

Data Sheet

Level Plus[®] – Tank SLAYER[®]

Magnetostrictive Liquid Level Transmitters with Temposonics[®] Technology

- 4-IN-1 Measurement
- Inherent Accuracy ± 1 mm
- API Temperature Corrected Volumes
- Hazardous Area Certified



MEASURING TECHNOLOGY

The absolute, linear position sensors provided by Temposonics rely on the company's proprietary Temposonics® magnetostrictive technology, which can determine position 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.

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 4-in-1 measurement using one process opening for product level, interface level, temperature and volume measurements. Once the transmitter is installed and calibrated there is no requirement for scheduled maintenance or recalibration for the expected 10 year life of the sensor. **Set it and forget it!**

Standard	Rating
FM 3610 ISA 60079-11:2014	Class I, Div. 1, Groups A, B, C, D T4 Class I, Zone 0, AEx ia IIC T4 Ga Ta= -50 to 71°C: IP65
C22.2 No. 157 C22.2 No. 60079-11:2014	Class I, Div. 1, Groups A, B, C, D T4 Class I, Zone 0, Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
EN 60079-11:2012	FM14ATEX0068X Ex II 1 G Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
IEC 60079-11:2011	IECEX FMG 14.0032X Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
UKSI 2016:1107	FM22UKEX0069X Ex II 1 G Ex ia IIC T4 Ga/Gb Ta= -50 to 71°C
FM 3615 ISA 60079-1	Class I, Div. 1, Groups A, B, C, D T6...T3 Class I, Zone 0/1, AEx db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
C22.2 No. 30 C22.2 No. 60079-1	Class I, Div. 1, Groups B, C, D T6...T3 Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
EN 60079-1:2014	FM16ATEX0068X Ex II ½ G Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
IEC 60079-1:2011	IECEX FMG 16.0033X Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
UKSI 2016:1107	FM22UKEX0070X Ex II ½ G Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C

Fig. 2: Certifications of Tank Slayer® level transmitter

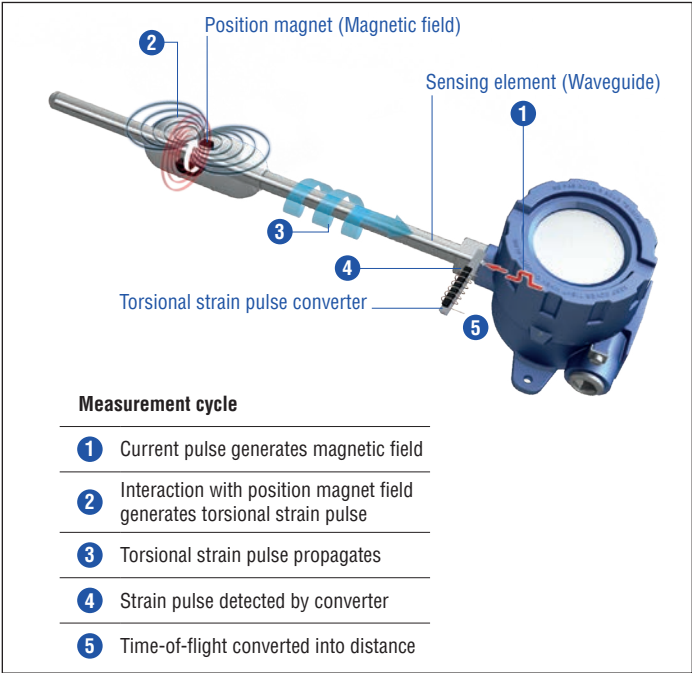


Fig. 1: Time-of-flight based magnetostrictive position sensing principle

- Features:**
 - 4-in-1 Measurement:
 - Product Level
 - Interface Level
 - Temperature
 - Volume
 - No scheduled maintenance or recalibration
 - Inherent Accuracy ±1mm
 - Integral Display
 - Intrinsically Safe
 - Explosion Proof
 - 200 Point Strap Table
 - API Temperature Corrected Volume
- Applications:**
 - Inventory Control
 - Bulk Storage
 - Custody Transfer
- Industries:**
 - Petroleum
 - LPG Terminals
 - Food & Beverage

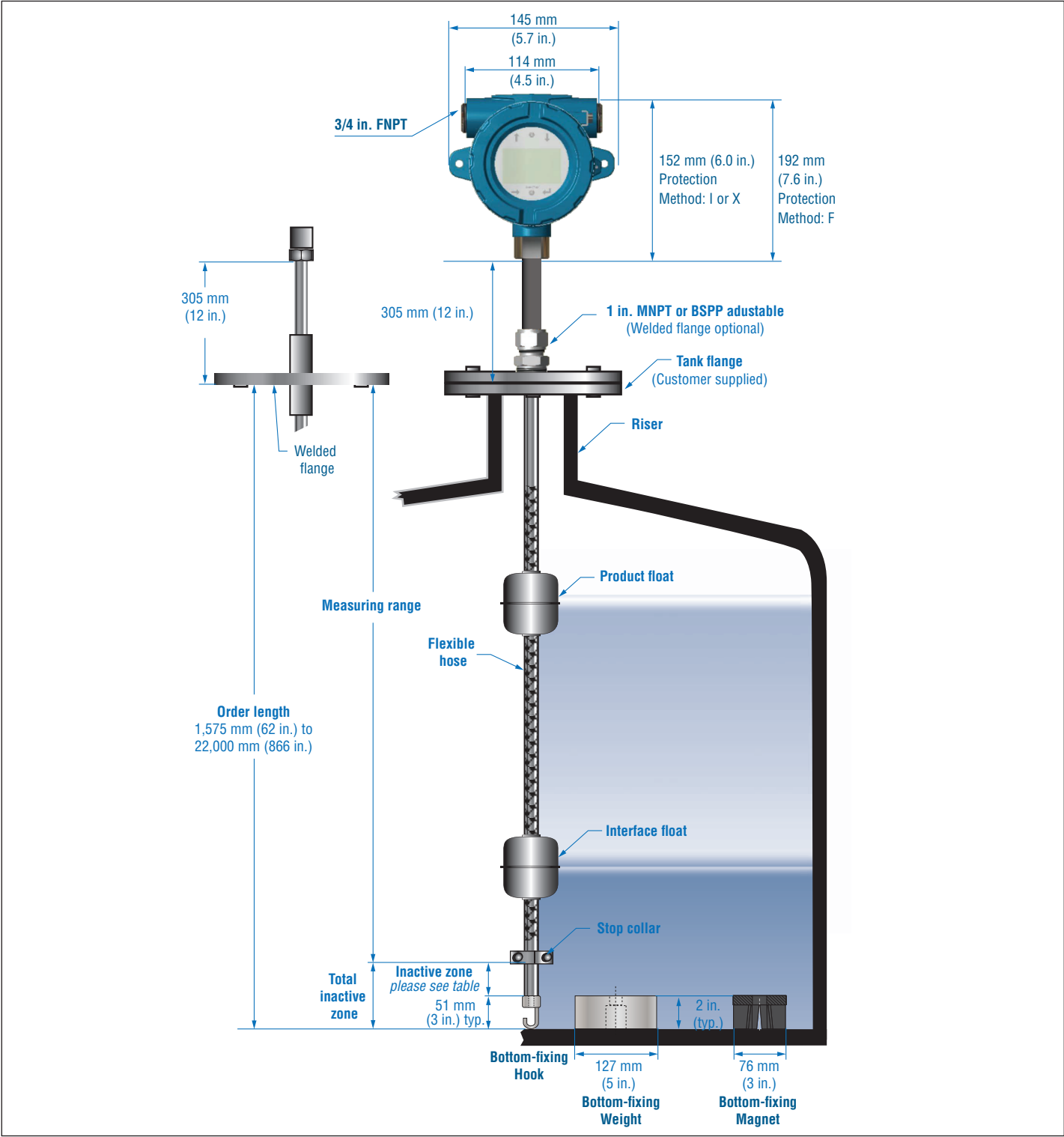


Fig. 3: Example of product and interface level measurement

TECHNICAL DATA

Level output	
Measured variable	Product level and interface level
Output signal/protocol	Modbus RTU, DDA, Analog (4...20 mA), HART®
Order length	1575...22000 mm (62...866 in.) (order length equals the measurement range plus the inactive zone / contact factory for longer lengths)
Inherent accuracy	±1 mm (0.039 in.)
Repeatability	0.001% F.S. or 0.381 mm (0.015 in.) whichever is greater (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...-20 °C (-40...-4 °F), ±0.1 °C (0.2 °F) range -20...+70 °C (-4...+158 °F), ±0.15 °C (0.3 °F) range +70...+100 °C (+158...+212 °F), ±0.5 °C (0.9 °F) range +100...+105 °C (+ 212 ...221 °F)
Temperature accuracy (Analog, HART®)	±0.28 °C (0.5 °F) range -40...+105 °C (-40...+221 °F)
Electronics	
Input voltage	10.5...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...100 % relative humidity, non-condensing
Operating temperatures	Electronics: -40...+71 °C (-40...+160 °F) Sensing element: -40...+125 °C (-40...+257 °F) (contact factory for specific temperature ranges) Temperature element: -40...+105 °C (-40...+221 °F)
Vessel pressure	Flexible Hose: 30 bar (435 psi) For CRN pressure specifications see Operation Manual 551685
Materials	Wetted parts: 316L stainless steel (contact factory for alternative materials) Non-wetted parts: 316L stainless steel, Epoxy coated aluminum
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 NEMA Type 4X: 87 mm (3.4 in.) W × by 124 mm (4.9 in.) D × 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, 4570 mm (180 in.) integral cable with pigtail Daniel Woodhead 6 pin male connector
Electrical connections	
Single and dual cavity	¾ in. FNPT conduit opening, M20 for ATEX/IECEX/UKCA version
NEMA Type 4X	½ in. FNPT conduit opening
Display	
Measured variables	Product level, interface level and temperature

