

Intrinsically Safe Magnetostrictive Level Sensors Series: MPI



MPI-E

MPI-E Chem

MPI-R

MPI-F/B
SS Stem

MPI-F/K
PVDF Stem

MPI-T

The MPI Series Intrinsically Safe Magnetostrictive Level sensor provides highly accurate and repeatable level readings in a wide variety of liquid level measurement applications. The MPI-R's large, buoyant, and robust float allows for use in harsh applications where fouling or buildup might otherwise be of concern. The MPI-E's lighter-weight design allows it to be used in applications where space is limited. The MPI-E Chemical has a chemical resistant sleeve for use in corrosive, acidic, or marine environments. The MPI-F's flexible stem--stainless steel or PVDF--allows for installation in tall tanks without needing a crane or flatbed delivery truck, and the MPI-T's 1" titanium stem provides compatibility in a wider range of corrosive media--including H₂S--in larger tanks.

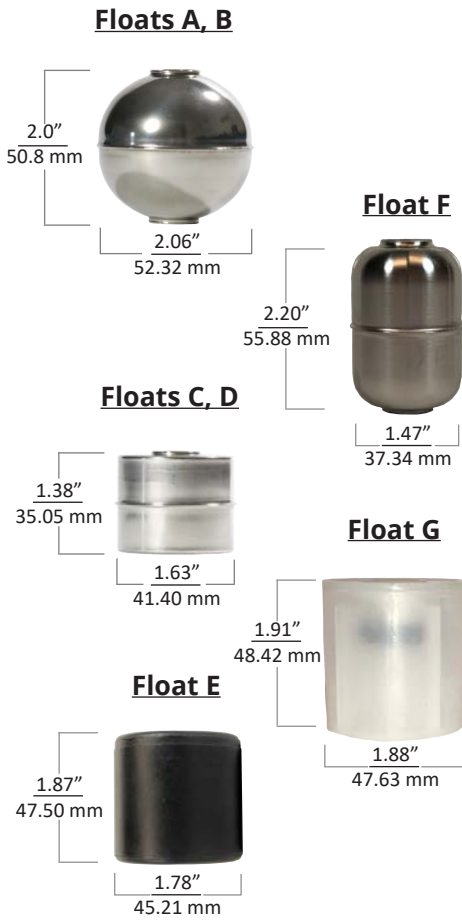
Features

- Class I, Division 1 and Class I, Zone 0 Hazardous Location Rating (cCSAus, ATEX, IECEx)
- Highly accurate and repeatable level and temperature readings
- RS-485 (Modbus RTU) and 4-20 mA (MPI-F only) outputs
- Low power; Start-up time under 5 seconds (MPI-F only)
- Rugged and reliable, lengths up to 50 feet (15.2 m)
- Dual level (interface) measurement
- Tank volume or level output, strapping table
- Pairs with MDI display for self-contained, intrinsically safe, level measurement and display system

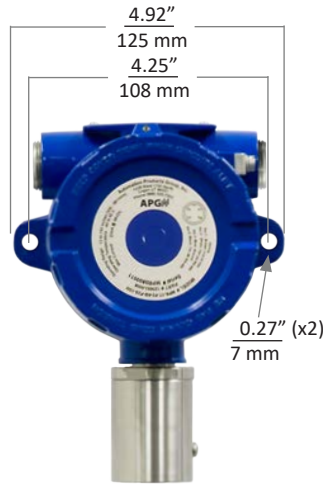


MPI-E Specifications

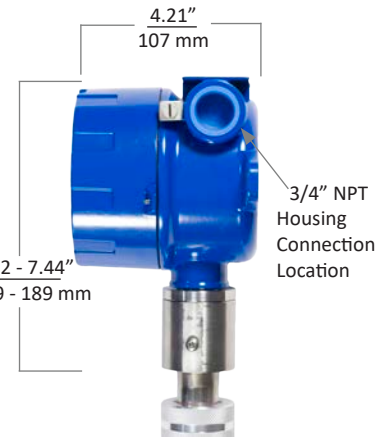
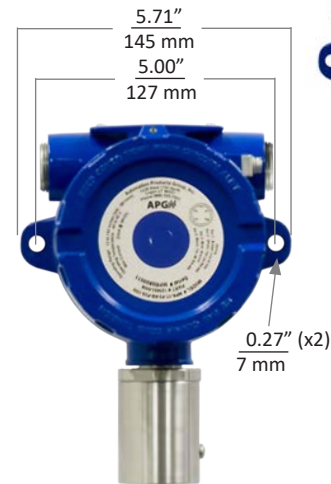
MPI-E Floats



Small Housing



Large Housing



Performance

- Resolution: Modbus: 0.04 in. (1 mm)
- Distance Accuracy: ± 0.04 in. (± 1 mm)
- Temperature Accuracy: $\pm 1^\circ\text{C}$

Programming

- Optional RST-6001 USB to RS-485 converter

Environmental

- Operating Temperature: $-40^\circ - 185^\circ\text{F}$ ($-40^\circ - 85^\circ\text{C}$)
- NEMA 4X, IP65

