

LMT200

External mount magnetostrictive level transmitter

High accuracy non-intrusive liquid
level and interface level detection
K-TEK Level products

Measurement made easy



Features

- Calibrated from the factory
- High Accuracy: .01% of Full Scale or +/- 1.27mm
- Never Requires Re-Calibration: Set It & Forget It
- Easy setup with waveform display
- Not affected by agitation, foam or emulsion layers
- No oscilloscope required
- Designed to Mount Externally to K-TEK KM26 or other Magnetic Level Gauge
- Superior Sensor (Patent #5,473,245)
- Local Indication with LCD Display
- Dual Compartment Housing with Separate Field Terminal Compartment
- Loop Powered to 15.24m (50ft) Probe Length
- Total and/or Interface Level Measurement
- Temperature Range: -195.5 to 426.6°C (-320 to 800°F) with options
- Field Replaceable / Upgradable Electronics Module
- Built-in RFI / EMI Filter
- Digital Communications
- Online Self-verification

Options

- Two Level Indications
- Glass Viewing Window
- 316 Stainless Steel Enclosure
- Built-in surge protection

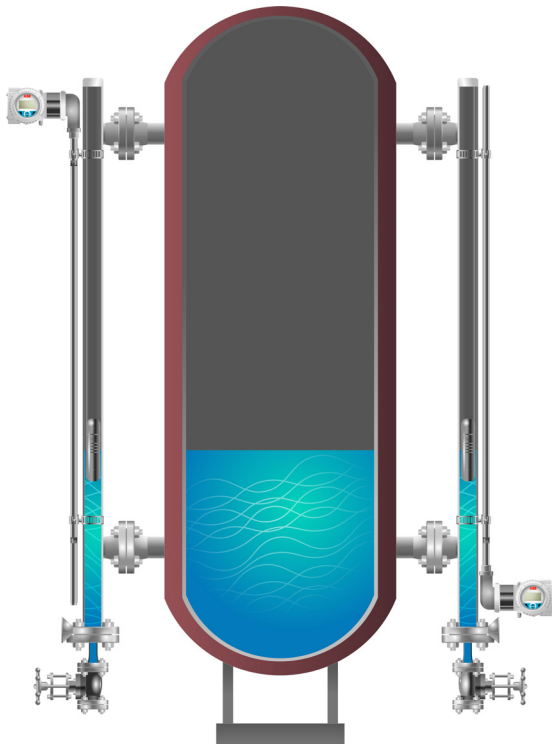
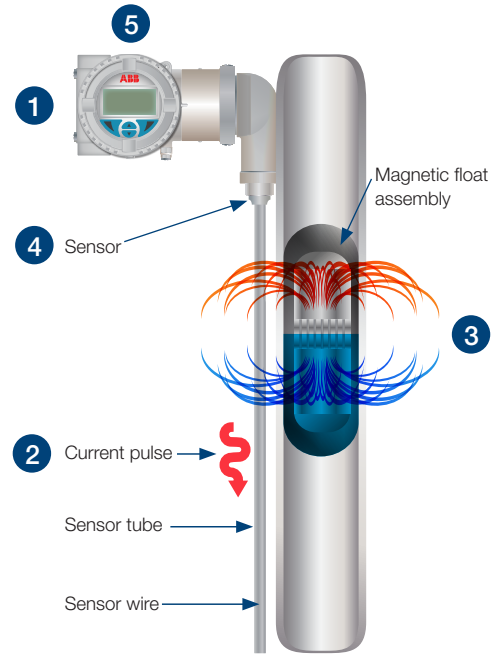
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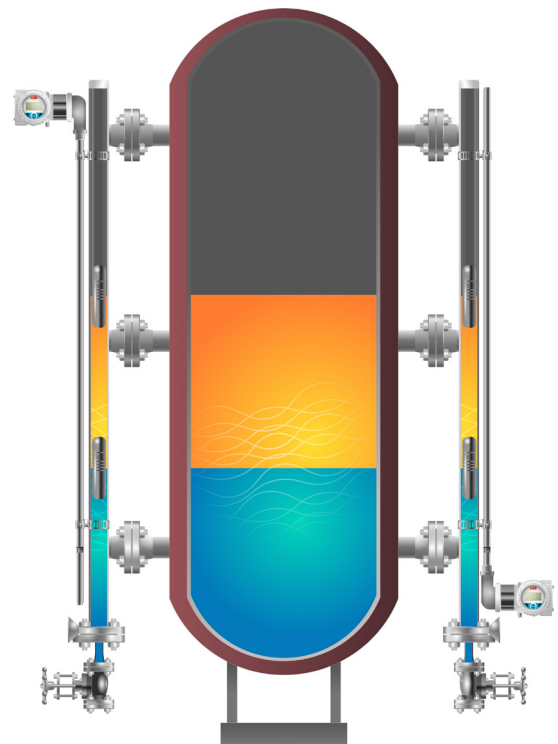
Principle of Operation:

The LMT200 is based upon the magnetostrictive principle.

1. The device electronics generates a low energy current pulse at fixed intervals.
2. The electrical pulses create a magnetic field which travels down a specialized wire inside the sensor tube.
3. The interaction of the magnetic field around the wire and the magnetic float causes a torsional stress wave to be induced in the wire. This torsion propagates along the wire at a known velocity, from the position of the magnetic float and toward both ends of the wire.
4. A patented sensing element placed in the transmitter assembly converts the received mechanical torsion into an electrical return pulse.
5. The microprocessor-based electronics measures the elapsed time between the start and return pulses (Time of Flight) and converts it into a position measurement which is proportional to the level of the float.



LMT200 non-intrusive single level installation.
Top and bottom mount shown.



LMT200 non-intrusive level and interface installation.
Top and bottom mount shown.

