Level Plus®
Magnetostrictive Liquid Level Transmitters
with Temposonics® Technology

CHAMBERED
Data Sheet

- Designed for Magnetic Level Gauge (MLG)
- No scheduled maintenance or recalibration
- Hazardous area certified
MEASURING TECHNOLOGY

The absolute, linear position sensors provided by MTS Sensors rely on the company's proprietary Temposonics® magnetostrictive technology, which can determine positions with a high level of precision and robustness. Each Temposonics® position sensor consists of a ferromagnetic waveguide, a position magnet, a strain pulse converter and supporting electronics. The magnet, connected to the object in motion in the application, generates a magnetic field at its location on the waveguide. A short current pulse is applied to the waveguide. This creates a momentary radial magnetic field and torsional strain on the waveguide. The momentary interaction of the magnetic fields releases a torsional strain pulse that propagates the length of the waveguide. When the ultrasonic wave reaches the end of the waveguide it is converted into an electrical signal. Since the speed of the ultrasonic wave in the waveguide is precisely known, the time required to receive the return signal can be converted into a linear position measurement with both high accuracy and repeatability.

CHAMBERED

The Level Plus® CHAMBERED level transmitter satisfies the demand for an accurate and robust liquid-level sensor with unsurpassed flexibility to meet most process application conditions. The CHAMBERED transmitter provides external measurement of most Magnetic Level Gauges (MLG) from popular suppliers. Once the transmitter is installed and calibrated there is no requirement for scheduled maintenance or recalibration. Set it and forget it!

Features:
• No scheduled maintenance or recalibration
• Integral display
• Intrinsically safe
• Explosionproof/flameproof

Applications:
• Magnetic Level Gauge
• Bypass chamber

Markets:
• Petroleum and petrochemical
• Chemical
• Power generation

Compatible with:
• Houdec
• Hawk
• Bliss Anand
• Jerguson
• Kenco
• Wika
• Quest-tec
• Pemberthy
• Klinger
• ISE Magtech
• ABB (K-tek)
• Bonetti
• SOR
• Krohne
• Nihon Klingage
• FOXC
• KSR Kuebler
• Shridhan

Table: Standards and Certifications

<table>
<thead>
<tr>
<th>Standard</th>
<th>Certification</th>
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<tbody>
<tr>
<td>FM 3610</td>
<td>Class I, Div. 1, Groups A, B, C, D T4</td>
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<tr>
<td>ISA 60079-11:2014</td>
<td>Class I, Zone 0/1, AEx ia IIC T4 Ta= −50 to 71 °C: IP65</td>
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<td>C22.2 No. 157</td>
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<td>C22.2 No. 60079-11:2014</td>
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<td>EN 60079-11:2012</td>
<td>FM1ATEX068X</td>
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<td>IEC 60079-11:2011</td>
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<tr>
<td>FM 3615</td>
<td>Class I, Div. 1, Groups A, B, C, D T6...T3</td>
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<td>ISA 60079-1</td>
<td>Class I, Zone 0/1, AEx db IIB+H2 T6...T3 Ga/Gb Ta= −40 to 71 °C: IP65</td>
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<td>IEC 60079-1:2011</td>
<td>IECEx FMG 16.0033X</td>
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Fig. 1: Time-of-flight based magnetostrictive position sensing principle

Fig. 2: Certifications of CHAMBERED level transmitter
## TECHNICAL DATA

### Level output

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Product level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal/protocol</td>
<td>Modbus RTU, DDA, Analog (4…20 mA), HART®</td>
</tr>
<tr>
<td>Order length</td>
<td>305…3658 mm (12…144 in.) (Order length equals the measurement range plus the inactive zone. Contact factory for longer lengths)</td>
</tr>
<tr>
<td>Inherent accuracy</td>
<td>±1 mm (0.039 in.)</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.001 % F.S. or 0.381 mm (0.015 in.) whichever is greater (any direction)</td>
</tr>
</tbody>
</table>

### Electronics

<table>
<thead>
<tr>
<th>Input voltage</th>
<th>10.5…28 VDC</th>
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<tbody>
<tr>
<td>Fail safe</td>
<td>High, full scale (Modbus, DDA)</td>
</tr>
<tr>
<td></td>
<td>Low, 3.5 mA default or high, 22.8 mA (Analog, HART®)</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>Series diode</td>
</tr>
<tr>
<td>EMC</td>
<td>EN 61326-1, EN 61326-2-3, EN 61326-3-2, EN 61000-6-2, EN 61000-6-3, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8</td>
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### Environmental

