

AST45PT Pressure & Temperature Submersible Sensor

Liquid Level and Temperature Sensor

Overview

The AST45PT is a submersible sensor for the measurement of pressure and temperature. For pressure ranges from 0-1 to 100 PSI that require a wide range of media compatibility, the AST45PT submersible sensor is an excellent solution to monitor level and temperature for indoor and outdoor applications.

Benefits

- High Strength Stainless Steel Construction
- No Internal O-rings
- Ranges up to 100 PSI
- Unparalleled Price and Performance
- Rugged Design
- Survives Harsh Environments
- Compatible with Various Liquids
- EMI/RFI Protection

Applications

- Ground Water Level Measurement
- Earthen & Concrete Dams
- Liquid Tanks
- Gasoline & Diesel Fuel Tanks
- Irrigation
- Waste Water Canals



Environmental Data

Temperature

Operating	-40 to 85°C (-40 to 185°F)
Storage	-40 to 100°C (-40 to 212°F)

Thermal Limits

Compensated Range	0 to 55°C (30 to 130°F)
TC Zero	<±1.0% of FS
TC Span	<±1.0% of FS

Other

Shock	100G, 11 msec, 1/2 sine
Vibration	10G peak, 20 to 2000 Hz.
EMI/RFI Protection:	Yes
Rating:	IP-68

Performance @ 25°C (77°F)

Accuracy (Pressure)*	<±0.25% of FS BFSL
Accuracy (Temp.)*	±2°C TEB
Over Range Protection	2X Rated Pressure
Burst Pressure	5X or 1,250 PSI (whichever is less)
Pressure Cycles	>50 Million

* Accuracy includes non-linearity, hysteresis & non-repeatability

Electrical Data

Output	4-20mA*	1-5V
Excitation	10-28VDC	10-28VDC
Current Consumption:	-	<10mA
Sampling Rate	400Hz	400Hz
Output Noise:	<1mV, RMS	<1mV, RMS
Zero Offset	<±0.5% FS	< ± 0.5% FS
Span Tolerance	<±0.5% FS	< ± 0.5% FS
Output Load:	0-800 Ohms@10-28VDC	5k Ohms, min.
Reverse Polarity Protection	Yes	Yes

*For units with loop-powered 4-20mA output, the pressure loop must be powered or the temperature output will not operate.



Ordering Information

AST45PT 1 L 00005 P 4 X 1 N 065

Series Type

Temperature Output Range
 1= -40 to 85°C (-40 to 185°F)
 2= -40 to 125°C (-40 to 257°F)
 3= 0 to 70°C (32 to 158°F)
 4= -55 to 125°C (-67 to 250°F)
 5= -18 to 93°C (0-200°F)

Configuration Interface
 L= Cone (Removable)

Pressure Range
 Insert 5-digit pressure code

Pressure Unit
 H= Inches H2O P= PSI

Outputs*
 4= 4-20mA 3= 1-5V

Electrical
 N= Conduit fitting, Cable 6 ft.
 P= Conduit fitting, Cable 10 ft.
 X= Optional Length (see options)

Wetted Material
 1= 316L / 304 SS/ Hytrel Cable

Fail Condition
 N= Not Specified H= Fail High L= Fail Low

Options Cable Lengths:
 140= 15 ft. (4.6 m) 004= 35 ft. (10.7 m) 003= 100 ft. (30.5 m)
 075= 20 ft. (6.1 m) 130= 40 ft. (12.2 m) 050= 150 ft. (45.7 m)
 074= 25 ft. (7.6 m) 065= 50 ft. (15.2 m)

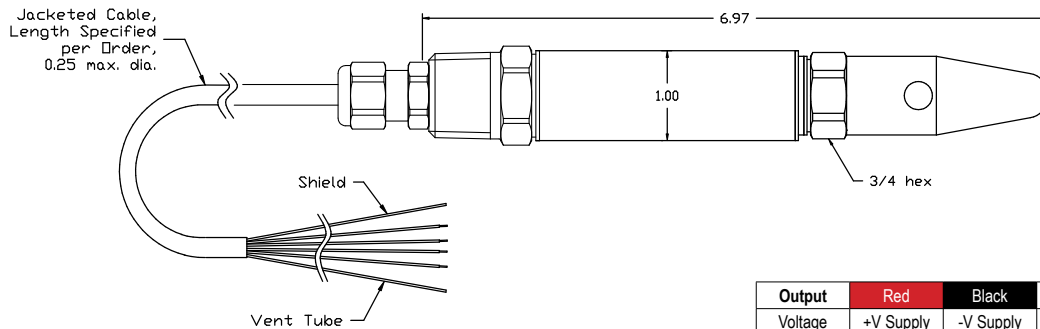
Pressure Ranges

Gage PSIG	Pressure Code
0-100	00100
0-50	00050
0-30	00030
0-20	00020
0-15	00015
0-10	00010
0-7.5	00208*
0-5	00005
0-2.5	00069*
0-1	00001

