

AT100

Magnetostrictive Level Transmitter

KTEK Products

Measurement made easy



Features

- SIL2 certified IEC 61508*
- High accuracy: .01% of full scale
- Superior piezo ceramic sensor (Patent # 5,473,245)
- Local indication with LCD display
- Never requires re-calibration: set it & forget it
- Dual compartment housing with separate field terminal compartment
- Loop powered to 75 ft./22 m probe length
- Total and/or interface level measurement
- Pressure to 3000 psig/207 bar, Std. 1800 psig/124.1 bar
- Temperature range: -320 to 800° F (-196 to 427°C) with options
- Field replaceable/upgradable electronics module
- Built in RFI/EMI filter
- Digital communications

Options

- Two level indications
- Temperature indications
- Foundation Fieldbus output
- Honeywell DE output
- Glass viewing window
- 316L stainless steel enclosure
- 20 point strapping table

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/Communications	Standard 4-20 mA DC Loop HART protocol (standard) Foundation Fieldbus (optional) <ul style="list-style-type: none"> • ITK 5.1.0 Compliant • 5 AI and 1 PID blocks • 12.5 mA Quiescent Current Draw • LAS Capable
	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 4-20mA/HART module option only

* Refer to "Ordering Information", Section F

Sensor Tube

	Standard	Options
Material	316L SS	Alloy 20, HSC-276, Teflon® (a registered trademark of DuPont) Jacketed 316L SS, Electro-Polish
Process Temp.	-320 to 250°F (-196 to 121°C)	800°F (427°C)
Max. Press.	1800 psig @ 300°F (124.1 bar @ 149°C)	3000 psig (206.8bar)
Probe Length	1 to 30 feet (304.8mm to 9.14m)	75 ft (22.3m)
Mounting	3/4 in MNPT compression fitting	Loose and welded flanges, plugs and tri-clamp fittings

Approvals:



FM Factory Mutual Research Corporation
 XP / I / 1 / ABCD / T6; DIP / II, III / 1 / EFG / T6¹
 IS / I / 1 / ABCD / T4 - ELE0001 and ELE1036^{2,3}
 NI / I / 2 / ABCD / T4
TYPE 4X



CSA Canadian Standards Association
 XP / I / 1 / ABCD / T6; DIP / II, III / 1 / EFG / T6¹
 IS / I / 1 / ABCD / T4 - ELE0001²
 NI / I / 2 / ABCD / T4
TYPE 4X



ATEX
FP: ITS08ATEX15869X¹
 II 1/2 G/D Ex d IIC T6
 Ex tD 20/A21 IP6X T80°C
IS: ITS08ATEX15866X^{2,3}
 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)

Ingress protection: IP66 and IP67



IEC International Electromechanical Commission
IS: IECEx ITS 08.0032X^{2,3}
 Ex ia IIC T4
 Ex iaD 20/21 IP6X T80°C
FP: IECExITS 08.0035¹
 II 1/2G/D Ex d IIC T6
 Ex tD A21 IP6X T80°C

- Notes:**
1. Excludes Probe F1 and SW3 options.
 2. Excludes RI (secondary analog output) & Honeywell DE options.
 3. Fieldbus & FISCO



Chinese Approvals Available
 when purchased through
 K-TEK (Tianjin) Level Co. LTD.
 TEDA-Tianjin, China +86 (22) 598 13078

IEC61508 CERTIFIED

Safety



Third Party Certified Safety Integrity Level (SIL 2) data (FMEDA analysis) for Safety Instrumented Systems engineering is available.

