1140 Magnetic Level Indicator

General Instructions
INTRODUCTION

Magnetic Level Indicators are used in applications requiring continuous measurement, indications and control of liquid levels. The design relies on the hydrostatic pressure principle to display tank level in a side mounted measuring chamber. A float, containing a ring magnet, rises and falls with the liquid level in the bypass chamber. This approach allows an all metal construction which eliminates the breakage and leakage problems frequently experienced with glass tube designs. Transmission, Visual indication or switching may be achieved by mounting magnetic sensitive devices on the exterior of the bypass chamber. These devices track or are activated by the magnet inside the float.

OPERATING PRINCIPLE

MAGNETIC FLAPPER TYPE

A communicating bypass chamber is flanged to the side of a vessel, and as the liquid level in the tank rises or falls, a float with a built-in magnetic system inside the chamber rises or falls, a float with a built-in magnetic system inside the chamber rises or falls with it. (Refer fig. 01). The chamber is completely sealed so that the only moving part of the apparatus in contact with the liquid is the float itself. On the dry side of the chamber is the Magnetic Flapper Display, a column of magnetic flappers which are white on one side and red on the other. The rollers are made from Stainless Steel with a distance of 10mm between their axes. As the float moves up or down the bunched field of the permanent magnet mounted in its top section pulls the rollers through a rotation of 180 Degrees, thus changing their color. As the float rises the rollers are turned from white again. This means that at any given time the amount of liquid in the tank is constantly represented by a red column without any external power supply.

MAGNETIC SHUTTLE TYPE

This is an economy type indicator with equally effective performance. The indicator consists of an encased follower magnet inside a glass tube. The follower magnet is coupled with the float magnet inside the cage and moves along with the float to indicate the correct liquid level. (Refer fig.02). The frame of this indicator is made of Aluminium.

APPLICATIONS

High temperature, High Pressure, Strong acids, Alkalies & Hazardous locations, Boilers, Power Generation, Petro Chemical etc.

CHECKLIST

• Please check the packaging condition.
• Please check the contents, it should be as per your purchase order.
• Please check the documents.
  1. Test Certificates
  2. Warranty Certificates
  3. Packing List (Optional)
  5. SOR Invoice
METHODS OF INSTALLATION

1. Remove the protective caps on the process connections before fitting. Check the connection dimensions (centre to centre distance) and the alignment of the process connections on the vessel.
2. The magnetic flapper indicator and any installed magnetic switches must be aligned. To do this, slowly move the enclosed float from bottom to top on the magnetic flapper indicator and then back down again.
3. Magnetic switches must be aligned on the basis of the same principle.
4. In the case of magnetic level indicators with insulation and magnetic flapper indicator with sight glass extension, the float must be moved up and down inside the chamber.

The magnetic level indicator is mounted in a vertical position on the vessel to be monitored using the process connections (1) provided. Seals (2), Bolts & Nuts (3), washers (4) and nuts (5) suitable for the process connection must be used. Choose a seal with a suitable corrosion resistance. If necessary, shut-off valves must be mounted between the vessel and the bypass.

Please heed the usual torque values of Bolts & Nuts used in pipefitting work.

The magnetic level indicator must be installed without tension. Suitable seals must be used.

Care must be taken that the seal material is resistant to the medium and its vapours as well as to the temperature and pressure loads to be expected.

For Installing the float Clean the float from any chips or dust around the float's magnetic system then remove the base flange (7) and insert the float (6) into the chamber from the bottom. (The marking “top” or a legible type code marks the top side of the float.) after that place the seal (9) onto the base flange. Refit the base flange and tighten it in place using the Bolts & Nuts (8).
Putting into operation

If the magnetic level indicator is fitted with shut-off valves between process connections and tank, proceed as follows:

1. **Close** drain and vent on the magnetic level indicator.
2. **Slowly open the shut-off valve** at the upper process connection.
3. **Slowly open the shut-off valve** at the lower process connection. As liquid flows into the bypass chamber, the float moves to the top. The magnetic system turns the magnetic rollers of the visual indicator from "light" to "dark". The current liquid level is shown after liquid equalization between the vessel and the magnetic level indicator.
4. **Always heed the mounting and operating instructions of attached devices** before putting them into operation.
Latching Spdt Switch Working

Where NO- Normally Open, NC- Normally Closed
The Switch has three wires with Colors Red, black & Green,
Red: NC
Black: NO
Green: Common

Connection Details
CONNECTION DETAILS OF TRANSMITTER FOR PROGRAMMING:

• Loop Link:

• HART Modem:

• HART Communicator:

NOTE: For detailed Programming details please refer respective Transmitter Operating Manual
MAINTENANCE

Normally, Magnetic Level Indicators operate free from maintenance and wear when applied properly. Depending on the application, occasionally mud or other floating substances can gather in the lower portion of the instrument. Should this be the case, follow the below steps to remove the gauge from service.

1. Isolate the chamber from service by closing the process valves starting with the lower valve and then the top valve.
2. Allow pressure to equalize with atmosphere by slowly opening the vent connection.
3. Drain off any remaining liquid in a manner compatible with plant requirements.
   - Remove the flange on the bottom of the gauge.

   Caution!
   Take care to not allow the float to drop on the floor.
   This can cause damage to the float and/or the magnet assembly.

5. Clean out chamber with a brush and wash with water if compatible. Make sure there are no remaining solid particles. Look for items or debris that will inhibit the movement of the float. Further inspect the gauge chamber to ensure that it is free from unexpected corrosion or damage.
6. Replace the float with the arrows in the “Up” position.
7. Using a new gasket, replace the bottom flange and tighten all fasteners to the proper torque.

TROUBLESHOOTING

The following table contains the most frequent causes of faults and the necessary countermeasures.

<table>
<thead>
<tr>
<th>Situation</th>
<th>Reason</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic level indicator cannot be fitted at planned place on the vessel</td>
<td>Thread size or flange size of the magnetic level indicator do not correlate</td>
<td>Modification of the vessel or Return to the factory</td>
</tr>
<tr>
<td></td>
<td>Thread on the fastening sleeve on the vessel is faulty</td>
<td>Recut the thread or replace the fastening sleeve</td>
</tr>
<tr>
<td></td>
<td>Screw-in thread on the magnetic level indicator is faulty</td>
<td>Return to the factory</td>
</tr>
<tr>
<td></td>
<td>Center to center distance of the vessel does not correlate with the magnetic level indicator</td>
<td>Modification of the vessel</td>
</tr>
<tr>
<td></td>
<td>Process connections are not attached parallel to one another</td>
<td>Return to the factory or Modification of the vessel</td>
</tr>
</tbody>
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