

SSI Technologies – Application Note PS-AN13

MediaSensor™ P51 Series HA

High Pressure Absolute Pressure Sensors

Product Description

SSI Technologies Inc. offers the **MediaSensor™ Series HA absolute pressure sensors** targeted at industrial and commercial applications where high pressure, cost, compact size, robust packaging, chemical compatibility and performance are critical.

These MediaSensor™ P51 Series HA bulk micro-machined, absolute pressure sensors are designed to work at high pressure ranges (**1000 psi to 3000 psi**) with superior *accuracy*.

The MediaSensor™ P51 Series HA pressure sensor are cost competitive, compact, have robust packaging with a wide variety of fittings that work in both harsh and benign media. They are ideal for a variety of pressure measurement applications in the automotive, industrial and commercial industries. Four different electrical signal outputs are available for use by computers, digital panel meters, PLCs, chart recorders and other devices that can display, record or change the pressure in a closed loop system.

Product Features

- **Pressure Ranges:**
 - 1000 psia (6.9 MPa),
 - 1500 psia (10.3 MPa)
 - 2000 psia (13.8 MPa)
 - 3000 psia (20.7 MPa)
- **Superb Accuracy:**
 - $\pm 0.5\%$ overall full scale at room temperature
 - includes Repeatability, Hysteresis and Linearity
- **Maximum Flexibility:** Custom ASIC provides signal conditioning for calibration and temperature compensation



MediaSensor™ High Pressure Sensors with integrated signal conditioning (shown with various ports and connectors)

- **Compact, Robust Package:** All laser-welded stainless steel design for optimal media isolation
- **Electrical Connectors:** Packard, Deutsch, MD-DIN, M12, Integral Harness
- **Electronics:**
 - 0.5 – 4.5 Volt output (with 5V input)
 - 0.5 – 4.5 Volt output with overvoltage protection (with 5V input)
 - 1 – 5 Volt Output (with 8 – 30V input)
 - 4-20 mA (with 8 – 30V input)
- **Standard and Custom Options**

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or visit our



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Web Site: <http://ssitechnologies.com>

Chemical Compatibilities: Any gas or liquid compatible with 304L & 316L stainless steel.

- Refrigerant
- Motor Oil
- Diesel
- Hydraulic Fluid
- Brake Fluid
- Water
- Waste Water
- Hydrogen
- Nitrogen
- Air

Typical Applications

- Refrigeration
- Fuel Cells
- Pumps
- Hydraulics
- Compressors
- Robotics
- Pneumatics
- Agriculture
- Spraying Systems
- Process Control
- Flow
- Hydrogen Storage

Typical Connections

The following torque limits should be used when mounting the MediaSensor™ pressure port.

Straight Thread w/O-Ring:	Recommended Torque
High Pressure (> 750 PSI)	300 in lb
All others with out Port types T, U, Y	150 in lb
Parts with Ports T,U, Y	120 in lb

MediaSensor™ Transmitter (4 -20mA) connections:

- 1) Connect the Power Lead (Red) to the + terminal of the supply voltage.
- 2) Connect the Return Lead (White) to the + terminal of the current measuring device
- 3) Connect the – terminal of the current measuring device to the – terminal of the supply voltage

MediaSensor™ Transducer (Voltage Output) connections:

- 1) Connect the Power Lead (Red) to the + terminal of the supply voltage.
- 2) Connect the Ground Lead (Black) and the – terminal of the supply voltage to – input of your voltage measurement equipment.
- 3) Connect the Vout Lead (White) to the + input of your voltage measurement equipment.

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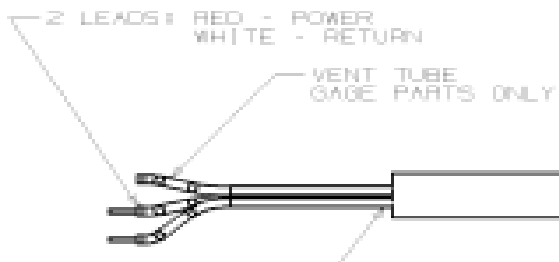
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Packaging

MediaSensor™ is readily available in a large selection of standard packaging options. MediaSensor™ offers an integral harness with 6 standard lengths and four standard readily available connectors (Packard, Deutsch, M12 and Mini DIN). In addition, SSI will work with the customer to meet their needs with custom options for large volume orders. (I.e... special fittings & connectors; special pressure ranges; operating temperature; and increased accuracy).

