to your specific application.

Standard Visual Flow Indicators utilize no accessories and are available in either threaded or flanged models. They can be mounted to detect flow in any direction.

Threaded models range in size from ½" through 2".

Flanged models range in size from ½" through 8".

Common accessories include:

- Flappers
- Rotators
- Drip Tubes

2.10 Components

Each Visual Flow Indicator is comprised of seven basic components. Depending upon the options utilized your actual number of components may be greater.

Body
The chamber containing the process flow. It provides the connections for attaching your Visual Flow Indicator to the process piping and the mounting surface for the windows and gaskets.

Seal Gasket
This is placed between the body and the window to prevent the escape of process fluid during operation.

Window
The transparent material allowing visual access to the process fluid.

Cushion Gasket
Placed between the window and retainer to prevent damage to the window when compression is applied. The material used for the cushion gasket must be harder than the material used for the sealing gasket.

Retainer
Provides a recessed mounting surface for the cushion gasket and window. It is also responsible for distributing the compressive force from the bolts/nuts evenly across the window.

Bolt
Responsible for connecting the retainer to the body.

Nut
Secures the bolt in place and provides the proper compression to seal the unit and prevent leaks.

2.20 Accessories

You have a number of accessories available for your Visual Flow Indicator. Each allows you to customize the unit to your application. Most of the accessories, with the exception of the shields, are designed to be installed at the factory, not in the field.

Flapper
This is an offset axle device that indicates the presence of either horizontal or vertical upward liquid flow. It is an appropriate choice for clear or semi-opaque liquids.

Rotator
This is a center axle device that indicates either horizontal or vertical liquid flow. It is appropriate for clear, translucent or dark solutions.

Drip Tube
This is best suited for use with vertical downward flows. It indicates low or intermittent flows by identifying the presence of condensation.

Shields
These are placed between the window and sealing gasket to protect the window from corrosive process fluids.

2.30 Pressure / Temperature Specifications

The allowable pressure / temperature limitations for your Visual Flow Indicator are material dependent. The combined effects of the body, retainer, window and gasket material are displayed below.

DANGER

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

Visual Flow Indicator Operating Pressure / Temperature

Class	Body Material	Gasket Material	Pressure / Temperature Rating
150#	Carbon Steel	Neoprene	285 psig @ 100° F 245 psig @ 250° F
		Teflon w/ Non-Asbestos Insert	285 psig @ 100° F 185 psig @ 450° F
		Viton®	285 psig @ 100° F 200 psig @ 400° F
		Silicone	285 psig @ 100° F 185 psig @ 450° F
	316 STS	Neoprene	275 psig @ 100° F 225 psig @ 250° F
		Teflon w/ Non-Asbestos Insert	275 psig @ 100° F 182 psig @ 450° F
		Viton®	275 psig @ 100° F 195 psig @ 400° F
		Silicone	275 psig @ 100° F 182 psig @ 450° F

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

Table 1

Visual Flow Indicator Operating Pressure / Temperature

Class	Body Material	Gasket Material	Pressure / Temperature Rating
300#	Carbon Steel	Neoprene	740 psig @ 100° F 665 psig @ 250° F
		Teflon w/ Non-Asbestos Insert	740 psig @ 100° F 617 psig @ 450° F
		Viton®	740 psig @ 100° F 635 psig @ 400° F
		Silicone	740 psig @ 100° F 617 psig @ 450° F
	316 STS	Neoprene	720 psig @ 100° F 590 psig @ 250° F
		Teflon w/ Non-Asbestos Insert	720 psig @ 100° F 497 psig @ 450° F
		Viton®	720 psig @ 100° F 515 psig @ 400° F
		Silicone	720 psig @ 100° F 497 psig @ 450° F

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

Table 2

3.00 Installation

3.10 Unpacking

Upon receipt of your Visual 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 Visual Flow Indicator is free of any damage due to mishandling or improper storage before proceeding with installation. Specific areas of concern are the window and pipe connections.

Examine the window for evidence of scratches, chips or cracks. If any are present, do not proceed with installation. Surface abrasions weaken the window 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 Visual 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 Visual Flow Indicator.

a) Do not impose system piping loads on the Visual 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 window. 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 Visual Flow Indicator were brought to the proper torque value 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 3.

Torque Sequence

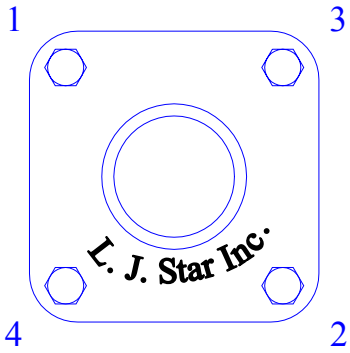

Figure 1

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

Size (inches)	150# Class		300# Class	
	Neoprene, Viton® or Silicone	Teflon w/ Non-Asbestos Insert	Neoprene, Viton® or Silicone	Teflon w/ Non-Asbestos Insert
1/2 & 3/4	8	12	12	17
1	10	20	15	25
1-1/2	20	20	25	30
2	20	20	40	45
3	60	65	85	90
4	85	85	85	90
6	105	120	95	135
8	155	175	95	135

Table 3

WARNING

Do not torque the nuts of your Visual 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 Visual 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 Visual Flow Indicator into service slowly. Rapid pressurization or temperature change will subject the window to shock that could significantly shorten its service life or result in failure.

5.00 Maintenance

Periodic maintenance and inspection of your Visual 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 Visual 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 window for signs of damage or wear.
B) the Visual Flow Indicator for signs of leaks at gaskets or process connections.
C) the Visual Flow Indicator for signs of internal or external corrosion.
D) bolt 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 Window

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

Cleaning the surface of your sight window 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 window is detected your Visual 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 Visual Flow Indicator for evidence of leaks at the gasket surface. If leaks are detected remove the unit from service immediately. Once the unit 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 Visual Flow Indicator should be removed from service and the material compatibility investigated by the end user.

6.00 Disassembly / Reassembly

DANGER

Do not attempt to disassemble your Visual Flow Indicator while it is still in operation. Pressure increases the possibility of the 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

The first step in the disassembly of your Visual Flow Indicator is to remove the nuts from the bolts. The same pattern used to torque the nuts should be followed to remove them. Once this is complete, take off the retainer, cushion gasket, window and sealing gasket using appropriate safety precautions.

The used window 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 windows or gaskets that have been placed in service. Hidden damage or stress will greatly increase the possibility of the window 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 body and retainer 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 window 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 Visual Flow Indicator must be replaced.

Refer to the Exploded Cross Section View if necessary.

a) Set the body on a clean stable worktable with one visual opening directed upward.
b) Insert the sealing gasket in the body's seating surface.
c) Install the window on the sealing gasket in body's counter bore.
d) Place the cushion gasket on the window.
e) Lower the retainer over the window and gasket assembly. Insure the cushion gasket and window are properly seated in the retainer counter bore.
f) Install the bolts through the holes in the retainer and body and attach the nuts. Tighten the nuts with your fingers until they are snug.
g) Torque the nuts in small increments (3 ft-lbs or less) until you have reached the correct value. Use the torque sequence and value as shown in Figure 1 and Table 3 respectively.
h) Turn the body over and repeat steps b through g for the second visual opening.

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

7.00 Telephone Assistance

For assistance with your L. J. Star Visual 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