Physical

- Housing: Cast aluminium, epoxy coated
- Stem: 0.5" \varnothing 316L SS
- Stem Length: 1 - 12.75 ft. (0.3 - 3.9 m)

Electrical

- Electrical Connection: Terminal Block, 8-24 VDC
- Typical current draw: 24 mA
- Reverse polarity protection
- Surge protection (IEC 61000-4-5, 4-6, 4-7)

Connectivity

- Output: Modbus RTU (RS-485) with Surge Protection

Certification

- NEMA 4X, IP65
- cCSAus Certificate CSA19CA70219727: 8-24 VDC, $I_{max} = 280\text{mA}$
 Class I, Division 1, Groups C, D T4;
 Class I, Zone 0; AEx ia IIB T4 Ga; Ex ia IIB T4 Ga, IP65
 $T_a = -40^\circ$ to 85°C
- ATEX Certificate Sira 19ATEX2072X:
 II 1G
 Ex ia IIB T4 Ga
 $T_a = -40^\circ$ to 85°C
- IECEx Certificate IECEx SIR 19.0026X:
 Ex ia IIB T4 Ga
 $T_a = -40^\circ$ to 85°C

MPI-E Model Configuration Options

Model Number: MPI - E 5 - - - - - - - - - - - -

A B C D E F G H I J K L

A. Stem Type

- E** 0.5 in. diameter, rigid

B. Output

- 5** Modbus RTU, with surge protection, Intrinsically Safe

C. Housing Type

All Housing Die-cast Aluminum, NEMA 4X, IP65, Blue

- Large Housing
- A**[▲] Small Housing

D. Float 1 (Top Float)

- A** 316L SS Round (0.65 SG)
- B** 316L SS Round (0.92 SG)
- C** 316L SS Cylindrical (0.65 SG)
- D** 316L SS Cylindrical (0.92 SG)
- E** Buna-N (0.5 SG)
- F** 316 SS 3A Cylindrical (0.5 SG)
- G** Kynar Cylindrical (0.66 SG)

E. Float 2 (optional)

- N** None
- B** 316L SS Round (0.92 SG)†

F. Mounting Type

- P**[▲] NPT Plug 150#
- N** None

G. Mounting Size

- 1.5** 1.5 in. (welded or slide connection)
- 2**[▲] 2 in. (welded or slide connection)
- 3** 3 in. (slide connection only)
- N** None

H. Mounting Connection

- W** Welded (fixed)
- S** Slide with Compression Fitting (adjustable)

I. Stem Finish Material

- B** 316L SS

J. Total Stem Length in Inches

- Min. 12 in. - Max. 153 in.

K. Temperature Sensor Options

- N**[▲] None
- 1D** Digital Temperature Sensor A, 12 in. from bottom of probe
- 2D** Digital Temperature Sensors A, B
- 3D** Digital Temperature Sensors A, B, C
- 4D** Digital Temperature Sensors A, B, C, D
- 5D** Digital Temperature Sensors A, B, C, D, E
- 6D** Digital Temperature Sensors A, B, C, D, E, F
- 7D** Digital Temperature Sensors A, B, C, D, E, F, G

Note: Temperature sensors B - G are spaced evenly between A and the probe's zero reference.

L. Custom Housing-Electrical Connection

- N**[▲] None
- B** Cable Gland (Cable sold separately)
- C** 4-pin M12 Micro Connector Female
- D** 4-pin M12 Micro Connector Male - 90°
- F** 4-pin M12 Micro Connector Female - 90°
- G** 90° Elbow
- M** 4-pin M12 Micro Connector Male

Note: [▲]This option is standard.

Note: †Must be used with Top Float A.

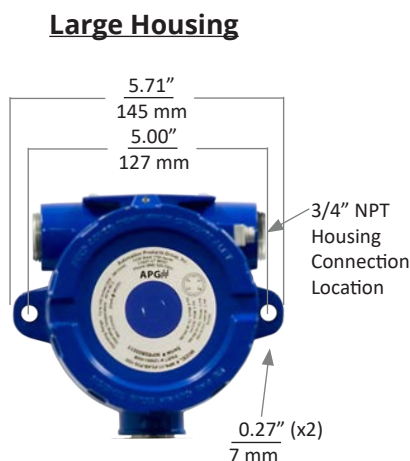
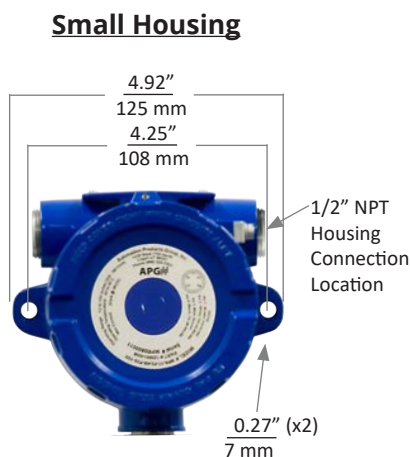
MPI Accessories

Please order separately, by part number.

