

## GEMS Continuous Electrical Output Transmitters Provide Direct Liquid Measurement

- ▶ Lengths to 18 feet (5.5 m)
- ▶ Alloys or Engineered Plastic Wetted Parts
- ▶ Analog Output

Completely electronic, Gems Liquid Level Transmitters provide reliable and durable remote tank gauging. A wide variety of material combinations provide compatibility for most liquid media. Gems XM- & XT-800 Series provide solutions for most small to mid-size tanks in both process and OEM applications; for deeper tanks (to 18 feet) look to Gems 36000 and 66000 Series.

Gems experienced engineering and sales staff can provide customized solutions for applications not satisfied by the standard transmitters shown in this catalog. Do not hesitate to contact Gems if you require a configuration not shown here.

### Single Probe or Complete Systems

As a component, Gems transmitters provide the output options compatible with most programmable controllers and other digital receivers. Combined with Gems Digital Receivers you can create a complete tank gauging system.

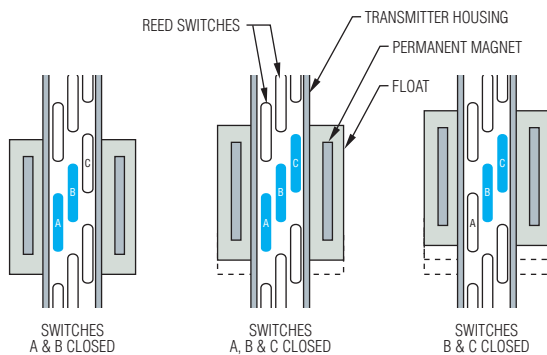
### Typical Applications

Consider GEMS' versatile transmitters for all your continuous liquid level monitoring needs — water, diesel, lube oils and fuels, as well as various chemical and petrochemical liquids. Here are just a few areas where GEMS' transmitters are used:

- Utilities • Beverage Industry • Medical • Pharmaceuticals • OHV
- Food Processing • Wineries • Printing • HVAC • Semiconductor

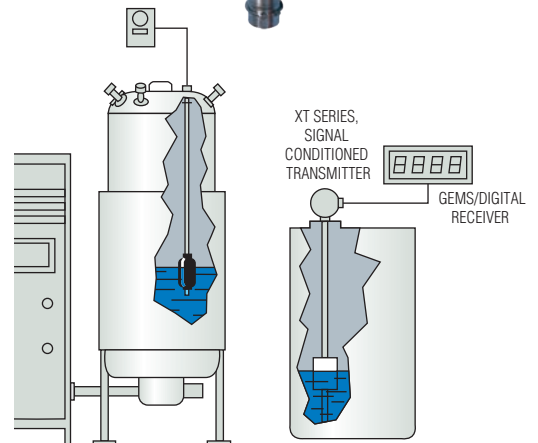
### Operating Principle

Gems voltage divider design uses a staggered series of reed switches. As the float moves with the liquid level, the magnets in the float close these reed switches in a “2-3-2 at-a-time” sequence. With every movement of the float, either one additional switch closes or one drops off.

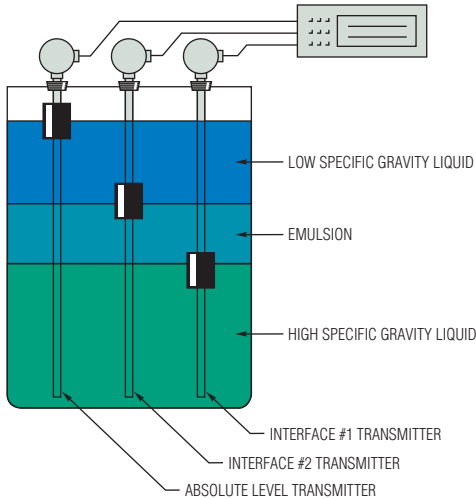


### What does this mean to you?

Ensures better accuracy — if one switch was to fail, the signal would be affected only at that point.



GEMS Transmitters monitor water, diesel or lube oils, chemicals and petrochemicals in industries such as pharmaceuticals, municipalities, breweries, textiles, automotive, pulp and paper and others.



## Got Mud?

Here's a tip. Gems Float Sensors are the best, most reliable method to monitor mud pits. See our Large Size Alloy models on Page C-13, and use with the 8" float for best results.

Use multiple Gems Transmitters to accurately monitor proportions of dissimilar liquids and emulsions within a single tank.

Contents	Page Start
XM/XT-800 Series .....	C-3
XM/XT-860 Series .....	C-7
XMP/XTP-800.....	C-10
XM/XT-36490.....	C-13
XM/XT-66400.....	C-13
Signal Conditioning Modules.....	C-16
Receivers .....	D-24

## Only a Float Can Show True Interface!

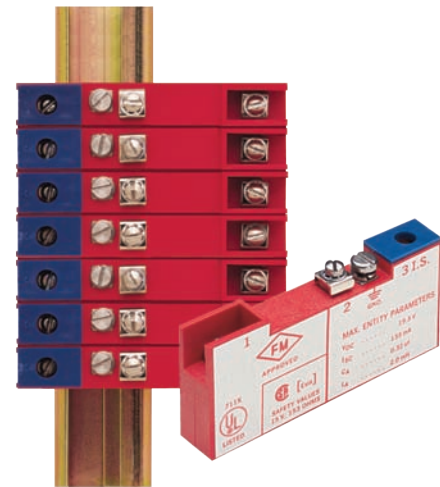
- By design or otherwise, dissimilar liquids often reside in the tank — one floating atop another. Most tank gauging methods are limited in these cases, and can only indicate the level of the uppermost surface. With GEMS Transmitters, you can easily monitor the interface between liquids...including the emulsions and slurries that sometimes form between them.
- By adjusting the density of the magnetic float, GEMS can adapt the transmitter to monitor the interface of a broad range of media. This principle applies to oil and water, slurries, acids, bilge and other dissimilar liquids.
- In conjunction with low level alarms, or automatic controllers, GEMS Transmitters will help assure that only the “correct” liquid is taken from a tank, or introduced into a process system.

## Selection Guide

Tank Depth	Maximum Pressure	Primary Material	Resolution	Output	Transmitter Series
Less Than 12 Feet (3.7 m)	150 psi (10 bar)	Alloy	1/4 inch (6.4 mm)	10-30 VDC Proportional	<b>XM-800/860</b>
				Signal Conditioned	<b>XT-800/860</b>
	50 psi (3.4 bar)	Engineered Plastic	1/4 inch (6.4 mm)	10-30 VDC Proportional	<b>XMP-800</b>
				Signal Conditioned	<b>XTP-800</b>
	300 psi (2 bar)	Alloy	1/2 inch (12.7 mm)	0-12 VDC Proportional	<b>XM-860</b>
				Signal Conditioned	<b>XT-860</b>
12 to 18 Feet (3.7 m to 5.5 m)	500 psi (35 bar)	Alloy	1/2 inch (12.7 mm)	10-30 VDC Proportional	<b>XM-66400</b> <b>XM-36490</b>
				Signal Conditioned	<b>XT-66400</b> <b>XT-36490</b>
12 to 18 Feet (3.7 m to 5.5 m)	2000 psi (138 bar)	Alloy	1/2 inch (12.7 mm)	10-30 VDC Proportional	<b>XM-66400</b>
				Signal Conditioned	<b>XT-66400</b>

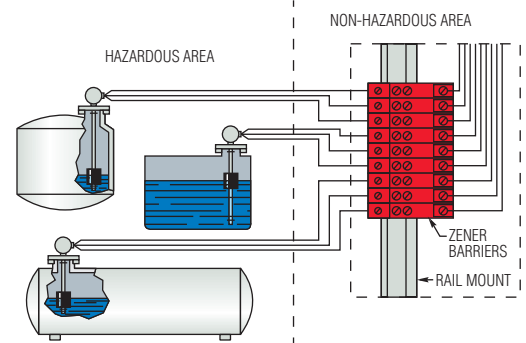
### Notes:

1. Proportional Voltage = DC voltage proportional to liquid level and source voltage. Ex. 5 VDC input, 0-5 VDC output.
2. Signal Conditioned = Regulated 0-5 VDC, 0-10 VDC, 0-12 VDC and 4-20 mA outputs.



## Intrinsic Safety

GEMS transmitters are intrinsically safe for hazardous area operation when properly connected to a GEMS Zener Barrier, a solid-state, energy limiting device. Any need for explosion-proof housings or special wiring of any kind is eliminated. GEMS Zener Barriers are variously UL, FM, CSA and MSHA approved. See Section I.



Any non-voltage-producing sensor or switch is rendered intrinsically safe for hazardous locations when properly connected to the output of GEMS Zener Barriers. These are described in Section I.

**ORDER IT!**

Ordering is Easy! See Page C-5.  
Easy online ordering too!

## Small Size – Alloys

### XM/XT-800 Series – Compact Analog Sensors

- ▶ Stainless or Brass Construction
- ▶ 1/4" Resolution
- ▶ Lengths to 144 inches (366 cm)
- ▶ OEM Configurations Available

These compact transmitters feature the rugged durability of stainless steel or brass construction. The XM-800 series provides analog output, and can be combined with GEMS Digital Meter Receiver Stations and compact Level Cubes described in this catalog. Our versatile XT-800 Series adds a choice of signal conditioning for use with GEMS digital bargraph receivers or other digital display and control equipment.

#### Approvals

XM-800 and XT-800 Series transmitters may carry the following commercial approvals:

- FM Approved, Explosion-Proof (J-Box and Stainless Steel Float required).
- UL-Recognized.

XM-800 Series transmitters only:

- CSA Certified

XT-800 Series transmitters only:

- FM Approved, Intrinsic Safety (J-Box and Stainless Steel Float required).

