



Measurement Products - Measurement made easy

Magnetostriuctive Level Transmitters K-TEK Level products

Contents



3	Introduction
4	Principle of operation
5	Industries and applications
6	Specifications
7	Magnetostrictive Level Transmitter Series
10	Typical applications
12	Contact Us

Introduction

Magnetostrictive level transmitters offering accuracy, safety and reliability even in the harshest environments



ABB, K-TEK magnetostrictive level transmitters are used extensively in various industries around the world to provide reliable continuous level indication and control in critical as well as non-critical applications.

The unique sensor design allows direct in-tank installation or external mounting to a magnetic level gauge, providing a non-intrusive sensor. Both sensor designs provide high accuracy measurement for tough industrial applications.

Unlike most level measurement devices on the market, our magnetostrictive sensor's signal to noise ratio is not affected by the process conditions such as: vapors, emulsion layers, condensation, liquid surface conditions or foam. The user can be confident that the measurement will not be lost when the process conditions are not exactly as expected.

Additionally, with standard output options of 4-20mA HART 7 and FOUNDATION Fieldbus protocol, our SIL certified magnetostrictive level transmitters are compatible with most control systems.

Customer benefits

- High accuracy +/- 1.27mm or 0.01% of full scale measurement
- Installation flexibility
- Reliable level and interface measurement
- Never needs recalibration; set it and forget it
- Easy installation and low maintenance

Principle of operation

Magnetostrictive transmitter offers one of the most accurate two wire liquid level technology in the world



Magnetostrictive level transmitters are one of the 10 technologies currently being offered by ABB that are utilized to control level in liquid or solid processes. The ABB, K-TEK magnetostrictive level transmitter is part of the liquid measurement product line and has been manufactured for more than 20 years. The AT and LMT Series level transmitters are based on the magnetostrictive principle, which detects the position of the float by using “time of flight” technology to calculate distance. Our magnetostrictive transmitters are custom engineered devices, characterized above all, by their accuracy, repeatability, and reliability.

Torsional wave sensor

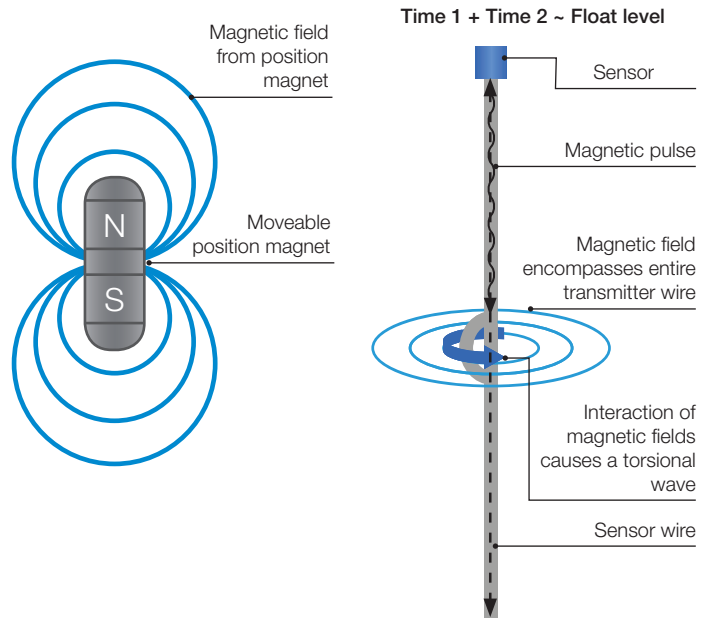
ABB, K-TEK’s patented torsional wave sensor is constructed so that it only responds to torque. This design achieves a voltage from the sensor when the torsional stress wave is detected and ignores all longitudinal vibrations. The sensor provides a maximum transfer of the torsional energy and provides self-cancellation of most other vibration influences. The result is an extremely high signal to noise ratio which allows our customers to use the magnetostrictive transmitter in extreme applications. The patented sensor allows for longer lengths and a wider range of temperatures and pressures.

