MTS SENSORS

Level Plus®

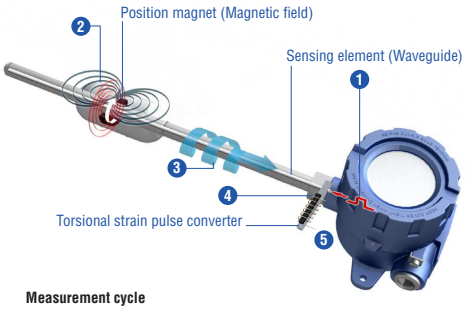
Magnetostrictive Liquid Level Transmitters
with Temposonics® Technology

Tank SLAYER®
Data Sheet

– 3-IN-1 Measurement
– Inherent Accuracy ±1 mm
– API Temperature Corrected Volumes
– No Scheduled Maintenance or Recalibration
– Hazardous Area Certified

TEMPOSONICS® TECHNOLOGY

Temposonics® Technology is the manner in which MTS applies the principles of magnetostriction to create a reliable position measurement system for use in industrial environments. Inside the sensor a torsional strain pulse is induced in a specially designed magnetostrictive waveguide by the momentary interaction of two magnetic fields. One field comes from a moving magnet, which passes along the outside of the transducer tube, and the other field is generated from a current pulse which is applied to the waveguide. The interaction between these two magnetic fields produces a strain pulse which travels at sonic speed along the sensor waveguide, until the pulse is detected at the head of the transducer. The position of the moving magnet is precisely determined by measuring the elapsed time between the application of the current pulse and the arrival of the strain pulse. As a result, MTS is able to create a reliable position measurement system that is capable of providing an accurate and repeatable measurement.



Measurement cycle	
1	Current pulse generates magnetic field
2	Interaction with position magnet field generates torsional strain pulse
3	Torsional strain pulse propagates
4	Strain pulse detected by converter
5	Time-of-flight converted into distance

Fig. 1: Time-based magnetostrictive position sensing principle

TANK SLAYER®

The Level Plus® Tank Slayer® liquid level transmitter satisfies the demand for an accurate and robust liquid-level sensor with unsurpassed flexibility to meet most process application conditions. The Tank Slayer® 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!***

Features:
– 3-in-1 Measurement
  – Product
  – Interface
  – Temperature
– No Scheduled Maintenance or Recalibration
– Inherent Accuracy ±1mm
– Integral Display
– Intrinsically Safe
– API Temperature Corrected Volumes

Applications:
– Inventory Control
– Bulk Storage
– Custody Transfer

Markets:
– Petroleum and Petrochemical
– LPG terminals
– Food and Beverage

Fig. 2: Example of product and interface level measurement

Standard	Rating
FM 3610	Class I, Div. 1, Groups A, B, C, and D T4 Class I, Zone 0/1, AEx ia IIC T4 Ta= -50 to 71°C: IP65
C22.2 No. 157	Class I, Div. 1, Groups A, B, C, and D T4 Class I, Zone 0/1, Ex ia IIC T4 Ta= -50 to 71°C: IP65
EN 60079-11:2012	FM14ATEX0068X II ½ G Ex ia IIC T4 Ta= -50 to 71°C: IP65
IEC 60079-11:2011	IECEx FMG 14.0032 II ½ G Ex ia IIC T4 Ga/Gb Ta= -50 to 71°C: IP65

