

**TOP MOUNTED MAGNETIC  
LEVEL INDICATOR  
WITH TRANSMITTER**  
**[ FDI - TMMLIT - 508 ]**



# INTRODUCTION

## TOP MOUNTED MAGNETIC LEVEL INDICATOR

Top Mounted Magnetic Level Indicator by pass chamber is flanged to the Top of the 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 with it.

A float connected to a guide rod (stem) changes its height in proportion to the filling level of the tank. At the end of the guide rod is a built-in permanent magnet. On the dry side of the chamber is the Magnetic Follower Display assembly comprising of a Red & Black magnetic capsule housed in a glass tube or bi-flapper Assembly. As the liquid level Rise or Fall float inside the chamber track, the magnet inside the float magnetically couples the Red & Black capsule or bi-flapper, and the capsule/Flapper will remain magnetically coupled and the level can be read off Instantly.

FIDICON is a pioneer in the field of manufacturing Level Indicator in India since 2002 years of designing, manufacturing, installation and service of the same. Top Mounted Magnetic Level Indicator manufactured by FIDICON are user friendly and easy to install. It comes in many ranges and can be tailor made as per the requirements of customers.

## WORKING PRINCIPLE

The working principle behind a magnetic level indicator is that the measuring instrument shares the same fluid and therefore, the same level as the vessel. The level indicator is attached to the vessel and connects directly with the fluid to be measured. Within the chamber is a float with a magnet assembly inside.

The magnetic level indicator working principle is widely used in level instrumentation. The interaction between float magnets inside the chamber and magnetic flags outside the chamber provide almost maintenance-free, continuous level information. This type of level indicator doesn't require power, making it ideal for a variety of applications across industries.

The magnetic level indicator working principle is based on the effects that one magnet has on nearby magnets. The mechanics are simple yet very effective, yielding reliable and repeatable level information for continuous monitoring and recording of fluid levels.

This float rests on the fluid's surface. As the fluid level rises or falls, so does the float. As the float moves up or down, the magnet assembly rotates a series of bi-colour magnetic flappers or capsule, changing the visual indicators mounted just outside the chamber from one colour to the other and in case of capsule moving in the glass tube.

Magnetic level indicators use the principle of magnetic field coupling to provide fluid level information, to activate a switch, or to provide continuous level data. Magnetic coupling allows to measure levels without direct contact between the indicator and the fluid in the vessel.



# INTRODUCTION

## WORKING PRINCIPLE

A magnetic field consists of the lines of flux surrounding a magnet. The field acts on other objects (magnets or ferromagnetic materials). When a magnetic field acts upon another object with sufficient force to move the object, the magnet is said to be magnetically coupled with that object.

The magnets within a float and an indicator are magnetically coupled. The float, located inside a chamber, follows the surface of the liquid. A magnet or magnet assembly inside the float creates a magnetic field, which penetrates the chamber wall to couple with the magnetic field created by the magnets in the indicator flags that display the fluid level.

Since the magnetic level indicator working principle relies on the interaction between magnets, these level measuring instruments do not need a power source. They are also virtually maintenance-free. An additional advantage: The indicator's magnetic force can affect optional switches or transmitters mounted outside of the chamber. The colored bi-flappers are easy to see, even from a distance, and are paired with a scale for precise readings. As for any level instrumentation, the size and material of the float are chosen according to the media, temperature, pressure, and density of the process media.

## TOP MOUNTED MAGNETIC LEVEL INDICATOR

The top mount MLI in the simplest configuration has a chamber with a single flange at one end and a machined cap at the other, a float assembly that hangs below the chamber, and an indicator column. The float assembly consists of a magnet at the top of a guide rod and a float at the bottom. The float assembly is weighted to operate at the specific gravity of the fluid to be measured. A float guide tube, also called a stilling well, is often used within the vessel to prevent bending of the rod during operation when stirring, agitation, or when processing turbulence may be present in the vessel.

As the fluid level changes in the vessel causing the float to move, the magnet, attached to the end of the rod, travels up and down within the chamber. As the magnet moves, the surrounding magnetic field directly affects the position of the shuttle or flags in the indicator and the display represents the fluid level in the vessel.



## APPLICATIONS

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- Refinery and chemical industries
- Energy and power plant technology
- Offshore exploration and drilling
- Pharmaceutical
- Wastewater tanks
- Oil and gas industries
- Pulp and paper
- Feed water heaters and boilers
- Food and beverage
- Pipeline compressor applications
- Gas plants

## FLOAT SELECTION

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- Working Pressure
- Temperature
- Medium
- Density

## ADVANTAGES

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- Standard unpressurised float system
- Float without mechanical or magnetic guide rails
- Fully corrosion resistant system
- Fully adjustable switches
- Back lighting is unnecessary
- Eccentric drain cannot be blocked by the float
- Permanent indication without external power supply
- Minimum sensitivity to density variations
- Low temperature version is fitted with ice free indication strip
- Measurement is unaffected by pressure, vacuum, temperature, foam and viscosity

## ADVANTAGES

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A magnetic level indicator is often used in applications where a glass sight gauge is unsafe, environmentally risky, or difficult to see. Typical shortcomings of sight glass gauges include:

- High pressures, extreme temperatures, and toxic or corrosive materials may cause a risk of fugitive emission of dangerous substances.
- Some chemical materials within a process vessel or storage tank can attack the glass, causing discoloration of the sight gauge, thus decreasing level visibility.
- Liquid-liquid interfaces can be very difficult to read in a sight glass particularly if the fluids are of similar colour. Clear liquids are also difficult to see in a sight glass.