Description	Part Number
Programming Module	
RST-6001 (Modbus)	125734
*sold with 6 ft USB cable	

MPI-E Chemical Specifications

MPI-E Chemical Float



Performance

- Resolution: Modbus: 0.04 in. (1 mm)
- Distance Accuracy: ± 0.04 in. (± 1 mm)
- Temperature Accuracy: $\pm 1^\circ\text{C}$

Programming

- Optional RST-6001 USB to RS-485 converter

Environmental

- Operating Temperature: $-40^\circ - 185^\circ\text{F}$ ($-40^\circ - 85^\circ\text{C}$)
- Maximum Operating Pressure: 30 PSIA @ $70^\circ\text{F} / 21^\circ\text{C}$
- NEMA 4X, IP65

Physical

- Housing: Cast aluminum, epoxy coated
- Stem: 0.67" \varnothing PVDF (rigid)
- Stem Length: 1 - 12.75 ft. (0.3 - 3.9 m)
- Float: 2" \varnothing PVDF, 0.94 SG or 0.65 Max SG

Electrical

- Electrical Connection: Terminal Block, 8-24 VDC
- Typical current draw: 24 mA
- Reverse polarity protection
- Surge protection (IEC 61000-4-5, 4-6, 4-7)

Connectivity

- Output: Modbus RTU (RS-485) with Surge Protection

Certification

- NEMA 4X, IP65
- cCSAus Certificate CSA19CA70219727:
8-24 VDC, $I_{\text{max}} = 280\text{mA}$
Class I, Division 1, Groups C, D T4;
Class I, Zone 0; AEx ia IIB T4 Ga; Ex ia IIB T4 Ga, IP65
 $T_a = -40^\circ$ to 85°C
- ATEX Certificate Sira 19ATEX2072X:
II 1G
Ex ia IIB T4 Ga
 $T_a = -40^\circ$ to 85°C
- IECEX Certificate IECEX SIR 19.0026X:
Ex ia IIB T4 Ga
 $T_a = -40^\circ$ to 85°C

MPI-E Chemical Model Configuration Options

Model Number: MPI - $\frac{E}{A}$ $\frac{5}{B}$ $\frac{\quad}{C}$ - $\frac{\quad}{D}$ $\frac{\quad}{E}$ - $\frac{P}{F}$ $\frac{2}{G}$ $\frac{W}{H}$ $\frac{N}{I}$ - $\frac{\quad}{J}$ - $\frac{\quad}{K}$ - $\frac{\quad}{L}$

A. Stem Type

- E** 0.5 in. diameter, rigid

B. Output

- 5** Modbus RTU, with surge protection, Intrinsically Safe

C. Housing Type

All Housing Die-cast Aluminum, NEMA 4X, IP65, Blue

- $\underline{\quad}$ Large Housing
- A**[▲] Small Housing

D. Float 1 (Top Float)

- K1**[▲]/**H** 3.5h x 2d in. PVDF (0.65 SG Max / 0.94SG)

E. Float 2

- N**[▲] None
- H** 3.5h x 2d in. PVDF (0.65 SG Max / 0.94SG)

F. Mounting Type

- P** NPT Plug

G. Mounting Size

- 2** Size 2

H. Mounting Connection

- W** Welded (fixed)

Note: [▲]This option is standard.

Note: ^{*}The Kynar stem is susceptible to thermal expansion when the process temperature exceeds 73°F / 23°C. This expansion can be calculated as follows: Expansion = (Max Process Temperature (°F) - 73)*.000108 * Kynar Stem Length). This is the distance that must be left between the end of the Kynar stem and the tank bottom at the maximum process temperature. Please account for this expansion by reducing the stem length to allow for this gap when installed. The gap is zero if the process temperature is less than or equal to 73 °F.