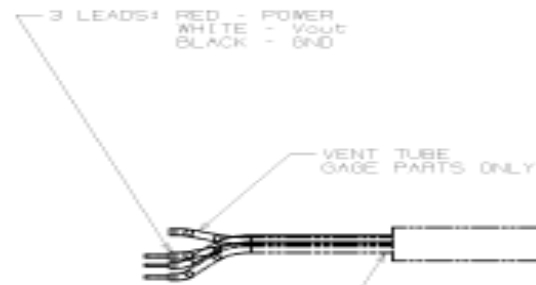
Integral Harness (Standard lengths of 6", 12", 18", 24", 36" and 72"). The Harness can be constructed of either PVC Jacketed 18 or 24 AWG Wire.



Wire Color

Red - Power
White - Return

Integral Harness Transmitter (4 to 20 mA)



Wire Color

Red - Power
White - Vout
Black - Ground

Integral Harness Transducer (1 to 5 Vdc or 0.5 to 4.5Vdc)

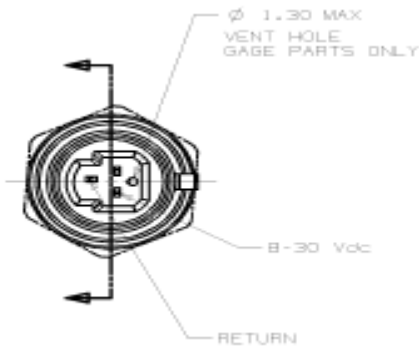


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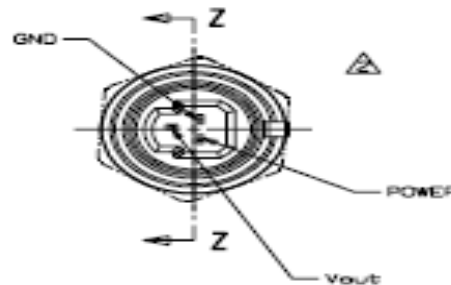
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Standard Connector Options

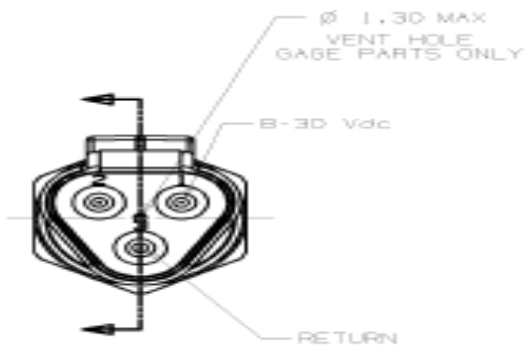


Pin 1 - Power
2 - Not Used
3 - Return



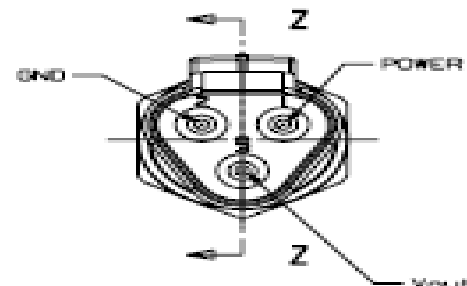
Pin 1 - Power
2 - Ground
3 - Vout

Packard Connector Transmitter (4 to 20 mA)



Pin 1 - Power
2 - Not Used
3 - Return

Packard Connector Transducer (1 to 5 Vdc or 0.5 to 4.5Vdc)



Pin 1 - Power
2 - Ground
3 - Vout

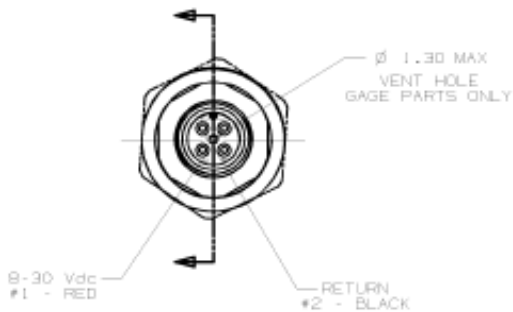
Deutsch Connector Transmitter (4 to 20 mA)

Deutsch Connector Transducer (1 to 5 Vdc or 0.5 to 4.5Vdc)