#### 1. Mounting Types



Type 1 1/2" NPT	Type 2 1-1/4" NPT	Type 3 2" NPT	Type 4 3" 150# Flange	Type 6 2-1/2" Sanitary Flange

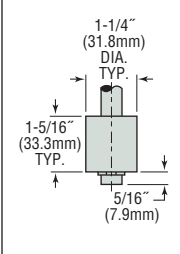
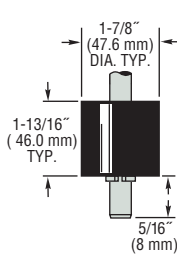
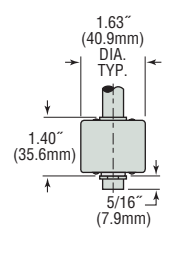
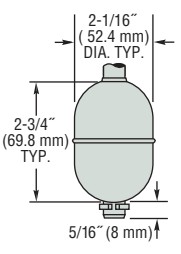
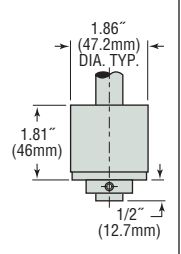
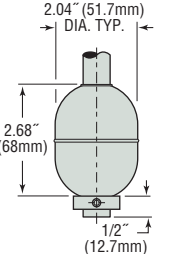
<b>Stem Material</b>	Brass or 316 Stainless Steel	316 Stainless Steel	
<b>Mounting Material</b>	Brass or 316 Stainless Steel	Carbon Steel or 316 Stainless Steel	316 Stainless Steel
<b>Float Stop Material</b>	Brass Units: Beryllium Copper Grip Rings; Stainless Steel Units: S.S. ARMCO PH-15-7MO Grip Rings		
<b>Operating Temperature*</b> With J. Box Mounted or XM Signal Conditioners	Oil: -40°F to +230°F (-40°C to 110°C), Water to +180°F (82.2°C)—Buna N Float -40°F to +230°F (-40°C to 110°C)—Stainless Steel Float		
<b>With Stem Mounted Signal Conditioners</b>	+5°F to +160°F (-15°C to +70°C)		
<b>Operating Pressure</b>	Dependent on Float Type; See Next Page		
<b>Overall Length, Max.</b>	72" (183 cm) Tubing; 144" (366 cm) Pipe (Types 3 & 4 only)		

\* Consult factory for higher temperature ranges.



## 2. Float Types

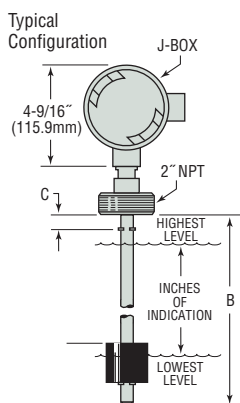
Based on the overall length required by your tank, select from two main subsets of floats below; further refine selection based on material and performance parameters.

Float Material	For Overall Lengths To 72"				For Lengths Greater Than 72" (144" Max.)	
	Buna N		Stainless Steel		Buna N	Stainless Steel
<b>Float Dimensions</b>						
<b>Compatible Mountings</b>	1, 2, 3, 4, 6	1, 3, 4	1, 3, 4, 6	1, 3, 4	3, 4	3, 4
<b>Part Number</b>	<b>164255<sup>2</sup></b>	<b>43359</b>	<b>156490</b>	<b>43590</b>	<b>69654</b>	<b>52084</b>
<b>Min. Liquid Spec. Gravity</b>	.55	.55	.70	.75	.55	.75
<b>Operating Pressure, Max.<sup>1</sup></b>	150 psi (10 bar)	150 psi (10 bar)	80 psi (6 bar)	300 psi (21 bar)	150 psi (10 bar)	300 psi (21 bar)
<b>Operating Temp., Max.</b>	Water: 180°F (82°C) Oil: 230°F (110°C)		230°F (110°C) <sup>3</sup>		Water: 180°F (82°C) Oil: 230°F (110°C)	230°F (110°C)*

Notes:

- @ Ambient Temperature
- Recommended for Type 2 mounting only.
- Consult factory for higher temperature range.

## 3. To Determine Dimensions



- B: Overall Length = Inches of Indication + C + X (See Table at Right)  
 C: Distance From Bottom of Mounting to Float Stop (Customer Specified):
- 1/4" (6.4mm) Minimum
  - 1-1/4" (31.8mm) Minimum on Type 1, XT Series only.

### Calculating Length

- To find Overall Length when Inches or Indication is known:
- Inches of Indication + C\* + X = Overall Length
- To find Maximum Inches of Indication when Overall Length is known:
- Overall Length - C\* - X = Maximum Inches of Indication

\*C dimension is determined by customer.

### Float Factor – X

Float Part Number	X
<b>164255</b>	2.0" (50.8)
<b>43359</b>	2.5" (63.5)
<b>156490</b>	2.062" (52.4)
<b>43590</b>	3.437" (87.3)
<b>69654</b>	2.687" (68.3)
<b>52084</b>	3.625" (92.1)

Inch (mm)

## 4. Input/Output

For XM-800 Series, no special output designation is necessary.  
 For XT-800 Series, specify the desired signal conditioning by Part Number.  
 Additional information about GEMS signal conditioning modules is found on Page C-16.

Series	Input Voltage	Output Signal	Part Number	Electrical Termination	Compatible Mountings		
					Type 1	Type 3	Type 4
XM-800	10 to 30 VDC	Proportional Voltage	—	Lead Wires (3), #22 AWG, 24" (60.9 cm), PTFE Jacket	•	•	•
	8 to 24 VDC*	0-5 VDC	<b>51965</b>	Lead Wires, #22 AWG, 24" (60.9 cm), PTFE Jacket	•	•	•
XT-800	14 to 30 VDC*	0-12 VDC	<b>51970</b>		•	•	•
	8 to 24 VDC*	0-5 VDC	<b>52536</b>	Junction Box		•	•
	15 to 30 VDC*	0-12 VDC	<b>52537</b>			•	•
	10 to 40 VDC	4-20 mA	<b>52555</b>	Panel Mount with Plug-in Base		•	•
	4-20 mA	<b>112300</b>	•		•	•	

\* Stem mounted.

**FAX IT!**  
**860-747-4244**

**Photocopy This Form**  
Use one form for each product type you are selecting.

This form may also be completed online at [gemssensors.com](http://gemssensors.com) for RFQ.

This is a  Request for a Quote  Order P.O.# \_\_\_\_\_

Quantity Needed \_\_\_\_\_

Date Required \_\_\_\_/\_\_\_\_/\_\_\_\_

Shipping Method: \_\_\_\_\_

Partials Accepted:  Yes  No

Name \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_ Zip \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_

Fax (\_\_\_\_) \_\_\_\_\_

## Float Type Level Transmitters – XM/XT-800 Series

### Application Environmental Conditions

This information is essential to the accurate and proper operation of your GEMS configurable sensors. Please complete fully and accurately.

- 1. Liquid Media:** \_\_\_\_\_
- 2. Pressure:** Minimum \_\_\_\_\_ psig Maximum \_\_\_\_\_ psig
- 3. Temperature:** Minimum \_\_\_\_\_ °F Maximum \_\_\_\_\_ °F
- 4. Specific Gravity:** Minimum \_\_\_\_\_ Maximum \_\_\_\_\_

- 5. Viscosity:** \_\_\_\_\_ SSU
- 6. Tank Material:** \_\_\_\_\_
- Tank Depth:** \_\_\_\_\_
- 7. Unit is Mounted In:**  Tank Top  Tank Bottom
- 8. Moisture Protection Required?**  Yes  No

#### 1. Series:

- XM/XT-800 (1/4" Resolution)

#### 3. Materials:

- a. Stem:
- Brass<sup>1</sup>  316 Stainless Steel
- b. Mounting:
- Brass<sup>1</sup>  316 Stainless Steel
- Carbon Steel (Type 4 flange only)
- c. Collar Float Stops<sup>2</sup>:
- Brass  316 Stainless Steel

#### 2. Mounting Type:

- Type 1 (1/2" NPT)  Type 2 (1-1/4" NPT)  Type 3 (2" NPT)
- Type 4 (3" 150# flange)  Type 6 (2-1/2" sanitary flange)

#### 4. Float Type<sup>1</sup>:

Match to Overall Length of Transmitter Stem

To 72 Inches	Over 72 Inches
<input type="checkbox"/> 164255 – Buna N <sup>2</sup>	<input type="checkbox"/> 69654 – Buna N
<input type="checkbox"/> 43359 – Buna N	<input type="checkbox"/> 52084 – Stainless Steel
<input type="checkbox"/> 156490 – Stainless Steel	
<input type="checkbox"/> 43590 – Stainless Steel	

#### Notes:

1. Stainless Steel float required for FM Approved Explosion Proof units.  
2. Recommended for Type 2 mounting.

#### Notes:

1. Type 1, Type 2 and Type 3 only  
2. Standard Float Stops supplied in PH 15-7 MO on S.S. units and Beryllium Copper on Brass units. Brass and S.S. Float Stops with Brass and S.S. units only, respectively.

#### 5. Dimensions:

Overall Length (complete one line only):

Float Selected	Indicating Length (Half Inches)	+	"C" Dimension ±1/16" (1.8 mm)	+	Float Factor X Inch (mm)	=	Overall Length
43359		+		+	2.5 (63.5)	=	
43590		+		+	3.44 (87.3)	=	
52084		+		+	3.63 (92.1)	=	
69654		+		+	2.69 (68.3)	=	
156490		+		+	2.06 (52.3)	=	
164255		+		+	2 (50.8)	=	

#### Notes:

1. Indicating Length: 1/2" increments  
2. Minimum C Dimension = 1/4"; or 1/2" on units greater than 72" in length.

#### 7. Options:

- Explosion Proof J-Box\*  NEMA 4 J-Box

\* Required for FM Approved Explosion Proof units

Please contact Gems for any configuration or special requirements not covered on this form. **800-378-1600**

Quote: \$ \_\_\_\_\_ Date Quoted: \_\_\_\_/\_\_\_\_/\_\_\_\_

#### 6. Input/Output:

- a. Optional 24 VDC Power Supply:
- 115 VAC input  230 VAC input
- b. Signal Conditioners (XT-800 Series Only)
- Output Shown in Parenthesis:
- 51965 (0-5 VDC – stem)
- 51970 (0-12 VDC – stem)
- 52536 (0-5 VDC – J-box)
- 52537 (0-12 VDC – J-box)
- 52555 (4-20 mA – J-box)
- 120650 (0-5 VDC – panel mount)
- 149600 (0-10 VDC – panel mount)
- 112300 (4-20 mA – panel mount)



**Gems Sensors & Controls**  
One Cowles Road  
Plainville, CT  
06062-1198

tel 860.747.3000  
fax 860.747.4244  
[www.gemssensors.com](http://www.gemssensors.com)

## Small Size – Alloys

### XM/XT-860 Series – Compact, Resistive Output Level Sensors

- ▶ High Volume/Low Cost OEM Design
- ▶ Brass or Stainless Steel Construction
- ▶ 1/2" or 1" Resolution
- ▶ Lengths to 24 inches (610 mm)

OEMs with fluid gauging requirements now have an affordable, yet robust continuous output sensor they can use to great value. Gems XM-860 liquid level sensors are a durable, low-cost solution for applications that don't require high-resolution output. Made of brass or stainless steel, this series offers rugged construction, utilizing a new, coated reed switch core that stands up to high levels of shock and vibration. They are equally at home in applications ranging from tranquil storage day tanks to the challenge of off-highway vehicle fluids tank gauging. Minimum order for this series is 250 units.