Communication protocols

- HART
- FOUNDATION Fieldbus

Certificates and agency approvals

- | | |
|------------------------|---------|
| – IEC | – NEPSI |
| – FM and CSA Standards | – ATEX |
| – CRN | – TR CU |



Industries and applications

The leader in level detection

ABB, K-TEK magnetostrictive transmitters are used in a wide variety of industries and applications worldwide. We are proud to provide the AT and LMT Series level transmitters to the industry leaders in Oil & Gas production, Refining, Chemical, Petrochemical, Power Generation and many other industries.

The reason so many industry leaders rely on the AT and LMT Series level transmitter is the design flexibility which allows

- direct in-tank installation,
- non-wetted removable sensor in a sensor well design, or
- external mounting to a magnetic level gauge, providing a non-intrusive sensor.

Our magnetostrictive level transmitters are used in simple applications such as in a sump or water storage tanks to tougher applications as a high pressure separator vessels or boiler drums. Our magnetostrictive level transmitter has been designed to be customized to meet the process application and communication protocol requirements. Additionally, the inherent design of the sensor allows the device to be used in applications where other level technologies can be challenged due to heavy vapors, emulsion layers, condensation, liquid surface conditions or foam.

Typical industries:

- Oil and gas
- Petrochemical
- Chemical
- Power generation
- Water and wastewater
- Pulp and paper
- Mining and minerals
- Biotech
- Marine

Typical applications:

- Interface measurement
- Feed water heater and boiler control
- Liquefied hydrocarbon storage
- Compressor level control
- Catch basins and sumps
- Flotation cell level measurement
- Reactor level control
- Distillation tower level
- Ammonia storage tanks