I. Stem Finish Material

- N** 0.67" diameter PVDF Sleeve

J. Total Stem Length in Inches

- $\underline{\quad}$ Min. 12 in. - Max. 153 in. *

K. Temperature Sensor Options

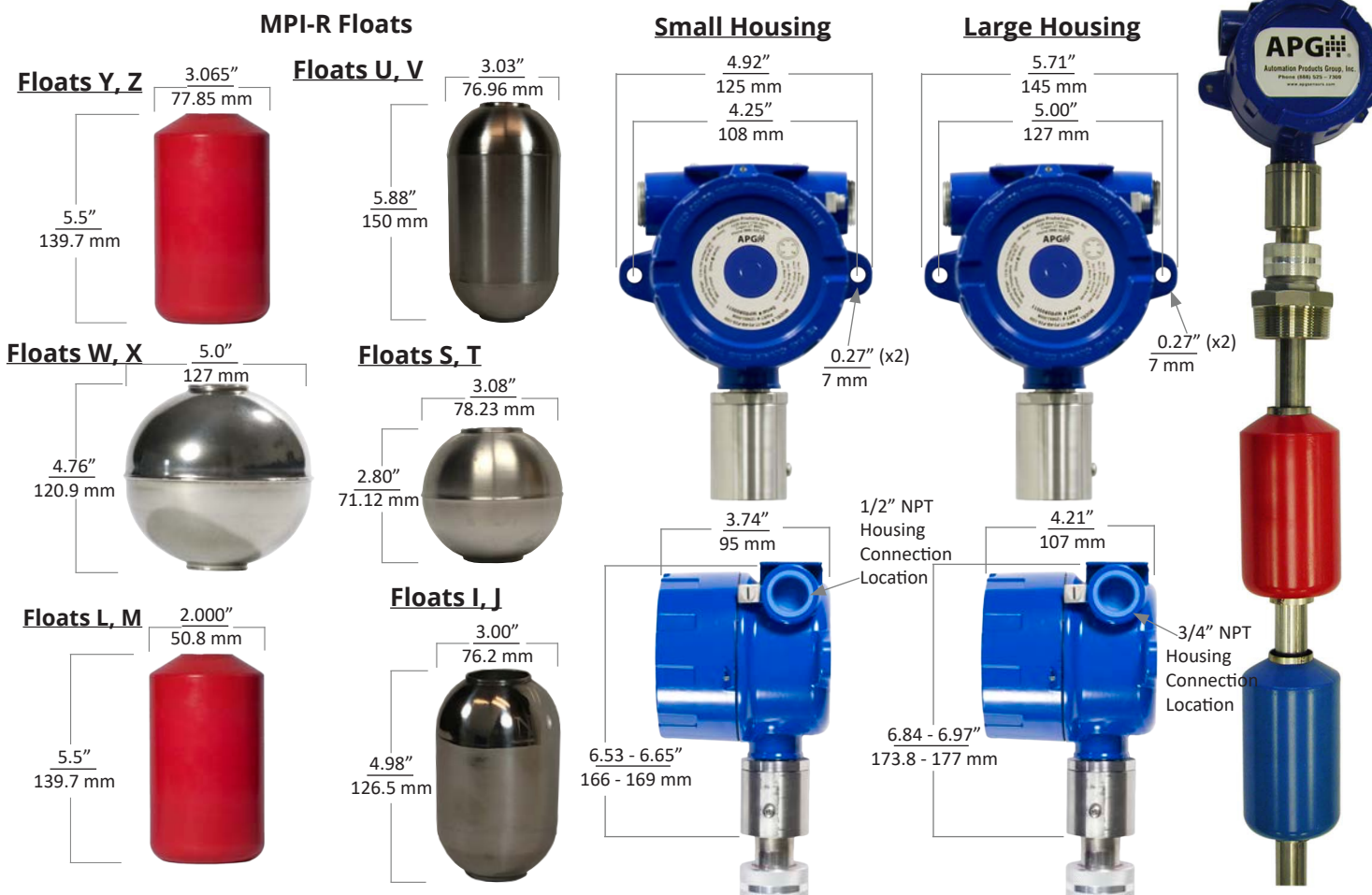
- N**[▲] None
- 1D** Digital Temperature Sensor A, 12 in. from bottom of probe
- 2D** Digital Temperature Sensors A, B
- 3D** Digital Temperature Sensors A, B, C
- 4D** Digital Temperature Sensors A, B, C, D
- 5D** Digital Temperature Sensors A, B, C, D, E
- 6D** Digital Temperature Sensors A, B, C, D, E, F
- 7D** Digital Temperature Sensors A, B, C, D, E, F, G

Note: Temperature sensors B - G are spaced evenly between A and the probe's zero reference.

L. Custom Housing-Electrical Connection

- N**[▲] None
- B** Cable Gland (Cable sold separately)
- C** 4-pin M12 Micro Connector Female
- D** 4-pin M12 Micro Connector Male - 90°
- F** 4-pin M12 Micro Connector Female - 90°
- G** 90° Elbow
- M** 4-pin M12 Micro Connector Male

MPI-R Specifications



Performance

- Resolution: Modbus: 0.04 in. (1 mm)
- Distance Accuracy: ±0.04 in. (±1 mm)
- Temperature Accuracy: ±1°C

Programming

- Optional RST-6001 USB to RS-485 converter

Environmental

- Operating Temperature: -40° - 185°F (-40° - 85°C)
- NEMA 4X, IP65

Physical

- Housing: Cast aluminium, epoxy coated
- Stem: 1.0" Ø 316L SS
- Stem Length: 4 - 31.5 ft. (1.22 - 9.60 m)

Electrical

- Electrical Connection: Terminal Block, 8-24 VDC
- Typical current draw: 25 mA
- Reverse polarity protection
- Surge protection (IEC 61000-4-5, 4-6, 4-7)

