Float Operated External Cage Magnetic Level Switch

**MLS** Series Float Operated Magnetic Level Switches are ideally designed for liquid level signalisations in vessels under pressure and temperature. The float movement is magnetically transmitted to switch action at the desired level. Also can be Top Mounted with a Guide/ Stilling Pipe inside vessel to ensure smooth float movement.

**Features:**

- Standard 1-Magnet type Switch Assembly for standard applications.
- 2-Magnet type Switch Assembly for adjustable differential (12-25 mm) and vibrating conditions.
- 3-Magnet type Switch Assembly for Multiple Level Signalisation.
- Adjustable Switch Operating Level by adjustment of switch carriage position (with longer switch box & 2-Magnet or 3-Magnet type switch mechanisms).
- Two Floats in tandem with separate extension rods and sleeves for level signalizations at two different levels (for large difference between High & Low Level's and in case of Flameproof Enclosures).
- External Cage can be Welded type (Lighter in weight) to ensure less chance of leakage or Bolted type to ensure easier opening of the same for float replacement.

- Horizontal Cage type for High Pressure (also low Sp.Gravity) applications (with counter Balance weight for float).
- Supplied with cooling/ radiating fins for high/ sub-zero temperature applications.
- Guide/ Stilling pipe in case of turbulent applications to ensure free float movement (for direct Top Mounted version).
- Switch Box rotatable.
- Standard/ Hermetically sealed/ High Temperature Microswitches or Hermetically sealed Mercury Switches.
- Sliding Sleeve design for getting higher differential.
- IBR/ LLOYDS Certification (if required).
- CIMFR Certification, CCOE approval, BIS licence for Flameproof Level Switches under Gas Gr.IIA, IIB or IIC (IS2148:2004). 3 – Magnet type is weatherproof only.

**Applications:**
Level Alarms & Controls in Power Plants, Petrochemical Plants & Refineries, Chemical Plants, Paper Mills, Sugar Mills, Ships, etc. (Wherever liquid flows in and out of Tanks / Pressure Vessels / Sumps).
**Principle of Operation:**

Standard 1- Magnet type. With the rise of liquid level, the float rises, the magnetic sleeve rises inside the sleeve pipe until it is near enough to pull the magnet placed outside the sleeve pipe. The Magnet thus overcomes the pull of the spring and causes the switch to change over contact. With the fall of liquid level, the Sleeve lowers, until the spring brings back the magnet to its original position thereby re-operating the switch. Upper & Lower end stops prevent false switch re-operation.

2-Magnet type. In this case there is no spring but a second magnet is provided in the Switch Assembly. During rise of Level, the switch changes over when sleeve rises enough to pull in the upper magnet. The switch re-operates (during fall of Level) when sleeve attracts the lower magnet again. The switch remains stay put by one magnet or other even if float has moved away (upwards or downwards). With larger Switch Box (weatherproof only) set point adjustability can be achieved by fix-ing Switch Assembly at different position on sleeve pipe.

3-Magnet type. In this case, the sleeve is replaced by a magnet which tilts forward or backward a Secondary Magnet by attraction; The Secondary Magnet operates (by repulsion) the Tertiary Magnet which carries 1 NO + 1 NC Air Break Type Contacts. Contacts remain stay-put even after float has moved away. With larger Switch Box, more than one switch can be fitted (adjustable) to have signals at various levels.

**Specifications:**

**Materials of Construction:**
- Float: SS 304/ SS 316/ Monel/PVC/Titanium; ECTFE/FEP Coated (Optional).
- Cage: MS/ CS/ SS 304/ SS 316, PP/PVC; ECTFE/ FEP Coated/Lined, Rubber lined.
- Switch Box & Cover: Aluminium / Stainless Steel / CI.
- Cooling Fins: MS/Aluminium/SS304 (SS304/ MS Cooling Fins above 400°C).

