

# AT100S

## Magnetostrictive Level Transmitter

### Sanitary magnetostrictive level transmitter

#### K-TEK Products



#### Features

- SIL2 Certified IEC 61508\*
- High Accuracy: .01% of Full Scale
- Superior Piezo Ceramic Sensor (Patent # 5,473,245)
- Local Indication with LCD Display
- Single & Double Tri-Clamp Installations
- Suitable for CIP & SIP Applications
- 180 Grit Polish Standard
- Never Requires Re-Calibration: Set It & Forget It
- Dual Compartment Housing with Separate Field Terminal Compartment
- Pressure to 1750 psig (120.7 bar)
- Temperature Range: -320 to 450° F (-196 to 232°C) with options
- Field Replaceable / Upgradable Electronics Module
- Built In RFI / EMI Filter
- Digital Communication

#### Options

- 240 Grit & Electropolished Finish
- 20 Point Strapping Table
- Temperature Indication
- Foundation Fieldbus
- Honeywell DE Output
- Glass Viewing Window
- 316L Stainless Steel Enclosure
- Flexible Waveguide for Low Headroom Applications

## SPECIFICATIONS

### Electronic Transmitter

Housing type	Explosion Proof Powdered Coated Cast Aluminum or Stainless Steel, Dual Compartment
Electrical Connection	1/2" FNPT or M20
Repeatability	0.005% of full scale or 0.015", whichever is greater
Non-Linearity	0.01% of full scale or 0.035", whichever is greater
Accuracy	0.01% of full scale or 0.050", whichever is greater
Supply Voltage	13.5 to 36 VDC - Loop Powered; 9 to 32 VDC - Foundation Fieldbus
Reverse Polarity Protection	Diode in series with loop
Output	Standard 4-20 mA DC Loop HART protocol (Standard) Foundation Fieldbus (optional) <ul style="list-style-type: none"> <li>• ITK 5.1.0 Compliant</li> <li>• 5 AI and 1 PID blocks</li> <li>• 12.5 mA Quiescent Current Draw</li> <li>• LAS Capable</li> </ul>
	Honeywell DE (optional)
Damping	Field adjustable by means of pushbuttons. Range: 0.1 to 36 seconds
Burnout	Jumper selectable upscale (21 mA) or downscale (3.6 mA)
Temperature	-40 to 170°F (-40 to 77°C) Ambient
Humidity	0 to 100% R.H., non-condensing



\* Transmitters equipped with single level 4-20mA/HART module option only

\* Refer to "Ordering Information" Section G

### Sensor Tube

<b>Material</b>	316L Stainless Steel
<b>Process Temp.</b>	-320 to 450°F (-196 to 232°C) with options
<b>Max. Press.</b>	1750 psig @ 450°F (120.7 bar @ 232°C) actual rating will be determined by process connection
<b>Probe Length</b>	1 to 30 feet (304.8mm to 9.14m)
<b>Mounting</b>	Tri-Clamp fitting standard; Refer to ordering information for options.

### Approvals:



#### FM Factory Mutual Research Corporation

XP / I / 1 / ABCD / T6; DIP / II, III / 1 / EFG / T6 <sup>1</sup>  
IS / I / 1 / ABCD / T4 - ELE0001 and ELE1036 <sup>2,3</sup>  
NI / I / 2 / ABCD / T4  
**TYPE 4X**



#### CSA Canadian Standards Association

XP / I / 1 / ABCD / T6; DIP / II, III / 1 / EFG / T6 <sup>1</sup>  
IS / I / 1 / ABCD / T4 - ELE0001 <sup>2</sup>  
NI / I / 2 / ABCD / T4  
**TYPE 4X**



#### ATEX

FP: **ITS08ATEX15869X**  
II 1/2 G/D Ex d IIC T6  
Ex tD 20/A21 IP6X T80°C  
IS: **ITS08ATEX15866X**  
II 1/2 GD Ex ia IIC T4 (-40°C ≤ Tamb ≤ 66°C)  
Ex iaD 20/21 IP6X T80°C (-40°C ≤ Tamb ≤ 66°C)



#### GOST Russia

FP: 1ExdIICT6 <sup>1</sup>  
IS: 0ExialIBT6 <sup>2</sup>  
Ingress protection: IP67  
Sanitary Hygienic Certificate



Ingress protection: IP66 and IP67



#### IEC International Electromechanical Commission

IS: **IECEX ITS 08.0032X** <sup>2,3</sup>  
Ex ia IIC T4  
Ex iaD 20/21 IP6X T80°C  
FP: **IECEX ITS 08.0035**  
II 1/2G/D Ex d IIC T6  
Ex tD A21 IP6X T80°C