The key reasons for selecting a Magnetic level Indicator over a sight glass are:

- Improved safety
- Reduced maintenance
- Increased visibility
- Easier initial installation and addition of transmitters and switches
- Lower long-term cost of ownership

## MAINTENANCE

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Magnetic level Indicator are virtually maintenance free once installed, because the indicator never touches the process fluid. With sight glasses, the gauges must be periodically checked for leaks and cleaned. Scale and build-up on the glass from the process fluid can cause the sight glass to become unreadable.

Top-mounted Magnetic level indicator if operated properly then TML do not require maintenance. The indicator should be repaired by the manufacturer or by persons authorized by the manufacturer only. You should observe the international and national regulations regarding the implementation of the repair.

## TRANSMITTER

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Level Sensing elements can be fixed directly to the float cage, so that simultaneously liquid level is electrically measured through smart transmitter with output of 4-20mA. Transmitters are used to provide a constant level reading without the need for additional process connections. The transmitter mounts to the exterior of the magnetic level indicator chamber. Transmitter will arrive already mounted and calibrated.

## RECOMMENDED DISPOSAL

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- Give it back to us & we will take care of recycling & possible disposal.
- User can dis-assemble the product in multiple stage
- The above may be handed over (state pollution board), authorized re-cycler item-wise.

## SAFETY

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The obvious safety benefit of the Side Mounted Magnetic Level Indicator over a Reflex level gauge is reduced chance of breakage. If the process fluid is under extreme pressures or temperatures, the likelihood of sight glass breakage increases. The pressure boundary of a Side Mounted Magnetics Level Indicator is made of robust metal, frequently the same as the vessel piping, making Magnetic Level Indicators as safe and strong as the vessel. The indicators, transmitters, and switches are all mounted externally and, therefore, are unaffected by toxicity, corrosiveness, or other process fluid characteristics.

Another safety benefit is that the chemical compatibility with the fluid in a Magnetic Level Indicator is restricted to only three components, the metallic chamber, gaskets and float. With Reflex Level gauge, the process fluid may have chemical compatibility issues with any of the wetted materials glass, metal, or sealants.

## TYPES OF INDICATOR

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- **Magnetic Follower Capsule**

Indicator system consists of magnetic capsule, which moves in glass tube inside the housing. As the level starts, rising or falling magnetic float also travels with liquid level in non-magnetic chamber. The magnetic interaction between magnets in float and capsule causes capsule to travel along with magnetic float. RED magnetic follower Capsule, that moves within a glass tube and can be read against a scale.

- **Bi-Color Roller Flapper:**

Each flap in the indicating rail is fitted with a permanent magnet which makes this level gauge unaffected by shocks, vibrations and high temperatures. Also, moisture and / or an aggressive environment are no problem for this level gauge.

This magnetic level gauge is available with plastic or stainless-steel flaps. The flaps can be placed in a plastic, aluminium or stainless-steel housing.

Because of the construction of the flaps, one side white and on the other red it is possible to see the level over a greater distance or in darker places. With the available "Pointers" it is possible to set the visual limits on the indicating rail on every level you require.

This system is expensive and consists of a series of bi-colour flappers. White on front side and RED on the reverse. Bi-coloured magnetic rollers equipped with small rod magnets which are rotated one after another at an angle of 180° by the directed field of the Permanent magnet inside the float. These flappers rotate corresponding to float movement, thus changing their colour from white to red as the float rises and vice-versa when the float falls. As such the liquid represented by an external RED.

Magnetic level gauge is also suitable for interface reading. The float will sink into the medium with the lower density and will float on the medium with the higher density.



## ENQUIRY SPECIFICATIONS:

- [1] Service Media Details.
- [2] Size/Connection
- [3] System Operating and Design Pressure.
- [4] System Operating and Design Temperature.
- [5] Material Specifications ( Body, Internal )
- [6] Center To Center Distance/Connection Height

## RECOMMENDED SPARES

- [1] Glass Tube
- [2] Magnetic Capsule/Bi-Flapper
- [3] Gasket
- [4] Drain/Isolation/Control Valve
- [5] Float

## OTHER RANGE OF PRODUCTS

- [1] Flame Arrester
- [2] Breather Valve
- [3] Level Indicators
- [4] Rotameters
- [5] Emergency Relief Valve
- [6] Gauge Hatch
- [7] Strainers
- [8] Pressure Reducing Valve
- [9] Safety Relief Valve
- [10] Flowmeters
- [11] Level Switches
- [12] Pressure Reducing Station
- [13] Level Gauge, etc.

### Any Query?

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