MAGTECH MAGNETIC LEVEL INDICATORS

Product data information

Magtech

EMERSON
Process Management

LG SERIES MAGNETIC LIQUID LEVEL INDICATORS

Reliable, low maintenance, redundant measurements are vital to the efficiency of your operation, so you need time tested solutions.

Magtech level instruments complement the Rosemount product portfolio and have served the process industry for over 25 years with flexible and creative solutions for a wide variety of applications.

Test, inspection and certification are increasingly important, and managing complex requirements reliably in today's safety conscious environment is a strength of the Magtech brand.

Magtech magnetic level indicators are low-maintenance alternatives to sight glasses and other level indicators. They provide non-invasive level indication while reducing leak points and fugitive emissions.

Combined with our externally mounted transmitters and switches, Magtech magnetic level indicators provide a complete, redundant and cost-effective level solution.

+ Easy to install, no extra piping required in most applications
+ Visual level indication to 100 ft (30 m)
+ No process liquid in contact with indicator glass
+ Ideal for high-temperature, high-pressure and corrosive applications
+ Manufactured to meet ASME B31.1 or ASME B31.3
+ Magnetostrictive and radar transmitter options for non-invasive and/or redundant level control
+ Available with HART™ 5, HART 7 or Foundation Fieldbus™
+ AMS Aware

Magtech magnetic level indicator and magnetostrictive level transmitter

Increased safety and reliability with non-pressurized high pressure floats

The Magtech high pressure float delivers higher safety and reliability than other, pressurized floats. Made from high strength titanium, it is suitable for specific gravities as low as 0.41 and pressures up to 3400 psi (234 bar). For pressures eceeding 3400 psi, please consult the factory.

Higher usability and safety with clearly visible flags

Magtech indicators contain flags made of aluminum coated with 850 °F (454 °C) paint, which can withstand high temperatures. The flags are assembled so that the components are prevented from separating, for example due to vibration in the application.

The Magtech standard flag color is red, which is the universal color of warning and stands out in an industrial environment, making sure the level in the vessel is highly visible.

Safety and reliability are challenges you need to meet

Safety and reliability are ever-increasing challenges. You need more stringent vessel, piping and process connection designs to cope with high pressure and cyclic process services. To meet these needs, we utilize a T-Drill machine to form extruded outlets. This features fully computerized automation control with ultra-precise machining for a more reliable gauge design.

+ Independent certified testing as required by ASME standards
+ Eliminates the need for pipe-tees and minimizes welds
+ 100% X-rayable process connection welds
+ Eliminates internal pipe distortion
+ Provides full bore process connections and all butt-weld construction

Your application is unique. All Magtech MLIs are custom-made based on your requirements

Style A	Style B	Style C	Style D	Style L
Flanged top and bottom, no top and bottom blind, no side process connection	Flanged top and bottom with side(s) process connection	Closed top, flanged bottom with side(s) process connection	Flanged top, closed bottom with side(s) process connection	Closed top and bottom with or without side(s) process connection

Magtech MLI mounting styles

No matter what your application, we can design and manufacture a magnetic level indicator to fit. Above are our standard mounting styles, but if none of these meet your needs we will come up with the best solution based on your requirements.
NOTE: Style "A" is for through process piping only. Other connections shown are examples of typical process connections and need to be specified.

INCREASED CONTROL AT A THIRD OF THE COST - AND REDUCTION IN LEAK POINTS

A process vessel with three point level switches, two short sight glasses, a pneumatic level controller and 15 valves with associated plumbing.