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| Specifications | | |
|-------------------------|--|--|
| Electronic transmitter: | | |
| Repeatability | ± 0.005% of Full Scale or 0.305 mm (0.012 in), whichever is greater | |
| Non-linearity | ± 0.01% of Full Scale or 0.864 mm (0.034in), whichever is greater | |
| Measuring accuracy | ± 0.01% of Full Scale or 1.27 mm (0.050 in), whichever is greater ¹ | |
| Supply voltage | 12 to 42 Vdc - 4-20mA HART loop powered | |
| Output/Communications | 4-20mA HART7® | |
| User Interface | Interactive display, DTM, EDDL with NE107 messaging | |
| Power consumption | 4-20mA | at 36.0 Vdc - 3.6mA 0.13 watts; 21mA 0.76 watts at 12.0 Vdc - 3.6mA 0.043 watts; 21mA 0.25 watts |
| | HART® mode (3.6mA) | at 36.0 Vdc 0.144 watts at 12.0 Vdc 0.048 watts |
| Maximum line resistance | 4-20mA | at 36.0 Vdc and 21mA, 1142 ohms* at 24.0 Vdc and 21mA, 571 ohms at 12 Vdc and 21mA, < 72 ohms** <small>*Maximum allowable with HART® communication is 700 ohms **See the current/resistance chart</small> |
| | HART® mode (3.6mA) | < 650 to 700 ohms |
| Polarity protection | Diode in series with loop | |
| Update rate | 10 measurements per second | |
| Minimum measuring span | 76.2mm (3.0in) consult factory if less is required | |
| Damping | Field Adjustable, Range: 0.1 to 60 seconds | |
| Alarm output | NE43, Software or Hardware selectable. Upscale (21 mA) or Downscale (3.6 mA) | |
| Surge Suppression | Integral surge suppression available with option code S1 | |
| Ambient temperature | -40 to 85°C (-40 to 185°F) Ambient ² | |
| Humidity | 0 to 100% RH | |
| Linearization | 21 Point Table Available | |
| Enclosure | Dual Compartment | |
| Enclosure material | Cast Low Copper Aluminum with Powder Coat or 316 Stainless Steel | |
| Device tag material | AISI 316 Stainless Steel | |
| Electrical connection | Two M20 x 1.5 or two 1/2in FNPT, Adapters and Bus Connectors also available | |
| Ingress protection | IP66, NEMA 4X | |
| Sensor tube: | | |
| Material | 316/L Stainless Steel | |
| Standard probe length | 304.8mm to 15.24 m (1 to 50 ft); 90 degree probes (SEH Option) 304.8mm to 7.62m (1 to 25 ft) | |
| Probe length tolerance | ± 3.2mm (0.125in) up to 3.0m (10ft); +/- 6.4mm (0.25in) up to 6.0m (20ft); ± 9.0mm (0.35in) up to 9.0m (29.5ft); +/- 25.4mm (1.0in) up to 15.24m (50ft) | |
| Mounting | Stainless Steel Clamps for KM26 Magnetic Level Gauge Chamber Included; Optional Vibration Isolation Mounts | |

¹ Measurement accuracy is recorded at factory ambient conditions (23.88 °F +/-5.6 °C (75 °F +/-10 °F)) using a calibration magnet. Accuracy may be further influenced by other factors such as float hysteresis, installation, process conditions and ambient conditions.

² Some agency approvals may differ.
HART® is a registered trademark of the FieldComm Group

LMT200

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Float Design for ABB K-TEK Products - KM26S

Every KM26 MLG float is precisely engineered to customer application, ensuring optimal accuracy and performance.

Precisely spaced magnets create a 360° magnetic field coverage, safeguarding level transmitter and gauge performance, even the most challenging applications.

Several materials of construction available including Titanium, Monel®, Hastelloy® C, Stainless Steel, and Plastics. Tefzel®, Halar®, TEFLON® S protective coatings are also available.

Process pressures to 344 Bar (5000 PSI) to full vacuum.

Tefzel® (Registered trademark of DuPont)

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

Monel® (Registered trademark of the INCO)

Halar® (Registered trademark of Solvay Solexis)



A minimum of 75 grams of buoyancy are engineered into every KM26 float ensuring optimal performance even in the most difficult process applications.



HMI Indicator (Option)

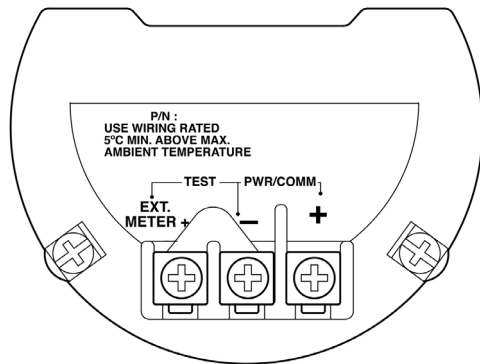
- Display of the waveform for device performance confirmation
- Display of the current level as well as interface or the temperature of the measuring medium (optional)
- Application-specific visualizations which the user can select. Four operator pages can be configured to display multiple values in parallel
- Plain text fault diagnostics in conformance to NE107
- Menu-guided parameter settings with four buttons
- “Easy Set-up” function for fast commissioning
- Parameter settings of the device through the front glass with the housing closed
- During ongoing operation, the HMI Indicator can be connected or disconnected and therefore also used as a configuration tool for other devices

LMT200

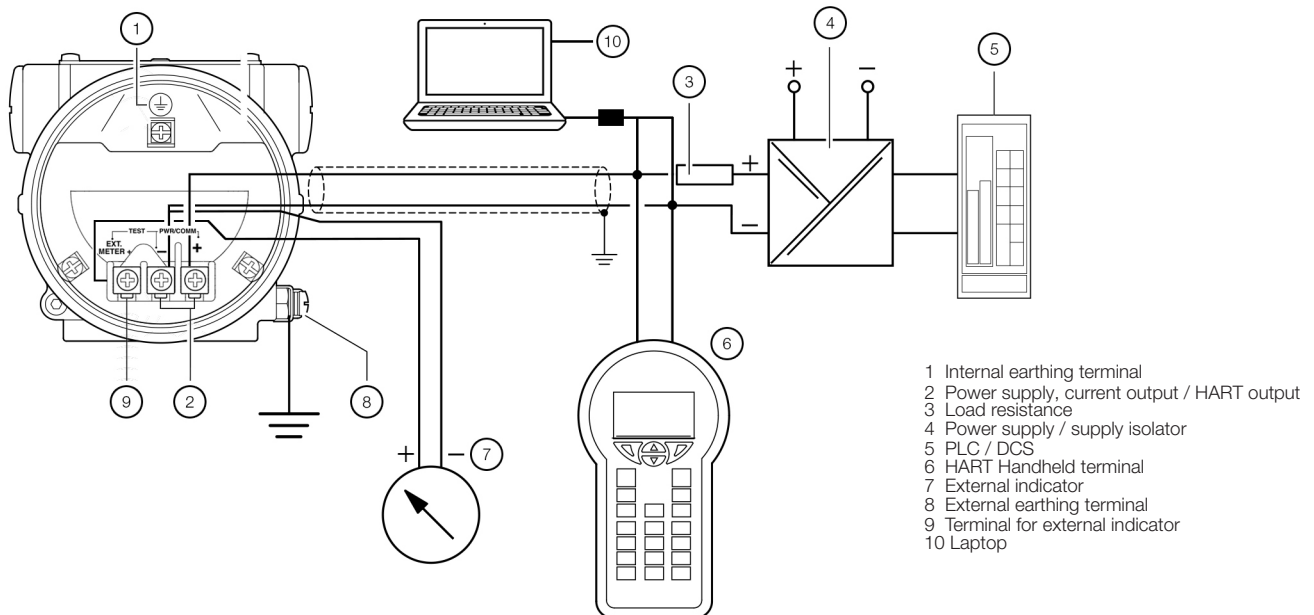
External mount magnetostrictive level transmitter