Specifications

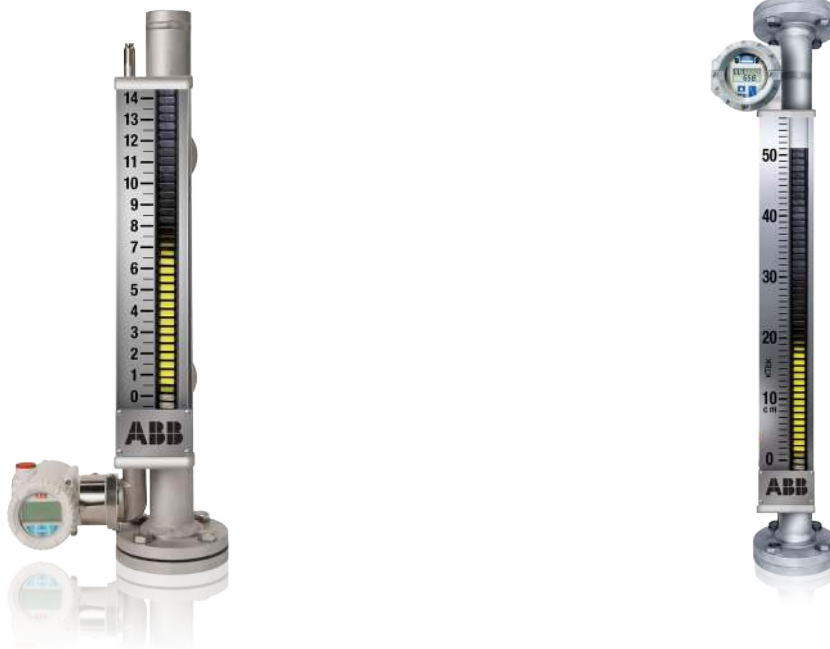
Reliable and accurate level solutions

	LMT100	LMT200 with KM26	AT100	AT200 with KM26
				
Design	Direct insertion providing, total and/or interface level measurement	Externally mounted providing total and/or interface level measurement	Direct insertion, providing total or interface	Externally mounted, providing total or interface
Microprocessor based	X	X	X	X
Total or interface level	X	X	X	X
2nd Level output option	X	X	X	X
RTD Process temperature sensor	Optional		Optional	
Dual compartment housing	X	X	X	X
HART 7 Protocol	X	X	HART 5	HART 5
FOUNDATION Fieldbus	in-progress	in-progress	X	X
Profibus PA	in-progress	in-progress		
Rotatable HMI display	X	X		
TTG Glass viewing window option	X	X		
SS316 enclosure option	X	X	X	X
Maximum length	23m / 75ft	15m / 50ft	23m / 75ft	15m / 50ft
Linearization table	X	X	Optional	Optional
Modular electronics	X	X	X	X
Field replaceable electronics	X	X	X	X
Accuracy	+/- 1.27mm or .01% of full scale	+/- 1.27mm or .01% of full scale	+/- 1.27mm or .01% of full scale	+/- 1.27mm or .01% of full scale
Repeatability	.005% of full scale	.005% of full scale	.005% of full scale	.005% of full scale
Non-linearity	.01% of full scale	.01% of full scale	.01% of full scale	.01% of full scale
Failure mode	Field selectable	Field selectable	Field selectable	Field selectable
Certified SIL 2/3	in-progress	in-progress	X	X
Minimum process temperature	-195.6°C / -320°F	-195.6°C / -320°F	-195.6°C / -320°F	-195.6°C / -320°F
Maximum process temperature	427°C / 800°F	537°C / 1000°F	427°C / 800°F	537°C / 1000°F
Maximum pressure	165.5 Bar / 2400 PSI	not applicable	165.5 Bar / 2400 PSI	not applicable

Magnetostrictive level transmitter series

Gauge mounted transmitters

The LMT200 and AT200 Magnetostrictive Level Transmitters are used as a direct enhancement for the KM26 Magnetic Level Gauge to create a complete level measuring system for a wide range of total and/or interface applications. The transmitter detects the position of the float within the magnetic level gauge chamber and provides continuous level reading via common industry protocols such as 4-20 mA HART or FOUNDATION Fieldbus (Profibus PA in-progress); while deriving its source of power from the same control loop. The resulting non-intrusive design provides highly accurate level measurement and enables installation or maintenance of the level transmitter without any vessel entry or line breaking.



LMT200 and AT200 Non-intrusive magnetostrictive level transmitters

- High accuracy: .01% of full scale or $\pm 1.27\text{mm}$ / 0.05in , whichever is greater
- Superior sensor (Patent #5,473,245)
- Local indication with HMI display
- Never requires recalibration: set it & forget it
- Dual compartment housing with separate field terminal compartment
- Loop powered
- Probe lengths up to 15m / 50 ft.
- Total and/or interface level measurement
- Field replaceable/upgradable electronics module
- Built-in RFI/EMI filter
- 4-20 mA HART, FOUNDATION Fieldbus
- Certified for use in SIL2/3 rated systems per IEC61508 (AT Series Only)
- DTM and EDDL Software available

Features unique to the LMT200

- Waveform Display (no need for an oscilloscope)
- 360° display rotation
- Vertical rotation of housing
- Mounting orientation field changeable
- Standard sealed sensor tube
- NAMUR NE107 Messaging

Magnetostrictive level transmitter series

Direct insertion transmitters

The LMT100 and AT100 Magnetostrictive Level Transmitters are highly accurate devices designed to be directly inserted into the process. The LMT series level transmitters features the finest technology available for liquid level interface measurement and control. These transmitters provide two independent outputs: one for interface and a second for total level. Interface level measurement is available for specific gravity differential down to .003. Most commonly applied to oil and water separator interface, this technique has applications in many other processes including: HF acid/propane vessels, desalters and sumps.