TECHNICAL DRAWING



TRANSMITTER INACTIVE ZONE REFERENCE

Order 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 22 m (40 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						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®
5	1 Loop with HART® and SIL 2
7	2 Loop with HART® and SIL 2 (loop 1 only)

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 in. OD tube w/bottom fixing eye
N	Flexible, 7/8 in. OD tube w/bottom fixing weight
P	Flexible, 7/8 in. OD tube w/bottom fixing magnet
S	Flexible, 7/8 in. OD tube w/o bottom fixing hardware

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

g	Process connection type
1	NPT adjustable (1 in. only)
2	BSPP adjustable (1 in. only)
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. (NPT or BSPP only)
D	2 in. (DN50)
E	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 Thermometers)
0	None
1	One DT
5	Five DT's (Modbus or DDA)
K	Twelve DT's (Modbus only)
M	Sixteen DT's (Modbus only)

j	DT's placement
F	Evenly spaced per API
C	Custom
X	None

k l m n o p Continued on next page

* / Contact factory for other materials

ORDER CODE

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

l	Protection method
F	Explosionproof/Flame proof (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	IIB + H2 (Explosion Proof / Flameproof only)
X	None

n	Unit of measure
M	Millimeters (Metric)
U	Inches (US customary)

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

p	Special
S	Standard product

NOTICE

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

FREQUENTLY ORDERED ACCESSORIES – Additional options available in our [Accessories Guide](#) 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 float	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	29.3 bar (425 psi)	149 °C (300 °F)	Yes	0.54	Stainless steel	252 961-2
				0.65	Nickel Alloy C-276	252 961-4
				0.93	Stainless steel	252 962-2
				0.93	Nickel Alloy C-276	252 962-4

Standard floats	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	22.4 bar (325 psi)	149 °C (300 °F)	No	0.66	Stainless steel	201 232-2
				0.70	Nickel Alloy C-276	201 232-4

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temposonics.com

Data Sheet

Level Plus® – LevelLimit

Magnetostrictive Liquid Level Transmitters with Temposonics® Technology

- 5-IN-1 Measurement
- Integral HI level Digital I/O
- Level Inherent Accuracy ± 1 mm
- API Temperature Corrected Volumes
- No Scheduled Maintenance or Recalibration
- Hazardous Area Certified



MEASURING TECHNOLOGY

The absolute, linear position sensors provided by Tempsonics rely on the company’s proprietary Tempsonics® magnetostrictive technology, which can determine position with a high level of precision and robustness. Each Tempsonics® 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.

LevelLimit

The Level Plus® LevelLimit liquid level transmitter satisfies the demand for an accurate and robust liquid level transmitter with integral HI level overflow protection. The level transmitter offers the ability to measure the product level, interface level, temperature, and volume. The electrically isolated HI level detection uses a separate set of electronics and reed switch technology to offer a Digital I/O output based off of the movement of an independent HI level float. The HI level float offers mechanical testing for verification.

Standard	Rating
FM 3610 ISA 60079-11:2014	Class I, Div. 1, Groups A, B, C, D T4 Class I, Zone 0, AEx ia IIC T4 Ga Ta= -50 to 71°C: IP65
C22.2 No. 157 C22.2 No. 60079-11:2014	Class I, Div. 1, Groups A, B, C, D T4 Class I, Zone 0, Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
EN 60079-11:2012	FM14ATEX0068X Ex II 1 G Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
IEC 60079-11:2011	IECEX FMG 14.0032X Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
UKSI 2016:1107	FM22UKEX0069X Ex II 1 G Ex ia IIC T4 Ga/Gb Ta= -50 to 71°C
FM 3615 ISA 60079-1	Class I, Div. 1, Groups A, B, C, D T6...T3 Class I, Zone 0/1, AEx db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
C22.2 No. 30 C22.2 No. 60079-1	Class I, Div. 1, Groups B, C, D T6...T3 Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
EN 60079-1:2014	FM16ATEX0068X Ex II ½ G Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71 °C: IP65
IEC 60079-1:2011	IECEX FMG 16.0033X Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
UKSI 2016:1107	FM22UKEX0070X Ex II ½ G Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C

Fig. 2: Certifications of LevelLimit level transmitter

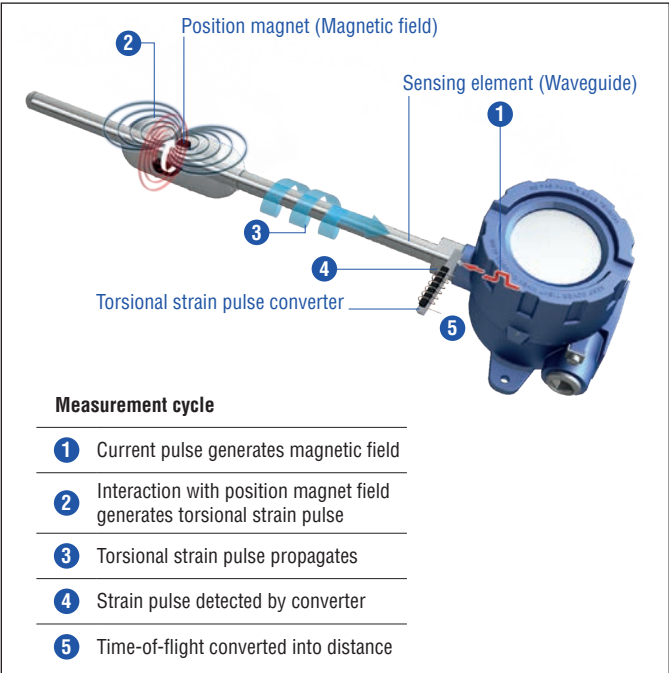


Fig. 1: Time-of-flight based magnetostrictive position sensing principle

- Features:**
 - 5-in-1 Measurement:
 - Product Level
 - Interface Level
 - Temperature
 - Volume
 - HI level Digital I/O
 - No scheduled maintenance or recalibration
 - Level Inherent Accuracy ± 1 mm
 - Integral Display
 - Intrinsically Safe
 - Explosion Proof
- Applications:**
 - Inventory Control
 - Bulk Storage
 - Custody Transfer
- Industries:**
 - Petroleum
 - LPG Terminals
 - Food & Beverage