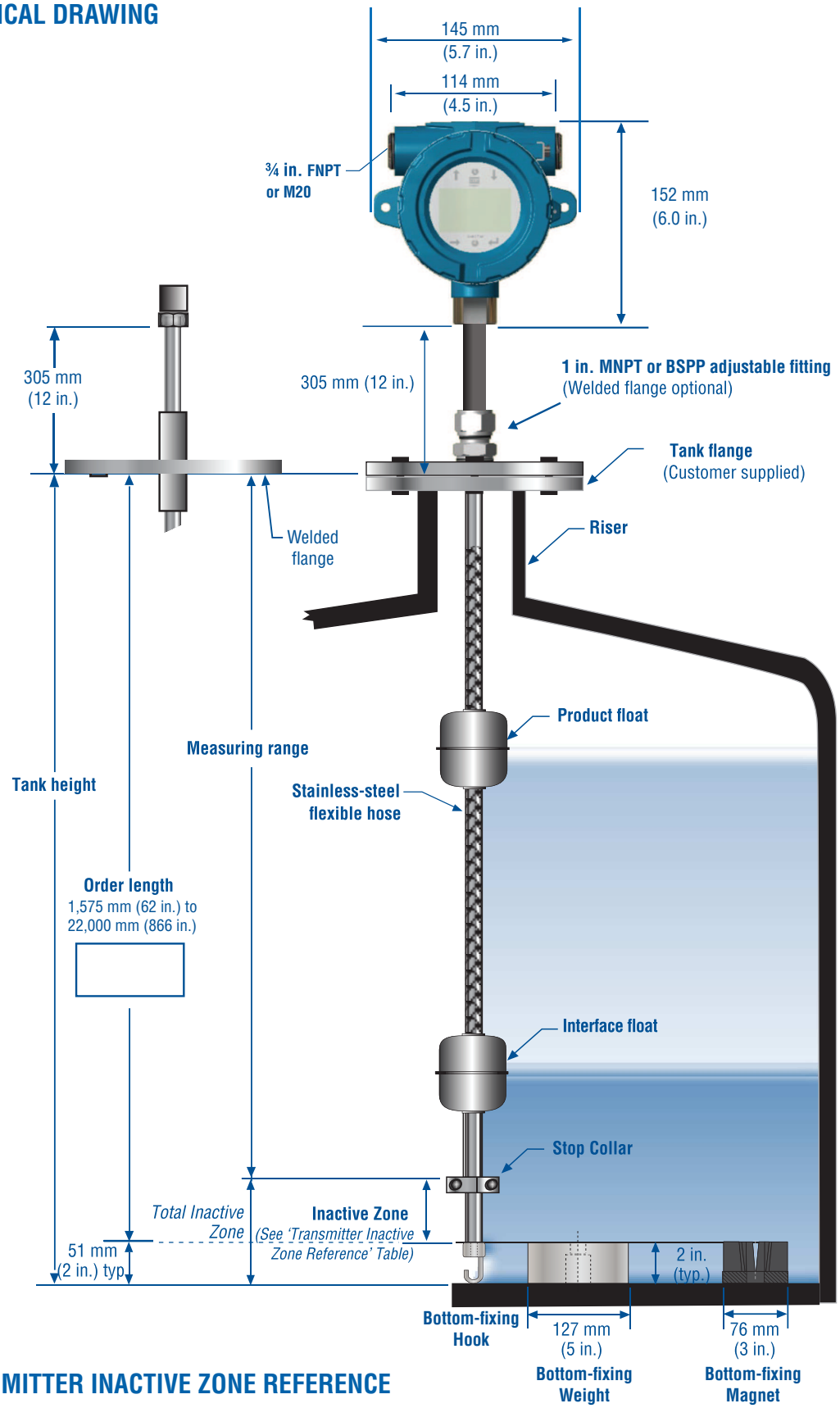
TECHNICAL DATA

Level Output	
Measured variable	Product level and interface level
Output signal /Protocol	Modbus RTU, DDA, Analog (4-20 mA), HART®
Order length	**Flexible hose:** 1575 mm (62 in.) to 22000 mm (866 in.) Δ§
Inherent Accuracy	±1 mm (0.039 in.)
Repeatability	0.001% F.S. or 0.381 mm (0.015 in.) * (any direction)
Temperature Output	
Measured variable	Average and multipoint temperatures (Modbus, DDA) Single point temperature (Analog, HART®)
Temperature accuracy (Modbus, DDA)	±0.2 °C (0.4 °F) range -40 °C (-40 °F) to -20 °C (-4 °F), ±0.1 °C (0.2 °F) range -20 °C (-4 °F) to 70 °C (158 °F), ±0.15 °C (0.3 °F) range 70 °C (158 °F) to 100 °C (212 °F), ±0.5 °C (0.9 °F) range 100 °C (212 °F) to 105 °C (221 °F)
Temperature accuracy (Analog, HART®)	±0.28 °C (0.5 °F) range -40 °C (-40 °F) to 105 °C (221 °F)
Electronics	
Input voltage	10.5 to 28 Vdc
Fail safe	High, Full scale (Modbus, DDA) Low, 3.5 mA default or High, 22.8 mA (Analog, HART®)
Reverse polarity protection	Series diode
EMC	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, EN 61000-4-11
Environmental	
Enclosure rating	NEMA Type 4X, IP65
Humidity	0 to 100% relative humidity, non-condensing
Operating temperatures	**Electronics:** -40 °C (-40 °F) to 71 °C (160 °F) **Sensing element:** -40 °C (-40 °F) to 125 °C (257 °F) ◊ **Temperature element:** -40 °C (-40 °F) to 105 °C (221 °F)
Vessel pressure	**Flexible Hose:** 260 psi (18 bar)
Materials	**Wetted parts:** 316L stainless steel † **Non-wetted parts:** 316L stainless steel, Epoxy coated aluminum
Field Installation	
Housing dimensions	**Single cavity:** 145 mm (5.7 in.) W x by 127 mm (5 in.) D x 109 mm (4.3 in.) H **Dual cavity:** 117 mm (4.6 in.) W x by 127 mm (5 in.) D x 206 mm (8.1 in.) H **Stainless steel single cavity:** 178 mm (7.1 in.) W x by 135 mm (5.3 in.) D x 153 mm (6 in.) H **NEMA Type 4X:** 87 mm (3.4 in.) W x by 124 mm (4.9 in.) D x 132 mm (5.2 in.) H
Mounting	
Flexible hose	1 in. Adjustable MNPT or BSPP fitting, Flange mount