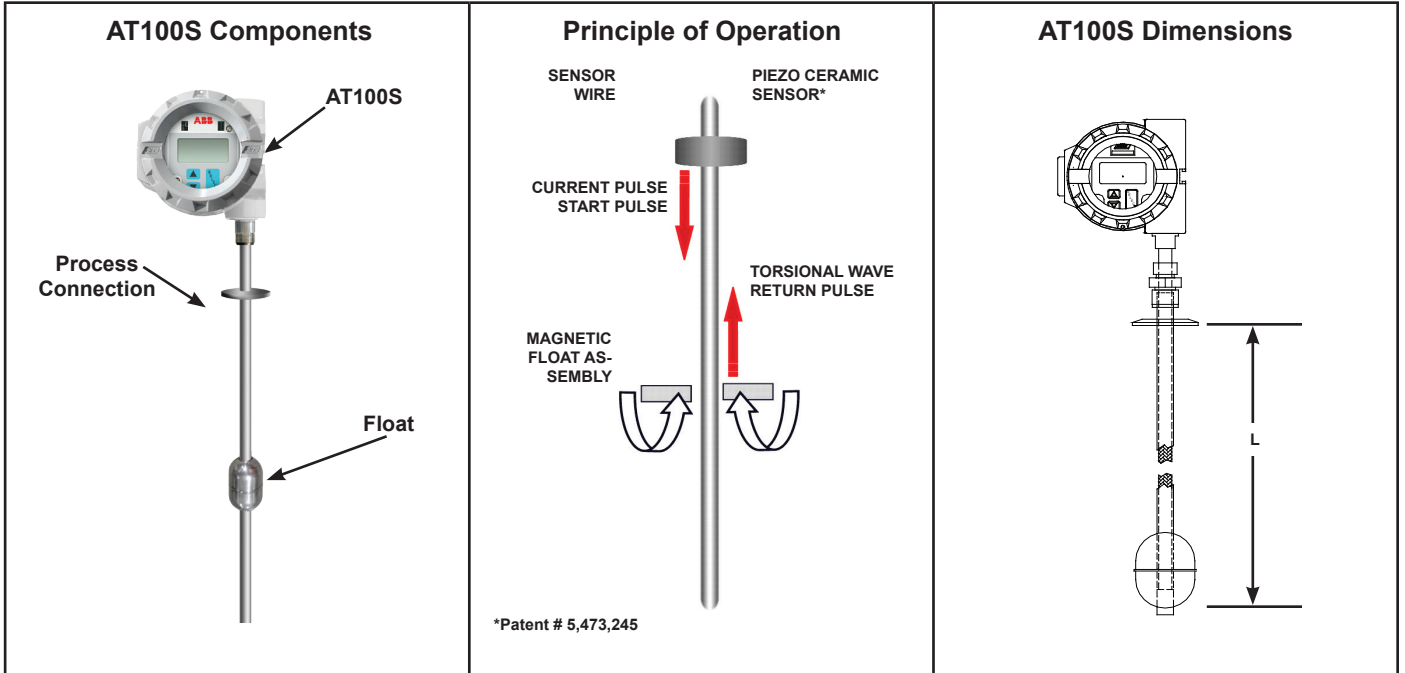
- Notes:**
1. Excludes Probe SW3 options.
  2. Excludes RI (secondary analog output) & Honeywell DE options.
  3. Fieldbus & FISCO

## IEC61508 CERTIFIED

**Safety** Third Party Certified Safety Integrity Level (SIL 2) data (FMEDA analysis) for Safety Instrumented Systems

**PRINCIPLE OF OPERATION:**

The AT100S is based upon the magnetostrictive principle. The sensing tube contains a wire which is pulsed at fixed time intervals creating a magnetic field around the wire. The interaction of the magnetic field around the wire and the magnetic float causes a torsional stress wave to be induced in the wire. This torsion propagates along the wire at a known velocity, from the position of the magnetic float and toward both ends of the wire. A patented piezo ceramic sensing element placed in the transmitter assembly converts the received mechanical torsion into an electrical return pulse. The microprocessor-based electronics measures the elapsed time between the start and return pulses and converts it into a position measurement which is proportional to the level of the float.



## ORDERING INFORMATION

### AT100S/a/b/c/d/e/f/g/h/l/j/k/l:

#### /a Probe Material

**S6** 316L Stainless Steel Standard

#### /b Transmitter Configuration

**L** Standard Local Transmitter

**LW** Standard Local Transmitter with Window Cover

**T** Local Transmitter with Top Access or Readout

**TW** Local Transmitter with Top Access or Readout and Window Cover

**C** Offset Transmitter with Vapor Seal for Service Below Ambient

**CW** Offset Transmitter with Vapor Seal for Service Below Ambient and Window Cover

#### /c Transmitter Housing

**A** Standard Dual Compartment Aluminum Housing

**S** Dual Compartment 316L Stainless Steel Housing

#### /d Probe Type

##### 5/8" OD Rigid Probes specify end of probe design:

**CP** Clean in Place with Float Retaining Clip

**DN** Drain in Place, No Through Hole, No Float Retainer

**DP** Drain in Place Sensor with Non-Removable Float

**3A** 3A Sensor with Non-Removable Float

**SW1** 1/2" OD Rigid Probe for Insertion into 5/8" OD x 0.049" Wall Sensor Well

Note: Order sanitary sensor well separately (ACS-0002-1)

**SW3** 1/2" OD Flexible SS Braided Probe for insertion into 5/8" OD x 0.49" wall Sensor Well

Notes: 1. Max 300°F (149°C) @ 1 hour Clean.