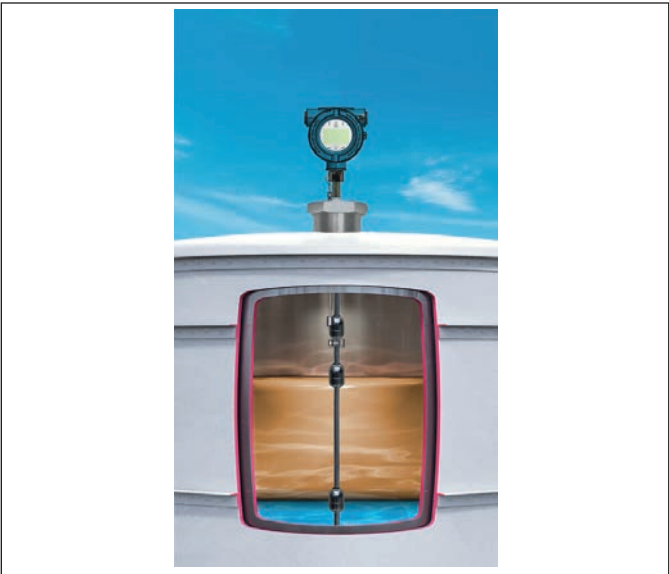
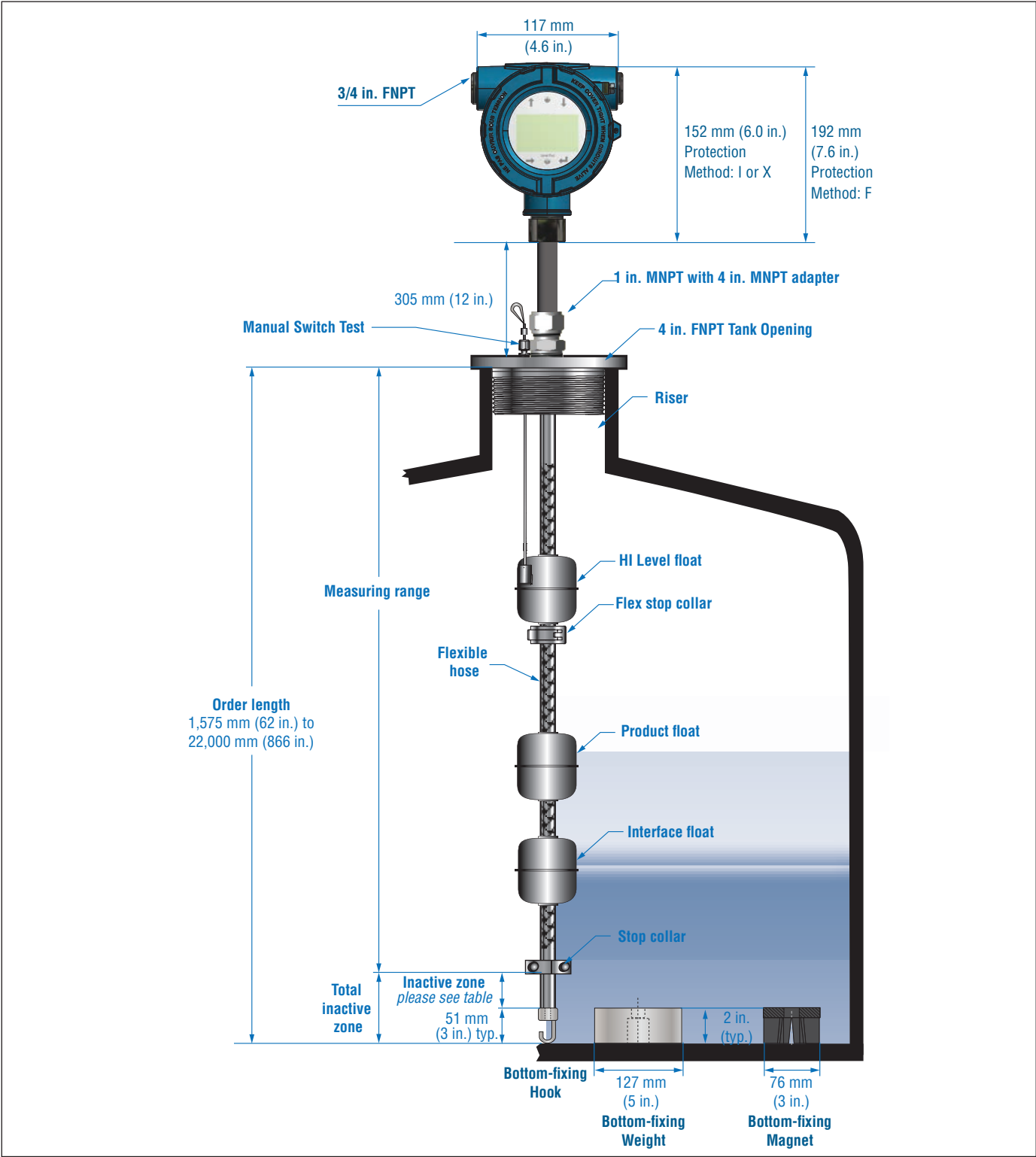


Fig. 3: Example of product and interface level measurement

TECHNICAL DATA

Level output	
Measured variable	Product level and interface level
Output signal/protocol	Modbus RTU Analog (4-20mA), HART®
Order length	Flexible hose: 1575...22000 mm (62...866 in.) Rigid pipe: 305...7620 mm (12...300 in.)
Inherent accuracy	±1 mm (0.039 in.)
Repeatability	0.001% F.S. or 0.381 mm (0.015 in.) whichever is greater (any direction)
Temperature output	
Measured variable	Average and multipoint temperature (Modbus) Single point temperature (Analog, HART®)
Temperature accuracy (Modbus)	±0.2 °C (0.4 °F) range -40...-20 °C (-40...-4 °F), ±0.1 °C (0.2 °F) range -20...+70 °C (-4...+158 °F), ±0.15 °C (0.3 °F) range +70...+100 °C (+158...+212 °F), ±0.5 °C (0.9 °F) range +100...+105 °C (+ 212 ...221 °F)
Temperature accuracy (Analog, HART®)	±0.28 °C (0.5 °F) range -40...+105 °C (-40...+221 °F)
Digital I/O	
Input voltage	Up to 30 VDC
Resistance	500 Ω
Current switch capability	50 mA @ 28 VDC
Compatibility	ABB RMC 100, Emerson ROC 827, Xetawave I/O, and others
Cable	Cat5 or equivalent type cable is required (15pF/ft. or 49pF/m) for a max run of 1200 m (4000 ft.)
Electronics	
Input voltage	10.5...28 VDC
Fail safe	High, full scale (Modbus) 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...100 % relative humidity, non-condensing
Operating temperatures	Electronics: -40...+71 °C (-40...+160 °F) Sensing element: -40...+125 °C (-40...+257 °F) (contact factory for specific temperature ranges) Temperature element: -40...+105 °C (-40...+221 °F)
Vessel pressure	Flexible hose: 30 bar (435 psi) Rigid pipe: 69 bar (1000 psi)
Materials	Wetted parts: 316L stainless steel (contact factory for alternative materials) Non-wetted parts: 316L stainless steel, Epoxy coated aluminum
Field installation	
Housing dimensions	Dual cavity: 117 mm (4.6 in.) W × by 127 mm (5 in.) D × 206 mm (8.1 in.) H
Mounting	
Flexible hose or rigid pipe	4 in. adjustable MNPT, ANSI and DIN flanges
Wiring	
Connections	Terminal block
Electrical connections	
Dual cavity	¾ in. FNPT conduit opening, M20 for ATEX/IECEx/UKCA version
Display	
Measured variables	Product level, interface level and temperature

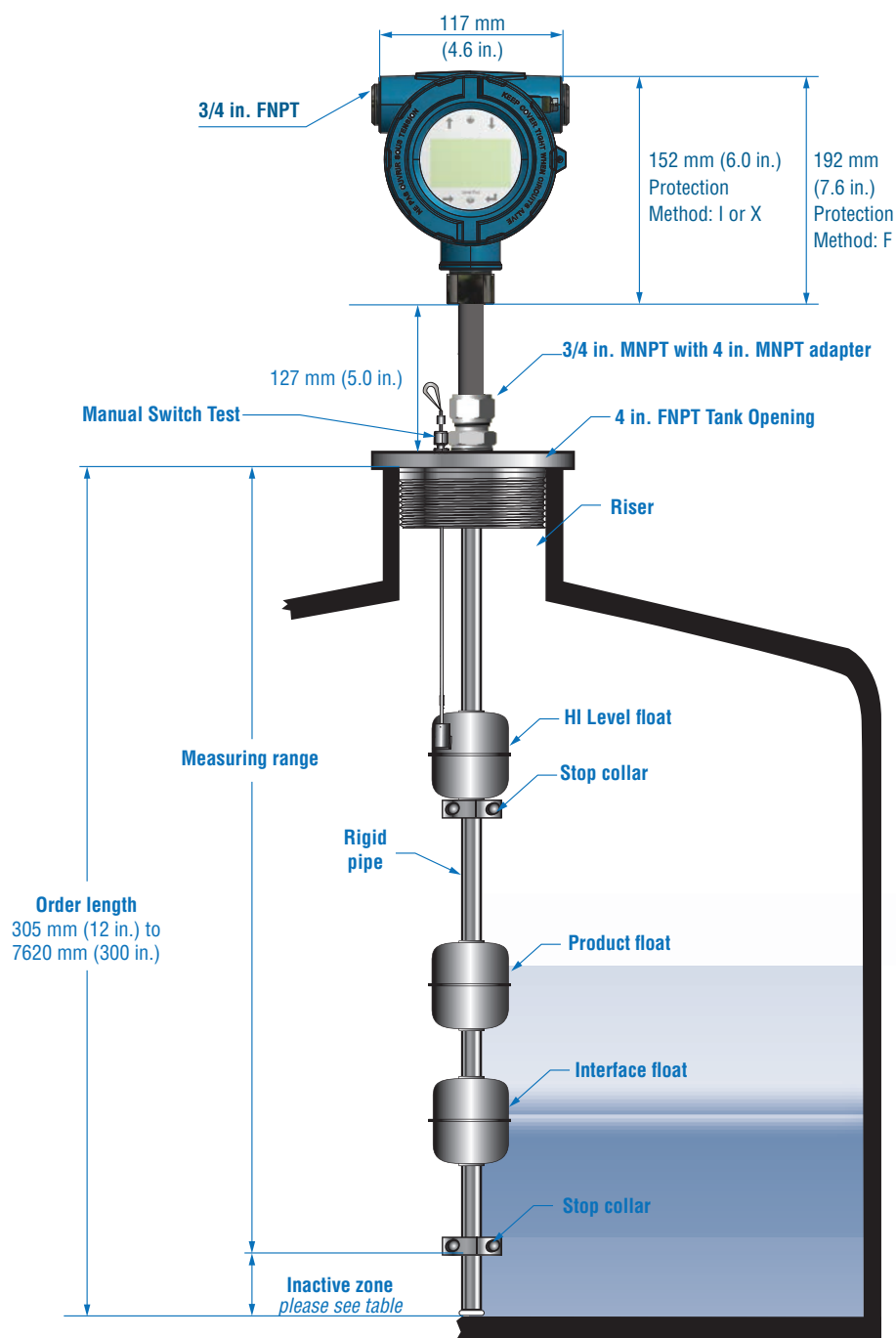
TECHNICAL DRAWING (FLEXIBLE HOSE)



TRANSMITTER INACTIVE ZONE REFERENCE

Order 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 22 m (40 to 72 ft.)	120 mm (4.7 in.)