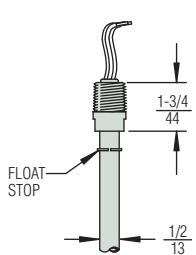
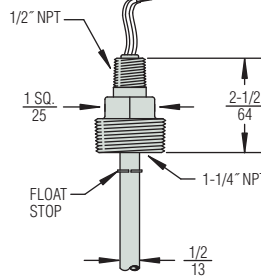
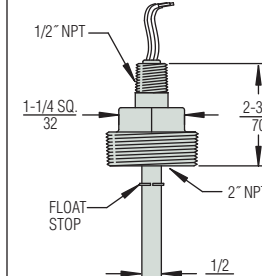
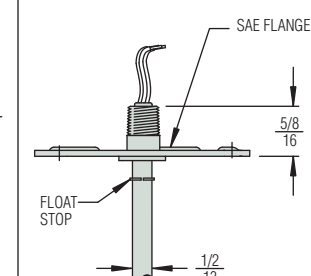
#### Gems XM-860 Advantages

- Floats provide true reading of liquid's surface position
- Floats can be used to sense dissimilar liquid interfaces (e.g. water/oil interface), including resulting emulsions.
- Unaffected by dielectric property of fluid
- Intrinsically-safe and Explosion-proof models available
- Unaffected by turbulence and motion

#### Typical Applications

- Generator Sets Fuel Tanks
- Auto Transmissions Fluid Reservoirs
- Reclamation Systems
- OHV Fuel Tanks
- Coolant Reservoirs
- Storage Day Tanks

### 1. Mounting Types

	Type 1 1/2" NPT Internal Mount	Type 2 1-1/4" NPT External Mount	Type 3 2" NPT External Mount	Type 4 SAE Flange External Mount
				
<b>Stem Material</b>	Brass or 316 Stainless Steel			Brass
<b>Mounting Material</b>	Brass or 316 Stainless Steel			Brass
<b>Float Stop Material</b>	Brass Units: Beryllium Copper Grip Rings; Stainless Steel Units: S.S. ARMCO PH-15-7MO Grip Rings			
<b>Stem Length</b>	24 inches (610 mm), Max.			
<b>Output Wiring</b>	Lead Wires Only	Lead Wires or Junction Box*		

\* Explosion-Proof (EP) units are supplied with junction box. Junction boxes for IS- or non-rated units may be ordered separately—P/N 113873.



**ORDER IT!**

Ordering is Easy! See Page C-9.  
Easy online ordering too!



## 2. Output Types

Make ordering selections from *either* the 2-wire or 3-wire output types detailed below.

### 2a. 2-Wire Versions, 1-inch Resolution

Designed for simplicity and economy, 2-wire resistive-output versions connect directly to many common automotive-type panel meters. Accuracy is 1 inch. Select the output resistance code from the table below for your Order Check List.

Output Resistance				
Resistance Code	Top Hard Stop	Individual Step R	Full Transition	Unit
R1	33	240-33 A (In.)	240	Ohms
R2	33	255-33 A (In.)	255	Ohms
R3	240	240-33 A (In.)	33	Ohms
R4	255	255-33 A (In.)	33	Ohms

High Resistance =  $\pm 2.75$   
Low Resistance =  $33 \pm 0.50$

#### Electrical Rating – Red to Black Wire

Resistance	33-240 or 33-255
Minimum Resistance	1000 Ohms
Maximum Voltage	30.0 VDC
Maximum Current	0.030 Amps
Maximum Power Dissipation	0.10 Watts/Inch of Indication

### 2b. 3-Wire Versions, 1/2-inch Resolution

These versions connect to Gems signal-conditioners (optionally selected in step 6b) for a variety of VDC and mA outputs. Accuracy is 1/2 inch. The standard resistance code is shown below. Consult factory for other resistance values.

Resistance Code	Resistance Value			
	R <sub>Lead</sub>	R	R <sub>Lag</sub>	Unit
P1	0	100	0	Ohms

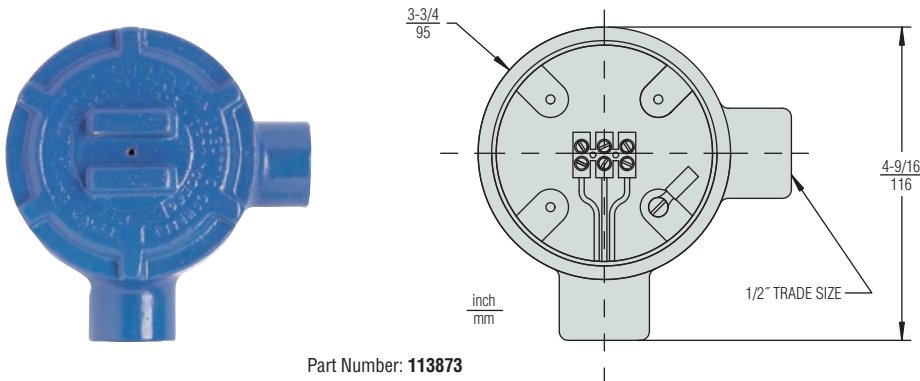
Total Indicating R =  $R_{Lead} + (A \text{ (In.)} * R) + R_{Lag}$

#### Electrical Rating – Red to Black Wire

Minimum Resistance	1000 Ohms
Maximum Voltage	30.0 VDC
Maximum Current	0.030 Amps
Maximum Power Dissipation	0.10 Watts/Inch of Indication

## 3. Output Options

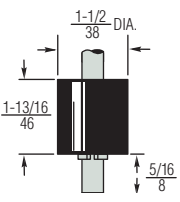
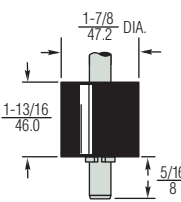
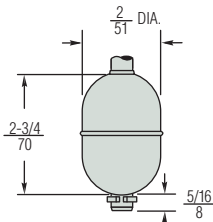
- A. Non-Rated Units.** Supplied with lead wire output; junction box optional. (See below.)
- B. Explosion-Proof Rated Units.** Supplied from factory with explosion-proof junction box.
- C. Intrinsically-Safe Rated Units.** Supplied with lead wire output; junction box optional. (See below.)
- D. Optional Junction Boxes – P/N 113873.** Simplify and protect wire connections for any non-Explosion-Proof Rated Unit. Optional Junction Boxes are supplied separately and must be assembled and wired by customer.



### 4. Float Types

Make selection based on Mounting Type being used and performance requirements.

**IMPORTANT:** If you are specifying either an Explosion-Proof or Intrinsically-Safe output, you must select a stainless steel float here.

Float Material	Buna N	Buna N	316 Stainless Steel
Compatible Mountings	Type 1, 2, 3, 4	Type 1 & 3	Type 1 & 3
Float Dimensions  inch mm			
Part Number	197428	43359	43590
Min. Liquid Specific Gravity	.63	.55	.75
Operating Pressure, Max*	150 PSI (10.3 bar)		300 PSI (20.7 bar)
Operating Temperature, Max.	Water: 180°F (82°C) Oil: 230°F (110°C)		300°F (149°C)

\*@ Ambient Temperature

### 5. To Determine Dimensions

**X:** Dimensional factor based on selected float (see table below)

**B:** Overall Length = Inches of Indication + C\*\* + X

**C:** Distance from bottom of mounting to float stop (customer specified):

- 1/4" (6.4mm) minimum
- 1-1/4" (31.8mm) minimum on Type 1, XT Series only

**M:** Distance from stem bottom to lowest level of indication

**N:** Distance from upper float stop to highest level of indication

#### Calculating Length

Note: 2-wire output units must specify Inches of Indication in even increments of 1 inch;  
3-wire output units must be specified in even increments of 1/2 inch.

To find Overall Length when Inches or Indication is known:

- Inches of Indication + C\*\* + X = Overall Length

To find Maximum Inches of Indication when Overall Length is known:

- Overall Length - C\*\* - X = Maximum Inches of Indication

\*\* C dimension is determined by customer.

If not specified, the float stop will be located at the minimum value (1/4").

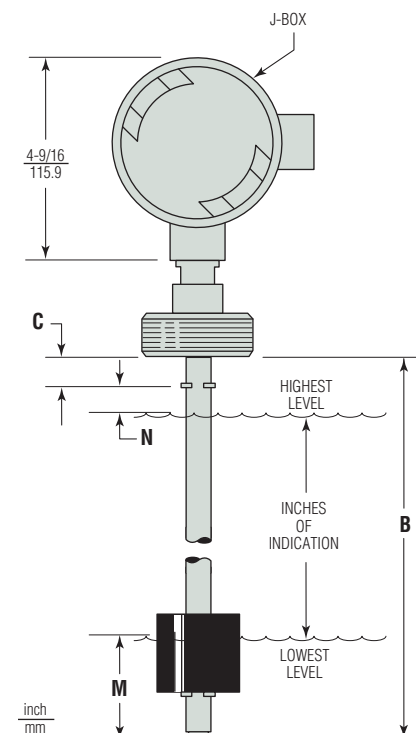
### Float Factors

Float Part Number	X Factor	M Dimension	N Dimension
197428	2.5 (63.5)	1.312 (33.3)	1.187 (30.1)
43359	2.5 (63.5)	1.312 (33.3)	1.187 (30.1)
43590	3.437 (87.3)	2.187 (55.5)	1.25 (31.7)


inch (mm)

M and N Dimensions are based on water (specific gravity 1.0).