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 in. FNPT conduit opening, M20 for ATEX/IECEx version
NEMA Type 4X	½ in. FNPT conduit opening
Display	
Measured variables	Product level, interface level and temperature

* Whichever is greater
Δ Contact factory for longer lengths.
◊ Contact factory for specific temperature ranges.

† Contact factory for alternative materials.
§ Order length equals the measurement range plus the inactive zone.

TECHNICAL DRAWING



TRANSMITTER INACTIVE ZONE REFERENCE

Length	Inactive Zone
<7.6 m (25 ft.)	76 mm (3 in.)
7.6 m to 12.2 m (25 to 40 ft.)	97 mm (3.8 in.)
12.3 m to 20 m (26 to 72 ft.)	120 mm (4.7 in.)

ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
L	P	T																			
a			b	c	d	e	f	g	h	i	j	k	l	m	n	o					p

a	Sensor model
L P T	Tank Slayer® Level Transmitter

b	Output
M	Modbus
D	DDA
1	1 Loop with HART®
2	2 Loop with HART®

c	Housing type
A	NEMA housing w/cable
B	NEMA housing w/terminal
C	NEMA housing w/connector
D	Single cavity with display
E	Dual cavity with display
L	SS single cavity w/display

d	Electronics mounting
1	Standard

e	Sensor pipe
M	Flexible, 7/8“OD tube w/bottom fixing eye
N	Flexible, 7/8“OD tube w/bottom fixing weight
P	Flexible, 7/8“OD tube w/bottom fixing magnet
S	Flexible, 7/8“OD tube w/o bottom fixing hardware

f	Materials of construction (Wetted parts)
1	316L stainless steel

Note: *Contact factory for other materials*

g	Process connection type
1	NPT adjustable
2	BSPP adjustable
6	150 lb. welded RF flange
7	300 lb. welded RF flange
8	600 lb. welded RF flange
A	PN16, DIN 2572 welded flange
B	PN40, DIN 2572 welded flange
C	PN64, DIN 2572 welded flange
D	PN100, DIN 2572 welded flange

h	Process connection size
B	1 in. (DN25)
D	2 in. (DN50)
E	2 ½ in. (DN65)
F	3 in. (DN80)
G	4 in. (DN100)
H	5 in. (DN125)
J	6 in. (DN150)
X	None

i	Number of DT‘s (Digital Thermometer)
0	None
1	One DT
5	5 DTs
K	Twelve DTs
M	Sixteen DTs

j	DT Placement
F	Evenly spaced per API
C	Custom
X	None

k	Notified body
C	CEC (FMC)
E	ATEX
F	NEC (FM)
I	IEC
X	None

l	Protection method
I	IS
X	No approval

(Continued on next page)

ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
L	P	T																			
a			b	c	d	e	f	g	h	i	j	k	l	m	n	o					p

m	Gas group
A	Group A
B	Group B
C	Group C
D	Group D
1	IIA
2	IIB
3	IIC
X	None

n	Unit of measure
M	Metric - Millimeters
U	US customary - Inches

o	Length (no decimal spaces)
X X X X X	Flexible sensor pipe: 62 to 866 in. (code as 06200 to 86600
X X X X X	Flexible sensor pipe: 1575 to 22000 mm (code as 01575 to 22000)

p	Special
S	Standard Product

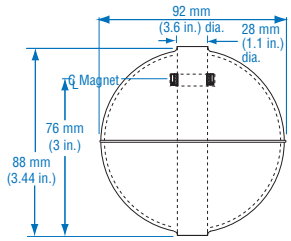
ORDERING NOTE

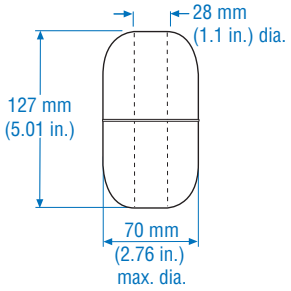
Accessories such as floats, cables, and displays have to be ordered separately. All accessories are shown in the Accessories Catalog (551103).

FREQUENTLY ORDERED ACCESSORIES – Additional options available in our Accessories Catalog 551103

General Notes:

1. Be sure that the float specific gravity is at least 0.05 less than that of the measured liquid as a safety margin at ambient temperature.
2. For interface measurement: A minimum of 0.05 specific gravity differential is required between the upper and lower liquids.
3. When the magnet is not shown, the magnet is positioned at the center line of float.
4. Drawings contained in this document are for reference only. Contact the factory for engineering drawings.

Long-gauge floats	Pressure	Temp.	Magnet offset	Specific gravity	Material	Part number
	29.3 bar (425 psi)	149 °C (300 °F)	Yes	0.54	SS	252961 -2
				0.65	Hastelloy-C	252961 -4
				0.93	SS	252962 -2
				0.93	Hastelloy-C	252962 -4

Long-gauge floats	Pressure	Temp.	Magnet offset	Specific gravity	Material	Part number
	22.4 bar (325 psi)	149 °C (300 °F)	No	0.66	SS	201232 -2
				0.70	Hastelloy-C	201232 -4

Controlling design dimensions are always in metric units

Document Part Number:
551688 Revision B (EN) 10/2016

LOCATIONS

USA
MTS Systems Corporation
Sensors Division
3001 Sheldon Drive
Cary, N.C. 27513, USA
Tel. +1 919 677-0100
Fax +1 919 677-0200
info.us@mtssensors.com
www.mtssensors.com

GERMANY
MTS Sensor Technologie
GmbH & Co. KG
Auf dem Schüffel 9
58513 Lüdenscheid, Germany
Tel. +49 2351 9587-0
Fax +49 2351 56491
info.de@mtssensors.com
www.mtssensors.com

JAPAN
MTS Sensors Technology Corp.
737 Aihara-machi,
Machida-shi,
Tokyo 194-0211, Japan
Tel. +81 42 775-3838
Fax +81 42 775-5512
info.jp@mtssensors.com
www.mtssensors.com

CHINA
MTS Sensors
Room 504, Huajing Commercial Center,
No. 188, North Qinzhou Road
200233 Shanghai, China
Tel. +86 21 6485 5800
Fax +86 21 6495 6329
info.cn@mtssensors.com
www.mtssensors.com

FRANCE
MTS Systems SAS
Zone EUROPARC Bâtiment EXA 16
16/18, rue Eugène Dupuis
94046 Creteil, France
Tel. +33 1 58 4390-28
Fax +33 1 58 4390-03
info.fr@mtssensors.com
www.mtssensors.com

ITALY
MTS Systems Srl.
Sensor Division
Via Camillo Golgi, 5/7
25064 Gussago (BS), Italy
Tel. +39 030 988 3819
Fax +39 030 982 3359
info.it@mtssensors.com
www.mtssensors.com

LEGAL NOTICES