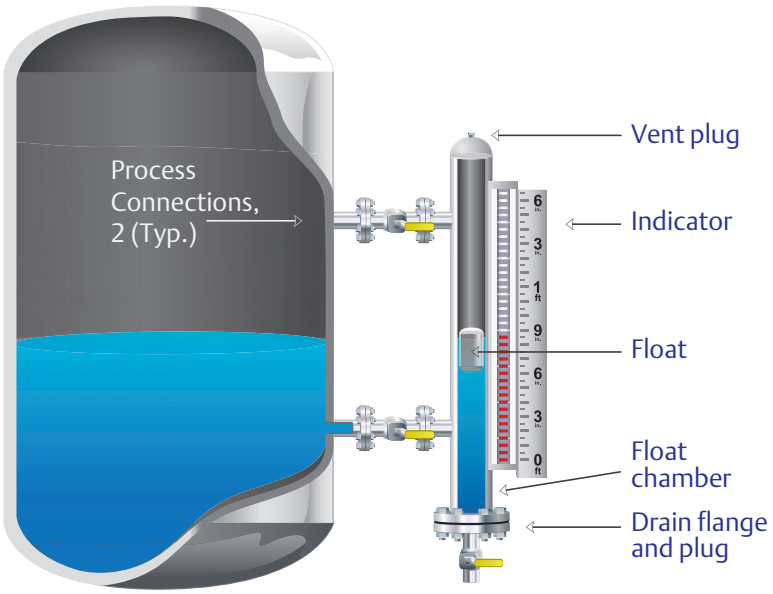
Process vessel after installing a Magtech indicator, providing increased control outputs at a third of the cost.

This is how it works

Magtech magnetic level indicators consist of a chamber, a magnet equipped float which rises and lowers with the fluid level, and an indicator which is mounted to the chamber.

The indicator houses a column of small flags which indicate the level of the fluid in the chamber, based on the position of the float. As the fluid level rises and lowers, the float rises and lowers as well, and the flags are tripped from one orientation to the other; typically the red side indicates the liquid level and the silver side indicates the vapor space.

As the float rises and falls with the process level, tripping the flags, it also stimulates any attached transmitters and switches, providing a signal back to the control system.



Options required by the application

	Typical construction	Optional as required
Chamber material	300 Series stainless wetted parts	Other non-ferrous materials that do not exhibit ferro-magnetic properties such as Hastelloy, CB20, Inconel, Monel 400 and T-321 stainless
Chamber pipe	2½" S10 or S40 welded pipe depending upon the application pressure, temperature and corrosion allowance	2", 3", or 4" may be required or pipe schedules up to S160 or XXS depending upon application requirements
Chamber flanges	Typically supplied ANSI B16.5 RF slip on type, 500 RMS, in 300 Series stainless steel	Common upgrades are ANSI weld neck style, socket weld, or lapjoint, and other flange faces such as RTJ or flat face
Process connections	1" 3000# FNPT unless otherwise specified; vent and drains are ½" 3000# FNPT	As with chamber flanges, upgrades to process connections, vents and drains are ANSI weld neck style, socket weld, or lap joint, and other size or rating NPT or socket weld connections
Float assembly	300 Series stainless steel suitable for applications up to 1000 psig and 0.63 S.G. at temperatures from -320 to 1000 °F (-196 to 538 °C)	Magtech floats are available in a wide variety of materials, for pressures to 3400 psig (234 bar), and in low pressure applications, minimum specific gravities down to 0.40 (lower SG could be possible under certain conditions, please consult factory)
Indicator	Brightly colored red and contrasting silver all metal, high temperature design reading in feet and inches with ½" divisions; approximately 1/3" resolution	Optional all stainless steel housing construction is available for severe environments. In addition, other indicator colors, units of measure or follower type may be specified.
Chamber design	Float chamber is designed to ANSI B31.1and B31.3, and ASME Boiler Code PG60. Welding and welder qualification in accordance with ASME Section IX.	Non-standard welding procedures, qualifications or testing may be supplied if required, as well as designs to proprietary customer design specifications
Testing	Functional and calibration test is performed on every Magtech gauge	Additional testing and documentation, such as MTRs, radiography, hydrostatic pressure tests, PMI, dye penetrant, NACE or witness testing are available if required

A COMPLETE LEVEL SOLUTION

Sourcing the right level equipment is complicated enough without having to go from supplier to supplier to obtain a complete, redundant package for your application.