Typical Configuration





 <p><b>Photocopy This Form</b> Use one form for each product type you are selecting. <small>This form may also be completed online at <a href="http://gemssensors.com">gemssensors.com</a> for RFQ.</small></p>	This is a <input type="checkbox"/> Request for a Quote <input type="checkbox"/> Order P.O.# _____ Quantity Needed _____ Date Required ____/____/____ Shipping Method: _____ Partial Accepted: <input type="checkbox"/> Yes <input type="checkbox"/> No	Name _____ Company _____ Street _____ City _____ State ____ Zip _____ Phone (____) _____ Fax (____) _____
--	--	--

## Float Type Level Transmitters – XM/XT-860 Series

### Application Environmental Conditions

This information is essential to the accurate and proper operation of your GEMS configurable sensors. Please complete fully and accurately.

- |  |   |
|--|---|
| <p><b>1. Liquid Media:</b> _____</p> <p><b>2. Pressure:</b> Minimum _____ psig Maximum _____ psig</p> <p><b>3. Temperature:</b> Minimum _____ °F Maximum _____ °F</p> <p><b>4. Specific Gravity:</b> Minimum _____ Maximum _____</p> | <p><b>5. Viscosity:</b> _____ SSU</p> <p><b>6. Tank Material:</b> _____</p> <p><b>Tank Depth:</b> _____</p> <p><b>7. Unit is Mounted In:</b> <input type="checkbox"/> Tank Top <input type="checkbox"/> Tank Bottom</p> <p><b>8. Moisture Protection Required?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
|--|---|

#### 1. Series

- XM/XT-860 (1/2" Resolution) – 3 wire output  
 XM/XT-860 (1" Resolution) – 2 wire output

#### 2. Mounting Type

- Type 1 (1/2" NPT)       Type 2 (1-1/4" NPT)  
 Type 3 (2" NPT)       Type 4 (SAE Flange)

#### 3. Materials

- a. Stem:  
 Brass       316 Stainless Steel
- b. Mounting:  
 Brass       316 Stainless Steel\*
- \*Type 1, 2, & 3 only

#### 4. Float Type

- 197428** – Buna N (Use with any Mounting Type)  
 **43359** – Buna N (Use **only** with Mounting Type 1 or 3)  
 **43590** – Stainless Steel (Use **only** with Mounting Type 1 or 3)

#### 5. Dimensions

Overall Length (complete one line only):

Float Selected	Indicating Length <sup>1</sup> (Whole Inches)	+	C Dimension ±1/16" (1.6mm)	+	Float Factor X Inch (mm)	=	Overall Length 24" (610 mm) Max.
197428		+		+	2.5 (63.5)	=	
43359		+		+	2.5 (63.5)	=	
43590		+		+	3.44 (87.3)	=	

- Notes:  
 1. Indicating Length: 1" increments  
 2. Minimum C Dimension = 1/4"

#### 6. Input/Output

- a. Optional 24 VDC Power Supply:  
 115 VAC input     230 VAC input
- b. Signal Conditioners  
 Output Shown in Parenthesis:  
 51965 (0-5 VDC – stem)  
 51970 (0-12 VDC – stem)  
 52536 (0-5 VDC – J-box)  
 52537 (0-12 VDC – J-box)  
 52555 (4-20 mA – J-box)  
 112300 (4-20 mA – panel mount)

Please contact Gems for any configuration or special requirements not covered on this form. **800-378-1600**

Quote: \$ \_\_\_\_\_ Date Quoted: \_\_\_\_/\_\_\_\_/\_\_\_\_



**Gems Sensors & Controls**  
 One Cowles Road  
 Plainville, CT  
 06062-1198

tel 860.747.3000  
 fax 860.747.4244  
[www.gemssensors.com](http://www.gemssensors.com)

## Small Size – Engineered Plastics

### XMP/XTP-800 Series Delivers Excellent Chemical Compatibility

- ▶ PVC, Polypropylene or PVDF Materials
- ▶ 1/4" Resolution
- ▶ Lengths to 70 inches (177.8 cm)

Specifically designed to monitor chemical tanks and vats, the XMP-800 Series provides superb resistance to corrosive liquids and vapors. Use XMP-800 transmitters with GEMS Digital Bargraph Display Receiver or Level Cube Receivers described in this catalog. The XTP-800 Series adds a choice of signal conditioning for use with GEMS digital bargraph display receivers or other digital instrumentation and control equipment.

**ORDER IT!**  
Ordering is Easy! See Page C-12.  
Easy online ordering too!

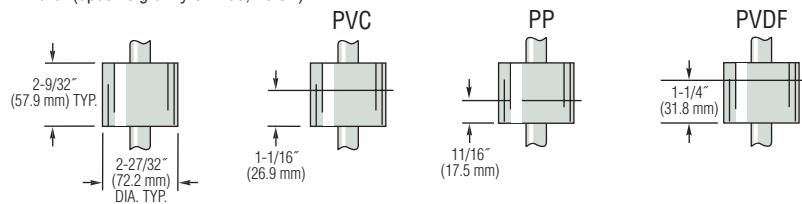


**LEVEL SENSORS – CONTINUOUS**

	Type A	Type B	Type C
	1" NPT	3" NPT	3" 150# Flange
<b>XMP-800 Dimensions</b>			
<b>XTP-800 Dimensions</b>			
<b>Stem, Mounting and Float Stop Material</b>	PVC, Polypropylene or KYNAR® (PVDF)		
<b>Operating Temperature</b>	See Chart, Next Page		
<b>Operating Voltage</b>	10-30 VDC		
<b>Overall Length, Max.</b>	70" (177.8 cm); please consult factory for longer lengths		

## 2. Float Types

Float submersion depths:  
In water (specific gravity of 1.00; ±0.3")

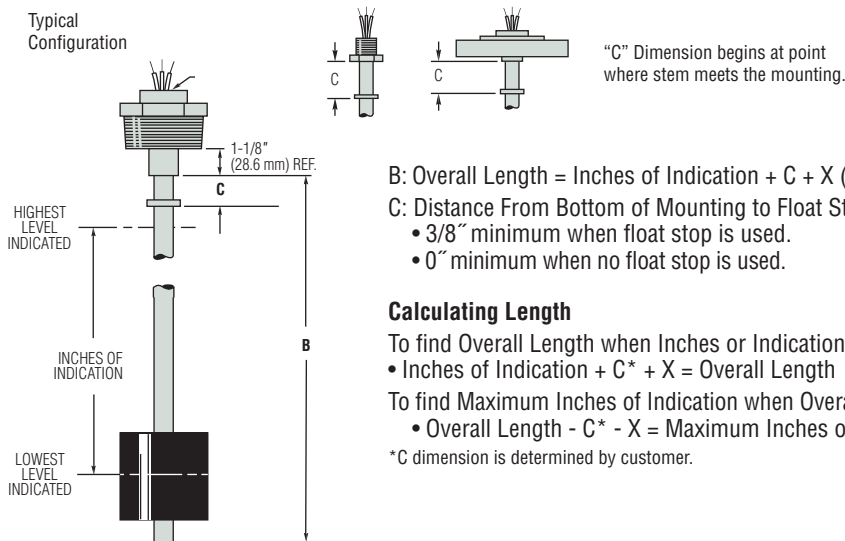


Material	Min. Liq. Specific Gravity	Part Number	Maximum Pressure vs. Temperature							
			0°F (17.8°C)	70°F (21.1°C)	100°F (37.8°C)	125°F (51.7°C)	140°F (60.0°C)	170°F (76.7°C)	200°F (93.3°C)	210°F (98.9°C)
PVC	.60	<b>61326</b>	50 PSI	50 PSI	35 PSI	20 PSI	10 PSI			
Polypropylene	.40	<b>61327</b>	50 PSI	50 PSI	40 PSI	35 PSI	30 PSI			
PVDF	.75	<b>61328</b>	50 PSI	50 PSI	45 PSI	40 PSI	35 PSI	30 PSI	25 PSI	25 PSI

■ = Not recommended at these temperatures

## 3. Dimensions

Typical Configuration



B: Overall Length = Inches of Indication + C + X (See Table at Right)

C: Distance From Bottom of Mounting to Float Stop (Customer Specified):

- 3/8" minimum when float stop is used.
- 0" minimum when no float stop is used.

### Calculating Length

To find Overall Length when Inches or Indication is known:

- Inches of Indication + C\* + X = Overall Length

To find Maximum Inches of Indication when Overall Length is known:

- Overall Length - C\* - X = Maximum Inches of Indication

\*C dimension is determined by customer.

### Float Factor – X

Float Part Number	X
<b>61326</b>	3.5" (88.9)
<b>61327</b>	3.5" (88.9)
<b>61328</b>	3.5" (88.9)

Inch (mm)

## 4. Input/Output


For XM Series, no special output designation is necessary.

For XT Series, specify the desired signal conditioning by Part Number.

Additional information about GEMS signal conditioning modules is found on Page C-16.

Series	Input Voltage	Output Signal	Part Number	Electrical Termination	Compatible Mountings		
					Type A	Type B	Type C
XMP-800	10 to 30 VDC	Proportional Voltage	—	Lead Wires (3), #22 AWG, 24" (60.9 cm), Polymeric Jacket	•	•	•
XTP-800	8 to 24 VDC	0-5 VDC*	<b>51965</b>	Lead Wires, #22 AWG, 24" (60.9 cm), PTFE Jacket	•	•	•
	14 to 30 VDC	0-12 VDC*	<b>51970</b>		•	•	•
	8 to 24 VDC	0-5 VDC	<b>154687</b>	ABS Junction Box		•	•
	15 to 30 VDC	0-12 VDC	<b>154685</b>			•	•
	10 to 40 VDC	4-20 mA	<b>116970</b>			•	•
		4-20 mA	<b>112300</b>	Panel Mount with Plug-in Base	•	•	•

\* Stem mounted.