LMT100 and AT100 direct insertion magnetostrictive level transmitter

- High accuracy: .01% of full scale or ± 1.27 mm / 0.05 in., whichever is greater
- Superior sensor (Patent #5,473,245)
- Local indication with HMI display
- Never requires recalibration: set it & forget it
- Dual compartment housing with separate field terminal compartment
- Loop powered
- Rigid probes up to 9m / 30ft probe length
- Total and/or interface level measurement
- Field replaceable/upgradable electronics module
- Built-in RFI/EMI filter
- Probe and flange materials to meet your process compatibility needs
- 4-20 mA HART, FOUNDATION Fieldbus

- Certified for use in SIL2/3 rated systems per IEC61508 (AT Series Only)
- DTM and EDDL Software available
- Integral RTD option available for process temperature measurement

Features Unique to the LMT100

- Waveform Display (no need for an oscilloscope)
- 360° display rotation
- Vertical rotation of housing
- Standard sealed sensor tube
- NAMUR NE107 Messaging

Magnetostrictive level transmitter series

Direct insertion transmitters

Preparing a vessel for service can be expensive and vessel entry often presents risks to employee health and safety. ABB has the solution for applications that vessel entry is not desired and external chamber mounting of the LMT200 or AT200 level transmitter is not possible. The LMT100 and AT100 level transmitters can be supplied with a non-wetted sensor and sealed sensor well. This allows the sensor to be removed and maintenance performed without vessel entry or process interruption. Sensor wells can be supplied for cryogenic temperatures (-195.6°C / -320°F) to high temperatures (427°C / 800°F) with process pressures up to 132 bar / 1900 PSI.

Sensor wells can be supplied in the same materials as standard wetted sensors. Standard material options are 316/L, HASTELLOY® C276, Alloy 20, TEFLON® Jacketed as well as PVDF. Other materials are available on request.

Common applications are acid storage, CO₂ storage, liquid hydrocarbon storage, caustic storage, applications with strong vapors or VOC's, applications with environmental agency monitoring.



LMT100 and AT100 direct insertion magnetostrictive level transmitters with sealed sensor well

- High accuracy: .01% of full scale or +/-1.27mm / 0.05in., whichever is greater
- Superior sensor (Patent #5,473,245)
- Same great features as the wetted LMT100 and AT100 sensors
- Sensor well with rigid probes up to 9m / 30ft probe length
- Sensor well with flexible probes up to 22.8m / 75ft probe length
- Total and/or interface level measurement
- Wide variety of sensor well designs to meet application needs
- Probe and flange materials to meet process compatibility needs
- Certified for use in SIL2/3 rated systems per IEC61508 (AT Series Only)
- Integral RTD option available for process temperature measurement

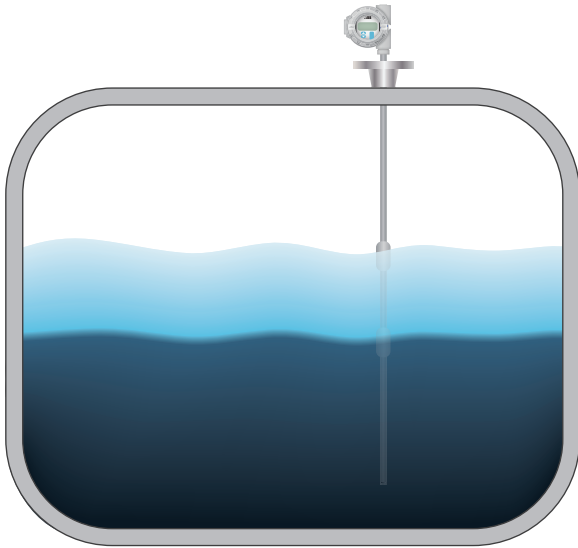


Direct insertion magnetostrictive liquid level transmitter with flexible sensor

- For applications with longer probe lengths or reduced space
- Available in flexible PFA TEFLON® sensor inserted into 1 in. OD segmented sensor well to / 22.8m / 75ft. probe lengths.
- Available in flexible braided stainless steel sensor inserted into a 5/8 in. OD rigid probe to 4.57m / 15ft. probe lengths
- Superior sensor (patent #5,473,245)

TEFLON® (Registered trademark of DuPont)
Hastelloy® (Registered trade mark of Haynes International, Inc.)