2. 15 ft. (4.5m) maximum probe length.

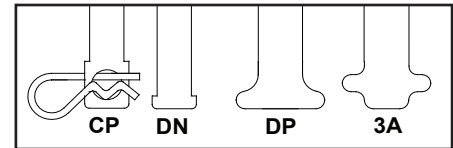
3. Available with /S6 probe material only.

4. Not suitable for explosion proof service.

5. Probe is not hermetically sealed. For use in conditioned (non-condensing) indoor locations only.

6. Only available with H0 process temperature option.

7. Order sanitary sensor well separately (ACS-0002-1)



#### /e Probe Finish

**X** None, use this selection with /SW1 & /SW3 probe types.

**1F** Standard 180 Grit Mechanical Finish (Suitable for 3A Service)

**2F** 240 Grit Mechanical Finish

**EP** 240 Grit Mechanical and Electro-polished Finish

Note: Certificates of RA and Passivation available upon request

#### /f Process Temperature Options

**H0** 170°F (77°C) Maximum; Top of transmitter is 8" (200mm) above tank nozzle

Note: Max 300°F (149°C) @ 1 hour Clean; Performance not guaranteed during 1 hr. cleaning cycle

**H1** 250°F (121°C) Maximum; Top of transmitter is 16" (406mm) above tank nozzle

Note: Max 300°F (149°C) @ 1 hour Clean; Performance not guaranteed during 1 hr. cleaning cycle

**H2** 450°F (232°C) Maximum; Top of transmitter is 26" (660mm) above tank nozzle

#### /g Electronic Module

##### Hart Protocol:

**M4A** One level, LCD indicator and SIL 2 rated 4-20 mA Output

**M4B** Two Levels, LCD Indicator and SIL 2 rated 4-20 mA Output

**M4AS** One Level, LCD Indicator and SIL 2 rated 4-20 mA Output and 20 point Strapping Table

**M4BS** Two Levels, LCD Indicator, HART Protocol, one SIL 2 rated 4-20 mA Output and 20 point strapping table



## ORDERING INFORMATION (continued)

### /g Electronic Module

#### Foundation Fieldbus Protocol:

**M4AF** One Level & LCD Indicator

**M4BF** Two levels & LCD Indicator

**M4AFS** One Level, LCD Indicator & 20 point Strapping Table

**M4BFS** Two Levels, LCD Indicator & 20 point Strapping Table

#### Honeywell DE Protocol:

**M4AD** One Level & LCD Indicator

**M4BD** Two Levels & LCD Indicator

**M5A** One Level, One temperature point, LCD indicator, and Communications

**M5B** Two Levels, One temperature point, LCD indicator, and Communications

### /h Second Analog Output (Not SIL rated)

**X** Not available

**RI** Second electronic module with 1 ea. Analog output and LCD indication

- Notes: 1. Only available with M5A modules  
2. Only for use with HART Protocol equipped electronics modules  
3. The RI100 is only approved as an Explosion Proof device  
4. Analog output field selectable to level or temperature  
5. Housing type will be same as primary transmitter housing (/c above)

### /i Approvals<sup>1,2</sup>

**FM** Factory Mutual

**CSA** Canadian Standards Association

**CEX** ATEX Flameproof

**CEI** ATEX I.S.

**IEI** International Electromechanical Commission I.S.

**IEX** International Electromechanical Commission Flameproof

**GR** GOST Russia

- Notes: 1. All Explosion Proof Approvals exclude Probe SW3.  
2. All Intrinsically Safe Approvals exclude RI (secondary analog output) & Honeywell DE options.



### /j Process Connection

**Tnn** Tri-Clamp: welded to the sensor

- Notes: 1. Specify "nn" as follows: 10 = 1", 15 = 1.5", 20 = 2.0", 25 = 2.5" up to 6"  
2. Tri-clamp size and type will determine the maximum probe pressure rating

**CF** Adjustable 1/2" to 5/8" compression fitting  
For use with SW1 and SW3 sensor well

**WP** Flange or plug welded to the sensor tube  
Specify type, material and rating from SLG-0001-1 Flange Designation Chart

### /k Float Type

**X** None; Use this selection with /SW1, & /SW3 probe types

**Fnn** Selection from Standard Float Chart (SLG-0003-1) or specify /FXX for custom float

### /l Insertion Length

**L** Specify inserted length from top of tank nozzle in inches or millimeters or meters  
Consult factory for transmitter measuring length. There is an unusable range of 2.5 inches minimum at the bottom of the sensing tube (which can be reduced depending upon float dimensions). The unusable range at the top is affected by the float dimensions.

**NOTE:** Consult factory for special application requirements.

### Available Accessories:

**M20 ISO FITTING:** M20 Female Electrical Connection (**MM** - Brass or **MMS** - Stainless Steel)

**FINISH CERT: Certificate of RA and Passivation (specify required RA finish for electro-polished probes only)**

For fastest response to inquiries provide a completed AT100 Application Data Sheet or the Serial Number of an existing AT100.

# Contact us

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