Connectivity

- Output: Modbus RTU (RS-485) with Surge Protection

Certification

- NEMA 4X, IP65
- cCSAus Certificate CSA19CA70219727: 8-24 VDC, I_{max} = 280mA Class I, Division 1, Groups C, D T4; Class I, Zone 0; AEx ia IIB T4 Ga; Ex ia IIB T4 Ga, IP65 Ta = -40° to 85°C
- ATEX Certificate Sira 19ATEX2072X: II 1G Ex ia IIB T4 Ga Ta = -40° to 85°C
- IECEX Certificate IECEX SIR 19.0026X: Ex ia IIB T4 Ga Ta = -40° to 85°C

MPI-R Model Configuration Options

Model Number: MPI - R - 5 - _____ - _____ - _____ - _____ - _____ - _____ - _____ - _____ - _____ - _____
A B C D E F G H I J K L

A. Stem Type

- R** 1 in. diameter, rigid

B. Output

- 5** Modbus RTU, with surge protection, Intrinsically Safe

C. Housing Type

All Housing Die-cast Aluminum, NEMA 4X, IP65, Blue

- ▲** Large Housing
- A** Small Housing

D. Float 1 (Top Float)

- Z/Y** 5.5h x 3d in. Red Polyurethane (0.65 SG / 0.94 SG)
- X/W** 5 in. Round 316L SS (0.52 SG / 0.92 SG)
- V/U** 6h x 3d in. Oval 316L SS (0.58 SG / 0.94 SG)
- T/S** 3 in. Round 316L SS (0.60 SG / 0.94 SG)
- M/L** 5.5h x 2d in. Red Polyurethane (0.57 SG / 0.94 SG)
- J/I** 5h x 3d in. Oval Titanium (0.60 SG / 0.94 SG)
- N** None

E. Float 2 (optional)

- N** None
- Y** 5.5h x 3d in. Blue Polyurethane (0.94 SG)
- W** 5 in. Round 316L SS (0.92 SG)
- U** 6h x 3d in. Oval 316L SS (0.94 SG)
- S** 3 in. Round 316L SS (0.94 SG)
- L** 5.5h x 2d in. Blue Polyurethane (0.94 SG)
- I** 5h x 3d in. Oval Titanium (0.94 SG)

F. Mounting Type

- P▲** NPT Plug 150#
- N** None

G. Mounting Size

- 2▲** 2 in. (welded or slide connection)
- 3** 3 in. (slide connection only)
- N** None

H. Mounting Connection

- W** Welded (fixed)
- S** Slide with Compression Fitting (adjustable)

I. Stem Finish Material

- B** 316L SS

J. Total Stem Length in Inches

- ▲** Min. 48 in. - Max. 378 in.

K. Temperature Sensor Options

- N** None
- 1D▲** Digital Temperature Sensor A, 12 in. from bottom of probe
- 2D** Digital Temperature Sensors A, B
- 3D** Digital Temperature Sensors A, B, C
- 4D** Digital Temperature Sensors A, B, C, D
- 5D** Digital Temperature Sensors A, B, C, D, E
- 6D** Digital Temperature Sensors A, B, C, D, E, F
- 7D** Digital Temperature Sensors A, B, C, D, E, F, G

Note: Temperature sensors B - G are spaced evenly between A and the probe's zero reference.

L. Custom Housing-Electrical Connection

- N▲** None
- B** Cable Gland (Cable sold separately)
- C** 4-pin M12 Micro Connector Female
- D** 4-pin M12 Micro Connector Male - 90°
- F** 4-pin M12 Micro Connector Female - 90°
- G** 90° Elbow
- M** 4-pin M12 Micro Connector Male

Note: ▲This option is standard.

MPI Accessories

Please order separately, by part number.

Description	Part Number
Programming Module	
RST-6001 (Modbus; MPI-x5, MPI-F8 only)	125734
RST-4100 (4-20 mA; MPI-F6, MPI-F7 only)	125759
*sold with 6 ft USB cable	

MPI-F Stainless steel Specifications

MPI-F/B Floats



Small Housing



Large Housing



Performance

- Resolution:
 - 4-20 mA: 14 bit DAC (1 mm); Modbus: 0.04 in. (1 mm)
- Distance Accuracy
 - 4-20 mA: Greater of $\pm 0.05\%$ of FS or 1 mm
 - Modbus: ± 0.04 in. (± 1 mm)
- Temperature Accuracy
 - Digital Temp Sensor: $\pm 1^\circ\text{C}$
 - API 18.2 Temp Sensors: $\pm 0.25^\circ\text{C}$ over $-40^\circ - 85^\circ\text{C}$
 $\pm 0.13^\circ\text{C}$ over $+20^\circ - 70^\circ\text{C}$

Physical

- Housing: Cast aluminium, epoxy coated
- Stem: $7/8"$ \varnothing Flexible Tubing with Braid, 316L SS
- Stem Length: 4 - 32 ft. (1.22 - 9.75 m)

Connectivity

- Output:
 - Single or dual loop-powered 4-20 mA
 - Modbus RTU (RS-485), optional temperature sensors