*2.5 and 7.5 PSI Sensor must be ordered in inches of H₂O.

*contact factory for other outputs

Dimensional Data



Output	Red	Black	White	Green
Voltage	+V Supply	-V Supply	Pressure	Temperature
4-20mA	+Pressure	-Pressure	-Temperature	+Temperature

Warranty

Workmanship - AST, Inc. pressure transmitters have a limited one-year warranty to the original purchaser. AST, Inc. will replace or repair, free of charge, any defective transmitter. All units returned for warranty evaluation must be thoroughly cleaned and free of process residue prior to shipment. Units that are not properly cleaned will be discarded and warranty service will be denied. This warranty does not apply to any units that have been modified; misused, neglected or installed where the application exceeds published ratings. AST45PT is not recommended for use with hydrogen. AST's sensors are made with pride in New Jersey, USA. If in the area please feel free to stop by for a visit!

Installation/Applications - The purchaser is responsible for media compatibility, functional adequacy, and correct installation of the transmitter. The nose cone is installed on the sensor with Loctite®. To remove, hold the sensor by the hex with a wrench. Put a screwdriver through both holes of the nose cone and turn counterclockwise. The level sensor will have a 1/4" NPT Male pressure port.

AST4500 & AST4510 Intrinsically Safe Liquid Level Sensor

Submersible Pressure Transducer / Transmitter

Overview

The AST4500 and AST4510 submersible level sensors are approved to UL/cUL913 (CSA 157) Class I Div 1, Groups C and D for use in intrinsically safe areas with an approved barrier. For pressure ranges from 0-1 to 0-100 PSI that require a wide range of media compatibility, the submersible series is an excellent solution to level monitoring for indoor and outdoor applications. The AST4500 and AST4510 level sensors are completely sealed for submersion, yet vented through the cable to correct for barometric pressure changes. The welded housing is tested in-house via a helium leak tester to ensure proper protection. The conductors of the cable are also isolated from the outside environment to keep the sensor operational for long-term use. .

Benefits

- High Strength Stainless Steel Construction
- No Internal O-rings
- Wide Operating Temperature Range
- Pressures from 1 to 100 PSI
- Low Static and Thermal Errors
- Unparalleled Price and Performance
- Rugged Design
- Survives Harsh Environments
- Compatible with Many Liquids
- EMI/RFI Protection

Applications

- Ground Water Level Measurement
- Earthen & Concrete Dams
- Liquid Tanks
- Gasoline & Diesel Fuel Tanks
- Irrigation
- Waste Water Canals
- Bio-Fuels
- Salt Water Holding Tanks
- Fertilizer Tanks



Environmental Data

Temperature

Operating	-40 to 85°C (-40 to 185°F)
Storage	-40 to 100°C (-40 to 212°F)

Thermal Limits

Compensated Range	0 to 55°C (30 to 130°F)
TC Zero	<±1.5% of FS (<±2.5%, typ. for 1PSI)
TC Span	<±1.5% of FS (<±2.5%, typ. for 1PSI)

Other

Shock	100G, 11 msec, 1/2 sine
Vibration	10G peak, 20 to 2000 Hz.
EMI/RFI Protection:	Yes
Rating:	IP-68

Performance @ 25°C (77°F)

Accuracy*	< ±0.25% BFSL (<±0.5% BFSL for 0-1 PSI)
Stability (1 year)	±0.25% FS, typical
Over Range Protection	2X Rated Pressure
Burst Pressure	5X or 1,250 PSI (whichever is less)
Pressure Cycles	> 50 Million