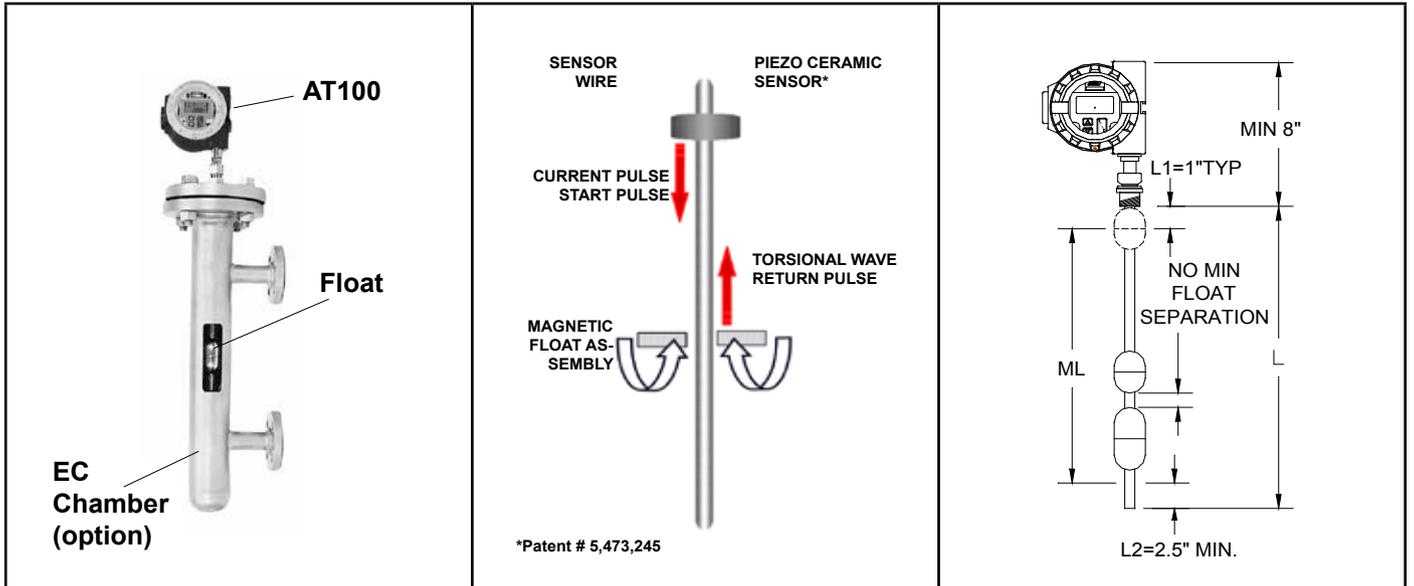
PRINCIPLE OF OPERATION:

The AT100 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.

AT100 Components

Principle of Operation

AT100 Dimensions



ORDERING INFORMATION

AT100/a/b/c/d/e/f/g/h/l/j/k:

Example: AT100/S6/LW/A/R1/H0/M4A/X/FM/CF/F1B/48"

/a Probe Material

- S6** 316L Stainless Steel Standard
- A2** Alloy 20
- HC** Hastelloy C-276 (1/2" OD SW1 Probe without Sensor Well)
- TF** PFA Jacket (1/16" thick) over 316L SS (Max 350°F (177°C) & 50 psig (3.4bar))

/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

R1 Standard Rigid Probe, 5/8" OD

- Notes: 1. 30 ft. (9.14m) maximum probe length
2. 1400 psig (96.5bar) @ 800°F (427°C)
3. 1600 psig (110.3bar) @ 700°F (371°C)
4. 1800 psig (124.1bar) @ 300°F (149°C)

F1 Flexible Teflon® (a registered trademark of DuPont) Sensor Inserted into 1" OD Segmented Sensor Well

- Notes: 1. Only available with /S6, /A2, /HC options.
2. 75 ft. (22.86 m) maximum probe length.
3. 300 psig (20.7bar) maximum & 170°F (77°C) maximum.
4. Specify maximum segment length, 10ft. (3.05m) standard.
5. Not suitable for explosion proof service.
6. Suitable for intrinsically safe installation.
7. Not suitable for cryogenic applications.

HP High Pressure Rigid Probe, 5/8" OD

- Notes: 1. Not available with /TF probe material option.
2. 30 ft. (9.14m) maximum probe length.
3. 3000 psig (206.8 bar) maximum.
4. Not available with /H3 Process Temperature Option.