Certification

- NEMA 4X, IP65
- cCSAus Certificate CSA19CA70219727:
 - 8-24 VDC, $I_{\text{max}} = 280\text{mA}$
 - Class I, Division 1, Groups C, D T4;
 - Class I, Zone 0; AEx ia IIB T4 Ga; Ex ia IIB T4 Ga, IP65
 - $T_a = -40^\circ$ to 85°C
- ATEX Certificate Sira 19ATEX2072X:
 - II 1G
 - Ex ia IIB T4 Ga
 - $T_a = -40^\circ$ to 85°C
- IECEx Certificate IECEx SIR 19.0026X:
 - Ex ia IIB T4 Ga
 - $T_a = -40^\circ$ to 85°C

Programming

- RS-485: Optional RST-6001 USB to RS-485 converter
- 4-20 mA: Factory set or RST-4100 programming module

Electrical

- Supply Voltage: 8-24 VDC (Modbus), 12-24 VDC (4-20 mA)
- Current draw:
 - 4-20mA, Single / Dual float: 22 / 44 mA (max)
 - Modbus (single or dual float): 15 mA (typ.)
- Reverse polarity protection
- CE compliant to EN 61326

Environmental

- Operating Temperature: $-40^\circ - 185^\circ\text{F}$ ($-40^\circ - 85^\circ\text{C}$)
- NEMA 4X, IP65



MPI-F pvdf Specifications

Small Housing

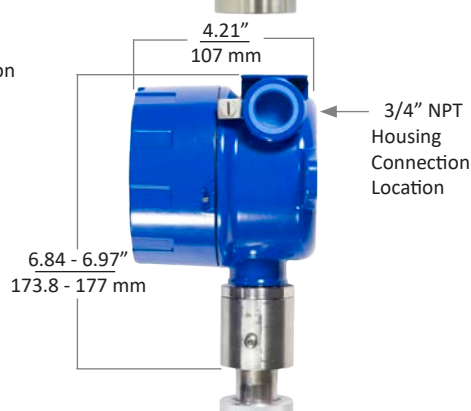
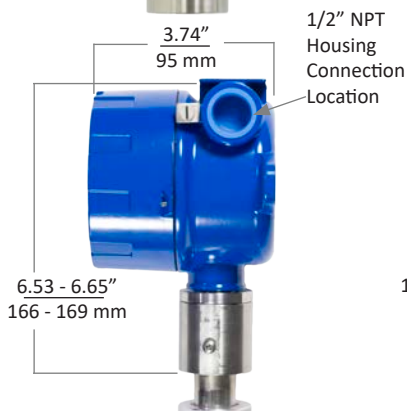
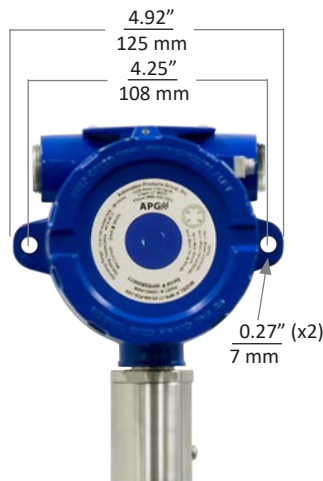
Large Housing

MPI-F/K Floats

Floats I, J



Floats H, K



Performance

- Resolution:
 - 4-20 mA: 14 bit DAC (1 mm); Modbus: 0.04 in. (1 mm)
- Distance Accuracy
 - 4-20 mA: Greater of $\pm 0.05\%$ of FS or 1 mm
 - Modbus: ± 0.04 in. (± 1 mm)
- Temperature Accuracy
 - Digital Temp Sensor: $\pm 1^\circ\text{C}$
 - API 18.2 Temp Sensors: $\pm 0.25^\circ\text{C}$ over $-40^\circ - 85^\circ\text{C}$
 $\pm 0.13^\circ\text{C}$ over $+20^\circ - 70^\circ\text{C}$

Physical

- Housing: Cast aluminium, epoxy coated
- Stem: 5/8" \varnothing Flexible Tubing, proprietary PVDF formulation
- Stem Length: 10 - 50 ft. (3.05 - 15.2 m)

Connectivity

- Output:
 - Single or dual loop-powered 4-20 mA
 - Modbus RTU (RS-485), optional digital temp. sensors

Certification

- NEMA 4X, IP65
- cCSAus Certificate CSA19CA70219727:
 - 8-24 VDC, $I_{\text{max}} = 280\text{mA}$
 - Class I, Division 1, Groups C, D T4;
 - Class I, Zone 0; AEx ia IIB T4 Ga; Ex ia IIB T4 Ga, IP65
 - $T_a = -40^\circ$ to 85°C
- ATEX Certificate Sira 19ATEX2072X:
 - II 1G
 - Ex ia IIB T4 Ga
 - $T_a = -40^\circ$ to 85°C
- IECEX Certificate IECEX SIR 19.0026X:
 - Ex ia IIB T4 Ga
 - $T_a = -40^\circ$ to 85°C

