L.J.STAR
INCORPORATED

MagneStar™

Magnetic Liquid Level Gage

Installation / Operation / Maintenance Manual

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1.00 Warranty

L. J. Star warrants its magnetic level gage against defects in material and workmanship for a period of one year 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 herender 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 magnetic level gages, MagneStar™, are an indirect reading liquid level gage. The MagneStar™ is designed especially for corrosive, toxic or flammable materials that preclude the use of glass for visual indication.

2.10 Theory of Operation

The MagneStar™ tracks the liquid level in a process vessel or tank by means of a float (containing a magnet) in a gage chamber. The gage chamber is connected to the process vessel. Each float is custom weighted for the specific gravity of the process media. This insures highly accurate level indication.

An indicator is mounted on the external face of the gage chamber. This indicator contains either a follower or series of flags magnetically coupled to the float. As the float moves vertically with the liquid level, the follower or flags mirror this movement and provide visual level indication.

Point level control and remote continuous level measurement are also available. They are achieved by mounting either switches and/or a 4-20 mA transmitter to the exterior of the gage chamber.

2.20 Components

The MagneStar™ consists of 3 major components.

2.21 Gage Chamber

The chamber is manufactured to meet the exact specifications of the individual application. Standard chamber construction consists of Schedule 40 pipe in either 304 or 316 STS material. However, other non-magnetic materials such as Hastelloy-C, Alloy-20, Monel, CPVC or Kynar may be utilized.

2.22 Float

Each float is designed and constructed to the individual application requirements. Consequently, floats are not interchangeable unless the process conditions and gage chamber are identical.

2.23 Indicator

There are two basic styles of visual indicators available, follower or flag. The type shipped with the gage was determined at the time of purchase.

A.) Follower Style

This indicator assembly consists of a rectangular yellow follower sealed in a channel with a 316 STS calibrated scale. The indicator is mounted parallel to and in direct contact with the gage chamber. This is necessary to provide maximum coupling between the float and follower.

B.) Flag Style

This indicator assembly consists of a series of magnetically interlocked ceramic flags. Each flag is black on one face and yellow on the other. The flags are sealed in a housing with a 316 STS calibrated scale.

As the float rises with the liquid level each flag will rotate 180°. This changes the color of the flag from black to yellow. When the float descends the process is reversed. Positive mechanical stops on each flag prevent them from rotating more than 180° and providing a false level indication.

3.00 Installation

3.10 Unpacking

Upon receipt of your MagneStar™ unit, check all components carefully for damage incurred during shipment. If damage is evident or suspected, do not attempt installation. Notify the carrier immediately and request a damage inspection. Check each item against the packing list.

The float is not in the gage chamber when shipped. Make certain it is not disposed with the packing materials. Since each float is unique, insure it stays with the corresponding gage. Installation of the float should not occur until after the gage chamber has been mounted to the vessel.

3.20 Gage Chamber Mounting

3.21 To operate properly the gage chamber must be vertical.

3.22 Check the vessel connections with a plumb line to verify alignment. The vessel must be free of dirt and debris to avoid malfunction of the level indicator.

3.23 Special handling and installation precautions must be used with long magnetic gages. This applies to any gage ten feet (3 meters) or more in length. Do not attempt to move or handle with a single point suspension or by both end suspension (such as two people picking up the gage by both ends). The gage chamber must be supported along its entire length.

3.24 It is strongly recommended that shutoff devices be installed between the vessel and gage chamber. This allows the gage to be isolated if necessary. The style of device utilized is a customer decision.

3.25 Before start-up verify that the gage chamber is free of any particles.

3.30 Float

Your custom weighted float has a preferred vertical orientation. The proper orientation can be verified using the directional information inscribed on the float.

If the float is installed improperly it will impact the operation of your indicator.

Install the float through the gage chamber access flange. Reinstall the blind flange to the gage chamber using a new gasket.

CAUTION

Do not conduct hydrostatic testing of the gage chamber with the float installed. If a gage is field tested with the float installed, you risk severely damaging the float to a point that it will no longer operate. Hydrostatic testing the gage chamber with the float installed will void the warranty.

4.00 Start Up

4.10 Check the connections between the gage chamber and the vessel to insure proper mating.

4.20 Check the gage chamber access flange(s) to insure the blind flange is properly mated to the chamber flange.

4.30 Close the drain plug or valve.

4.40 Open the isolation valve at the top vessel connection.

CAUTION

Do not open the lower isolation valve prior to the top valve. If the valves are opened in this order the float may be driven to the top of the gage chamber and irreparably damaged.

4.50 Slowly open the isolation valve at the lower vessel connection. This will allow for a gradual equalization of level in the gage chamber.

5.00 Maintenance

WARNING

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

Periodic maintenance and inspection of the magnetic gage is recommended to insure the unit is in proper working order. The frequency of maintenance will vary with the application.

Many maintenance procedures require the gage to be flushed or "blown down". If one of these procedures is utilized, the float should be removed prior to performing this operation. This will prevent any accidental damage to the float that could impair future operation.

To flush the gage chamber:
A.) Close the isolation valves.
B.) Open the drain plug or valve.
C.) Follow your normal flushing procedure.

Anytime the gage chamber blind flange(s) are removed, you should replace the gasket. The gasket material must be compatible with the process fluid.

6.00 Troubleshooting

Problem	Cause	Solution
Loss of indication. Even though there is liquid in the gage and the float is moving freely the indicator fails to register a level.	The float has been installed incorrectly.	Drain the gage, remove the float and install it correctly.
	The indicator is not fastened either vertically or tightly to the gage chamber.	Align the indicator vertically with the gage chamber and insure the indicator housing contacts the gage chamber throughout its entire length.
	If you are using a follower indicator you may be experiencing volatile level changes or a high degree of vibration.	Change to a flag style indicator. Due to its design it will not decouple from the float.
The float is stationary when level changes are occurring.	The float has been damaged due to improper start up or maintenance procedures	Remove the existing float from the gage chamber and replace it.
	Deposits in the process liquid have lodged between the float and the inside wall of the gage chamber.	Drain and flush the gage chamber. Remove and clean the float.
	There is a source of ferromagnetic material too close to the gage chamber.	Remove the source of the ferromagnetic material or shield the magnetic gage from it.
	The float and operating specific gravity do not correspond	Verify the operating specific gravity of the process and that of the float. If they do not agree the float will need to be replaced.
	The gage chamber has been damaged. If it is warped or creased this will prevent free movement of the float.	Inspect the gage chamber for damage. If any exists, the chamber should be replaced.