Electrical Connections

Devices with HART® communication
Current output / HART® output



| Terminal | Function / Comment |
|------------|---|
| PWR/COMM + | Power supply, current output / HART® output |
| PWR/COMM - | |
| EXT. METER | Not assigned |



For connecting the signal voltage / supply voltage, twisted cables with a conductor cross-section of 18 ... 22 AWG / 0.8 ... 0.35 mm² and a maximum length of 1500 m (4921 ft.) must be used. For longer leads a greater cable cross section is required.

For shielded cables the cable shielding must only be grounded on one side (not on both sides).

For the earthing on the transmitter, the inner terminal with the corresponding marking can also be used.

The output signal (4 ... 20 mA) and the power supply are conducted via the same conductor pair.

The transmitter works with a supply voltage between 12 ... 42 V DC. For devices with the type of protection "Ex ia, intrinsic safety" (ATEX, IEC, FM, and CSA approval), the supply voltage must not exceed 30 V DC. In some countries the maximum supply voltage is limited to lower values. The permissible supply voltage is specified on the name plate on the top of the transmitter.

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| Power Supply | |
|----------------------------------|-----------------------------|
| Devices with HART® communication | |
| Terminals | PWR/COMM + / PWR/COMM - |
| Supply Voltage | 12 ... 42 V DC |
| Residual Ripple | Maximum 5 % or Uss = ±1.5 V |
| Power consumption | < 1 W |

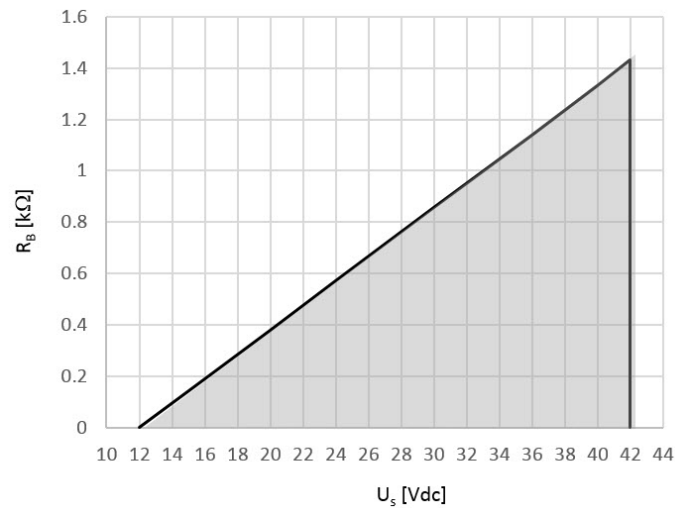
Current Output / HART® Output

Only for devices with HART® communication

Terminals: PWR / COMM + / PWR/COMM -

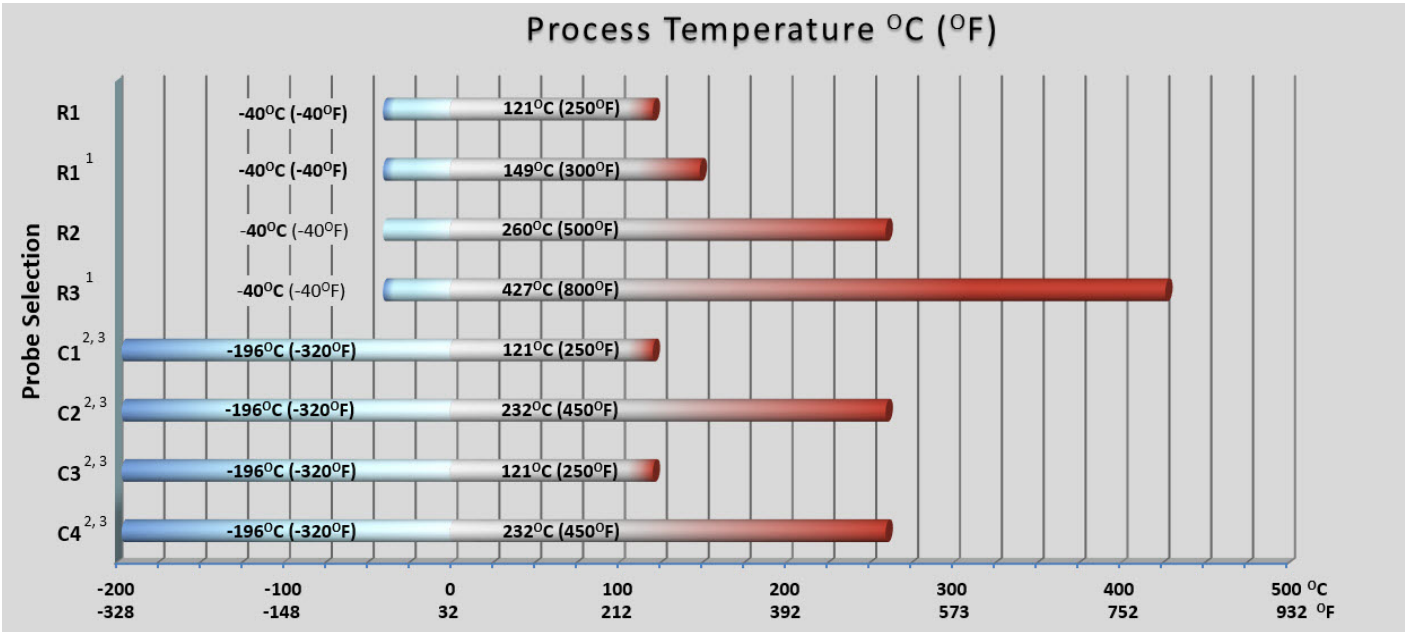
In HART® communication, the smallest load is R_B = 250 Ω . The load is R_B is calculated as a function of the available supply voltage U_S and the selected signal current I_B as follows:

$$R_B = \frac{U_S - \text{min. operating voltage (12.0) Vdc}}{I_B}$$



R_B Load Resistance
 U_S Supply Voltage
 I_B Signal current

Probe Selection Guide



1. Requires chamber insulation or IHPAD
2. C3 and C4 options are Additionally, the C3 and C4 sensors are preferred for cryogenic insulated chambers, allowing sensor removal without destruction of the insulation. To use these options, chamber top must be dome or flat cap.
3. SEH option is required for bottom mount cryogenic applications in order to allow access to the terminals and display of transmitter. Also, typical bottom mounted installations are not designed with C3 or C4 sensors since chambers are designed for float removal from the bottom (flange).

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Approvals

Flameproof marking

- ATEX/IECEX
 - II 1/2 G Ex db IIC T6..T2 Ga/Gb FM15ATEX0074X
 - IECEx FME150011X Power Supply 42 Vdc/2W Max
- FM (C and US) approved
 - CLI Zone 1, AEx/Ex db IIC T6...T2 Gb
 - US - CLI GP ABCD, T6...T2
 - Canada - CLI GP BCD, T6...T2

Protection by enclosure marking

- ATEX/IECEX
 - II 2 D Ex tb IIIC T85°C...T300°C Db FM15ATEX0074X
 - IECEx FME150011X Power Supply 42 Vdc/2W Max
- UFM (C and US) approved
 - Zone 21 AEx/Ex tb IIIC T80°C...T165°C Db
 - US - CLII GP EFG, CLIII T6...T2
 - Canada - CLII GP EFG, CLIII T6...T2

Intrinsic / Non-Incendive marking

- ATEX/IECEX
 - II 1 G Ex ia IIC T6...T4 Ga
 - II 1 D Ex ia IIIC T80°C Da;
 - FM15ATEX0072X - IECEx FME150011X
 - II 3 G Ex ic IIC T6..T4 Gc
 - II 3 D Ex ic IIIC T80°C Dc
 - II 3 G Ex nA IIC T6..T4 Gc
 - FM15ATEX0073X - IECEx FME150011X
- FM (C and US) approved
 - CLI DIV1/GP ABCD, CLII/DIV1/GP EFG, CLIII;
 - CLI ZONE 0 AEx/Ex ia IIC T6...T4 Ga;
 - Zone 20 AEx ia IIIC T80°C; CLII/III DIV1 Ex ia IIIC T80°C;
 - CLI/DIV2/GP ABCD; CLII/DIV2/GP FG; CLIII;
 - CLI ZONE 2, AEx nC IIC T6...T4;
 - CLI ZONE 2, Ex nL IIC T6...T4;
 - per 3KXL140000G0109

Example of Code:

LMT200.M1.S6.R1.B1.D1.L2.H1-TS.AV.AR // GD2.M5 ML = 1234.12mm

| LMT200 Model Codes | | | | |
|---|------------------------|----|----|-----------------|
| LMT200 External Mount | LMT200.....xxx- | xx | xx | xx |
| Approvals | | | | |
| General Purpose | | Y0 | | |
| ATEX / IECEx Intrinsic Safety | | E1 | | |
| ATEX / IECEx Flameproof housing | | E2 | | |
| ATEX / IECEx Flameproof Non-Sparking (Ex nA) | | E3 | | |
| ATEX / IECEx Ex ic Category 3 | | E8 | | |
| Multi-Approval - North American (meeting FM and Canadian Standards) / ATEX / IECEx Explosion Proof or Flameproof, Intrinsic Safety or Non-Sparking (Protection Type marked by Customer) | | M1 | | |
| North American Intrinsic Safety | | N1 | | |
| North American (meeting FM and Canadian Standards) Explosion Proof / Flameproof | | N2 | | |
| North American (meeting FM and Canadian Standards) Non-Incendive / Non-Sparking | | N3 | | |
| North American (meeting FM and Canadian Standards) Ex ic | | N8 | | |
| Others | | Z9 | | |
| Probe Material | | | | |
| 316/L SS | | | S6 | |
| Special | | | Z9 | |
| Probe Style and Probe Type | | | | |
| 5/8 in. Rigid Probe, -40 to 121.11°C (-40 to 250°F) | | | | R1 |
| 5/8 in. Rigid Probe, -40 to 232.22°C (-40 to 450°F) | | | | R2 |
| 5/8 in. Rigid Probe, -40 to 426.66°C (-40 to 800°F) | | | | R3 |
| 5/8 in. Rigid Probe for Cryogenic Services, -195.55 to 121.11°C (-320 to 250°F) with Vapor Seal | | | | C1 ¹ |
| 5/8 in. Rigid Probe for Cryogenic Services, -195.55 to 232.22°C (-320 to 450°F) with Vapor Seal | | | | C2 ¹ |
| 3/4 in. NPS Sensor Well with 5/8 in. Rigid Probe for Cryogenic Services, -195.55 to 121.11°C (-320 to 250°F) with Vapor Seal | | | | C3 ¹ |
| 3/4 in. NPS Sensor Well with 5/8 in. Rigid Probe for Cryogenic Services, -195.55 to 232.22°C (-320 to 450°F), with Vapor Seal | | | | C4 ¹ |
| Special | | | | Z9 |

¹ Due to the insulation thickness, it is likely the SEH option will be required if cryogenic units are bottom mounted. It is also recommended to use the C3 or C4 options so that removal of the transmitter is possible without damaging the insulation.