TECHNICAL DRAWING (RIGID PIPE)



TRANSMITTER INACTIVE ZONE REFERENCE

Order Length	Inactive Zone
<7.6 m (25 ft.)	76 mm (3 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	23	24
L	P	L																					
a			b	c	d	e	f	g	h	i	j	k	l				m	n					

a	Sensor model
L P L	LevelLimit Level Transmitter

b	Output
1	1 Loop with HART®
2	2 Loop with HART®
5	1 Loop with HART® and SIL 2
7	2 Loop with HART® and SIL 2 (Loop 1 only)
M	Modbus

c	Sensor pipe
B	5/8 in. OD rigid pipe
M	Flexible, 7/8 in. OD tube w/bottom fixing eye
N	Flexible, 7/8 in. OD tube w/bottom fixing weight
P	Flexible, 7/8 in. OD tube w/bottom fixing magnet
S	Flexible, 7/8 in. OD tube w/o bottom fixing hardware

d	Process connection type
1	NPT adjustable (4 in. size only)
6	150 lb. drilled and tapped flange
7	300 lb. drilled and tapped flange
8	600 lb. drilled and tapped flange
A	PN16, DIN 2572 drilled and tapped flange
B	PN40, DIN 2572 drilled and tapped flange
C	PN64, DIN 2572 drilled and tapped flange
D	PN100, DIN 2572 drilled and tapped flange

e	Process connection size
D	2 in. (DN50)
E	2.5 in. (DN65)
F	3 in. (DN80)
G	4 in. (DN100)
H	5 in. (DN125)
J	6 in. (DN150)

f	Number of DT's (Digital Thermometers)
0	None
1	One DT
5	Five DT's
K	Twelve DT's
M	Sixteen DT's

g	DT's placement
F	Evenly spaced per API
C	Custom
X	None

h	Notified body
B	INMETRO
C	CEC (FMC)
E	ATEX
F	NEC (FM)
N	NEPSI
K	KC
I	IEC
T	CML/TIIS
U	UKCA
X	None

i	Protection method
F	Explosionproof/Flame proof
I	Intrinsically safe
X	No approval

j	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	IIB + H2 (Explosion Proof/Flameproof only)
X	None

k	Unit of measure
M	Millimeters (Metric)
U	Inches (US customary)

l m n Continued on next page

*/ Contact factory for other materials

ORDER CODE

l Length (no decimal spaces)					
X	X	X	X	X	Flexible sensor pipe: 1400...22000 mm (code as 01400 to 22000)
X	X	X	X	X	Flexible sensor pipe: 55...866 in. (code as 05500 to 86600)
X	X	X	X	X	Rigid sensor pipe: 275...7620 mm (code as 00275 to 76200)
X	X	X	X	X	Rigid sensor pipe: 10...300 in. (code as 01000 to 30000)

m Special	
S	Standard product

n HI Level switch position					
X	X	X	X	X	Flexible sensor pipe: 1575...22000 mm (code as 01575 to 22000)
X	X	X	X	X	Flexible sensor pipe: 55...866 in. (code as 05500 to 86600)
X	X	X	X	X	Rigid sensor pipe: 275...7620 mm (code as 00275 to 76200)
X	X	X	X	X	Rigid sensor pipe: 10...300 in. (code as 01000 to 30000)

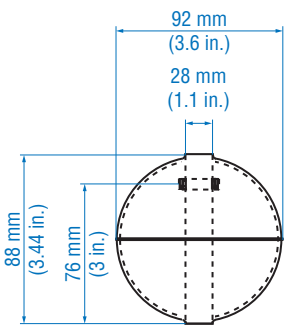
NOTICE

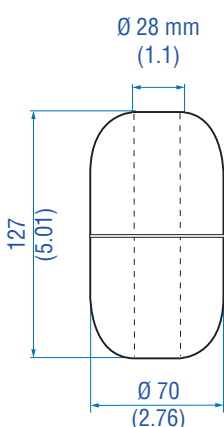
Accessories such as floats, cables, and remote displays have to be ordered separately. All accessories are shown in the [Accessories Catalog \(551103\)](#).

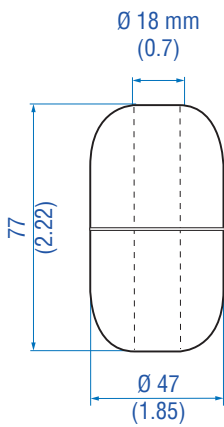
FREQUENTLY ORDERED ACCESSORIES – Additional options available in our [Accessories Guide](#) 551103

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 float	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	29.3 bar (425 psi)	149 °C (300 °F)	Yes	0.54	Stainless steel	252 961-2
				0.65	Nickel Alloy C-276	252 961-4
				0.93	Stainless steel	252 962-2
				0.93	Nickel Alloy C-276	252 962-4

Standard floats	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	22.4 bar (325 psi)	149 °C (300 °F)	No	0.66	Stainless steel	201 232-2
				0.70	Nickel Alloy C-276	201 232-4

Standard floats	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	29.3 bar (25 psi)	149 °C (300 °F)	No	0.67	Stainless steel	251 981-2
				0.71	Nickel Alloy C-276	251 981-4

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551993 Revision E (EN) 01/2023



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Level Plus® – RefineME®

Magnetostrictive Liquid Level Transmitters with Temposonics® Technology

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



MEASURING TECHNOLOGY

The absolute, linear position sensors provided by Temposonics rely on the company's proprietary Temposonics® magnetostrictive technology, which can determine position 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.

RefineME®

The Level Plus® RefineME® liquid level transmitter satisfies the demand for an accurate and robust liquid-level sensor with unsurpassed flexibility to meet most process application conditions. The RefineME® transmitter provides 4-in-1 measurement using one process opening for product level, interface level, temperature and volume measurements. Once the transmitter is installed and calibrated there is no requirement for scheduled maintenance or recalibration for the expected 10 year life of the sensor. **Set it and forget it!**

Standard	Rating
FM 3610 ISA 60079-11:2014	Class I, Div. 1, Groups A, B, C, D T4 Class I, Zone 0, AEx ia IIC T4 Ga Ta= -50 to 71°C: IP65
C22.2 No. 157 C22.2 No. 60079-11:2014	Class I, Div. 1, Groups A, B, C, D T4 Class I, Zone 0, Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
EN 60079-11:2012	FM14ATEX0068X Ex II 1 G Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
IEC 60079-11:2011	IECEx FMG 14.0032X Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
UKSI 2016:1107	FM22UKEX0069X Ex II 1 G Ex ia IIC T4 Ga/Gb Ta= -50 to 71°C
FM 3615 ISA 60079-1	Class I, Div. 1, Groups A, B, C, D T6...T3 Class I, Zone 0/1, AEx db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
C22.2 No. 30 C22.2 No. 60079-1	Class I, Div. 1, Groups B, C, D T6...T3 Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
EN 60079-1:2014	FM16ATEX0068X Ex II ½ G Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
IEC 60079-1:2011	IECEx FMG 16.0033X Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
UKSI 2016:1107	FM22UKEX0070X Ex II ½ G Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C

Fig. 2: Certifications of RefineME® level transmitter

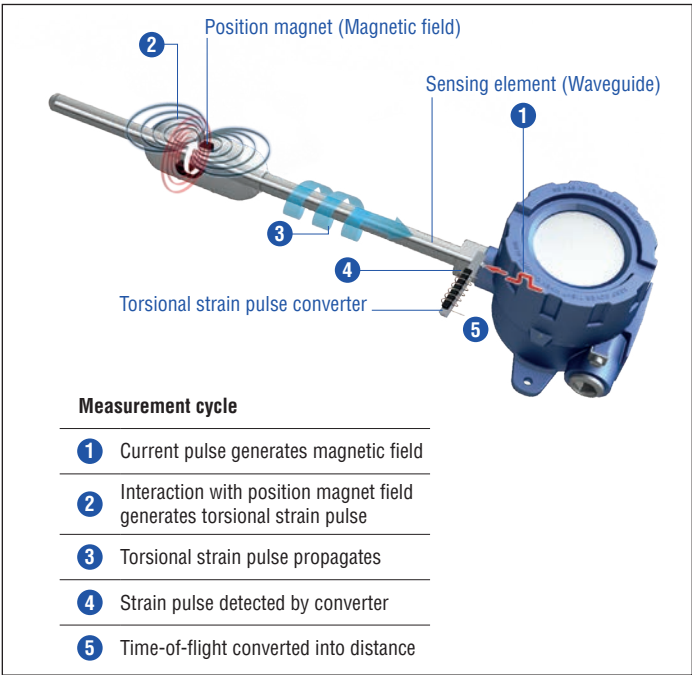


Fig. 1: Time-of-flight based magnetostrictive position sensing principle

Features:

- 4-in-1 Measurement:
 - Product Level
 - Interface Level
 - Temperature
 - Volume
- No scheduled maintenance or recalibration
- Field repairable
- Inherent accuracy ±1mm
- 200 Point Strap Table
- API Temperature corrected volumes

Applications:

- Fuel Additive Tanks
- Sump Tanks
- Bullet Tanks
- Separator Tanks
- Battery Tanks
- Storage Tanks
- Solvent Extraction

Industries:

- Petroleum
- Liquid Petroleum Gas
- Chemical
- Mining

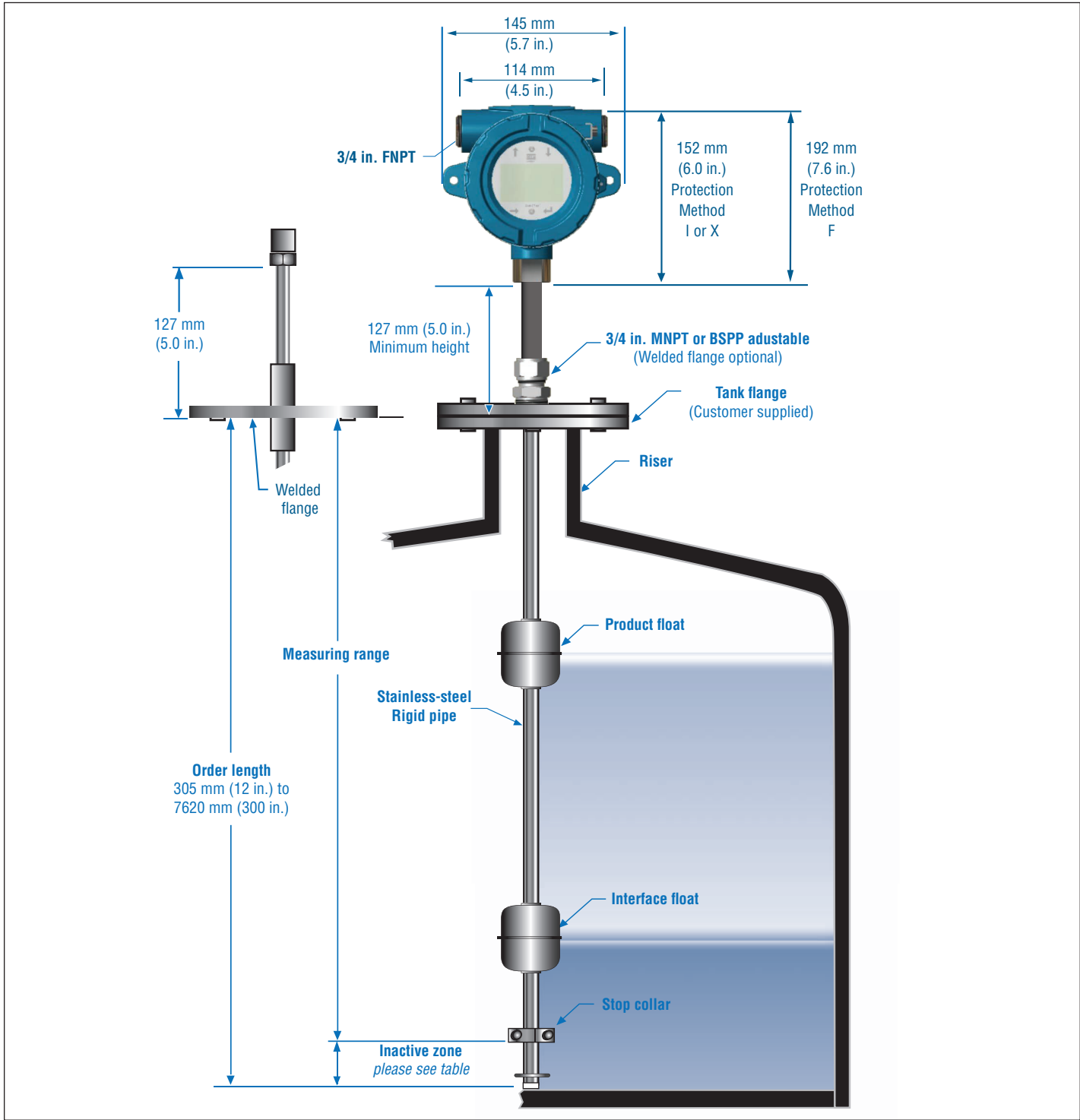


Fig. 3: Example of product and interface level measurement

TECHNICAL DATA

Level output	
Measured variable	Product level and interface level
Output signal/protocol	Modbus RTU, DDA, Analog (4...20 mA), HART®
Order length	Rigid Pipe: 305 mm (12 in.) to 7620 mm (300 in.) (Order length equals the measurement range plus the inactive zone. Contact factory for longer lengths)
Inherent accuracy	±1 mm (0.039 in.)
Repeatability	0.001% F.S. or 0.381 mm (0.015 in.) whichever is greater (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...-20 °C (-40...-4 °F), ±0.1 °C (0.2 °F) range -20...+70 °C (-4...+158 °F), ±0.15 °C (0.3 °F) range +70...+100 °C (+158...+212 °F), ±0.5 °C (0.9 °F) range +100...+105 °C (+ 212 ...221 °F)
Temperature accuracy (Analog, HART®)	±0.28 °C (0.5 °F) range -40...+105 °C (-40...+221 °F)
Electronics	
Input voltage	10.5...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...100% relative humidity, non-condensing
Operating temperatures	Electronics: -40...+71 °C (-40...+160 °F) Sensing element: -40...+125 °C (-40...+257 °F) (Contact factory for specific temperature ranges) Temperature element: -40...+105 °C (-40...+221 °F)
Vessel pressure	Rigid pipe: 1,000 psi (68.9 bar)/FEP pipe: 25 psi (1.75 bar) For CRN pressure specifications see Operation Manual 551690
Materials	Wetted parts: 316L stainless steel, Nickel Alloy C-276, FEP (Contact factory for alternative materials) Non-wetted parts: 316L stainless steel, epoxy coated aluminum
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 NEMA Type 4X: 87 mm (3.4 in.) W × by 124 mm (4.9 in.) D × 132 mm (5.2 in.) H
Mounting	
Rigid pipe	¾ 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/UKCA version
NEMA Type 4X	½ in. FNPT conduit opening
Display	
Measured variables	Product level, interface level and temperature

TECHNICAL DRAWING



TRANSMITTER INACTIVE ZONE REFERENCE

Material	Order Length 1219 mm (<48 in.)	Order Length 1220 mm (>48 in.)
316L stainless steel, Nickel Alloy C-276	74 mm (2.9 in.)	74 mm (2.9 in.)
FEP	115 mm (4.5 in.)	132 mm (5.2 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	R																			
a			b	c	d	e	f	g	h	i	j	k	l	m	n						p

a	Sensor model
L P R	RefineME® Level Transmitter

b	Output
M	Modbus
D	DDA
U	USTDII Replacement
1	1 Loop with HART®
2	2 Loop with HART®
5	1 Loop with HART® and SIL 2
7	2 Loop with HART® and SIL 2 (loop 1 only)

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	Stainless steel single cavity w/display

d	Electronics mounting
1	Standard

e	Sensor pipe
B	5/8 in. OD rigid pipe

f	Materials of construction (Wetted parts)*
1	316L stainless steel
3	Nickel Alloy C-276
A	FEP

g	Process connection type
1	NPT adjustable (¾ in. only)
2	BSPP adjustable (¾ in. only)
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
A	¾ in. - NPT or BSPP only
D	2 in. (DN50)
E	DN65
F	3 in. (DN80)
G	4 in. (DN100)
H	5 in. (DN125)
J	6 in. (DN150)
X	None

i	Number of Digital Thermometers (DT's)
0	None
1	One DT
5	Five DT's (Modbus or DDA)
K	Twelve DT's (Modbus only)
M	Sixteen DT's (Modbus only)

j	Digital Thermometer placement
F	Evenly spaced per API
C	Custom
X	None

k l m n o p Continued on next page

* / Note: Contact factory for other materials

ORDER CODE

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

l	Protection method
F	Explosion proof/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	IIB + H2 (Explosion Proof/Flameproof only)
X	None

n	Unit of measure
M	Millimeters (Metric)
U	Inches (US customary)

o	Length (no decimal spaces)
X X X X X	Rigid sensor pipe: 305...7620 mm (code as 00305 to 07620)
X X X X X	Rigid sensor pipe: 12...300 in. (code as 01200 to 30000)

p	Special
S	Standard product

NOTICE

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

FREQUENTLY ORDERED ACCESSORIES – Additional options available in our [Accessories Guide](#) 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.