 <b>Photocopy This Form</b> Use one form for each product type you are selecting. <small>This form may also be completed online at gemssensors.com for RFQ.</small>	This is a <input type="checkbox"/> Request for a Quote <input type="checkbox"/> Order P.O.# _____	Name _____ Company _____ Street _____ City _____ State ____ Zip _____ Phone (____) _____ Fax (____) _____
	Quantity Needed _____ Date Required ____/____/____ Shipping Method: _____ Partial Accepted: <input type="checkbox"/> Yes <input type="checkbox"/> No	

## Float Type Level Transmitters – XMP/XMT-800 Series

### Small Size, Engineered Plastics

#### Application Environmental Conditions

This information is essential to the accurate and proper operation of your GEMS configurable sensors. Please complete fully and accurately.

- |   |  |
|---|--|
| <b>1. Liquid Media:</b> _____                             | <b>5. Viscosity:</b> _____ SSU   |
| <b>2. Pressure:</b> Minimum _____ psig Maximum _____ psig | <b>6. Tank Material:</b> _____   |
| <b>3. Temperature:</b> Minimum _____ °F Maximum _____ °F  | <b>Tank Depth:</b> _____   |
| <b>4. Specific Gravity:</b> Minimum _____ Maximum _____   | <b>7. Unit is Mounted In:</b> <input type="checkbox"/> Tank Top <input type="checkbox"/> Tank Bottom |

#### 1. Series:

- XMP-800     XTP-800

#### 2. Mounting Type:

- Type A     Type B     Type C

#### 5. Dimensions:

a. Overall Length:

Indicating Length    C Dimension    X  
 \_\_\_\_\_ + \_\_\_\_\_ " + 3.5" =   " 70" (177.8 cm) maximum.

Notes:

1. Consult factory for longer lengths.
2. Indicating Length: 1/2" Increments.
3. C Dimension: 3/8" minimum when float stop is used; 0" minimum when no float stop is used.

#### 6. Input/Output:

a. Optional 24 VDC Power Supply:

- 115 VAC input     230 VAC input

b. Signal Conditioners (XTP-800 Series Only):

- 51965 (0-5 VDC – stem)
- 51970 (0-12 VDC – stem)
- 154687 (0-5 VDC – J-box)
- 154685 (0-12 VDC – J-box)
- 116970 (4-20 mA – J-box)
- 112300 (4-20 mA – panel mount)

Please contact Gems for any configuration or special requirements not covered on this form. **800-378-1600**

Quote: \$ \_\_\_\_\_ Date Quoted: \_\_\_\_/\_\_\_\_/\_\_\_\_



**Gems Sensors & Controls**  
 One Cowles Road  
 Plainville, CT  
 06062-1198

tel 860.747.3000  
 fax 860.747.4244  
 www.gemssensors.com

**ORDER IT!**

Ordering is Easy! See Page C-15.  
Easy online ordering too!

## Large Size – Alloys

### Sized for Deep Tanks and Rugged Duty



- ▶ Stainless Steel Construction
- ▶ Standard Lengths to 18 feet (549 cm)

These rugged transmitters are designed for tanks up to 18 feet (549 cm) in depth. Heavy duty stems resist turbulence, and float options accommodate liquids with minimum specific gravity as low as 0.53. Standard resolution is 1/2 inch; higher resolutions are available on request.

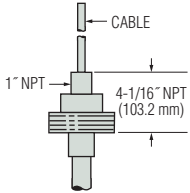
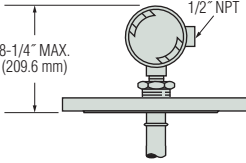
\* Contact GEMS about solutions for deeper tanks.

### Approvals

XM-36490 and XT-36490 Series transmitters may carry the following commercial approvals:

-  FM Approved, Explosion-Proof for lengths up to 10 feet (305 cm)
-  UL-Approved, Explosion-Proof

### 1. Mounting Types

Series	XM/XT-66400	XM/XT-36490
Mounting	4" NPT	5" ANSI Flanges; 150#, 300#, or 600#
		
Stem Material	316L Stainless Steel	316L Stainless Steel
Mounting Material	316L Stainless Steel; or Carbon Steel	316L Stainless Steel; or Carbon Steel Flange
Float Stop Material	316L Stainless Steel	316L Stainless Steel
Overall Length, Max.	216" (549 cm)	

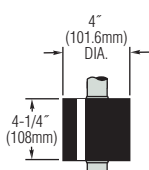
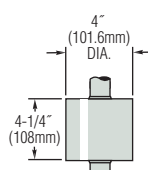
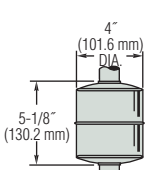
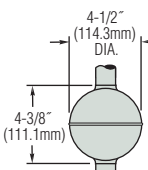
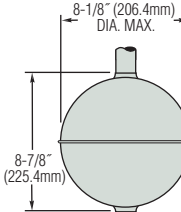
Note: XM/XT-36490 will be manufactured with matching Stem and Float Stop material. Consult factory for longer lengths.

### Got Mud?

These Gems Alloy Float Level Sensors are the best, most reliable method to monitor mud pits. The large diameter, stainless steel stems are rugged and strong to handle heavily viscous mud and slurries. Use with the exceptionally-buoyant 8" float for best results.



## 2. Float Types

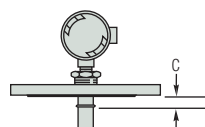
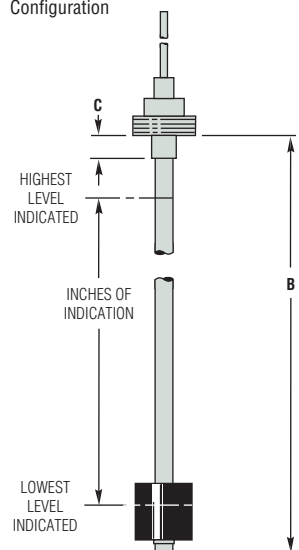
Material	Buna N	4" Dia. Syntactic Foam	4" Dia. Stainless Steel	4-1/2" Dia. Stainless Steel	8" Dia. Stainless Steel**
Float Dimensions					
Part Number	32230	31830	125520	35560	38609
Minimum Liquid Specific Gravity	0.59	0.87	0.57	0.78	0.53
Operating Temperature	-40°F to +180°F (-40°C to +82°C)	-40°F to +225°F (-40°C to +107°C)	-40°F to +230°F (-40°C to +110°C)		
Operating Pressure, Max*	150 PSI (10 bar)	2000 PSI (138 bar)	15 PSI (1 bar)	500 PSI (35 bar)	150 PSI (10 bar)

\* Unit pressure rating is determined by the flange and float selected. Consult factory for higher pressure ratings.

\*\* Float P/N 38609 must be installed on the transmitter stem from within the tank; or consult factory for larger flanges.

## 3. Dimensions

Typical Configuration



B: Overall Length = Inches of Indication + C + X (See Table at Right)

C: Distance From Bottom of Mounting to Float Stop (Customer Specified):  
 • 1/2" (12.7mm) Minimum

### Calculating Length

To find Overall Length when Inches or Indication is known:

• Inches of Indication + C\* + X = Overall Length

To find Maximum Inches of Indication when Overall Length is known:

• Overall Length - C\* - X = Maximum Inches of Indication

\*C dimension is determined by customer.

### Float Factor – X

Float Part Number	X
32230	6.75" (171.5)
31830	6.75" (171.5)
125520	7.75" (196.5)
35560	6.75" (171.5)
38609	11.375" (288.9)

Inch (mm)

## 4. Input/Output

For XM- Series, no special output designation is necessary.


For XT- Series, specify the desired signal conditioning by Part Number.

Additional information about GEMS signal conditioning modules is found on Page C-16.

Series	Input Voltage	Output Signal	Part Number	Electrical Termination
XM-36490	10 to 30 VDC	Proportional Voltage	—	Junction Box
XM-66400				Cable, (4) Conductor, 30 ft. long, Nitrile Jacket
XT-Series	8 to 24 VDC	0-5 VDC	52532	Junction Box
	15 to 30 VDC	0-12 VDC	52533	
	10 to 40 VDC	4-20 mA	52550	Panel Mount with Plug-In Base
	4-20 mA	112300 ⚡		

⚡ = Stock item



 <p><b>Photocopy This Form</b> Use one form for each product type you are selecting. <small>This form may also be completed online at <a href="http://gemssensors.com">gemssensors.com</a> for RFQ.</small></p>	This is a <input type="checkbox"/> Request for a Quote <input type="checkbox"/> Order P.O.# _____ Name _____ Company _____ Quantity Needed _____ Street _____ Date Required ____/____/____ City _____ State ____ Zip _____ Shipping Method: _____ Phone (____) _____ Partial Accepted: <input type="checkbox"/> Yes <input type="checkbox"/> No Fax (____) _____
--	--

## Float Type Level Transmitters – Large Size

### Application Environmental Conditions

This information is essential to the accurate and proper operation of your GEMS configurable sensors. Please complete fully and accurately.