* Accuracy includes non-linearity, hysteresis & non-repeatability

Electrical Data

Output	4-20mA	1-5VDC
Excitation	10-28VDC	10-28VDC
Output Impedance	>10k Ohms	<100 Ohms, Nominal
Current Consumption:	20mA, typical	5mA, typical
Bandwidth	(-3dB): DC to 250 Hz	(-3dB): DC to 1kHz
Output Noise:	-	<2mV RMS
Zero Offset:	<±1% of FS (<±4% 1PSI)	<±1% of FS (<±4% 1PSI)
Span Tolerance:	<±2% of FS (<±4% 1PSI)	<±1.5% of FS (<±4% 1PSI)
Output Load:	0-800 Ohms@10-28VDC	10k Ohms, min
Reverse Polarity Protection	Yes	Yes



Ordering Information

AST4510 L 00005 P 4 N 1 000

Series Type

Configuration Interface

L= Cone

Pressure Range

Insert 5-digit pressure code

Pressure Unit

B= Bar K= kg/cm²

H= Inches H₂O P= PSI

Outputs

3= 1-5V

4= 4-20mA

Electrical*

N= Conduit fitting, Cable 6 ft.

P= Conduit fitting, Cable 10 ft.

X= Optional Length (see options)

Wetted Material

1= 316L / 304 / Hytrel

Options Cable Lengths:

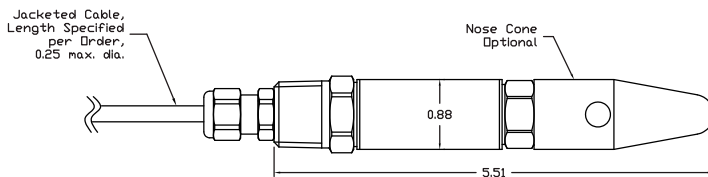
140= 15 ft. (4.6 m) 004= 35 ft. (10.7 m) 003= 100 ft. (30.5 m)

075= 20 ft. (6.1 m) 130= 40 ft. (12.2 m) 050= 150 ft. (45.7 m)

074= 25 ft. (7.6 m) 065= 50 ft. (15.2 m)

*Wiring information available at: <http://www.astensors.com/mediacenter.php>

Dimensional Data



Warranty

Workmanship - AST, Inc. pressure transmitters have a limited one-year warranty to the original purchaser. AST, Inc. will replace or repair, free of charge, any defective transmitter. All units returned for warranty evaluation must be thoroughly cleaned and free of process residue prior to shipment. Units that are not properly cleaned will be discarded and warranty service will be denied. This warranty does not apply to any units that have been modified; misused, neglected or installed where the application exceeds published ratings. AST4510 is not recommended for use with hydrogen. AST's sensors are made with pride in New Jersey, USA. If in the area please feel free to stop by for a visit!

Installation/Applications - The purchaser is responsible for media compatibility, functional adequacy, and correct installation of the transmitter. The nose cone is installed on the sensor with Loctite®. To remove, hold the sensor by the hex with a wrench. Put a screwdriver through both holes of the nose cone and turn counterclockwise. The level sensor will have a 1/4" NPT Male pressure port.

Pressure Ranges

AST4500

Gage PSIG	Pressure Code	Feet of Water Column @ 4°C (approx.)
0-100	00100	230.67
0-50	00050	115.33
0-30	00030	69.20
0-20	00020	46.13

AST4510

0-15	00015	34.60
0-10	00010	23.07
0-7.5	00208*	17.30
0-5	00005	11.53
0-2.5	00069*	5.77
0-1	00001	2.31

Typical Ranges. All ranges between 0-1 PSI and 0-100 PSI are available. Please consult factory. *2.5 and 7.5 PSI Sensor must be ordered in inches of H₂O.

Barrier Installation

Class I, Div. 1, Groups C, D Nonhazardous Location A08949
Hazardous Location

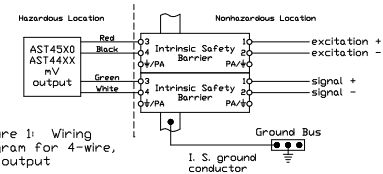


Figure 1: Wiring diagram for 4-wire, mV output

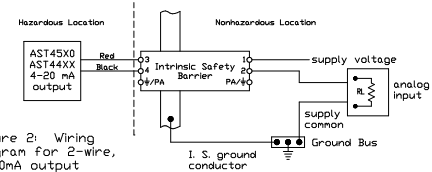


Figure 2: Wiring diagram for 2-wire, 4-20mA output

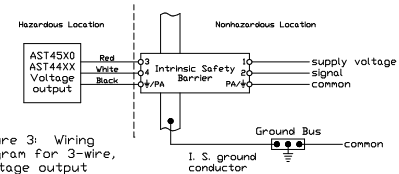


Figure 3: Wiring diagram for 3-wire, Voltage output

Entity Parameters

Models AST4400, AST4410 and AST44LP Models AST4400, AST4410 and AST44P with integral cable Models AST4500, AST4510 and AST4520

