

# Level Plus®

Magnetostrictive Liquid-Level Sensors  
with Temposonics® Technology



## M-Series Model USTD II

Underground Storage Tank Level Sensing  
for Leak Detection and Inventory Monitoring

Document Part Number  
550949 Revision H

### Data Sheet

#### FEATURES

- DDA Output
- 3-in-1 Measurement
  - Product
  - Interface
  - Temperature
- No Scheduled Maintenance or Recalibration
- Non-linearity  $\pm 0.5$  mm (0.02 in.)
- Intrinsically Safe (I.S.)

#### APPLICATIONS

- Underground Storage Tanks
- Fuels and Solvents
- Sumps

#### MARKETS

- Petroleum and Petrochemical
- Biotech and Pharmaceuticals
- Water and Wastewater

#### Product overview

The Level Plus® Model USTD II level transmitter is designed for use in Underground Storage Tanks (UST). The most common UST application is containing automotive fuels at gas stations. The Model USTD II transmitter provides 3-in-1 measurement using one process opening for product level, interface level, and temperature measurements. Once the transmitter is installed and calibrated, there is no requirement for scheduled maintenance or recalibration. **Set it and forget it!**

The Model USTD II transmitter uses a proprietary ASCII based protocol referred to as Direct Digital Access (DDA) for communication. The DDA output utilizes a 4-wire, multi-drop power and data bus RS-485 network. Utilizing the data bus network eliminates requirements for individual cable runs to and from each tank. The RS-485 network also allows for longer cable runs for more tanks and greater distances.



Level Plus Model USTD II  
Liquid-Level Transmitter



All specifications are subject to change. Contact MTS for specifications and engineering drawings that are critical to your application. Drawings contained in this document are for reference only. Go to <http://www.mtssensors.com> for the latest support documentation and related media.

## Product specifications

Parameters	Specifications	Parameters	Specifications
<b>LEVEL OUTPUT</b>		<b>ENVIRONMENTAL</b>	
<b>Measured variable:</b>	Product level and interface level	<b>Enclosure rating:</b>	IP 68
<b>Output signal / Protocol:</b>	DDA	<b>Humidity:</b>	0 to 100% relative humidity, noncondensing
<b>Order length:</b>	<b>Rigid pipe:</b> 737 mm (29 in.) to 3785 mm (149 in.) §△ § Order length equals the distance from the bottom of the housing to the tip of the pipe, (including the inactive zone). △ Contact factory for longer lengths.	<b>Operating temperatures:</b>	<b>Electronics:</b> -40 °C (-40 °F) to 71 °C (160 °F) <b>Sensing element:</b> -40 °C (-40 °F) to 125 °C (257 °F) <b>Temperature element:</b> -40 °C (-40 °F) to 105 °C (221 °F)
<b>Non-linearity:</b>	± 0.5 mm (0.02 in.)	<b>Vessel pressure:</b>	4 bar (60 psi)
<b>Repeatability:</b>	0.001% F.S. or 0.381 mm (0.015 in.)◇ ◇ Whichever is greater.	<b>Materials:</b>	<b>Wetted parts:</b> 316L stainless steel <b>Non wetted parts:</b> 316L stainless steel
<b>TEMPERATURE OUTPUT</b>		<b>FIELD INSTALLATION</b>	
<b>Measured variable:</b>	Average and multipoint temperatures Up to 5	<b>Housing dimensions:</b>	51 mm (2 in.) dia. by 132 mm (5.2 in.) height
<b>Accuracy:</b>	± 0.28 °C (± 0.5 °F)	<b>Mounting:</b>	¾ in. Adjustable NPT fitting (ATEX, FM) or Fill tube hanger (FM only)
<b>ELECTRONICS</b>		<b>Wiring:</b>	4-wire, plus earth ground
<b>Input voltage:</b>	10.5 to 30.1 Vdc 28 Vdc maximum for I.S. ATEX approval	<b>Electrical Connections:</b>	5-pin M12 connector
<b>Fail safe:</b>	High, Full scale		
<b>Reverse polarity protection:</b>	Series diode		
<b>Lightning/Transient protection:</b>	<b>Stage 1:</b> Line-to-ground surge suppression; IEC 61000-4-5 <b>Stage 2:</b> Line-to-line and line-to-ground transient suppressors; IEC 61000-4-4		
<b>CALIBRATION</b>			
<b>Zero adjust range:</b>	Anywhere within the active length		
<b>Span adjust range:</b>	Full scale to 152 mm (6 in.) from zero		