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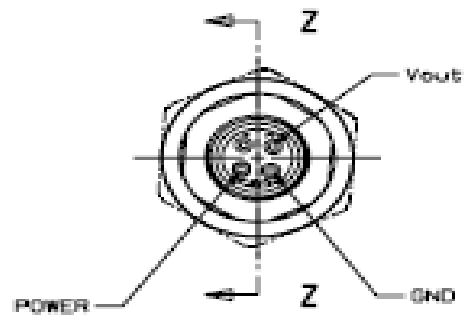
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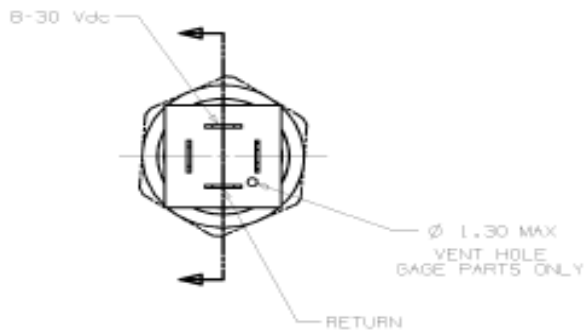
- Pin 1 - Power
- 2 - Return
- 3 - Not Used
- 4 - Not Used

M12 Connector Transmitter (4 to 20 mA)



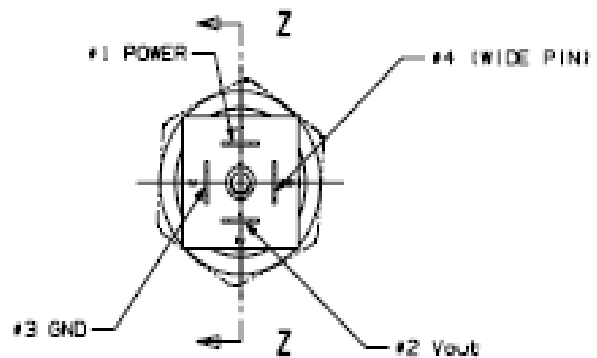
- Pin 1 - Power
- 2 - Ground
- 3 - Vout
- 4 - Not Used

M12 Connector Transducer (1 to 5 Vdc or 0.5 to 4.5Vdc)



- Pin 1 - Power
- 2 - Return
- 3 - Not Used
- 4 - Not Used

DIN 43650 Transmitter Connector



- Pin 1 - Power
- 2 - Vout
- 3 - Ground
- 4 - Not Used

DIN 43650 Transducer Connector

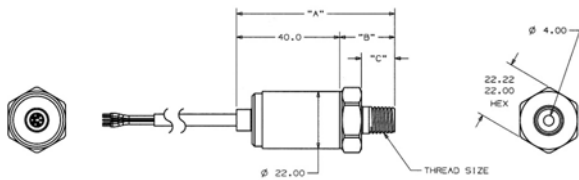


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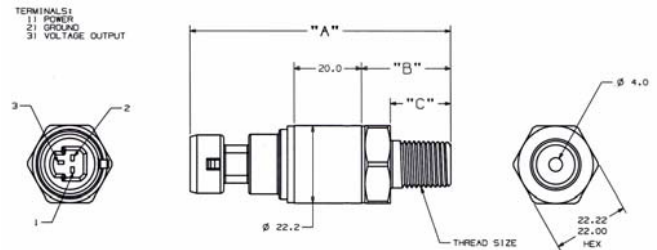
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Standard Packaging Options



THREAD SIZE	LENGTH "A"	LENGTH "B"	LENGTH "C"
1/4-18 NPT	66.6	26.0	18.0
1/8-27NPT	61.6	21.0	13.0
7/16-20UNF	59.6	19.0	11.0
9/19-18 UNF	59.6	19.0	11.0
3/8-24 UNF	58.1	17.5	9.5

Integral Harness with 22mm Hex



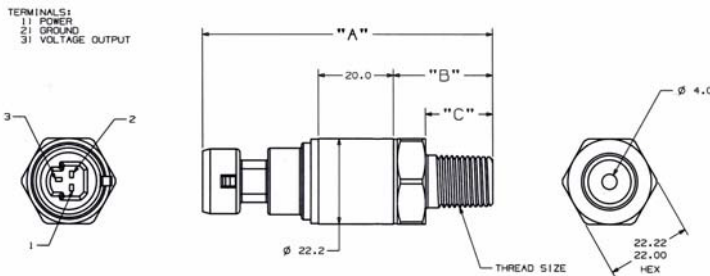
THREAD SIZE	LENGTH "A"	LENGTH "B"	LENGTH "C"
1/4-18 NPT	70.0	26.0	18.0
1/8-27NPT	65.0	21.0	13.0
7/16-20UNF	63.0	19.0	11.0
9/19-18 UNF	63.0	19.0	11.0
3/8-24 UNF	61.5	17.5	9.5