V_{max} = 28 Vdc
I_{max} = 175 mA
C_i = 0.45 uF
L_i = 0

V_{max} = 28 Vdc
I_{max} = 175 mA
C_i = 0.45 uF
L_i = 1.32 uH

V_{max} = 28 Vdc
I_{max} = 175 mA
C_i = 0.46 uF
L_i = 16.5 uH

1. For installation in accordance with Fig. 2, barrier must be a CSA Certified, Single Channel grounded Shunt-Diode Zener Barrier or a Single Channel Isolating Barrier.

Barrier parameters must meet the following requirements:

$$V_{oc} \text{ or } U_o \leq V_{max} \quad C_a \text{ or } C_o \geq C_i + C_{cable}$$

$$I_{sc} \text{ or } I_o \leq I_{max} \quad L_a \text{ or } L_o \geq L_i + L_{cable}$$

$$P_o \leq P_i \text{ (if applicable)}$$

2. For installations in accordance with Figs. 1 and 3, one dual-channel or two single-channel barriers may be used, where in either case, both channels have been Certified for use together with combined entity parameters.

The following conditions must be satisfied:

$$V_{oc} \text{ or } U_o \leq V_{max} \quad C_a \text{ or } C_o \geq C_i + C_{cable}$$

$$I_{sc} \text{ or } I_o \leq I_{max} \quad L_a \text{ or } L_o \geq L_i + L_{cable}$$

$$P_o \leq P_i \text{ (if applicable)}$$

3. Maximum non-hazardous area voltage must not exceed 250 V.

4. Installation should be in accordance with Canadian Electrical Code, Part I.

5. A grounding method is not provided by the manufacturer as part of the integral design of the Transducer. For units which are connected through a grounded shunt diode safety barrier, ensure that the transducer is mounted to a surface which is at the same potential as the barrier ground.

AST4520 Class I Div 1, Groups C and D with Approved Barrier

Flush Diaphragm Submersible Pressure Transmitter

Overview

The AST4520 Flush Diaphragm Submersible Pressure Transmitter is the cost effective solution for level monitoring of turbulent tanks with viscous media. Approved to UL/cUL913 Class 1 Division 1 IS, Groups C and D with an approved barrier, the product ensures a safe, reliable source for level measurement. The AST4520 is offered with pressure ranges from 0-2.5 to 0-15 PSIG. The AST4520 steel cage front end design allows for proper flow of media while keeping the sensor at the bottom of the tank or well. With an engraved stainless steel housing and Kynar PVDF cable, this sensor is built to handle the toughest environments.

Benefits

- Engraved 316L Housing
- Protective Steel Cage Assembly
- Kynar PVDF Cable
- Compatible with a Various Chemicals
- Ruggedly Designed for Harsh Waste Water Environments
- Suitable for Waste, Salt, Brackish, or Fresh Water Systems
- EMI/RFI and Reverse Polarity Protection
- Lightning and Surge Protection
- Competitively Priced for OEM Applications
- Excellent Price to Performance Ratio

Applications

- Lift Stations - Wastewater, Storm Water, Industrial Applications
- Food Tanks
- Viscous Media Tanks
- Heavy Oil



Environmental Data

Temperature

Operating -40 to 85°C (-40 to 185°F)

Storage -40 to 100°C (-40 to 212°F)

Thermal Limits

Compensated Range 0 to 55°C (30 to 130°F)

TC Zero <±1.5% of FS

TC Span <±1.5% of FS

Other

Shock 100G, 11 msec, 1/2 sine

Vibration 10G peak, 20 to 2000 Hz.