**Enclosure Class:**
- Weatherproof to IP66 or Weatherproof & Flameproof (to Gas Groups IIA, IIB or IIC as per IS 2148: 2004).
- Flameproof Level Switches are fitted with CIMFR approved Flameproof Switch Boxes having type numbers as follows:

<table>
<thead>
<tr>
<th>Type of Switch</th>
<th>Single Switch</th>
<th>Double Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 - SPDT</td>
<td>2 - SPDT</td>
</tr>
<tr>
<td>Micro</td>
<td>SBAS11</td>
<td>SBAS12</td>
</tr>
<tr>
<td>Mercury</td>
<td>SBAP11</td>
<td>SBAP12</td>
</tr>
</tbody>
</table>

**Vessel Connection:**
- Top side and Bottom or Bottom side – min 25 NB (40 NB for extra high pressure preferred).

**Pressure Rating:**
- Up to 200 Kg/Cm² (for higher rating, please consult us).

**Temperature Rating:**
- 400°C max. (for higher rating, please consult us).

**Specific Gravity:**
- 0.7 - 1.2. (for other values please consult us).

**Switch Carriage:**
- Standard type, 2-Magnet type or 3-Magnet type.

**Contact Rating:**
- Microswitch: 5A at 230 V AC / 4A at 24 V DC (Contact us for current rating of Special Microswitches).
- Mercury Switch (Hermetically Sealed): 5A at 230V AC/5A at 24V DC.

**Cable Entry:**
- ½", ¾" NPT (F) as standard, other types on request. In case of non-flameproof enclosures Cable Entries can be 2/3 or 4.
Differential: Standard Type: 12 mm ± 2 mm  
Standard Type with Horizontal Cage: 15 mm ± 2 mm  
2 Magnet Type: 12-25 mm ± 2 mm  
3 Magnet Type: 17 mm ± 3 mm

DIFFERENTIAL may change if Specific Gravity varies or for Interface Applications.

MODEL NUMBER OF FLOAT OPERATED MAGNETIC LEVEL SWITCHES

<table>
<thead>
<tr>
<th>MLS</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure Class of Switch Box</td>
<td>Type of Design</td>
<td>Pressure Class</td>
<td>Material of Cage/Flange</td>
<td>No. of Floats</td>
<td>Material of Floats</td>
<td>No. &amp; Type of Switch Carriage</td>
<td>No. &amp; Type of Switch per Carriage</td>
<td>Special Features if any</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Weatherproof</td>
<td>4.6”NB Cage Welded</td>
<td>1. Nominal Pr.</td>
<td>4. SS 304</td>
<td>9. One Float.</td>
<td>4. SS 304</td>
<td>1. One Std. Type.</td>
<td>1. One Micro Switch.</td>
<td>3/4” NB Cages, Rubber Lined Cage, Sliding Sleeve etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. WP &amp; Flame-proof (II C)</td>
<td>6.50/65 kg/cm²</td>
<td>7. 80/110 kg/cm²</td>
<td>9. Others</td>
<td>7. One 3-Magnet Type.</td>
<td>8. 50/65 kg/cm²</td>
<td>9. Three 3-Magnet Type.</td>
<td>6. Two Mercury Switch.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.6”NB Cage Bolted Type, Side &amp; Bottom Conn.</td>
<td>8. High Pr. Type.</td>
<td></td>
<td></td>
<td>8. Two 3-Magnet Type.</td>
<td></td>
<td></td>
<td>8. Air Break Type (1 NO + 1 NC).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.6”NB Cage Bolted Type, Side &amp; Side Connection.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Horizontal Cage (Welded Type).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**: Pressure Class 4,5,6,7 are basically 150/300/600/900 ANSI rated & hence may be higher than the figures indicated. Special Materials belonging to the same category will be designated by same number with suffix ‘S’ (for example, SS 304L will be ‘4’, Low Temp. Carbon Steel will be ‘8’ etc.)

Since improvements are made from time to time, the specifications are liable to change without notice.

**Head Office Address**: “RajKamal” Bldg, 6th Floor, 13, Camac Street, Kolkata – 700017, Tel: 033)2283-2766/3022-5767/3022-9368 Fax: (033)2283-2719/2280-9645 E-mail: info@levcongroup.com, levconh@vsnl.net, levcon@ricmail.com.

**Mumbai Branch Address**: 301, Protprima Chambers, 1 Suren Road, Andheri East, Mumbai-400093, Tel :022)2683-2127/ 2683-3015, Fax : (022)2683-3015. E-mail: levconn@airtelmail.in

LI/MLS/02 (Dt. 25.05.2009).