Programming

- RS-485: Optional RST-6001 USB to RS-485 converter
- 4-20 mA: Factory set or RST-4100 programming module

Electrical

- Supply Voltage: 8-24 VDC (Modbus), 12-24 VDC (4-20 mA)
- Current draw:
 - 4-20mA, Single / Dual float: 22 mA / 44 mA (max)
 - Modbus (single or dual float): 15 mA (typ)
- Reverse polarity protection
- CE compliant to EN 61326

Environmental

- Operating Temperature: $-40^\circ - 185^\circ\text{F}$ ($-40^\circ - 85^\circ\text{C}$)
- NEMA 4X, IP66

MPI-T Specifications

MPI-T Floats

Floats Y, Z



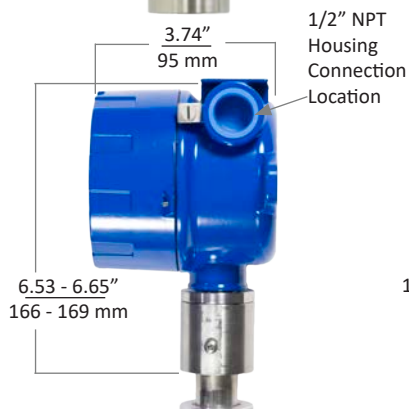
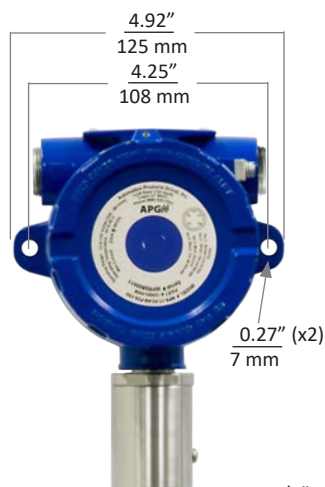
Floats L, M



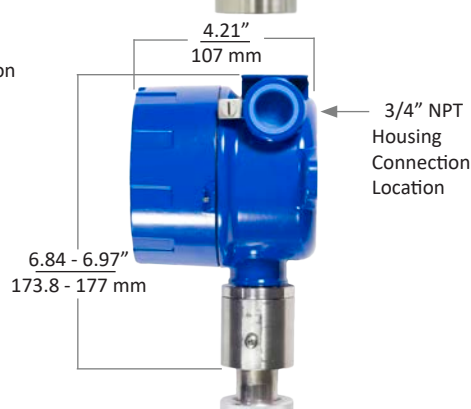
Floats I, J



Small Housing



Large Housing



Performance

- Resolution: Modbus: 0.04 in. (1 mm)
- Distance Accuracy: ± 0.04 in. (± 1 mm)
- Temperature Accuracy: $\pm 1^\circ\text{C}$

Programming

- Optional RST-6001 USB to RS-485 converter

Environmental

- Operating Temperature: $-40^\circ - 185^\circ\text{F}$ ($-40^\circ - 85^\circ\text{C}$)
- NEMA 4X, IP65

Physical

- Housing: Cast aluminium, epoxy coated
- Stem: 1.0" \varnothing Titanium 2
- Stem Length: 4 - 25 ft. (1.22 - 7.62 m)
- Slide Mounting: 316L SS
- Compression Fitting: Aluminum

Electrical

- Electrical Connection: Terminal Block, 8-24 VDC
- Typical current draw: 25 mA
- Reverse polarity protection
- Surge protection (IEC 61000-4-5, 4-6, 4-7)

Connectivity

- Output: Modbus RTU (RS-485) with Surge Protection

Certification

- NEMA 4X, IP65
- cCSAus Certificate CSA19CA70219727: 8-24 VDC, $I_{\text{max}} = 280\text{mA}$ Class I, Division 1, Groups C, D T4; Class I, Zone 0; AEx ia IIB T4 Ga; Ex ia IIB T4 Ga, IP65 $T_a = -40^\circ$ to 85°C
- ATEX Certificate Sira 19ATEX2072X: II 1G Ex ia IIB T4 Ga $T_a = -40^\circ$ to 85°C
- IECEX Certificate IECEX SIR 19.0026X: Ex ia IIB T4 Ga $T_a = -40^\circ$ to 85°C

Tank Cloud



Put Your Tanks In The Cloud

1 Remote Sensors

Connect to any 4-20mA signal or APG Modbus sensor for constant access to your data. Access up to 10 sensors on a single connection.