EMI/RFI Protection: Yes

Rating: IP-68

Performance @ 25°C (77°F)

Accuracy*	< ±0.25% BFS
Stability (1 year)	±0.25% FS, typical
Over Range Protection	2X Rated Pressure
Burst Pressure	5X or 1,250 PSI (whichever is less)
Pressure Cycles	> 50 Million

* Accuracy includes non-linearity, hysteresis & non-repeatability

Electrical Data

Output	4-20mA
Excitation	10-28VDC
Output Impedance	>10k Ohms
Current Consumption:	20mA, typical
Bandwidth	(-3dB): DC to 250 Hz
Output Noise:	-
Zero Offset:	<±1% of FS
Span Tolerance:	<±2% of FS
Output Load:	0-800 Ohms@10-28VDC
Reverse Polarity Protection	Yes



Ordering Information

AST4520 **Y** **00005** **P** **4** **X** **1** **353**

Series Type

Configuration Interface
Y= G1/2 with steel cage

Pressure Range
Insert 5-digit pressure code

Pressure Unit
P = PSI
H= Inches H₂O

Outputs
4 = 4-20mA

Electrical (Wiring information available at: <http://www.astensors.com/mediacenter.php>)
X = Optional Length (see options)

Wetted Material
1 = 316L / 304 SS / Kynar

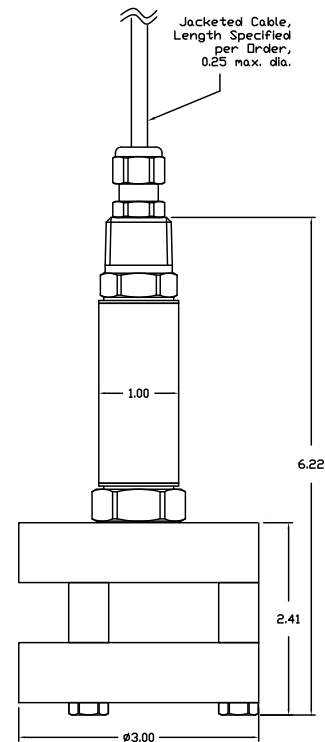
Options Cable Lengths:
353 = 25 ft. (7.62 m) 354 = 50 ft. (15.24 m) 355 = 75 ft. (22.86 m)

Pressure Ranges

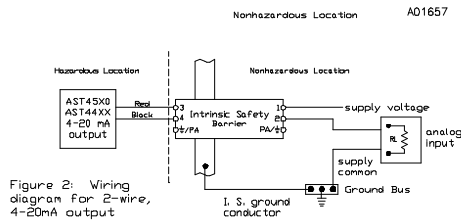
Gage PSIG	Pressure Code	Feet of Water Column @ 4°C (approx.)
0-15	00015	34.60
0-10	00010	23.07
0-7.5	00208*	17.30
0-5	00005	11.53
0-2.5	00069*	5.77

*2.5 and 7.5 PSI Sensor must be ordered in inches of H₂O.

Dimensional Data



Barrier Installation



The transducers listed below are designed for installation in a Class I, Division 1, Groups C and D, Division 1 hazardous location when connected to Associated Apparatus as described in note 1.

Entity Parameters
 $V_{max} = 28V_{dc}$
 $I_{max} = 175mA$ I_{max} is the total current available from the Associated Apparatus under any condition.
 $C_1 = 0.44\mu f$
 $L_1 = 0$

- Notes:**
- Associated Apparatus shall provide intrinsically safe connections which meet the following parameters:
 $V_{oc} \text{ or } V_{t} \leq V_{max}$ $C_0 \geq C_1 + \text{Cleads}$
 $I_{sc} \text{ or } I_t \leq I_{max}$ $L_0 \geq L_1 + \text{Cleads}$
 - Control Room apparatus shall not generate in excess of 250V (U_{max}).
 - Installation should be in accordance with Article 504 in the National Electrical Code, ANSI/NFPA 70.

Warranty

Workmanship - AST, Inc. pressure transmitters have a limited one-year warranty to the original purchaser. AST, Inc. will replace or repair, free of charge, any defective transmitter. All units returned for warranty evaluation must be thoroughly cleaned and free of process residue prior to shipment. Units that are not properly cleaned will be discarded and warranty service will be denied. This warranty does not apply to any units that have been modified; misused, neglected or installed where the application exceeds published ratings. AST4520 is not recommended for use with hydrogen. AST's sensors are made with pride in New Jersey, USA. If in the area please feel free to stop by for a visit!

Installation/Applications - The purchaser is responsible for media compatibility, functional adequacy, and correct installation of the transmitter.