Standard floats	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	29.3 bar (425 psi)	149 °C (300 °F)	No	0.67	Stainless steel	251 981-2
				0.71	Nickel Alloy C-276	251 981-4

Standard floats	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	29.3 bar (425 psi)	149 °C (300 °F)	No	0.93	Stainless steel	251 982-2
					Nickel Alloy C-276	251 982-4

Teflon® floats	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	1.7 bar (25 psi)	38 °C (100 °F)	Yes	0.86	FEP	201 109-2
				0.93	FEP	251 115-2
				1.06	FEP	251 116-2

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Document Part Number:
551691 Revision H (EN) 01/2023



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Data Sheet

Level Plus[®] – CHAMBERED

Magnetostrictive Liquid Level Transmitters with Temposonics[®] Technology

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



MEASURING TECHNOLOGY

The absolute, linear position sensors provided by Temposonics 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.

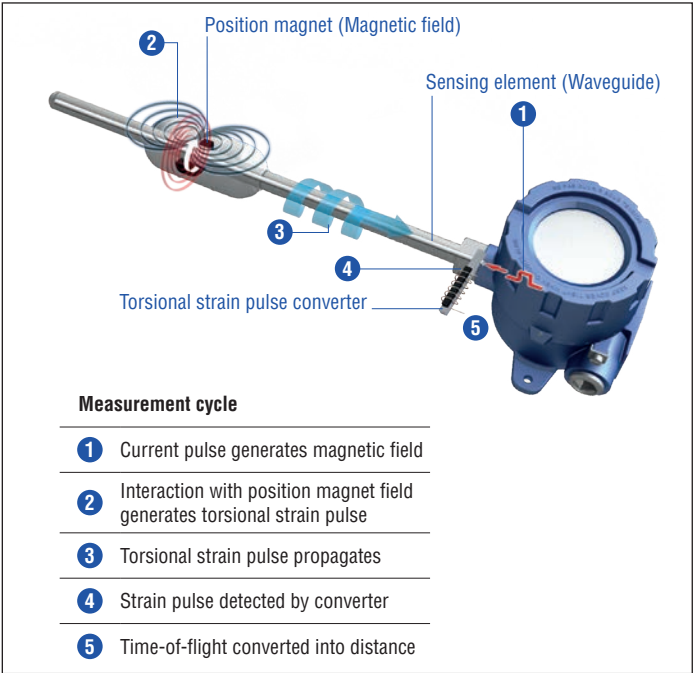


Fig. 1: Time-of-flight based magnetostrictive position sensing principle

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/Flame proof

Applications:

- Magnetic Level Gauge
- Bypass chamber

Markets:

- Petroleum and petrochemical
- Chemical
- Power generation

Compatible with:

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

Standard	Certification
FM 3610 ISA 60079-11:2014	Class I, Div. 1, Groups A, B, C, D T4 Class I, Zone 0, AEx ia IIC T4 Ga Ta= -50 to 71°C: IP65
C22.2 No. 157 C22.2 No. 60079-11:2014	Class I, Div. 1, Groups A, B, C, D T4 Class I, Zone 0, Ex ia IIC T4 Ga Ta= -50 to 71 °C: IP65
EN 60079-11:2012	FM14ATEX0068X Ex II 1 G Ex ia IIC T4 Ga Ta= -50 to 71 °C: IP65
IEC 60079-11:2011	IECEx FMG 14.0032X Ex ia IIC T4 Ga Ta= -50 to 71 °C: IP65
UKSI 2016:1107	FM22UKEX0069X Ex II 1 G Ex ia IIC T4 Ga/Gb Ta = -50 to 71°C
FM 3615 ISA 60079-1	Class I, Div. 1, Groups A, B, C, D T6...T3 Class I, Zone 0/1, AEx db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71 °C: IP65
C22.2 No. 30 C22.2 No. 60079-1	Class I, Div. 1, Groups B, C, D T6...T3 Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71 °C: IP65
EN 60079-1:2014	FM16ATEX0068X Ex II ½ G Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71 °C: IP65
IEC 60079-1:2011	IECEx FMG 16.0033X Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71 °C: IP65
UKSI 2016:1107	FM22UKEX0070X Ex II ½ G Ex db IIB+H2 T6...T3 Ga/Gb Ta = -40 to 71 °C

Fig. 2: Certifications of CHAMBERED level transmitter

TECHNICAL DATA

Level output	
Measured variable	Product level
Output signal/protocol	Modbus RTU, DDA, Analog (4...20 mA), HART®
Order length	305...3658 mm (12...144 in.) (Order length equals the measurement range. Contact factory for longer lengths)
Inherent accuracy	±1 mm (0.039 in.)
Repeatability	0.001 % F.S. or 0.381 mm (0.015 in.) whichever is greater (any direction)
Electronics	
Input voltage	10.5...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
Environmental	
Enclosure rating	NEMA Type 4X, IP65
Humidity	0...100 % relative humidity, no condensation
Operating temperatures	Electronics: -40...+71 °C (-40...+160 °F) Sensing element: -40...+125 °C (-40...+257 °F) (Contact factory for specific temperature ranges)
Materials	316L stainless steel, epoxy coated aluminum
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/UKCA version
NEMA Type 4X	½ " FNPT conduit opening
Display	
Measured variables	Product level

TECHNICAL DRAWING

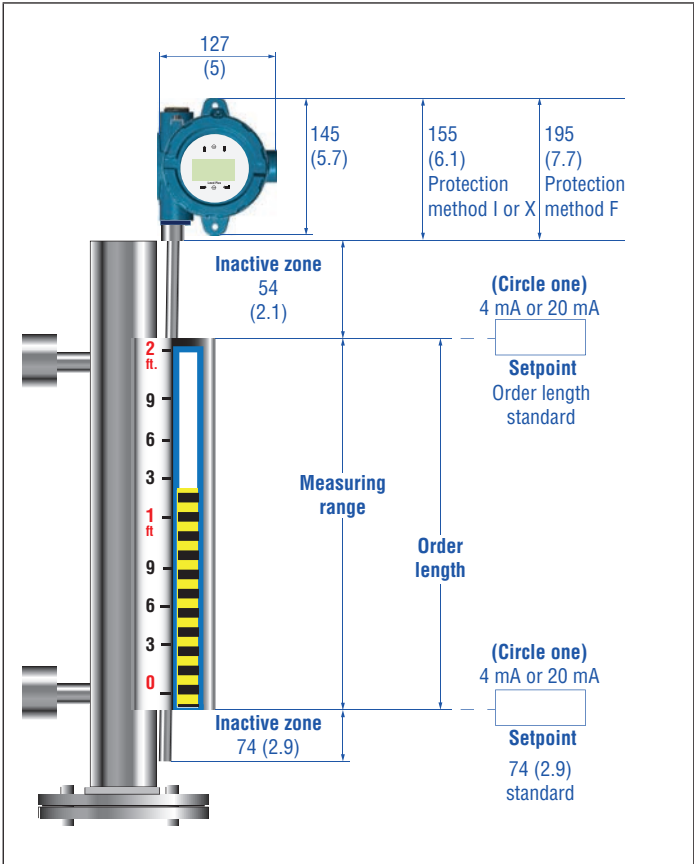


Fig. 3: CHAMBERED mounting, bottom flange ¹

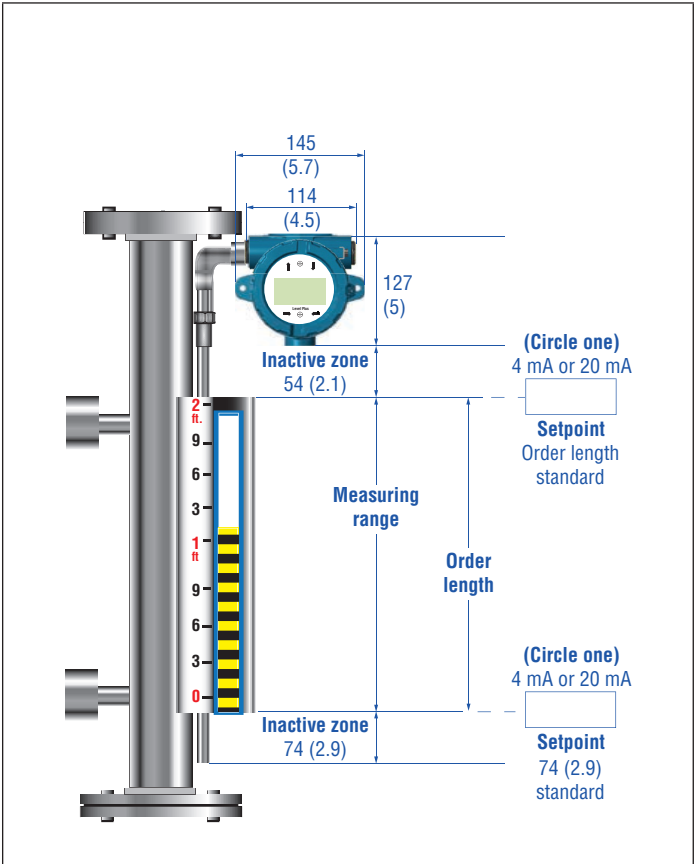


Fig. 4: CHAMBERED mounting, top and bottom flange ¹

LEVEL TRANSMITTER INACTIVE ZONE REFERENCE

Order length	Inactive zone
< 3658 mm (144 in.)	74 mm (2.9 in.)