With Emerson, the solution is available from one source. You don't have to worry about everything fitting and operating together; you can obtain a magnetic level indicator, a magnetostrictive level transmitter and a guided wave radar that are designed to work optimally together to provide the most reliable measurements.

We combine the proven reliability and rugged construction of Magtech LG Series magnetic level indicators, magnetostrictive level transmitters and Rosemount guided wave radar transmitters. The union of these outstanding level measurement technologies provides a redundant system appropriate for use in a wide range of applications.

+ Allows measurement of virtually all level and interface applications
+ Local indication and redundancy via guided wave radar and magnetostrictive level transmitter
+ Manufactured to fit perfectly together - no project delays
+ Each unit designed for optimal performance in each application

Guided wave radar and magnetic level indicator in combination for redundant level measurements

Guided wave radar features and benefits

Guided wave radar provides a top mounted, direct level and interface measurement of liquids and solids, including those with wide temperature and pressure requirements. They are easy to install and are virtually unaffected by process conditions.

- Highly accurate and reliable
- Multivariable output includes the choice of level, interface level, distance, upper product thickness, volume and signal strength
- Best fit for chamber applications and ideal for replacing older technologies
- No moving parts, no calibration
- Wide selection of materials and process connections
- Seamless system integration with HART, Foundation Fieldbus, and Modbus
- Wireless option available
- Available with dynamic vapor compensation for steam applications

Principle of operation

Microwave pulses guided down a probe reach the media and part of the signal is reflected back. The time difference between sending and receiving is measured, and the level and/or interface level is derived.

APPLICATIONS

- Boiler drum level control and indication
- Safety systems requiring redundancy
- Displacer replacement
- Level and interface
- High temperature/high pressure

Accessories

LTM Series magnetostrictive transmitter

LTM Series magnetostrictive level transmitters offer a variety of configuration options. The LTM transmitter may be utilized as a direct insertion transmitter or externally mounted to a magnetic level indicator for non-invasive level measurement.

In the gauge-mount configuration, the sensor is attached to the exterior of the magnetic indicator. This allows the transmitter to be installed or serviced without removing the indicator from service. As the fluid rises and falls, so does the float. The magnetostrictive level transmitter senses the level of fluid in the vessel by detecting the level of the magnets contained within the float, and then transmits the measurement back to the control system.

LTM transmitters are available with two-wire loop powered 4-20 mA signal output, or bus powered (Fieldbus) with digital output(s).

Remote-mount electronics are available for easy access or high temperature applications. Sensor probes are available in a variety of materials including stainless steel and exotic alloys or electropolished for sanitary service. LTM transmitters feature explosion-proof, dual-compartment enclosures, integral displays and intrinsically safe electronics.

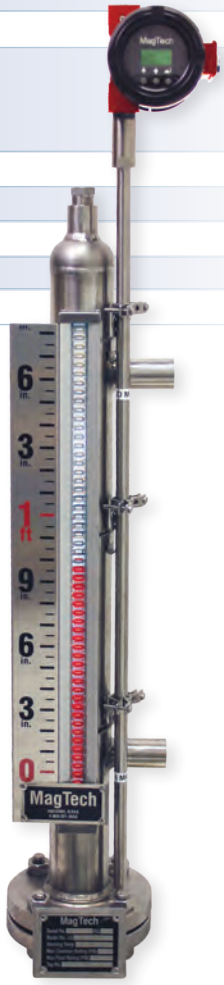
The “plug-and-play” electronics allow easy upgrades. LTM transmitters offer the latest and most advanced software features on the market, introducing a registered HART DD, Rev. 5 with AMS Aware and Rev. 7 with EDD, compliant to IEC 61804-2, and compliant to Foundation Fieldbus software version ITK-4.6.