<table>
<thead>
<tr>
<th>Enclosure rating</th>
<th>NEMA Type 4X, IP65</th>
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<tbody>
<tr>
<td>Humidity</td>
<td>0…100 % relative humidity, no condensation</td>
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<tr>
<td>Operating temperatures</td>
<td>Electronics: −40…+71 °C (−40…+160 °F)</td>
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<tr>
<td></td>
<td>Sensing element: −40…+125 °C (−40…+257 °F) (Contact factory for specific temperature ranges)</td>
</tr>
<tr>
<td>Materials</td>
<td>316L stainless steel, epoxy coated aluminum</td>
</tr>
</tbody>
</table>

### Field installation

| Housing dimensions    | Single cavity: |
|                       | 145 mm (5.7 in.) W × by 127 mm (5 in.) D × 109 mm (4.3 in.) H |
|                       | Dual cavity: |
|                       | 117 mm (4.6 in.) W × by 127 mm (5 in.) D × 206 mm (8.1 in.) H |
|                       | Stainless steel single cavity: |
|                       | 178 mm (7.1 in.) W × by 135 mm (5.3 in.) D × 153 mm (6 in.) H |

### Wiring

| Connections           | 4-wire shielded cable or twisted pair, Daniel Woodhead 6 pin male connector, 4570 mm (180 in.) integral cable with pigtail |

### Electrical connections

| Single and dual cavity | ¾" FNPT conduit opening, M20 for ATEX/IECEX version |
| NEMA Type 4X           | ½" FNPT conduit opening |

### Display

| Measured variables    | Product level |
TECHNICAL DRAWING

LEVEL TRANSMITTER INACTIVE ZONE REFERENCE

<table>
<thead>
<tr>
<th>Order length</th>
<th>Inactive zone</th>
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<tbody>
<tr>
<td>&lt; 3658 mm (144 in.)</td>
<td>74 mm (2.9 in.)</td>
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</tbody>
</table>

Controlling design dimensions are in millimeters and measurements in ( ) are in inches.

1/ The ambient temperature rating, $T_a = -50 \, ^\circ C \text{ (}-58 \, ^\circ F\text{)}$ to $71 \, ^\circ C \text{ (160 } ^\circ F\text{)}, must not be exceeded due to the mounting of the level transmitter to the MLG and exposure to the process temperature.
ORDER CODE

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<tbody>
<tr>
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</tbody>
</table>

**a** Sensor model
L P C CHAMBERED level transmitter

**b** Output
D DDA
M Modbus
3 1 Loop with HART\textsuperscript{®}
6 1 Loop with HART\textsuperscript{®} and SIL 2

**c** Housing type
D Single cavity with display
E Dual cavity with display
L Stainless steel single cavity with display

**d** Electronics mounting
3 90° bend (housing top left)
4 90° bend (housing top right)
5 90° bend (housing bottom left)
6 90° bend (housing bottom right)
7 Top mount (housing top right)
8 Bottom mount (housing bottom left)

**e** Sensor pipe
B ⅝ " OD pipe
R ½ " OD pipe
Y 10 mm OD pipe

**f** Materials of construction (wetted parts) \textsuperscript{2}
1 316L stainless steel

**g** Process connection type
X None

**h** Process connection size
X None

**i** Number of digital thermometers (DT’s)
0 None

**j** Digital thermometer placement
X None

**k** Notified body
B INMETRO
C CEC (FMC)
E ATEX
F NEC (FM)
I IEC
K KC
N NEPSI
P CCOE
T CML/TIIS
X None

**l** Protection method
F Explosionproof/flameproof (only for housing type D, E, or L)
I Intrinsically safe
X No approval

**m** Gas group
A Group A (not available with “C = CEC (FMC)” notified body and “F = Flameproof/explosion” proof protection method)
B Group B
C Group C
D Group D
3 IIC (intrinsically safe only)
4 IIIB + H2 (explosionproof/flameproof only)
X None

\textsuperscript{2} Note: Contact factory for other materials
**Level Plus® CHAMBERED**

**Data Sheet**

**NOTICE**

Accessories such as floats, cables, and remote displays have to be ordered separately. All accessories are shown in the Accessories Catalog (551103).

Manuals, Software & 3D Models available at:

www.mtssensors.com

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<thead>
<tr>
<th>Length (no decimal spaces)</th>
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</tbody>
</table>

**Special**

R Reverse measurement

S Standard product

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**Unit of measure**

M Metric – Millimeters

U US customary – inches