## Agency approvals

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### Intrinsically Safe

<b>FM 3610</b>	Class I, Division 1, Groups A, B, C and D T4 Division 1, NEMA Type 4X
<b>GB 3836.4</b>	Exia IIC T4 Ga

### EN 50020

PTB 04 ATEX 2107 X



II 1/2 G bzw. II 2 G  
EEx ia IIB T4 bzw. EEx ia IIA T4 \*\*

*(Fill tube hanger mount is not ATEX  
approved)*

## MTS DDA setup software

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MTS developed the DDA Setup software to help customers program and customize their installed Model USTD II transmitter. The DDA Setup software allows the user to change addresses, calibrate current tank levels, and create a backup and restore file of current settings. The backup and restore file allows the customer to replace the electronics or transmitter and restore all previously defined settings.

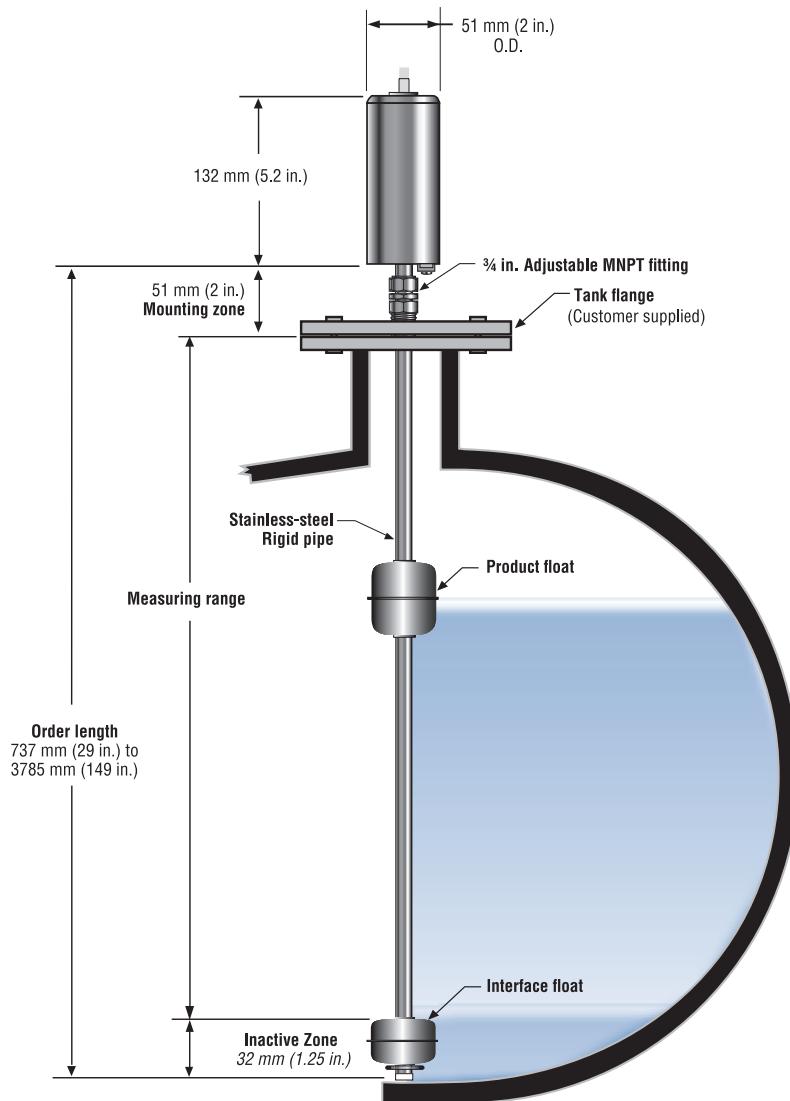
MTS setup software is shipped with each transmitter order. However, if you require an additional copy or an upgrade to your currently installed setup software, updates are available for download from our public website at <http://www.mtssensors.com>.