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Example of Code:

LMT200.M1.S6.R1.B1.D1.L2.H1-TS.AV.AR // GD2.M5 ML = 1234.12mm

| LMT200 Model Codes (Continued) | | | | |
|--|----------------|----|----|----|
| LMT200 External Mount | LMT200.....xx- | xx | xx | xx |
| Mounting Orientation | | | | |
| None | Y0 | | | |
| Bottom left connected electronic housing | B1 | | | |
| Bottom right connected electronic housing | B2 | | | |
| Top left connected electronic housing | T1 | | | |
| Top right connected electronic housing | T2 | | | |
| Housing | | | | |
| Aluminum with 2 x M20 x 1.5 | D1 | | | |
| Aluminum with 2 x NPT 1/2 in. | D2 | | | |
| 316L Stainless Steel with 2 x M20 x 1.5 | D3 | | | |
| 316L Stainless Steel with 2 x NPT 1/2 in. | D4 | | | |
| Special | Z9 | | | |
| Display | | | | |
| No Display, with Blind Cover | | | L0 | |
| With Through the Glass (TTG) Push Buttons, Display and Glass Cover | | | L2 | |
| Special | | | Z9 | |
| Output | | | | |
| Single 4 ... 20 mA + HART® | | | | H1 |
| Special | | | | Z9 |

The following codes behind the hyphen (-) are options which affect the construction and tagging of the transmitter.

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Example of Code:

LMT200.M1.S6.R1.B1.D1.L2.H1-TS.AV.AR // GD2.M5 ML = 1234.12mm

The following codes behind the hyphen (-) are options which affect the construction and tagging of the transmitter.

| Options | | | | | | | | |
|--|------------------|----|----|----|-------|----|----|-----|
| LMT200.....xxx-xxx.xx | xxx | xx | xx | xx | xx(x) | xx | xx | xxx |
| Sensor Probe Options | | | | | | | | |
| 90 degree bend housing extension (maximum probe length 7.62 m / 25 ft.) | SEH | | | | | | | |
| Sensor special | SEZ | | | | | | | |
| Add Nitrogen purged vapor seal to standard probe | SEV ¹ | | | | | | | |
| Device Identification Plate | | | | | | | | |
| Add stainless steel hang tag, custom markings 4 lines, 22 characters per line | TS | | | | | | | |
| Other tagging special | TZ | | | | | | | |
| Electrical Connector Type | | | | | | | | |
| M20 stainless steel adapter | | | U8 | | | | | |
| M20 brass adapter | | | U9 | | | | | |
| Electrical Connector Special | | | UZ | | | | | |
| Surge Protector | | | | | | | | |
| Surge / Transient Protector | | | | S1 | | | | |
| Special Other | | | | | | | | |
| Transmitter special option | | | | | STT | | | |
| Special paint or treatment on housing | | | | | STH | | | |
| Special paint or treatment on flange | | | | | STF | | | |
| Nuclear use, device to be used in a nuclear facility (application must be reviewed by ABB) | | | | | P4 | | | |
| Special | | | | | PZ | | | |
| Mounted Accessories | | | | | | | | |
| Mounted to chamber with vibration isolators, minimum 2 assemblies and additional assemblies per additional 5 ft. of probe length | | | | | | AV | | |
| Valve position transmitter kit including mounting bracket and magnet assembly | | | | | | AT | | |
| Repeat Indicator (for two analog level outputs) | | | | | | | | |
| RI100 remote indicator (HART® only), requires additional 4 ... 20 mA loop, same material as transmitter housing | | | | | | | AR | |
| Mounting Options | | | | | | | | |
| Mounting to KM26 with shuttle | | | | | | | | MKS |
| Mounting to KM26 with bar graph | | | | | | | | MKB |
| User mounting to existing chamber without insulation | | | | | | | | MKN |
| User mounting to existing KM26 with insulation blanket | | | | | | | | MKH |
| User mounting to existing chamber. IHPAD insulation pad accessory required | | | | | | | | MKP |

¹ SEV option is for R1, R2 and R3 sensors. C1, C2, C3 and C4 include vapor seals.

**All codes located behind the // are for additional requirements and order comments.
These codes will not be included on the device tag.**

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Example of Code:

LMT200.M1.S6.R1.B1.D1.L2.H1-TS.AVAR // GD2.M5 ML = 1234.12mm

All codes located behind the // are for additional requirements and order comments.

These codes will not be included on the device tag.

| Additional Order Requirements and Order Comments | | | | | |
|---|-------|-----|----|----|----|
| LMT200.....xxx- ...// | xx(x) | xxx | xx | xx | xx |
| Certificates | | | | | |
| Declaration of compliance with the order 2.1 acc. EN 10204 | C4 | | | | |
| Test report 2.2 acc. EN 10204 | C1 | | | | |
| MTR 3.1, Material monitoring with inspection certificate 3.1 acc. EN 10204 | C2 | | | | |
| MTR 3.2, Material monitoring with inspection certificate 3.2 acc. EN 10204 | C3 | | | | |
| Material monitoring NACE MR 0175, MR 0103 with inspection certificate 3.1 acc. EN 10204 | CN | | | | |
| PMI Positive Material Identification with carbon content | CHC | | | | |
| PMI Positive Material Identification without carbon content | CHD | | | | |
| Other certificates | CZ | | | | |
| Drawings | | | | | |
| Drawings for approval required prior to construction | GD1 | | | | |
| Drawings for record required | GD2 | | | | |
| Certified as built drawings required | GD3 | | | | |
| Other drawings | GDZ | | | | |
| Documentation Language (installation, operation and maintenance manual) | | | | | |
| German | | | M1 | | |
| Italian | | | M2 | | |
| Spanish | | | M3 | | |
| French | | | M4 | | |
| English | | | M5 | | |
| Chinese | | | M6 | | |
| Portuguese | | | MA | | |
| Russian | | | MB | | |
| Others | | | MZ | | |
| Calibration & Configuration | | | | | |
| 3-point calibration verification certificate, factory default 100, 50 and 0 % of measurement length, or customer specified points | | | | R3 | |
| 5-point calibration verification certificate, factory default 100, 75, 50, 25 and 0 % of measurement length, or customer specified points | | | | R5 | |
| Custom Linearization or Strapping table entered (up to 20 points) | | | | RL | |
| Calibrate for two float application | | | | RF | |
| Witnessed calibration, with certificate | | | | RW | |
| Printed record of configured settings in transmitter | | | | CG | |
| Special calibration | | | | RZ | |
| Special | | | | | |