Specifications	
Housing:	Epoxy coated aluminium or stainless steel
Protection rating:	NEMA 4X, NEMA 7, IP66
Sensor probe	
Material:	316 SS, 5/8 inch (15.88mm) probe (standard), other materials available All wetted parts are non-ferrous compatible materials (stainless steel, Monel, Hastelloy, etc.)
Maximum length:	30 ft (9 m)
Mounting style:	Gauge mount (via 316 SS brackets)
Operating temp.:	-200 to 750 °F (-129 to 399 °C)
Insertion type optional	
Operating temperature:	-58 to 300 °F (-58 to 149 °C)

**All transmitters have the following RFI Limits: SAMA PMC 31.1, 20 to 1000 MHz, up to 30 V/m*

Bottom mount with elbow

Remote mount



Top mount

Accessories

LT-1 Level transmitter

The LT-1 level transmitter is based on tried-and-true measurement technology, where precise accuracy and digital communication are not required. The sensor probe consists of a series of resistors and reed switches. The change in resistance caused by the magnetic float in the level gauge is converted to a 4-20 mA signal proportional to level. The LT-1 transmitter is available in either ½" or ¼" resolution.

This transmitter is a low-cost alternative for level measurement. The following features are included:

+ 4-20 mA output
+ Field-reversible probe (allows transmitter to be top or bottom mounted)

LT-1 Transmitter specifications	
Sensor probe	
Length:	Maximum 20 ft (6 m)
Resolution:	½ inch (¼ inch under 30" measuring length)
Material:	316 stainless steel standard
Max. operating temp.:	750 °F (399 °C) process temperature
Transmitter	
Power:	24 V dc (loop powered) nominal
Output:	4-20 mA
Load:	750 ohm max.
Housing:	Explosion-proof, Class I, Div. I, Groups. B, C and D
Maximum temperature:	150 °F (85 °C) in housing

For high temperature applications, the transmitter should be remote mounted

APPLICATIONS

+ Examples of customer installations of Magtech products

Accessories

Magtech level switches

Magtech level switches are non-invasive alarm switches that clamp to the gauge chamber and are magnetically actuated by the float through the chamber wall. These switches provide a low cost, reliable alarm and control action without making additional cutouts in the vessel.

The external mounting clamps make it easy to adjust the set point or service the switch at any time without interrupting the process. They are also easily added after gauge installation. All Magtech switches may be wired for rising or falling level and NC or NO operation. Each switch has approximately ½ inch deadband to eliminate chattering and all have “break before make” action. The MLS-3EX is CSA, ATEX, UL and C-UL listed for both the U.S. and Canada.

MLS-10EX Series

The MLS-10EX-C is a DPDT cam-actuated switch used to control pumps, solenoids, etc. The switch can be set by the user for rising or falling activation. This switch meets Class 1, Div. 1 codes and the internal micro-switches are UL approved. MLS-10EX-R (relay, requires auxiliary power) is available for higher inductive load.

Specifications	
Deadband:	.50 Inches
Max. temp.:	200 °F (93 °C) Standard
	450 °F (232 °C) High temperature version
Min. temp.:	-40 °F (-40 °C)
Contacts:	DPDT, form C
Current:	10 Amps maximum at 250V ac
	5 Amps maximum at 125V dc
Power:	2 KVA / 300W
Approvals:	UL/CUL and CSA Cl. I Grp. B,C,D; Cl. II Grp. E,F,G; Cl.III

MLS-3 Series

The MLS-3EX is a hermetically sealed switch with Form C contacts. A bias magnet latches the switch, maintaining contact as the float continues to rise or fall within the gauge chamber. A non-latching switch is available.
The MLS-3EX is best suited for low power alarm signals.

MLS-3EX-M Series

Specifications	
Deadband:	.50 Inches (12.7 mm)
Max. temp.:	350 °F (177 °C) standard
	650 °F (343 °C) MLS-3EX-HT
Min. temp:	-40 °F (-40 °C)
Contacts:	SPDT or DPDT, Form C
Current:	1 Amp ac/dc resistive
Switch options:	
MLS-3	Switch only (no housing)
MLS-3EX-M	Standard EXP housing
MLS-3EX-M-A	ATEX EXP housing
MLS-3EX-2	DPDT contacts
MLS-3EX-HT	High temp. option up to 650 °F (343 °C)
Approvals:	UL/CUL & CSA Cl. I Grp. B,C,D; Cl. II Grp. E,F,G; Cl.III, ATEX Ex II 2G EExd IIC T6