Packard Connector with 22mm Hex

5 Vdc Input: 0.5 – 4.5 Vdc Ratiometric Output

Harness Construction: PVC Jacketed 24 AWG Wire

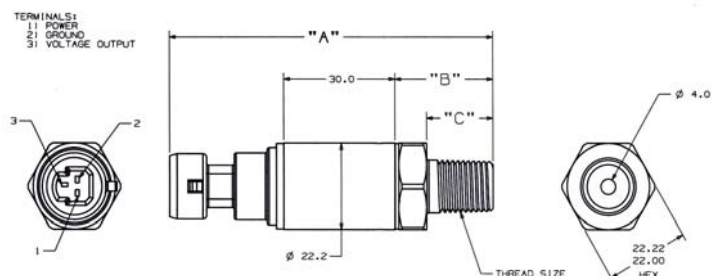
Mating Packard Connector P/N 12065287 and Mating Packard Terminal P/N 12103881



THREAD SIZE	LENGTH "A"	LENGTH "B"	LENGTH "C"
1/4-18 NPT	70.0	26.0	18.0
1/8-27NPT	65.0	21.0	13.0
7/16-20UNF	63.0	19.0	11.0
9/19-18 UNF	63.0	19.0	11.0
3/8-24 UNF	61.5	17.5	9.5

Packard Connector with 22mm Hex

8 - 30 Vdc Input : 1 - 5 Vdc Output



THREAD SIZE	LENGTH "A"	LENGTH "B"	LENGTH "C"
1/4-18 NPT	80.0	26.0	18.0
1/8-27NPT	75.0	21.0	13.0
7/16-20UNF	73.0	19.0	11.0
9/19-18 UNF	73.0	19.0	11.0
3/8-24 UNF	71.5	17.5	9.5

Packard Connector with 22mm Hex

8 - 30 Vdc Input : 4 - 20 mA Output

Mating Packard Connector P/N 12065287 and Mating Packard Terminal P/N 12103881



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Typical Performance Specifications (all values at 22°C unless noted otherwise)

Output Type	0.5 to 4.5 Volts	4 – 20 mA	1 – 5 Volts
Accuracy ¹ (1000 PSI TO 3000 PSI)	<± 1.00% FS	<± 1.00% FS	<± 1.00% FS
Thermal Error ⁶ (-40°C to 105°C)	<± 1.00% FS	<± 1.00% FS	<± 1.00% FS
Zero Pressure Offset ²	0.50 V	4.0 mA	1.0 V
Full Scale Output ³	4.5 V	20 mA	5.0 V
Operating Temperature	-40 to 105°C	-40 to 105°C	-40 to 105°C
Storage Temperature	-40 to 105°C	-40 to 105°C	-40 to 105°C
Proof Pressure	3 X FS	3 X FS	3 X FS
Burst Pressure	10 X FS or 15,000 PSI	10 X FS or 15,000 PSI	10 X FS or 15,000 PSI
Absolute Pressure Transducers	(whichever is less)	(whichever is less)	(whichever is less)
Reverse Voltage Protection (+/- 16V over 5 minutes)	N/A	Reverse	Reverse
Overvoltage Protection Option (+/- 16V over 5 minutes)	Available	N/A	N/A

Electrical Specifications

Output Type	0.5 to 4.5 Volts	4 – 20 mA	1 – 5 Volts
Supply Voltage	5 +/- 0.5	8 to 30 Volts	8 to 30 Volts
Supply Current	< 6 mA	Not Applicable	< 3 mA
Output Current	0.45mA Max (Sink or Source)	Not Applicable	0.45mA Max (Sink or Source)
Response Time	< 1 ms	< 1 ms	< 1 ms

Reliability and Environmental Performance

	Test Conditions	Value	Units
Pressure/Temperature Cycles ⁴	0 to FS @ 8Hz; and -40°C to 105°C	>1.8x10 ⁶	Cycles
Thermal Shock	105°C to -40°C, 0.5 hr soaks at Temp. (2s Transfer)	300	Cycles
Vibration	100 to 2000 Hz, 20g Sinusoidal, 3 Axes	144	Hours
EMC Compatibility ⁵	10 Volts/meter per EN 61000-4-3		
Humidity	85°C and 90% to 95% R. H.	250	Hours
Weight	Model 51 with M12 x 1.5 6g 304L Stainless Port	≤85	Grams

¹Includes hysteresis, repeatability, & non-linearity (BFSL)

²Transducer output @ 0 PSIA, 0 PSIG, or 0 PSIS (consult factory for other options)

³Sealed Transducer output @ Pressure Range + 14.5 PSIA

⁴Pressure cycling performed at rated full scale pressure.

⁵Higher levels of EMC Compatibility are available upon request.