Z9

Measuring length on LMT200

Measuring Length (ML)

Inches

Millimeters

12345.12

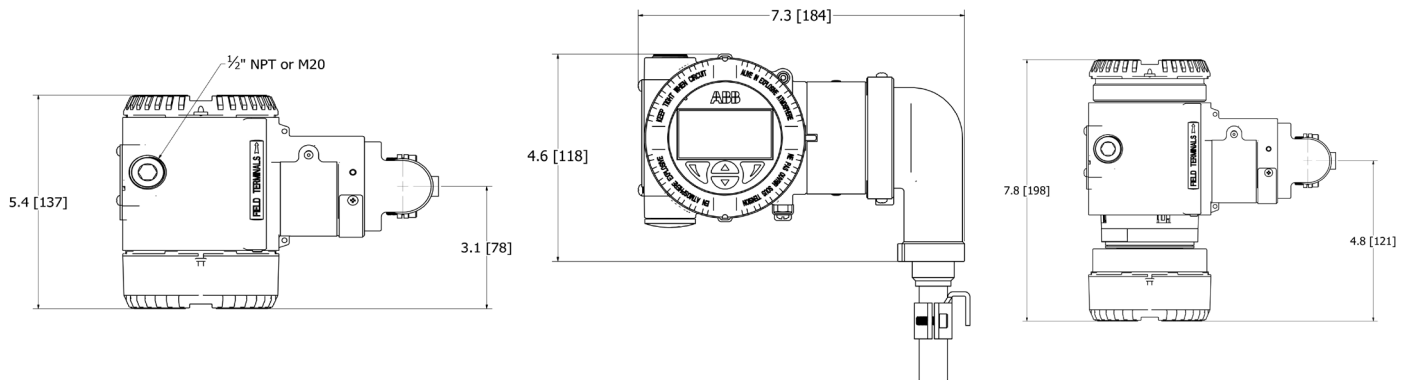
xxxxx.xx IN

xxxxx.xx MM

LMT200

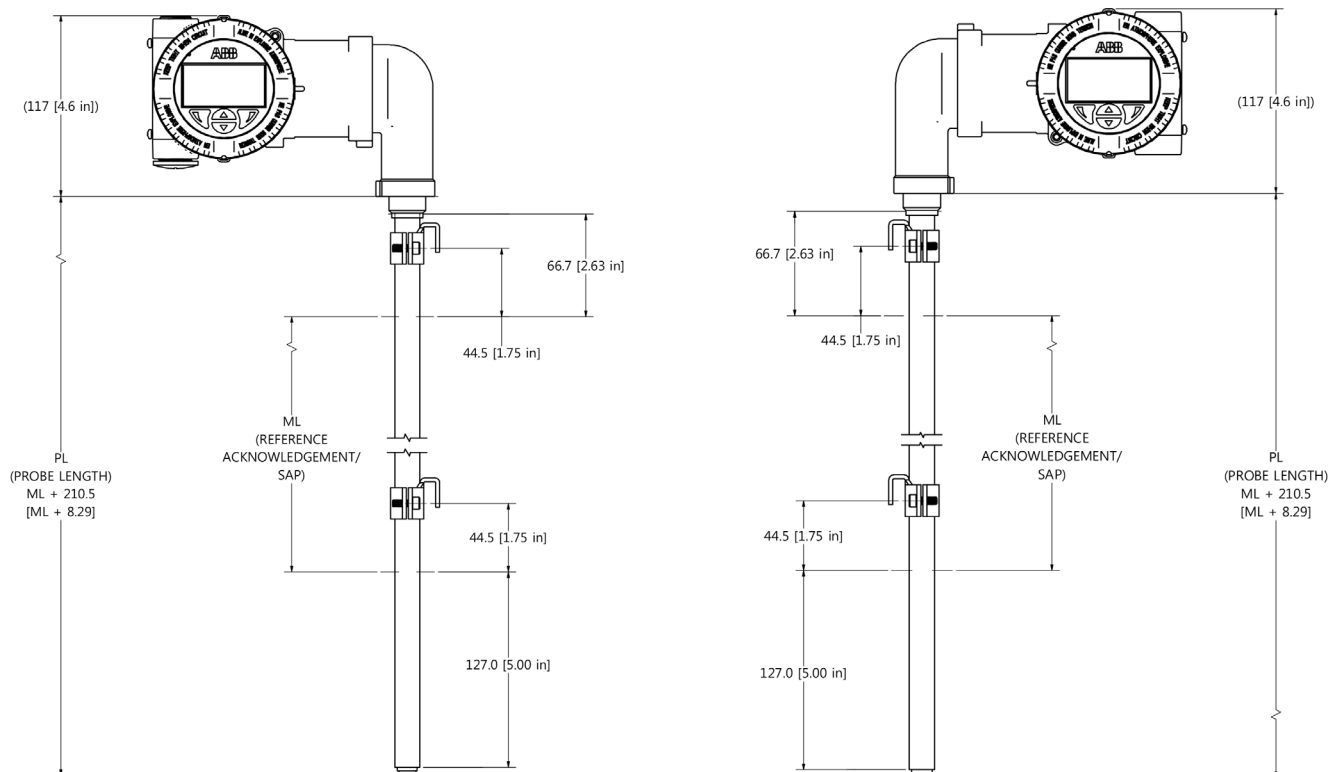
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Enclosures