PS-2 Series

The PS-2 is a pneumatic switch designed to control air and natural gas from 15 to 100 psi. The PS-2 is rotary cam activated and incorporates a non-bleed switch. When the float passes, the cam rotates and latches the switch in the open position. This will allow unobstructed airflow. When the float moves back in the opposite direction the switch unlatches and blocks the airflow. The non-bleed design of the PS-2 can be used to control pneumatic alarms, valves and pumps, and is configured for rising or falling level.

Other options

Standard insulation

Cryogenic insulation

Insulation

Insulation is recommended when indicators are to be used under extreme temperature conditions. Factory installed, removable insulation blankets are available in two configurations. The standard blanket is for temperatures to 500˚F (260˚C) and consists of a 2 inch thick (compressed to 1 inch), 6# Cer-Wool HP enclosed in 3201-2-SS silicone coated fiberglass cloth. For operating temperatures above 500˚F (260˚C), fiberglass material rated to 1100˚F (593˚C) is included on the contact surface of the blanket.

In cryogenic applications, aluminum-skinned “foamglas” insulation with indicator frost extension to prevent “icing” and flashing for fluids with low boiling points is provided.

Heat tracing

A wide variety of electrical and steam heat tracing options are available. Heat tracing can be used for freeze protection or to maintain the process temperature of molten materials. Electrical tracing is engineered to customer specifications and can be provided with controllers.

Common types are mineral insulated (MI) and self regulating (SR). Steam tracing of Magtech indicators is accomplished by traversing four lengths of the gauge with ¼ inch or 3/8 inch stainless steel tubing.

Specifications	
Standard blanket	
Max. temp.:	500 °F (260 °C)
Material:	6# Cer-Wool HP enclosed in 3201-2-SS silicone coated fiberglass cloth
Cryogenic blanket	
Max temp:	1100 °F (593 °C)
Min. temp:	-320 °F (-196 °C)
Material:	aluminum-skinned “foamglass” insulation with indicator frost extension

Optional scales

In addition to the standard stainless steel scale (graduated in feet and inches), other scale options are available.

+ Inches only
+ Negative/positive (boiler service)
+ Metric (mm/cm)
+ Decimal feet (0.1 ft. or 0.01 ft. divisions)
+ Offset zero (plus and minus scale divisions)
+ Percent (0 to 100)
+ Volumetric (gallons, liters)*

Given that characteristics of every vessel are different, drawings or strapping tables must be supplied.

Testing

All materials are supported by material traceability reports (MTR’s), available upon request. Both NACE MR-01-75 and NACE MR0103 are available as well as dual NACE stamping if required. All peripheral bolts, nuts and fittings are ANSI B31.1/ B31.3 compliant. In addition, random samples are X-rayed in order to insure quality materials and workmanship.

Further testing and documentation is available upon request. This includes dimensional (as built) drawings, positive material identification (PMI), X-ray, dye penetration, and hydrostatic testing.

For more information on industry leading level instrumentation visit us at www.rosemount.com/level

Emerson Process Management
Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA
T (U.S.) 1-800-999-9307
T (International) (952) 906 8888
F (952) 949 7001
www.rosemount.com

Emerson Process Management
Blegistrasse 23
P.O. Box 1046
CH 6341 Baar
Switzerland
Tel +41 (0) 41 768 6111
Fax +41 (0) 41 768 6300

Emerson Process Management
Asia Pacific Pte Ltd
1 Pandan Crescent
Singapore 128461
Tel +65 6777 8211
Fax +65 6777 0947
Service Support Hotline : +65 6770 8711

Emerson FZE
P.O. Box 17033
Jebel Ali Free Zone
Dubai, UAE
Tel +971 4 883 5235
Fax +971 4 883 5312

Magtech

00803-0100-6156 Rev AC 9/13

EMERSON
Process Management