2 Use the Internet Backbone

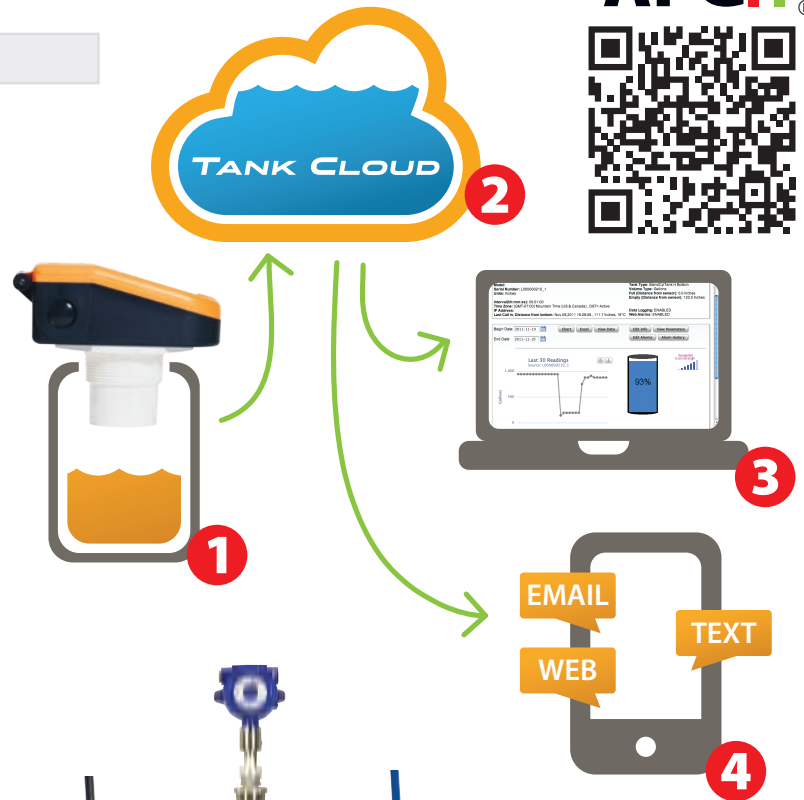
Connect the APG sensor or module to the Internet via landline, radio, cellular, or satellite.

3 View Secure Data 24/7

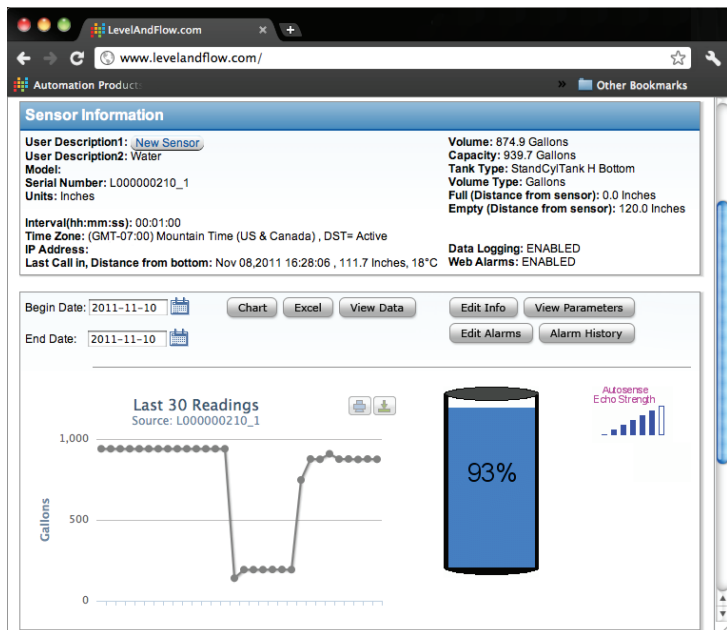
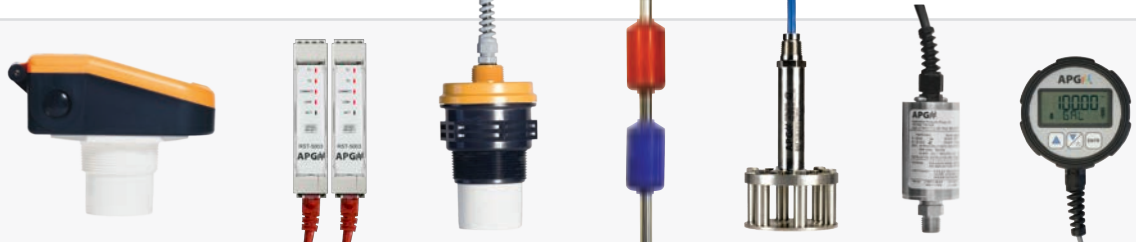
Access sensor data online through our secure portal at levelandflow.com. If the Internet is accessible, so is your information.

4 Stay Up-To-Date

Program custom alarms - receive email and text (sms) message alerts on your computer, mobile phone, or tablet.



The Line-Up:



Online Data Portal

The Tank Cloud data portal, located online at www.levelandflow.com, displays everything you need to know about your measurement.

Here you can:

- View your current and past readings,
- Manage alarms,
- Configure your sensors,
- and Setup user permissions for others in your organization.

Measurements are sorted by location and grouped into sites. Simply select the site you would like to view, and then choose the sensor. Current readings are prominent in the center of the screen.

Contact us today at 888-525-7300 to set-up a demonstration of our sensors and online software. We are excited to show you how it can impact your business.