Data sheet DS/AT100-EN Rev. T

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

Power and productivity
for a better world™

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) • 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 170ºF (-40 to 77ºC) 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 250ºF (-196 to 121ºC)	800ºF (427ºC)
Max. Press.	1800 psig @ 300ºF (124.1 bar @ 149ºC)	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 / T6 [1]
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 / T6 [1]
IS / I / 1 / ABCD / T4 - ELE0001 [2]
NI / I / 2 / ABCD / T4
TYPE 4X

ATEX
FP: ITS08ATEX15869X [1]
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

GOST Russia
FP: 1ExdIICT6 [1]
IS: 0ExiaIICT6 [2]
Ingress protection: IP67
Sanitary Hygienic Certificate

IEC International Electromechanical Commission
IS: **IECEx ITS 08.0032X [2,3]**
Ex ia IIC T4
Ex iaD 20/21 IP6X T80°C
FP: **IECExITS 08.0035 [1]**
II 1/2G/D Ex d IIC T6
Ex tD A21 IP6X T80°C

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

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

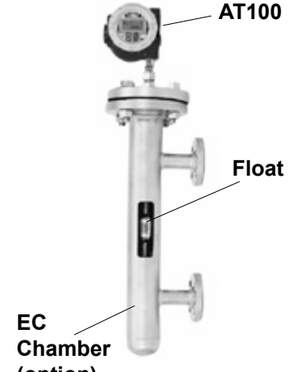
IEC61508 CERTIFIED

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

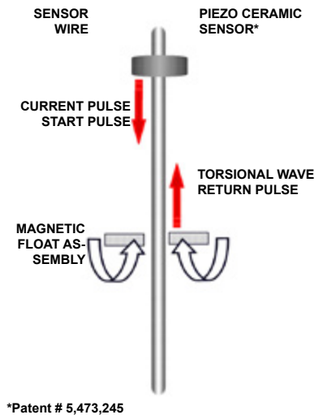
PRINCIPLE OF OPERATION:

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.

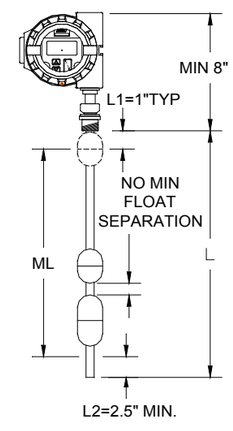
AT100 Components



Principle of Operation



AT100 Dimensions



ORDERING INFORMATION

AT100/a/b/c/d/e/f/g/h/I/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 350ºF (177ºC) & 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) @ 800ºF (427ºC)
3. 1600 psig (110.3bar) @ 700ºF (371ºC)
4. 1800 psig (124.1bar) @ 300ºF (149ºC)

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 & 170ºF (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 300ºF (149ºC) @ 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 < 170ºF (77ºC) Maximum; Top of transmitter is 8” (200mm) above process connection

H1 < 250ºF (121ºC) Maximum; Top of transmitter is 16” (406mm) above process connection

H2 < 450ºF (232ºC) Maximum; Top of transmitter is 26” (660mm) above process connection

H3 < 800ºF (427ºC) 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 Fieldbus Protocol:
M4AF One Level & LCD Indicator
M4BF Two Levels & LCD Indicator
M4AFS One Level & LCD Indicator & 20 point Strapping Table
M4BFS One Level & LCD Indicator & 20 point Strapping Table

Honeywell DE Protocol:
M4AD One Level & LCD Indicator
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

GR GOST Russia

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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