## Level Plus® Model USTD II Installation Guideline External Mounting Applications

### Installation guideline, external mount

MTS offers the Level Plus Model USTD II transmitter configured with a rigid pipe constructed of 316L stainless steel. The rigid pipe configuration can be ordered in lengths from 737 mm (29 in.) to 3785 mm (149 in.). The Model USTD II can be installed using a flange mount (see illustration below). The flange mount allows the transmitter to be installed external to the tank through a flange with a 3/4 in. MNPT Adjustable fitting which is FM and ATEX approved. The NPT fitting allows the transmitter mount to be adjusted (within an inch) if the tank height and order length are not exactly equal.

The 'Measuring range' of the Model USTD II transmitter is equal to the 'Order length' minus the 'Mounting zone' at 51 mm (2.0 in.) and the 'Inactive zone' of 32 mm (1.25 in.). The Model USTD II transmitter can be ordered with a single product float or can include the optional interface float (Refer to page 7 for float specifications). Average and individual temperature measurement from five positions are included.



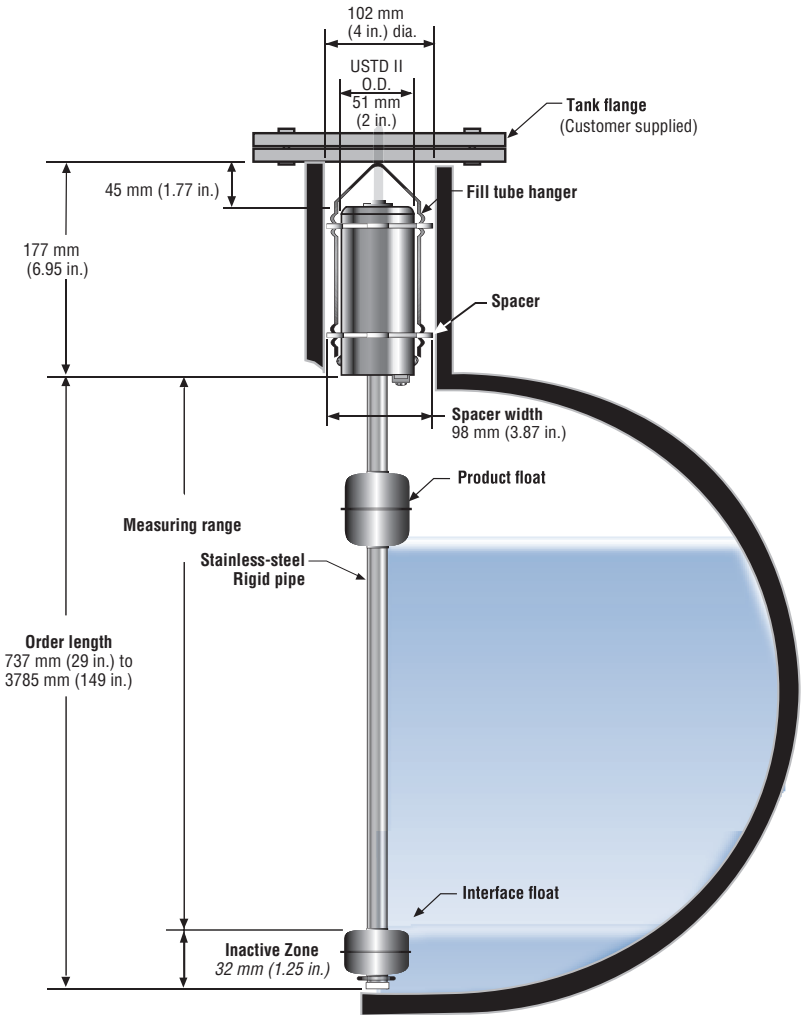
**Installation guideline, internal mount**

MTS offers the Level Plus Model USTD II transmitter configured with a rigid pipe constructed of 316L stainless steel. The rigid pipe configuration can be ordered in lengths from 737 mm (29 in.) to 3785 mm (149 in.). The Model USTD II can be installed using a *Fill Tube Hanger* mount (see illustration below). The fill tube hanger mount allows the transmitter to be installed in the fill tube or riser pipe within the tank and is FM approved.