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

- Notes: 1. Specify and order sensor well separately.
2. 20 ft. (6.10m) maximum probe length.
3. Not available with /H3 Process Temperature Option.

SW2 5/8" OD Rigid Probe for Insertion Into 3/4" Sch. 40 or 80 Sensor Well

- Notes: 1. Specify and order sensor well separately.
2. 30 ft. (9.14m) maximum probe length.

SW3 1/2" OD Flexible 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. (4.57m) 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.

/e Process Temperature Options

- H0** < 170°F (77°C) Maximum; Top of transmitter is 8" (200mm) above process connection
- H1** < 250°F (121°C) Maximum; Top of transmitter is 16" (406mm) above process connection
- H2** < 450°F (232°C) Maximum; Top of transmitter is 26" (660mm) above process connection
- H3** < 800°F (427°C) Maximum; Top of transmitter is 26" (660 mm) above process connection
Note: 15 ft. (4.57m) maximum probe length.

ORDERING INFORMATION (continued)



/f Electronic Module

X None

HART Protocol: **M4A** One Level, LCD Indicator & SIL 2 rated 4-20 mA Output
M4B Two Levels, LCD Indicator & SIL 2 rated 4-20 mA Output
M4AS One Level, LCD Indicator & SIL 2 rated 4-20 mA Output & 20 point Strapping Table
M4BS Two Levels, LCD Indicator & SIL 2 rated 4-20 mA Output & 20 point Strapping Table
M5A One Level, One temperature point, LCD indicator, and Communications
M5B Two Levels, One temperature point, LCD indicator, and Communications

Foundation **M4AF** One Level & LCD Indicator
Fieldbus Protocol: **M4BF** Two Levels & LCD Indicator
M4AFS One Level & LCD Indicator & 20 point Strapping Table
M4BFS One Level & LCD Indicator & 20 point Strapping Table

Honeywell **M4AD** One Level & LCD Indicator
DE Protocol: **M4BD** Two Levels & LCD Indicator

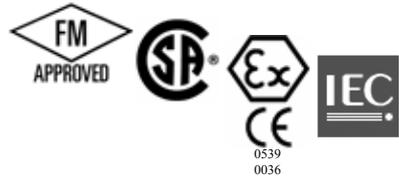
/g Second Analog Output (Not SIL Rated)

X None

RI Second electronic module with 1 ea. Analog output and LCD indication
 Notes: 1. Only for use with HART Protocol equipped electronics modules
 2. The RI100 is only approved as an Explosion Proof device
 3. Analog output field selectable to any of the two levels or temperature
 4. Housing type will be same as primary transmitter housing (/c above)

/h Approvals^{1,2}

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



Notes: 1. All Explosion Proof Approvals exclude Probe F1 and SW3.
 2. All Intrinsically Safe Approvals exclude RI (secondary analog output) & Honeywell DE options.

/i Process Connection

X None (use with /SW1, /SW2 and /SW3 probe types)
CF Standard adjustable compression fitting 3/4" MNPT (1"MNPT with /F1 probe type)
FL Flange or plug (shipped loose) with FNPT thread for use with compression fitting (specify type, material and rating from SLG-0001-1 Flange Designation Chart)
WP Flange or Plug welded to the sensor tube without compression fitting (specify type, material and rating from SLG-0001-1 Flange Designation Chart)

/j Float Type

X None (Use this selection with /SW1, /SW2, & /SW3 probe types)
Fnn Selection from Standard Float Chart (SLG-0003-1) or specify /FXX for custom float

/k Insertion Length

L Specify inserted length from process connection to end of probe in inches or millimeters or meters
 Consult factory for ML, L1 & L2. There is an unusable range of 2.5 inches minimum (12" for /F1) at the bottom of the sensing tube (which can be reduced depending upon float dimensions).
 The unusable range at the top of the sensor tube will be 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)

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

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