- |   |  |
|---|--|
| <b>1. Liquid Media:</b> _____<br><b>2. Pressure:</b> Minimum _____ psig Maximum _____ psig<br><b>3. Temperature:</b> Minimum _____ °F Maximum _____ °F<br><b>4. Specific Gravity:</b> Minimum _____ Maximum _____ | <b>5. Viscosity:</b> _____ SSU<br><b>6. Tank Material:</b> _____<br><b>Tank Depth:</b> _____<br><b>7. Unit is Mounted In:</b> <input type="checkbox"/> Tank Top <input type="checkbox"/> Tank Bottom |
|---|--|

#### 1. Series:

- XM/XT-66400       XM/XT-36490

#### 2. Mounting Type:

- 4" NPT (66400)  
 Flange Size:  4"       5"       6"  
 Flange:  150#       300#       600# (36490 Series Only)

#### 3. Material:

- a. Stem:  316L Stainless Steel  
 b. Mounting:  
 36990:  316L Stainless Steel     Carbon Steel  
 66400:  316L Stainless Steel

#### 4. Float Type P/N – Description:

- 32230 – Buna N  
 125520 – 4" Stainless Steel  
 35560 – 4-1/2" Stainless Steel  
 38609 – 8" Stainless  
 31830 – 4" Syntactic Foam

#### 5. Dimensions:

Float Selected	Indicating Length (Whole Inches)	+	C Dimension (1/2" min.)	+	Float Factor X	=	Overall Length (180" (457.2 cm), Max.)
31830							
32230		+		+	6.75" (171.5 mm)	=	
35560							
38609		+		+	11.375" (288.9 mm)	=	
125520		+		+	7.75" (196.8 mm)	=	

Note: Indicating Length = Whole Inch Increments

#### 6. Input/Output:

- a. Optional 24 VDC Power Supply:  
 115 VAC input  
 230 VAC input
- b. Signal Conditioners:  
 52550 (4-20 mA)  
 52532 (0-5 VDC)  
 52533 (0-12 VDC)

Please contact Gems for any configuration or special requirements not covered on this form. **800-378-1600**

Quote: \$ \_\_\_\_\_ Date Quoted: \_\_\_\_/\_\_\_\_/\_\_\_\_



**Gems Sensors & Controls**  
 One Cowles Road  
 Plainville, CT  
 06062-1198

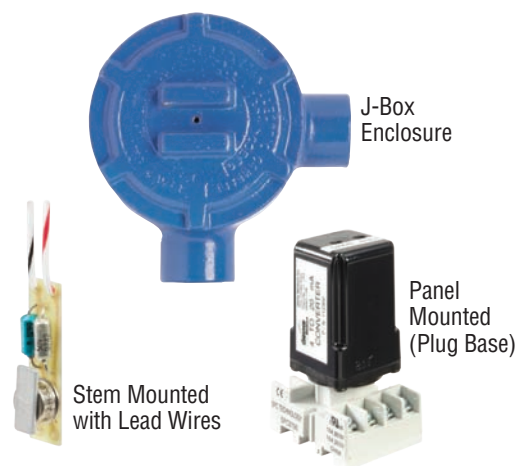
tel 860.747.3000  
 fax 860.747.4244  
[www.gemssensors.com](http://www.gemssensors.com)

# Signal Conditioning Modules, 0-5 VDC, 0-12 VDC and 4-20 mA Outputs

Provide signal conditioning as an integral part of the XT-Series Transmitters

- ▶ Stem Mounted
- ▶ Panel Mounted
- ▶ J-Box Enclosed
- ▶ Units with Preset High and Low Alarm

GEMS' signal conditioners provide outputs for direct connection to a wide range of instrumentation. They are ideal for large, multi-tank complexes. Units with 4-20 mA outputs are particularly well suited for instrumentation control loops. No intermediate receiver is required.

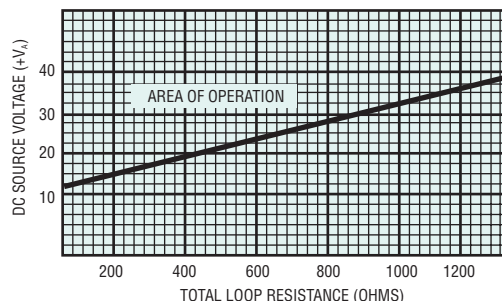


## Specifications (Not included in table below)

<b>System Accuracy</b>	With XT-36000 Series Transmitters: ±0.4% of full scale or ±1", whichever is greater. With XT-800 Series Transmitters: ±0.4% of full scale or ±1/2", whichever is greater.
<b>Operating Temperature</b>	+5°F to +160°F (-15°C to +71°C)
<b>Storage Temperature</b>	-40°F to +212°F (-40°C to +100°C)
<b>Output Temperature Coefficient (% of full scale, max.)</b>	±0.00388%/°F (±0.007%/°C)
<b>20 mA Types</b>	To within ±1% of 16 mA

## Excitation Required for Transmitters using 4-20 mA Signal Conditioners

The minimum excitation required for operation of transmitters with 4-20 mA, DC signal converters (See chart at right) can be determined for a given total loop resistance from the graph shown. (Total loop resistance = the sum of the DC termination resistance plus loop resistance.) For optimum operation, which is a function of source voltage (+V<sub>A</sub>) and total loop resistance, the source voltage value used should be above the minimum load line for the related loop resistance.






## Power Supply Module

Input Power	Part Number
115 VAC, 60 Hz	<b>52560</b>
230 VAC, 60 Hz	<b>52570</b>

Operates on 115 VAC or 230 VAC inputs to supply a regulated 24 VDC to the signal conditioned transmitter where external VDC power is not available. Maximum Load: 70 mA.

## How To Order

Select Part Number based on Output Signal desired and XT-Series sensor being used.

Electrical Termination Method	Output Signal	Input Voltage	Module Part Numbers For:			
			XT-800, XT-860 Series	XTP-800	XT-36488	XT-36490 XT-66400
 Stem Mount, Lead Wires #22 AWG, Teflon® Jacket, 24" Length	0-5 VDC	8-24 VDC	<b>51965</b>	<b>51965</b>	—	—
	0-12 VDC	14-30 VDC	<b>51970</b>	<b>51970</b>	—	—
 Junction Box	0-5 VDC	8-24 VDC	<b>52536</b>	<b>154687</b>	<b>154687</b>	<b>52532</b>
	0-12 VDC	15-30 VDC	<b>52537</b>	<b>154685</b>	<b>154685</b>	<b>52533</b>
	4-20 mA	10-40 VDC	<b>52555</b>	<b>116970</b>	<b>116970</b>	<b>52550</b>
 Panel Mount with Plug-In Base	4-20 mA	10-40 VDC	<b>112300 ⚡</b>	<b>112300 ⚡</b>	<b>112300 ⚡</b>	<b>112300 ⚡</b>

⚡ = Stock item

## NOTES

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.

## Ultrasonic Continuous Liquid Level Sensors

- ▶ Accurate and reliable sensing method
- ▶ Ideal technology for difficult fluids
- ▶ Sized and priced for most applications
- ▶ Easy to install—simple to use

Gems delivers the answer for challenging fluid measurement and monitoring with our new ultrasonic UCL Series Continuous Non-Contact Level Transmitters. These accurate and reliable sensors are designed for the most difficult fluids to monitor — including ultrapure, dirty, coating, scaling or corrosive types.

### Typical Media

- Acids
- Wastewater
- Inks and Paints
- Slurries
- Food and Beverage
- Semiconductor Process Chemicals
- Oils and Petroleum Distillates

### How Ultrasonic Monitoring Works

**UCL Series Continuous Non-Contact Transmitters:** Mounted at the top of a tank, the sensor continuously transmits pulses of high-frequency sound waves that travel away from the sensor, hit the surface of the liquid and return to the sensor. Solid-state electronics measure the time it takes from transmitted sound to return of the echo. With reference to the speed of sound in air, the exact distance of the liquid surface from the sensor can be calculated with high accuracy ( $\pm 0.2\%$  of maximum range). Level/Distance measurements are automatically temperature-compensated throughout the operating temperature range of the sensor.

Contents	Page Start
UCL-510.....	C-19
UCL-520.....	C-21



## UCL-510 — Transmitter/Multipoint Switching Combo

- ▶ 49-inch (1.25m) range. Compact sensor with 2" dead band and beam width are optimized for small tank applications
- ▶ 1" NPT mounting
- ▶ Reliable, non-contact alternative to float and conductivity level sensors for corrosive, sticky or dirty media
- ▶ Outputs continuous level and provides full pump or valve control
- ▶ PVDF transducer for corrosive liquid media

The UCL-510 is a general purpose ultrasonic sensor providing non-contact level detection up to 49.2" (1.25m), with 4 relays for switch or control functions and continuous level measurement. This compact unit offers a non-contact alternative to our float or conductance sensors in small tank chemical feed or handling applications when corrosive, sticky or dirty media is involved.

The configuration software, supplied with the sensor, provides flexible system integration or retrofit of existing level devices with configuration control. Integral level automation functions can further reduce system costs through the reduction of external control hardware. The analog output enables local tank level indication, remote PLC monitoring or automation functions. Gems UCL-510 is the non-contact solution for small tank level switch, control and measurement.

### Specifications

<b>Range</b>	49.2" (1.25 m)
<b>Accuracy</b>	0.125" (3 mm)
<b>Resolution</b>	0.019" (0.5 mm)
<b>Beam Width</b>	2" (5 cm)
<b>Dead Band</b>	2" (5 cm)
<b>Supply Voltage</b>	24VDC (loop)
<b>Loop Resistance</b>	400Ω max.
<b>Consumption</b>	0.5W
<b>Signal Output</b>	4-20 mA, two-wire (when loop powered)
<b>Contact Type</b>	(4) SPST relays 1A
<b>Loop Fail-Safety</b>	4 mA, 20 mA, 21 mA, 22 mA or hold last
<b>Relay Fail-Safety</b>	Power loss: Hold last; Power on: Open, close or hold last
<b>Hysteresis</b>	Selectable
<b>Configuration Software</b>	PC Windows® USB 2.0
<b>Temp. Comp.</b>	Automatic over range
<b>Process Temp.</b>	20°F to 140°F (-7°C to +60°C)
<b>Ambient Temp.</b>	-31°F to +140°F (-35°C to +60°C)
<b>Pressure</b>	MWP = 30 PSI
<b>Enclosure</b>	Type 6P encapsulated, corrosion resistant & submersible
<b>Encl. Material</b>	PC/ABS FR
<b>Strain Relief Mat.</b>	Santoprene®
<b>Trans. Material</b>	PVDF
<b>Cable Length</b>	48" (1.2 m)
<b>Cable Jacket Mat.</b>	Polyurethane
<b>Process Mount</b>	1" NPT (1" G)
<b>Mount. Gasket</b>	Viton®
<b>Classification</b>	General Purpose
<b>Approvals</b>	CE, cFMus



### Typical Applications

- Water and Waste Water
- Control Automation
- Chemical Feed
- Food and Beverage
- Acids, Inks, Paints
- Slurries

### Control and Switch Functions

- 2 pumps with 2 alarms
- 1 pump with 3 alarms
- 2 pumps (lead-lag) with 2 alarms
- 2 pumps (duplexing) with 2 alarms
- 4 level switch points

## Versatile Application

### Controller

- Auto fill/empty
- Can control 2 pumps/valves
- Lead/lag
- Duplex
- Unused relays may be used as additional alarms

The UCL-510 feature programmable level intelligence and can be reconfigured for different sensing duties (such as switch actuation points) after installation. This is an advantage over our float or conductivity type sensors. The user-friendly configuration software provides un-matched accuracy and programming for control applications. Multi-function relay control, coupled with 4-20 mA output generates amazing control capabilities. Advanced signal processing techniques provides the UCL-510 with next generation digital processing for control. The UCL-510 is level control made simple.