*Drawings for Reference Only

Probe Type R1, R2 & R3 - Top Mount

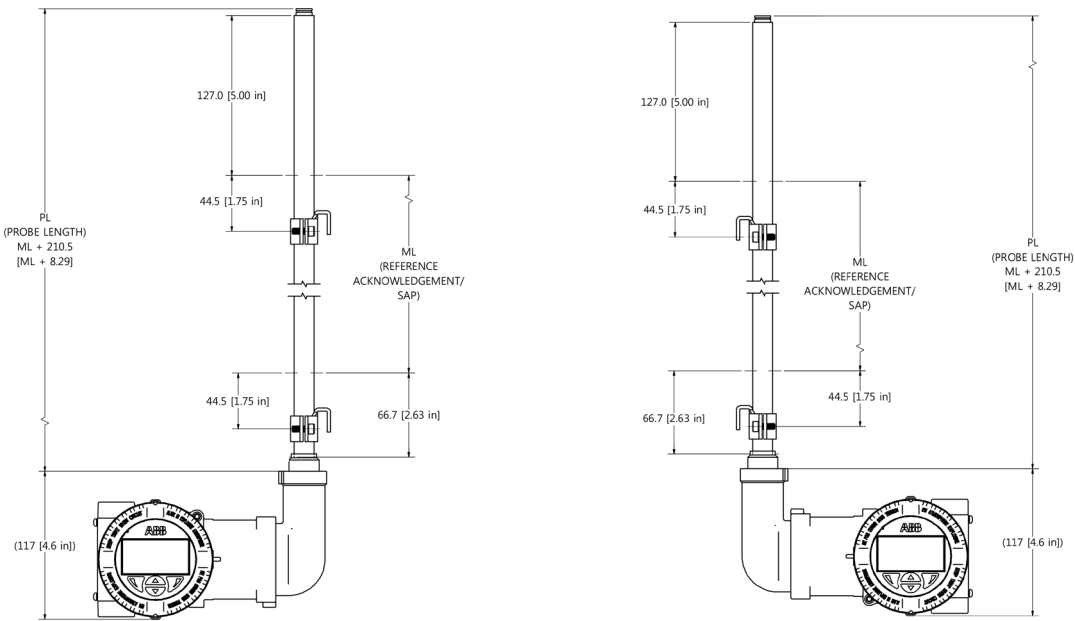


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LMT200

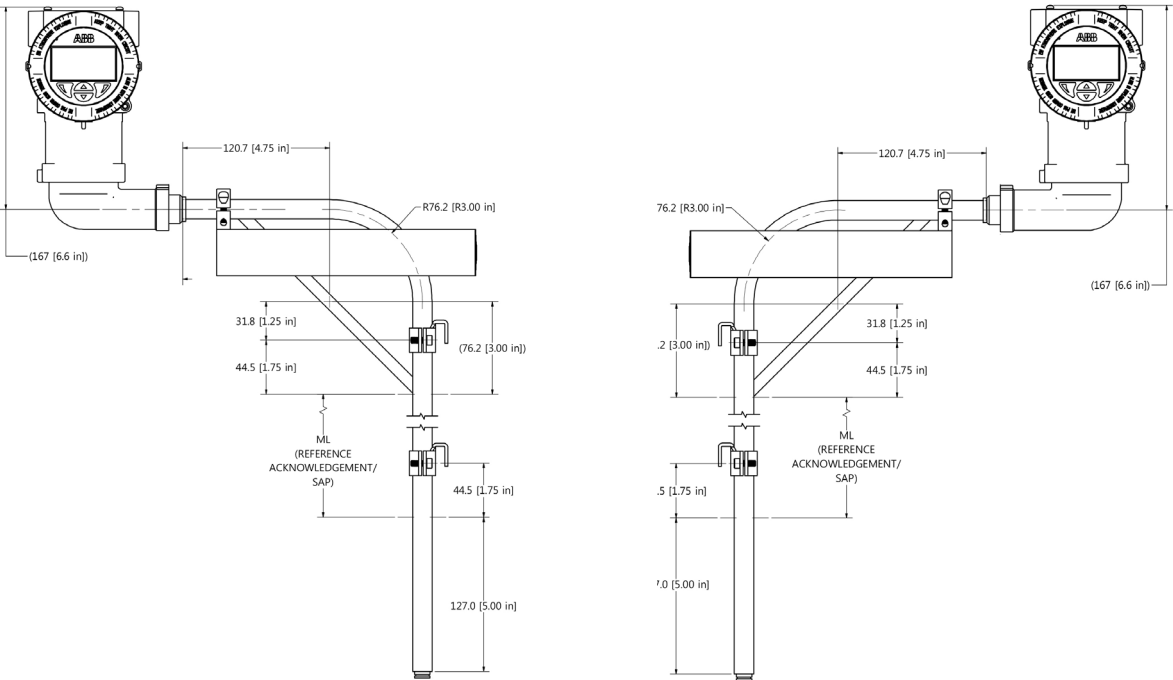
External mount magnetostrictive level transmitter