The 'Measuring range' of the Model USTD II transmitter is equal to the 'Order length' minus the 'Inactive zone' of 32 mm (1.25 in.). The overall length of the transmitter in the tank is equal to the 'Order length' plus the height of the housing and bracket at 176.5 mm (6.95 in.)

The Model USTD II transmitter can be ordered with a single product float, or can include the optional interface float (Refer to page 7 for float specifications). Average and individual temperature measurement from five positions are included.

**\*\* The fill tube hanger mount is not available with ATEX approval**



## Level Plus® Model USTD II Ordering Information

### Ordering information

_____ <b>TRANSMITTER MODEL</b> _____ =		<b>U</b> <b>S</b> <b>T</b> <b>D</b> <b>I</b> <b>I</b>	1 - 6
M-Series Model USTD II liquid-level transmitter			
_____ <b>UNIT OF MEASURE</b> _____ =		<input type="text"/>	7
<b>M</b>	= Metric (millimeters)		
<b>U</b>	= US Customary (inches)		
_____ <b>TRANSMITTER ORDER LENGTH</b> _____ =		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	8 - 11
<b>Length</b>	<b>Code</b>		
Millimeters	= XXXX (737 mm to 3785 mm)		
Inches	= OXXX (29 in. to 149 in.)		
_____ <b>MOUNTING AND CATEGORY OF APPARATUS</b> _____ =		<input type="text"/>	12
<b>H</b>	= Fill tube mounting (hanger with centering spacers) FM Approved		
<b>A</b>	= Flange mounting (3/4 in. MNPT adjustable fitting) FM Approved		
<b>6</b>	= Flange mounting (3/4 in. MNPT adjustable fitting) ATEX Approved		
_____ <b>MOUNTING TYPE</b> _____ =		<input type="text"/>	13
<b>S</b>	= Standard product without cable (FM Approved)		
<b>9</b>	= Standard product without cable (ATEX Approved)		
<b>7</b>	= Cable gland and integral blue cable (ATEX Approved)		

#### STANDARD FEATURES

Five DT's, evenly spaced  
Data output format (USTD type)

#### USTD II CABLE ASSEMBLY OPTION

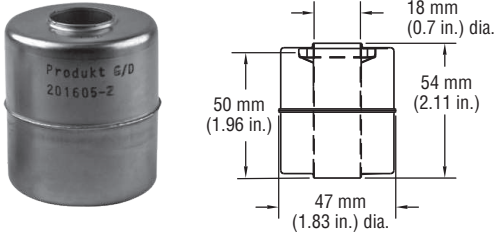
Description	Part number
5 m straight connector cable (ATEX)	402486
2 m straight connector cable (FM)	530049
2 m 90° connector cable (FM)	370481

## Standard product and interface float selection

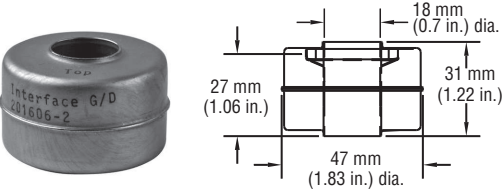
The table below lists standard product and interface float selections. Consult the factory for help in selecting the correct float for your application. For detailed information about all liquid-level product accessories, refer to the 'Level Plus Accessories Catalog, document Number 551103' from a link on the following MTS Level Product Support page:

<http://www.mtssensors.com/products/liquid-level-sensors/accessories/index.html>

### PRODUCT FLOAT

Float and dimension reference	Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number
	4 bar (60 psi)	149 °C (300 °F)	Yes	0.6	SS	Yes	201605-2

### INTERFACE FLOAT

Float and dimension reference	Pressure	Temp.	Magnet offset	Specific gravity	Material	Weight offset	Part number
	4 bar (60 psi)	149 °C (300 °F)	Yes	0.85 - 0.9	SS	Yes	201606-2

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