### Switching

- High level alarm (1-4)
- Low level alarm (1-4)
- Any combination of high and/or low alarms

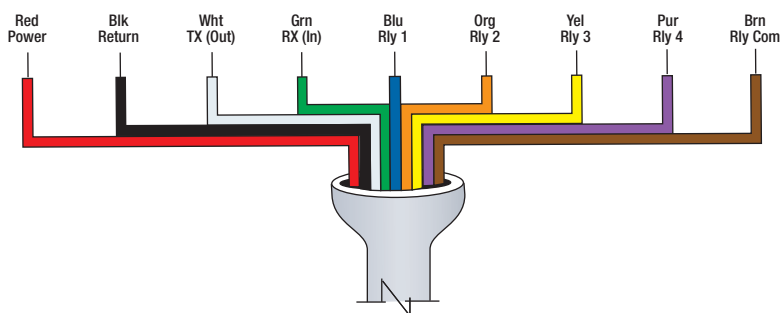
The UCL-510 provides a non-contact alternative to our float and conductivity probes multipoint level switches. It combines 4 built in SPST relays, with a selectable hysteresis that eliminates relay chatter from turbulent media. Additionally, non-contact sensors are immune to the performance issues influenced by changes in a media's specific gravity.

### Continuous Transmitter

- Adjustable 4-20 mA output
- Reversible output
- Interface directly to local display and/or to PLC, SCADA, DCS systems
- Remote displays/controllers can increase relay functionality

The UCL-510 is a good non-contact alternative to our XT float type transmitters for challenging media that can damage moving parts. The UCL-510 is for sticky, scaling or corrosive media. It provides exceptional measurement accuracy (0.125"), resolution (0.019") and repeatability ensuring overall system performance reliability.

## Wiring



## How To Order

Select by Part Number.

Description	Part Number
UCL-510 Transmitter/Multipoint Switch with Configuration Software and Fob	225100
Replacement/Additional Configuration Fob	227100

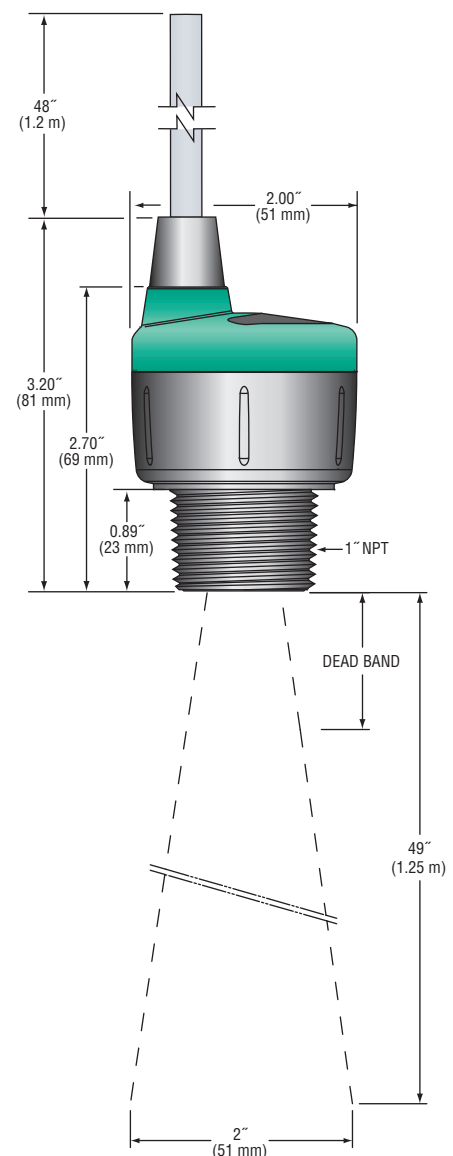
## Configuration Software

- Free download @ [GemsSensors.com/software](http://GemsSensors.com/software)
- Windows XP or 2000 compatible; USB 2.0 connection
- Provides configuration, file management (saving, printing, backup), and troubleshooting

The user interface allows you to take complete visual control of your set-up and configuration. Using simple menus and visual representations, the confusion of target calibration are gone. Once you have completed your configuration design, simply click "Write to Unit" and the UCL-510 is configured. It also enables multiple UCL-510's to be configured with just a click of the button. It even generates viewable and printable PDF wiring diagrams of your configurations to simplify and ensure proper field installation.

Gems supplies the USB Fob required to use the configuration software with each UCL-510 sensor. Replacements or additional Fobs may be ordered separately.

## Dimensions



LEVEL SENSORS – CONTINUOUS



## UCL-520 — 2-Wire Transmitter for Midsize Tanks

- ▶ To 26-feet (8m) range with 2" transducer
- ▶ 2" NPT mounting
- ▶ Setup is fast and easy. Incorporates push button calibration and LCD display
- ▶ 6-segment LCD display indicates level in inch or centimeter values
- ▶ 7.6 cm minimum beam width for applications with restricted space
- ▶ Fail-safe intelligence with diagnostic feedback for easy troubleshooting

The UCL-520 is a general purpose two-wire ultrasonic transmitter providing non-contact level measurement up to 26.2' or 8m. It is ideally suited for challenging ultrapure, corrosive or waste liquids.

Push button calibrated, the UCL-520 is broadly selected for atmospheric bulk storage, day tank and waste sump applications. Media examples include wastewater and sodium hydroxide. The PC/ABS enclosure is rated NEMA 4X, and the transducer is housed in rugged PVDF.

### Specifications

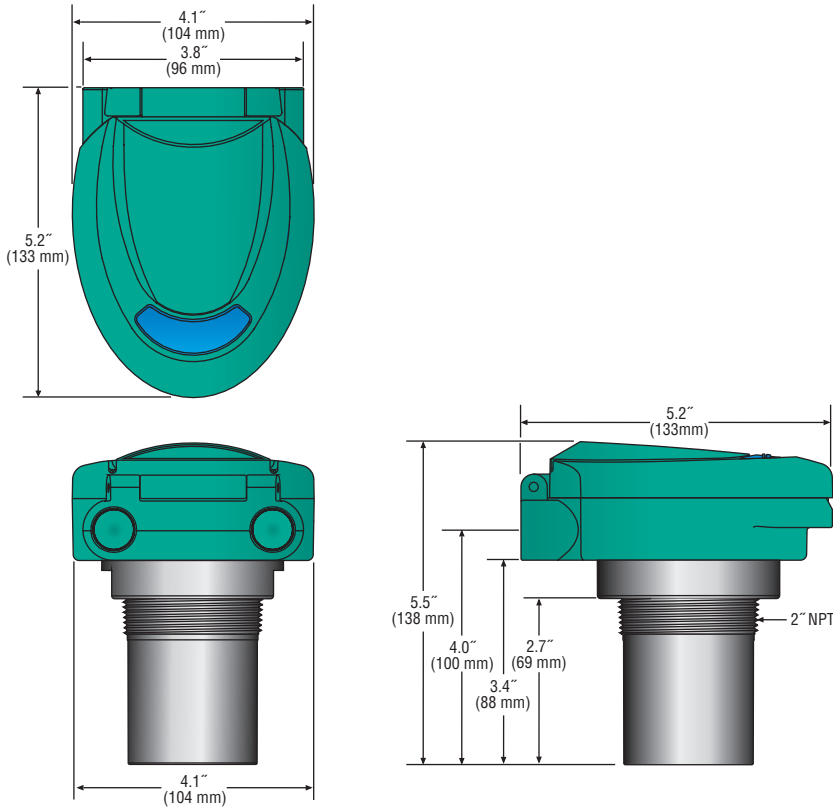
<b>Range</b>	6' to 26.2' (1.8 m to 8 m)
<b>Accuracy</b>	± 0.2% of span in air
<b>Resolution</b>	0.039" (1 mm)
<b>Beam Width</b>	3" (7.6 cm) dia.
<b>Dead Band</b>	8" (20 cm)
<b>Display Type</b>	LCD, 6-digit
<b>Display Units</b>	Inch, cm or percent
<b>Display Mode</b>	Air gap or liquid height
<b>Memory</b>	Non-volatile
<b>Supply Voltage</b>	12-28 VDC
<b>Loop Resistance</b>	500 Ohms @ 24 VDC
<b>Signal Output</b>	4-20 mA, two-wire
<b>Signal Invert</b>	4-20 mA or 20-4 mA
<b>Calibration</b>	Push button
<b>Fail-Safety</b>	Selectable 4 mA, 20 mA, 21 mA, 22 mA or hold
<b>Process Temp.</b>	-7°F to +140°F (-20°C to +71°C)
<b>Temp. Comp.</b>	Automatic
<b>Electronics Temp.</b>	-40°F to +160°F (-40°C to +71°C)
<b>Pressure</b>	30 PSI (2 bar) @ 25°C, derated @ 1.667 PSI (0.113 bar) per °C above 25°C
<b>Enclosure Rating</b>	NEMA 4X (IP65)
<b>Enclosure Vent</b>	Water tight membrane
<b>Enclosure Material</b>	PC/ABS FR
<b>Trans. Material</b>	PVDF
<b>Process Mount</b>	2" NPT (2" G)
<b>Mount. Gasket</b>	Viton®
<b>Conduit Entrance</b>	Dual, 1/2" NPT
<b>Classification</b>	General Purpose
<b>CE Compliance</b>	EN 61326 EMC



### Typical Applications

- Water and Waste Water
- Petrochemical
- Health Care
- Mining
- Cleaning
- HVAC
- Chemical
- Semiconductor
- Agriculture
- Electric Power
- Water Parks/Swimming Pools