⁶ Additional over temperature



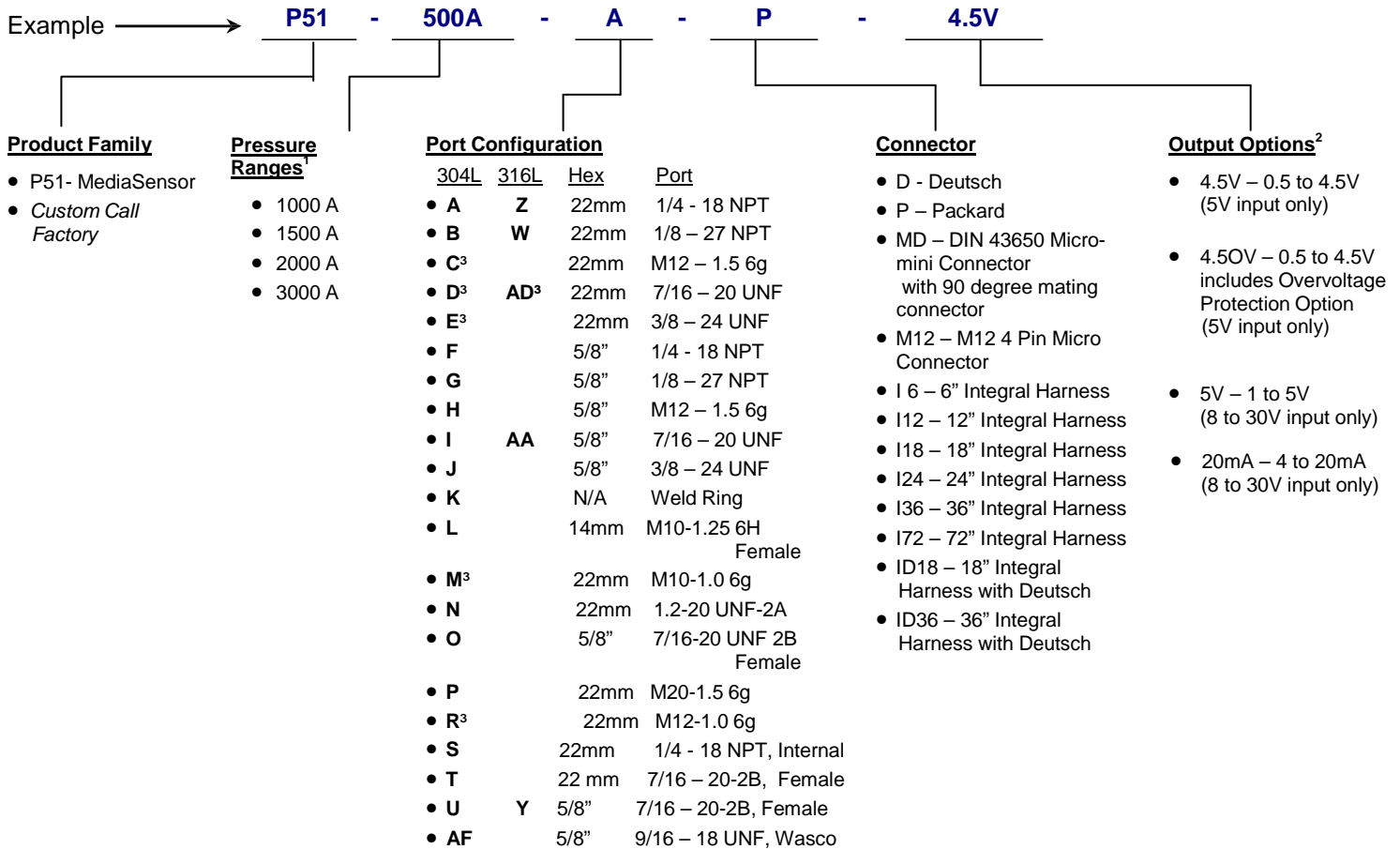
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MediaSensor™ Series HA High Pressure Sensor Ordering System

The following explains SSI's pressure sensor order number sequence.



- Notes:**
- 1) A designates Absolute Pressure
 - 2) Calibration of the transducer is as follows:
 - a. Absolute Transducers are calibrated to have the 0.5 Vdc, 1 Vdc, or 4 mA respectively at 0 PSIA
 - 3) These ports are not available with pressure sensors with the 50 PSI or below pressure ranges.

To place an order or to view our other pressure sensors, please see our website <http://www.ssitechnologies.com> for a listing of our distribution partners and Regional Sales Managers

For custom orders or specifications not listed, call SSI toll-free at **1- 888- 477- 4320**