Typical Applications

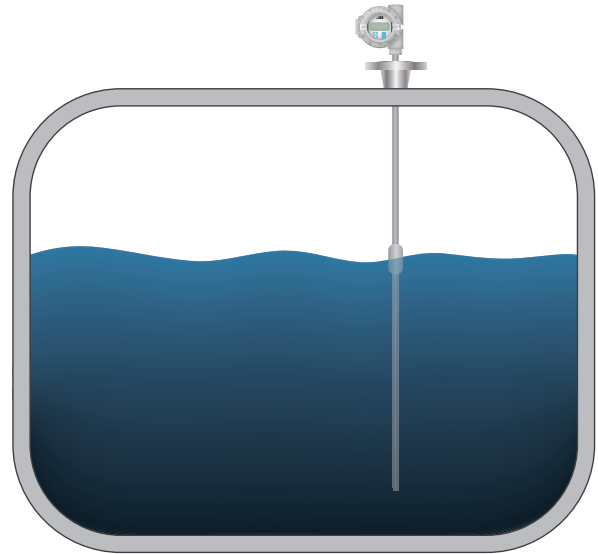


Process vessels

ABB, K-TEK transmitters are used in various industries extensively around the world to accurately measure level in process vessels. High accuracy, quick startup, easy installation or high reliability are the most common reasons for choosing this technology. With ratings to 427 °C / 800 °F and 165 bar / 2400 PSI, magnetostrictive level transmitters are suitable for almost any application. 4-20 mA HART and FOUNDATION Fieldbus (Profibus PA in-progress) protocol options make our magnetostrictive level transmitters easy to connect digitally to most control systems. Integrated HMI display provide local indication in 4-20 mA, percentage or engineering units.

Interface Measurement

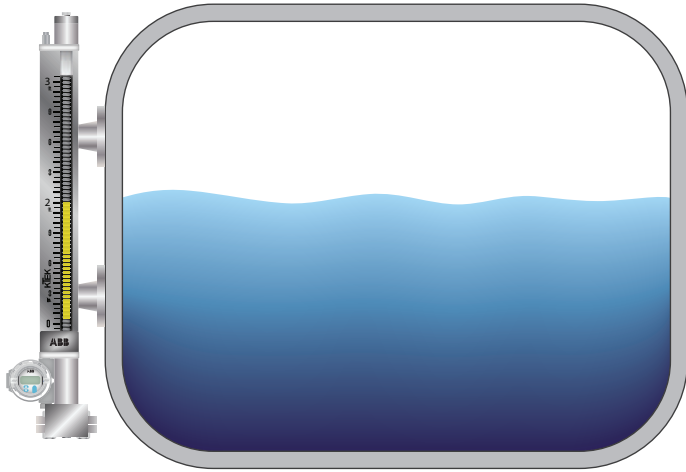
The LMT and AT Series level transmitters provide the most reliable interface measurement available on the market today. While other technologies are influenced by the process conditions such as percent water in an emulsion layer, thickness in an emulsion layer or buildup on the sensor, the LMT and the AT continues to deliver reliable and accurate level measurement with its unequivocal magnetostrictive technology.



Storage tanks

Concerns of high accuracy, low maintenance and reasonable cost drives customers to install flexible probe versions of the magnetostrictive level transmitters in their storage tanks. With the ability to be easily installed to a maximum of 23m / 75ft, almost any liquid storage application can be handled. Some common liquids include water, acids, caustics, propane, ammonia, oils, fuels, chemicals, or waste liquids. An optional internal 21 point linearization table allows the magnetostrictive level transmitter to provide accurate output in horizontal or round vessels.

Typical Applications (continued)



KM26 Magnetic Level Gauge Installation

The integration of a magnetostrictive level transmitter to a KM26 magnetic level gauge creates a complete level measuring system and helps eliminate numerous bridges and unnecessary connections in the process. The most common benefits to this solution include: quick startup, easy installation, low maintenance, no calibration, reduced cost and no contact with the process fluids. The KM26 and LMT level system is the preferred solution over sight glasses, DP transmitters, liquid level displacers or other problematic level instruments.

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