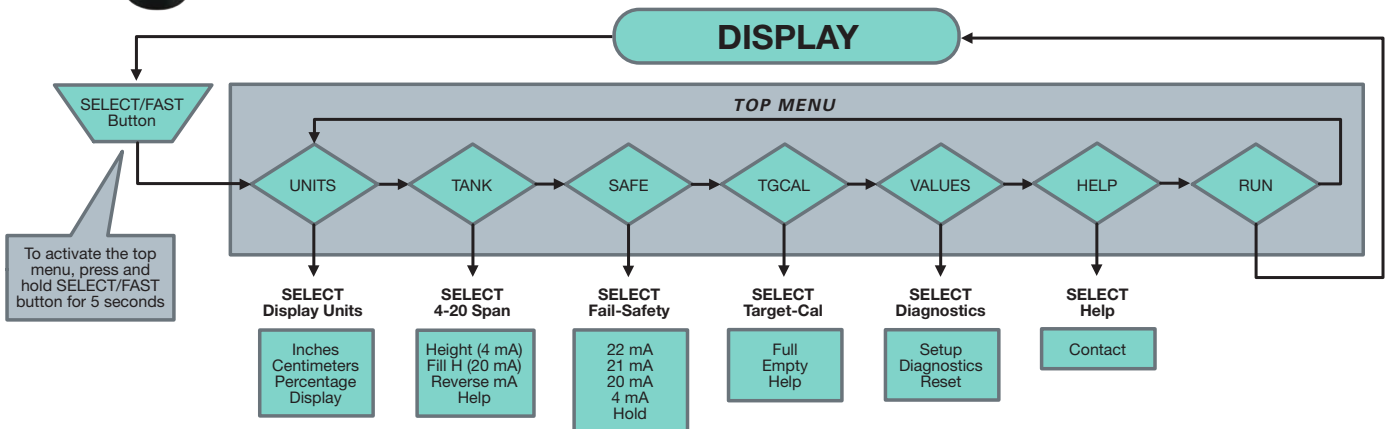
Dimensions



Easy Calibration



Calibration is fast and simple with our scrolling single layer menu, three button interface and 6-segment LCD display. Troubleshooting is easy with our unique Setup and Diagnostic feedback modes. Setup displays the transmitter's calibration set points. Diagnostics provides users with a snapshot of sensor performance and application variables. Gems UCL-520 is full feature level sensing made simple.



How To Order

Select by Part Number.

Description	Part Number
UCL-520 2-Wire Transmitter	225200

## NOTES

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.

# XT-1000 Series

## Magnetostrictive Level Sensor

- ▶ Measuring accuracy up to  $\pm 0.008''$  (0.2 mm)
- ▶ Resolution better than  $0.004''$  (0.1 mm)
- ▶ Temperature-compensated
- ▶ 2-wire terminal (4-20mA)
- ▶ Measuring range along the complete probe length
- ▶ Lengths of 8'' to 157'' (200 to 4,000 mm)

The high-precision and robust level sensor is designed to provide continuous gauging of liquid media levels in tanks. The measuring principle used by the sensor exploits the physical effect of magnetostriction and is largely unaffected by temperature. Magnetostriction is particularly ideal where level measurements are required to be extremely accurate, e.g. in the chemical industry. The level sensor outputs measuring signals in the range 4 to 20 mA. Available in lengths of 8'' to 157'' (200 to 6,000 mm), it is compatible with a variety of tank dimensions. It also comes in the following versions:

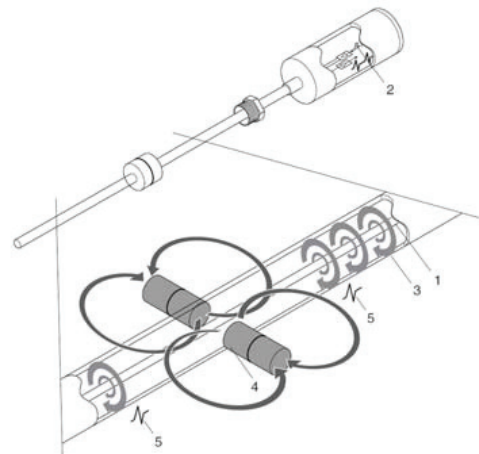
The explosion-proof version of the level sensor can be installed in potentially explosive atmospheres in which electrical equipment of category 1 (zone 0) or category 1/2 (zone 0/1) are required. Operating on the digital HART protocol, the HART level sensor is able to output the position of the first, second or both floats.

### Specifications

<b>Housing</b>	
Protection Type	IP 68
Material	Stainless Steel
Cable Diameter	0.19" to 0.394" (5 to 10 mm)
<b>Probe Tube</b>	
Diameter	0.472" (12 mm)
Material	Stainless Steel 316 Ti; Hastelloy C
Length	8" to 157" (200 to 4,000 mm)
<b>Electrical</b>	
Connection	2-wire
Supply	10 to 30 VDC
Current Signal	4 to 20 mA
Error Message	Adjustable to 3.6 or 21.5 mA
<b>Measuring Accuracy</b>	
Filling Level	Up to 0.020" (0.5 mm)
Resolution	Up to 0.004" (0.1 mm)
Analog Part	$\pm 0.1\%$ / K, resolution better 0.5 $\mu$ A

### Operating Principle

Inside the probe tube there is a rigid wire (1) made of magnetostrictive material. The sensor circuitry emits pulses of current (2) through the wire, generating a circular magnetic field (3). The level transmitter is a magnet (4), which is integrated into the float. Its magnetic field magnetizes the wire axially. Since the two magnetic fields are superimposed, around the float magnet a torsion wave (5) is generated which runs in both directions along the wire. One wave runs directly to the probe head while the other is reflected at the bottom of the probe tube. The time is measured between emission of the current pulse and arrival of the wave at the probe head. The position of the float is determined on the basis of the transit times.



**Mounting Types**

Size	Material	Mounting Type	Code
R 1-1/2*	Brass	Threaded	<b>1</b>
2" NPT	316 Stainless Steel	Threaded	<b>2</b>
3" - 150#		Flange	<b>3</b>

\* Includes adjustable mounting option

**Float Types**

Min. Specific Gravity	Max. Operating Pressure	Float Type	Material	Diameter	Code
≥0.50	290 psi (20 bar)	Ball	Titanium	1.99" (50 mm)	<b>11</b>
≥0.60			316 Ti	2.05" (52 mm)	<b>02</b>
≥0.70	145 psi (10 bar)	Cylinder	C276	1.81" (46 mm)	<b>12</b>
	232 psi (16 bar)				<b>07</b>
≥0.85	290 psi (20 bar)	Ball	316 Ti	1.69" (43 mm)	<b>09</b>
≥0.95	725 psi (50 bar)				<b>03</b>

**Temperature Ranges**

<b>Ambient</b>	-40°F to +185°F (-40°C to +85°C)
----------------	----------------------------------

**Process Medium**

Temperature	Range	Code
Standard	-40°F to +257°F (-40°C to +125°C)	<b>1</b>
Low	-85°F to +257°F (-65°C to +125°C)	<b>4</b>
High	-40°F to +482°F (-40°C to +250°C)	<b>3</b>
Highest	-40°F to +842°F (-40°C to +450°C)	<b>5</b>

**How to Order**

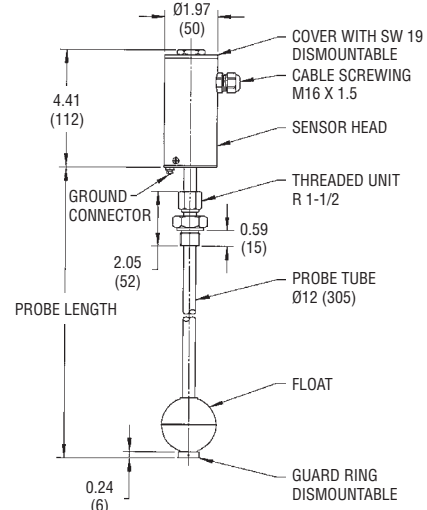
Use the **bold** characters from the chart below to construct a product code

**XT-1000 - X - XXX - XX - X - X - X - X**

<p>Probe Tube Material</p> <p><b>B</b> - 4-20 mA</p> <p><b>N</b> - 0.5-4.5 V</p>	<p>Probe Lengths</p> <p>For flanged version state the fitting length</p> <p>Length in inches</p>	<p>Float Type</p> <p><b>00</b> - None</p> <p><b>02</b> - Ball dia. 2.05" (52 mm), 316 Ti, 290 psi (20 bar), ≥ 0.60 SG</p> <p><b>03</b> - Ball dia. 1.69" (43 mm), 316 Ti, 725 psi (50 bar), ≥ 0.95 SG</p> <p><b>07</b> - Cylinder dia. 1.69" (43 mm), 316 Ti, 232 psi (16 bar), ≥ 0.70 SG</p> <p><b>09</b> - Ball dia. 1.69" (43 mm), 316 Ti, 290 psi (20 bar), ≥ 0.85 SG</p> <p><b>10</b> - Ball dia. 2.05" (52 mm), 316 Ti, 40 bar, ≥ 0.70 SG</p> <p><b>11</b> - Ball dia. 1.99" (50 mm), Titanium, 20 bar, ≥ 0.50 SG</p> <p><b>12</b> - Cylinder dia. 1.81" (46 mm), C276, 10 bar, ≥ 0.70 SG</p>	<p>HART</p> <p><b>0</b> - None</p> <p><b>1</b> - Hart Protocol</p>	<p>Certificate</p> <p><b>0</b> - None</p> <p><b>1</b> - Ex (ATEX)</p>	<p>Medium Temperature Range</p> <p><b>1</b> - Standard Temperature</p> <p><b>3</b> - High Temperature</p> <p><b>4</b> - Low Temperature</p> <p><b>5</b> - Highest Temperature</p>	<p>Mounting Type</p> <p><b>0</b> - None</p> <p><b>1</b> - Threaded, Brass, R 1-1/2</p> <p><b>2</b> - 2" NPT, Stainless Steel 316</p> <p><b>3</b> - 3" 150# Flange, Stainless Steel</p>
--	--	---	--	---	---	--

**Dimensions – in. (mm)**

**Threaded**



**Flange**