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

1/ The ambient temperature rating, Ta = -50 °C (-58 °F) to 71 °C (160 °F), must not be exceeded due to the mounting of the level transmitter to the MLG and exposure to the process temperature

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	C					1	X	X	0	X										
a			b	c	d	e	f	g	h	i	j	k	l	m	n						p

a	Sensor model
L P C	CHAMBERED level transmitter

b	Output
D	DDA
M	Modbus
3	1 Loop with HART®
6	1 Loop with HART® 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	5/8" OD pipe
R	1/2" OD pipe
Y	10 mm OD pipe

f	Materials of construction (Wetted parts) 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
U	UKCA
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	IIB + H2 (explosionproof/flameproof only)
X	None

n o p Continued on next page

2/ Note: Contact factory for other materials

ORDER CODE

n	Unit of measure
M	Millimeters (Metric)
U	Inches (US customary)

o	Length (no decimal spaces)
X X X X X	305...3658 mm (code as 00305...03658)
X X X X X	12...144 in. (code as 01200...14400)

p	Special
R	Reverse measurement (Select with Electronic Mount 5, 6, and 8)
S	Standard product

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.temposonics.com

Document Part Number:

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temposonics.com

Data Sheet

Level Plus[®] – SoCLEAN[®]

Magnetostrictive Liquid Level Transmitters with Temposonics[®] Technology

- Sanitary and Electropolished Finish
- Inherent Accuracy ± 1 mm
- No Scheduled Maintenance or Recalibration
- Hazardous Area Certified



MEASURING TECHNOLOGY

The absolute, linear position sensors provided by Temposonics 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.

SoCLEAN®

The Level Plus® SoCLEAN® liquid level transmitter satisfies the demand for an accurate and robust liquid-level sensor with unsurpassed flexibility to meet most process application conditions. The SoCLEAN® transmitter provides 4-in-1 measurement using one process opening for product level, interface level, temperature and volume measurements. Once the transmitter is installed and calibrated there is no requirement for scheduled maintenance or recalibration for the expected 10 year life of the sensor. **Set it and forget it!**

Standard	Rating
FM 3610 ISA 60079-11:2014	Class I, Div. 1, Groups A, B, C, D T4 Class I, Zone 0, AEx ia IIC T4 Ga Ta= -50 to 71°C: IP65
C22.2 No. 157 C22.2 No. 60079-11:2014	Class I, Div. 1, Groups A, B, C, D T4 Class I, Zone 0, Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
EN 60079-11:2012	FM14ATEX0068X Ex II 1 G Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
IEC 60079-11:2011	IECEX FMG 14.0032X Ex ia IIC T4 Ga Ta= -50 to 71°C: IP65
UKSI 2016:1107	FM22UKEX0069X Ex II 1 G Ex ia IIC T4 Ga/Gb Ta= -50 to 71°C
FM 3615 ISA 60079-1	Class I, Div. 1, Groups A, B, C, D T6...T3 Class I, Zone 0/1, AEx db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
C22.2 No. 30 C22.2 No. 60079-1	Class I, Div. 1, Groups B, C, D T6...T3 Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
EN 60079-1:2014	FM16ATEX0068X Ex II ½ G Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
IEC 60079-1:2011	IECEX FMG 16.0033X Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C: IP65
UKSI 2016:1107	FM22UKEX0070X Ex II ½ G Ex db IIB+H2 T6...T3 Ga/Gb Ta= -40 to 71°C

Fig. 2: Certifications of SoCLEAN® level transmitter

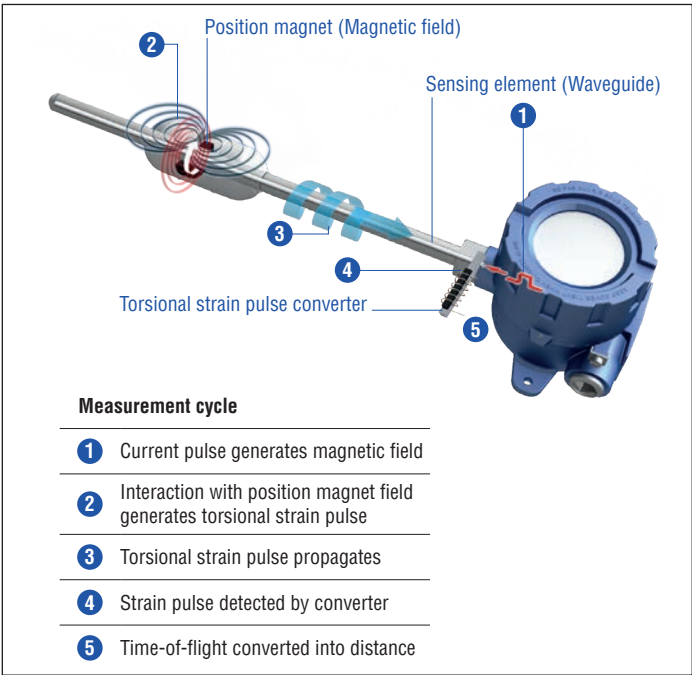


Fig. 1: Time-of-flight based magnetostrictive position sensing principle

Features:

- 4-in-1 Measurement:
 - Product Level
 - Interface Level
 - Temperature
 - Volume
- No scheduled maintenance or recalibration
- Field Repairable
- Inherent Accuracy ±1 mm
- Intrinsically Safe
- Sanitary Finish Ra 25 µin (0.64 µm)
- Electropolished Finish Ra 15 µin (0.38 µm)
- Explosion proof

Applications:

- Process Control
- Batching
- Bioreactor
- CIP Tanks

Industries:

- Food and Beverage
- Pharmaceutical
- Cosmetics

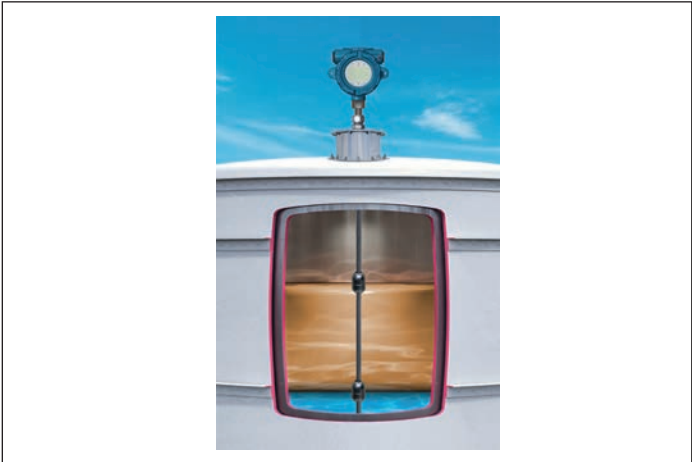
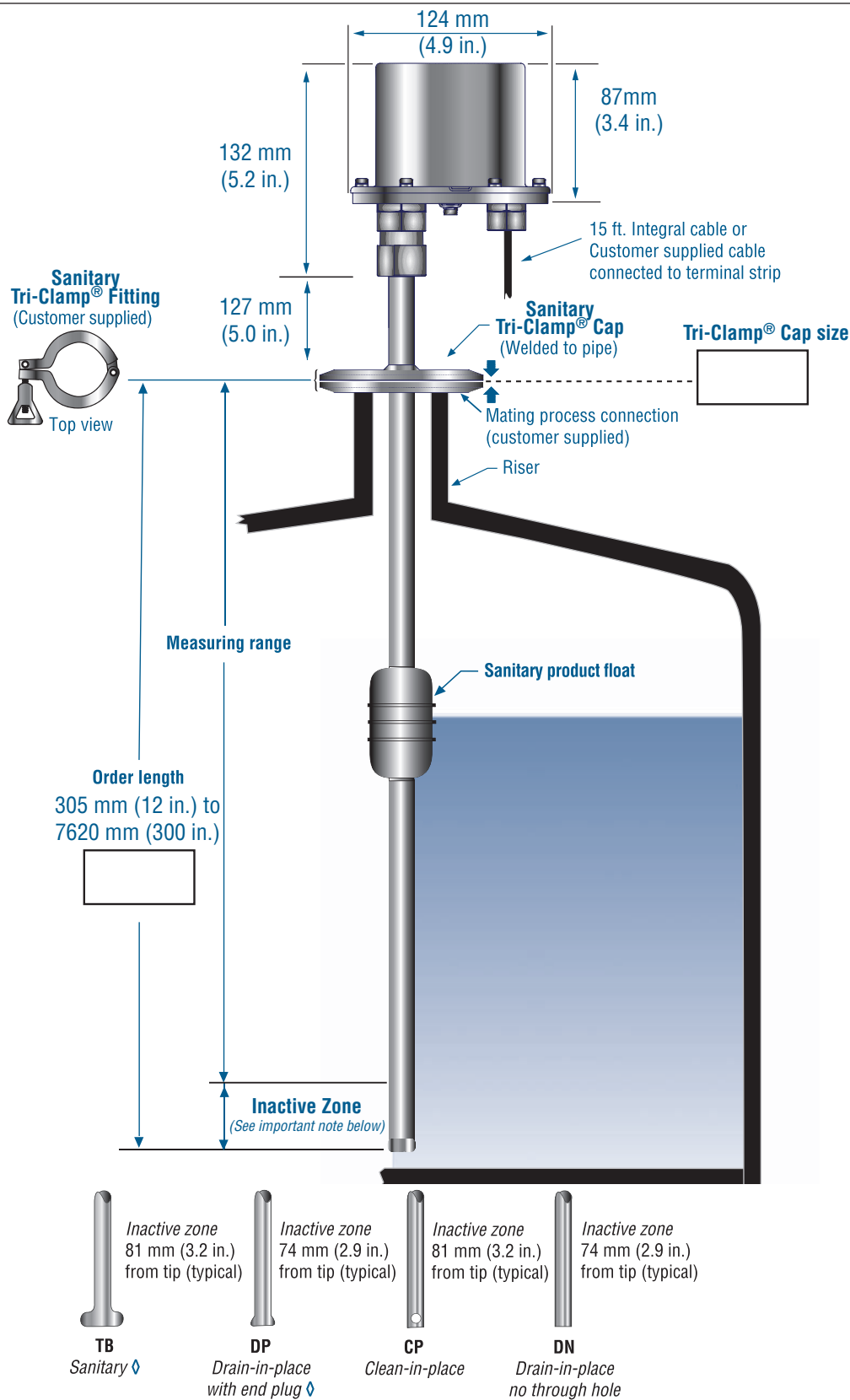


Fig. 3: Example of product and interface level measurement

TECHNICAL DATA

Level output	
Measured variable	Product level and interface level
Output signal/protocol	Modbus RTU, DDA, Analog (4...20 mA), HART®
Order length	305 mm (12 in.) to 7620 mm (300 in.) (order length equals the measurement range plus the inactive zone/contact factory for longer lengths)
Inherent accuracy	±1 mm (0.039 in.)
Repeatability	0.001% F.S. or 0.381 mm (0.015 in.) whichever is greater (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...-20 °C (-40...-4 °F), ±0.1 °C (0.2 °F) range -20...+70 °C (-4...+158 °F), ±0.15 °C (0.3 °F) range +70...+100 °C (+158...+212 °F), ±0.5 °C (0.9 °F) range +100...+105 °C (+ 212 ...221 °F)
Temperature accuracy (Analog, HART®)	±0.28 °C (0.5 °F) range -40...+105 °C (-40...+221 °F)
Electronics	
Input voltage	10.5...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...100% relative humidity, non-condensing
Operating temperatures	Electronics: -40...+71 °C (-40...+160 °F) Sensing element: -40...+125 °C (-40...+257 °F) (contact factory for specific temperature ranges) Temperature element: -40...+105 °C (-40...+221 °F)
Vessel pressure	Rigid pipe: 69 bar (1000 psi) For CRN pressure specifications see Operation Manual 551693
Materials	Wetted parts: 316L stainless steel, Nickel Alloy C-276 (contact factory for alternative materials) Non-wetted parts: 316L stainless steel, Epoxy coated aluminum
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 NEMA Type 4X: 87 mm (3.4 in.) W × by 124 mm (4.9 in.) D × 132 mm (5.2 in.) H
Mounting	
Rigid pipe	Tri-Clamp, ¾ in. adjustable MNPT or BSPP fitting
Wiring	
Connections	4 wire shielded cable or twisted pair, 4570 mm (180 in.) integral cable with pigtail Daniel Woodhead 6 pin male connector
Electrical connections	
Single and dual cavity	¾ in. FNPT conduit opening, M20 for ATEX/IECEX/UKCA version
NEMA Type 4X	½ in. FNPT conduit opening
Display	
Measured variables	Product level, interface level and temperature

TECHNICAL DRAWING



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	S																			
a			b	c	d	e	f	g	h	i	j	k	l	m	n						p

a	Sensor model
L P S	SoCLEAN® Level Transmitter

b	Output
M	Modbus
D	DDA
1	1 Loop with HART®
2	2 Loop with HART®
5	1 Loop with HART® and SIL 2
7	2 Loop with HART® and SIL 2 (loop 1 only)

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
C	Sanitary T-bar, TB
D	Sanitary drain-in-place DP
E	Sanitary clean-in-place CP
F	Sanitary drain-in-place no hole, DN

f	Materials of construction (Wetted parts)*
1	316L stainless steel
2	Electropolished 316L stainless steel
3	Nickel Alloy C-276
9	Electropolished Nickel Alloy C-276

g	Process connection type
1	NPT adjustable (¾ in. only)
2	BSPP adjustable (¾ in. only)
4	Sanitary Tri-Clamp, Welded
5	Sanitary Tri-Clamp, Adjustable

h	Process connection size
A	¾ in. - NPT or BSPP only
C	1 ½ in. (DN40) (* Only for pipe option C or F)
D	2 in. (DN50)
E	2 ½ in. (DN65)
F	3 in. (DN80)
G	4 in. (DN100)
J	6 in. (DN150)
X	None

i	Number of DT's (Digital Thermometers)
0	None
1	One DT
5	Five DT's (Modbus or DDA)
K	Twelve DT's (Modbus only)
M	Sixteen DT's (Modbus only)

j	DT's 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
B	INMETRO
N	NEPSI
P	CCOE
T	CML/TIIS
U	UKCA
K	KC

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

* / Contact factory for other materials

m n o p Continued on next page

ORDER CODE

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	IIB + H2 (Explosion Proof / Flameproof only)
X	None

n	Unit of measure
M	Millimeters (Metric)
U	Inches (US customary)

o	Length (no decimal spaces)
X X X X X	Rigid pipe: 305...7620 mm (code as 00305 to 07620)
X X X X X	Rigid pipe: 12...300 in. (code as 01200 to 30000)

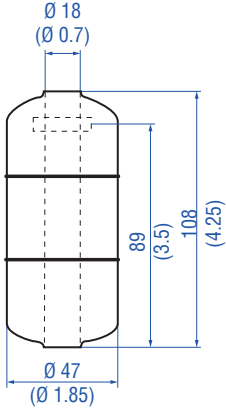
p	Special
S	Standard product

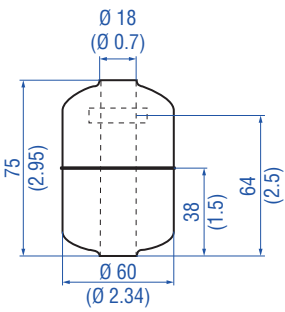
NOTICE	
Accessories such as floats, cables, and remote displays have to be ordered separately. All accessories are shown in the Accessories Catalog (551103) .	

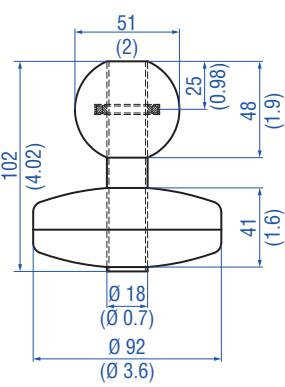
FREQUENTLY ORDERED ACCESSORIES – Additional options available in our [Accessories Guide](#) 551103

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.

Sanitary floats	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	10.3 bar (150 psi)	149 °C (300 °F)	Yes	0.66	Stainless steel 200 Grit/ Ra 25 µm (0.625 µm)	401 513 -2
					Stainless steel 240 Grit/ Ra 15 µm (0.375 µm)	401 513 -4

Sanitary floats	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	22.4 bar (325 psi)	149 °C (300 °F)	Yes	0.63	Stainless steel 200 Grit/ Ra 25 µm (0.625 µm)	200 931-6
					Stainless steel 240 Grit/ Ra 15 µm (0.375 µm)	200 931-8

Low Lift off floats	Pressure	Temperature	Magnet offset	Specific gravity	Material	Part number
	8.6 bar (125 psi)	149 °C (300 °F)	Yes	0.48	Stainless steel 240 Grit/ Ra 15 µm (0.375 µm)	252 228-2

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