Probe Type R1, R2 & R3 - Bottom Mount



*Drawings for Reference Only

SEH 90 degree bend housing extension - Top Mount

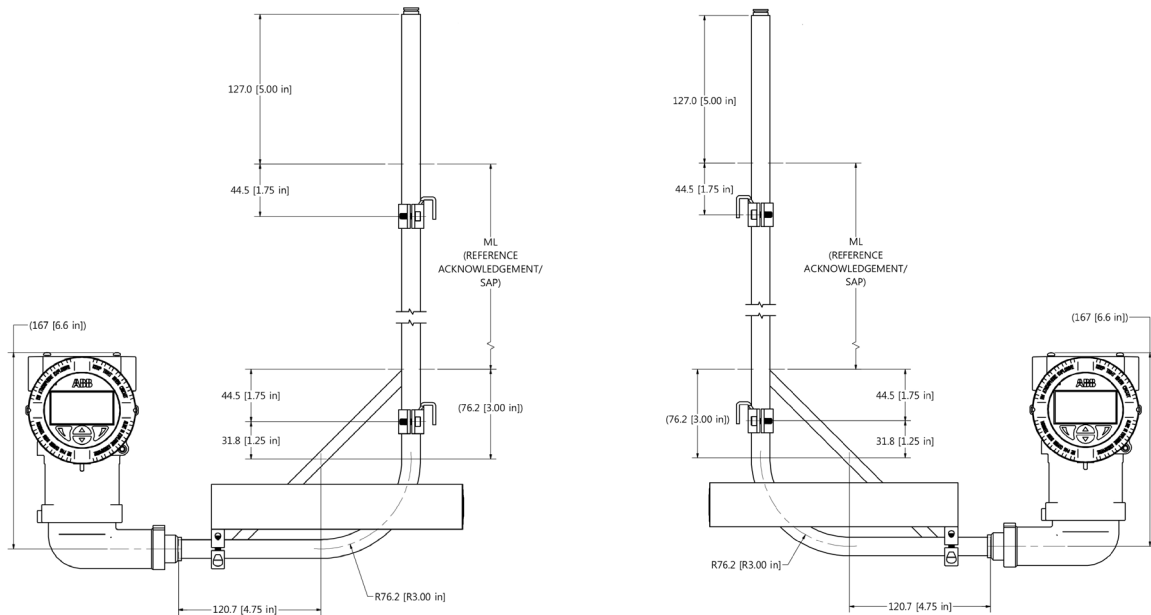


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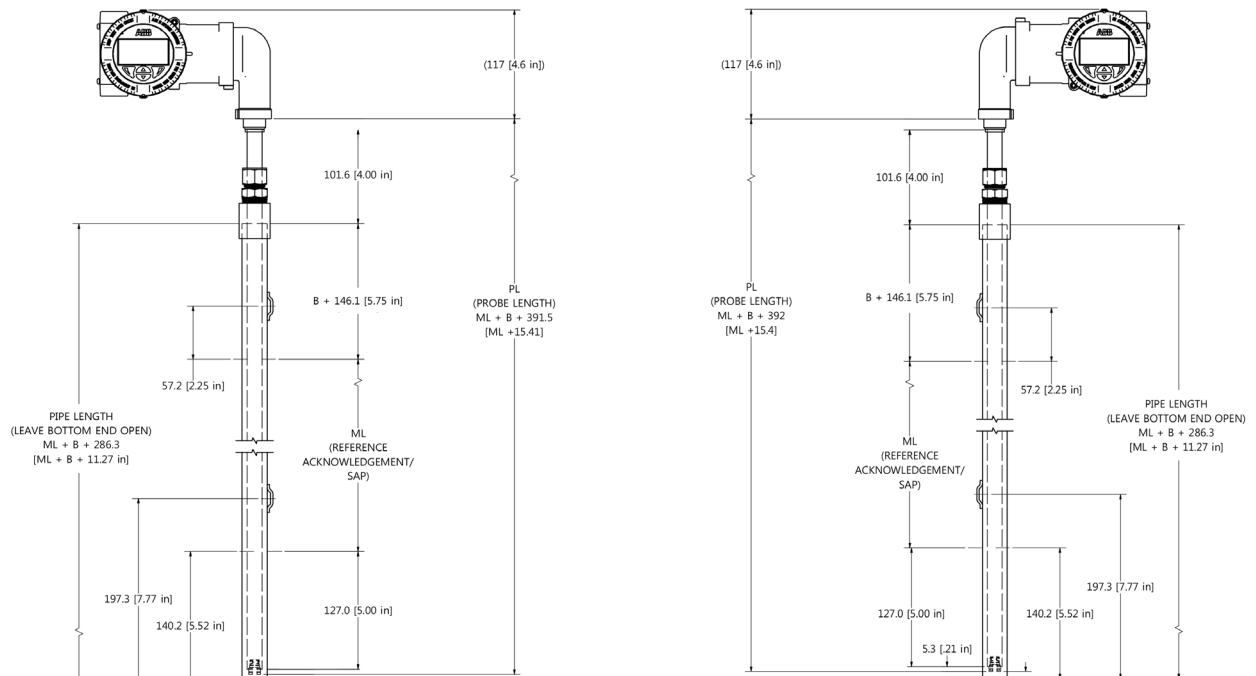
External mount magnetostriuctive level transmitter

SEH 90 degree bend housing extension - Bottom Mount



*Drawings for Reference Only

Cryogenic with insertion well - Top Mount

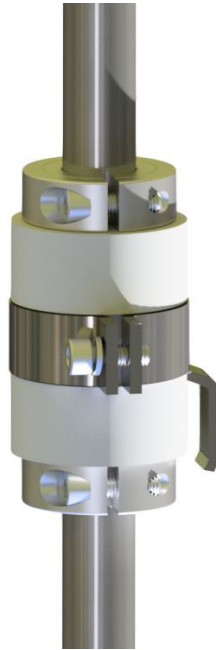


*Drawings for Reference Only

Vibration Isolator Mount Option

Kit Includes:

- 1 Vibration Isolator
- 1 Chamber mounting clamp assembly
- 2 Bearing clamp assemblies



For measurement lengths (ML) of 60 in. (1524 mm) or less, a minimum of two VI-KIT assemblies are required for installation in high vibration installations.

For ML greater than 60 in. (1524 mm), the number of isolators required can be determined from the below chart.

| ML up to | # of Kits |
|--------------------|-----------------|
| 914.4mm (36in) | 2 |
| 1828.8mm (72in) | 3 |
| 2286.0mm (90in) | 4 |
| 2743.2mm (108in) | 4 |
| 3200.4mm (126in) | 5 |
| 3657.6mm (144in) | 5 |
| 4114.8mm (162in) | 6 |
| 4572.0mm (180in) | 6 |
| > 4572.0mm (180in) | consult factory |

Position Transmitter Mounting Option

Example Installation: LMT200 Valve Position Transmitter and Hydraulic Control Valve

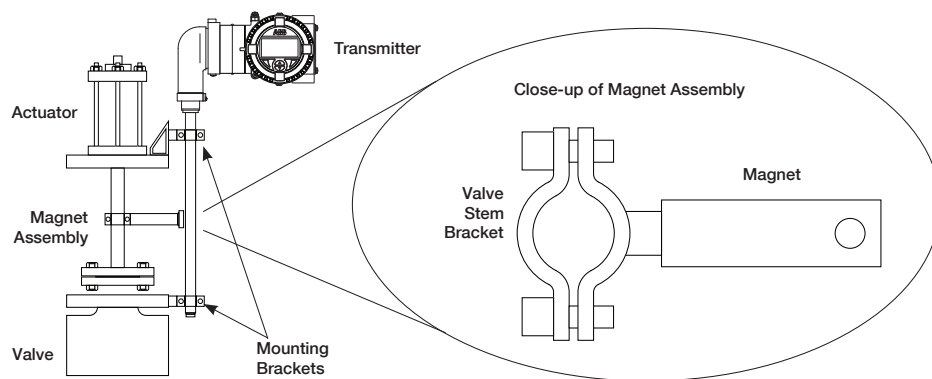


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