



Thin-Film Pressure Transducers & Transmitters

Test and Measurement Accuracy and Repeatability with Industrial Process Control Durability

Highlights

- Monitor heavy equipment and industrial processes for feedback and control
- Acquire precise data for research, development, and laboratory test applications
- Check performance of distribution stations, HVAC Equipment, and hydraulic systems
- Obtain accurate liquid-level or depth measurements in tanks, reservoirs, sumps, and bore holes



Test critical race car brake performance with 1500 Series pressure sensors.

Manufactured with an unique thin-film process to “atomically fuse” sensitive resistive material behind a recessed diaphragm, Series 1500 Pressure Transducers and Transmitters achieve high accuracy, repeatability, and stability required of today’s measurement and control requirements.

Choose gauge, absolute, sealed-gauge, and compound pressure ranges that span from vacuum up to 6000 psi (400 bar). Configure with a variety of threaded, cavity-style pressure ports, an assortment of hermetic electrical connectors, or submersible integral cables. Select from versions with amplified 0-5 VDC, 0-10 VDC, or loop-powered 4-20 mA outputs for interface with a wide range of analyzers, readout instruments, and process controllers.

As with all PCB® instrumentation, this equipment is complemented with toll-free applications assistance, 24-hour customer service, and is backed by a no-risk policy that guarantees satisfaction or your money refunded.



Series 1500

Fulfill Process Control, Test, and R&D Requirements





1500 Series pressure sensor being used to test hydraulic brake performance.

Advantages of the “Atomically Fused” Pressure Sensing Element.

Series 1500 pressure sensors have been specifically designed to provide high accuracy, excellent repeatability, and unmatched long-term stability. This is achieved by a unique thin-film process, which “atomically fuses” sensitive resistive material directly to the pressure sensing element. This process eliminates the traditional use of adhesives, as well as the need for a “fluid-fill.” The pressure sensing element is mated to an integrated circuit, programmed to provide the required span, zero and output configuration. Then, to ensure reliability, the sensing cores are encapsulated by an all-welded, corrosion-resistant, stainless-steel diaphragm and housing. Additionally, sensors are subjected to 500 pressure cycles to 2 x FS range, and thermally cycled from -65 to +275 °F (-54 to +135 °C). Finally, each sensor undergoes individual qualification testing and is supplied with a NIST-traceable calibration certificate, which documents exact performance characteristics.

Series 1500 Pressure Sensor Specifications

Specification	English	SI	English	SI	English	SI
	Series 1501		Series 1502		Series 1503	
Output	0-5 VDC FS		0-10 VDC FS		4-20 mA FS	
Supply Voltage (Vs)	6.5 to 30 VDC		11.5 to 30 VDC		8-30 VDC	
Supply Voltage Sensitivity [7]	≤ ± 0.01% FS / VDC		≤ ± 0.01% FS / VDC		≤ ± 0.01% FS / VDC	
Typical Current Consumption	6 mA		6 mA		n/a	
Minimum Load Resistance	2500 ohm		5000 ohm		n/a	
Maximum Loop Resistance	n/a		n/a		(Vs - 7) x 50 ohm	

Performance	English	SI
Pressure Ranges [1, 2]	From 0 to 10 psi (0.7 bar) FS up to 0 to 6000 psi (400 bar) FS	
Accuracy [1, 3]	≤ ± 0.1% FS, ≤ ± 0.25% FS or ≤ ± 0.5% FS	
Span and Zero Tolerance [4]	≤ ± 1.0% FS	
Typical Resolution	≤ 0.01% FS	
Response Time	≤ 1 ms	
Long Term Drift Non-cumulative Drift	≤ ± 0.1% FS/ year	
Environmental		
Proof Pressure [1]	2x or 4x	
Burst Pressure	> 35x for ≤ 100 psi (≤ 6 bar) > 20x for ≤ 1000 psi (≤ 60 bar) > 5x for ≤ 6000 psi (≤ 400 bar)	
Operating Temperature Range [5]	-40 to +260 °F	-40 to +125 °C
Thermal Error over Operating Range	≤ ± 2% FS	
Compensated Temperature Range	-5 to +180 °F	-20 to +80 °C
Thermal Error over Compensated Range [1]	≤ ± 1.5% FS or ≤ ± 1.0% FS	
Acceleration Sensitivity	≤ ± 0.03% FS/g	≤ ± 0.3% FS/ms ²
Vibration Survivability Rating	35 g peak sinusoidal (5 to 2000 Hz)	
Mechanical Shock Limit	Withstands IEC 60068-2-32 #1 Free-fall	
Fatigue Life	> 100 Million Cycles	
Mechanical / Electrical		
Pressure Ports [1]	English, NPT, SI, and 'M' Threads	
Materials: Wetted Parts Housing	17-4 PH SS 316/316L SS	
Weight	3.5 oz	~100 grams
Electrical Connection [1, 6]	Solder Tabs, Connector or Integral Cable	
Approvals	CE EN50081-2 / EN50082-2	
Cavity Volume (port dependent)	0.071 to 0.192 in ³	1.163 to 3.146 cc

Notes

- See adjacent page for specific ordering information and options.
- Gauge, sealed gauge, and absolute pressure references are available. Reference port for gauge sensor vents directly to atmosphere, which must be non-conductive and non-corrosive.
- Accuracy is calculated as the square root of the sum of the squares of non-linearity, non-repeatability and hysteresis.
- Verified by supplied NIST-traceable calibration certificate.
- When operating the pressure sensor at ambient temperatures greater than +212 °F (+100 °C), supply voltage (Vs) must not exceed 24 VDC.
- Integral cable models are submersible to 750 psi (50 bar). Solder tab connection “EZ” is compatible with DIN-style cable connector “EX” (supplied).
- Supply voltage sensitivity at 24 VDC.



MODEL NUMBERING SYSTEM FOR SERIES 1500 PRESSURE SENSORS

1.) Series 1500 (output signal format)

1501	Pressure Transducer, Amplified 0-5 VDC FS output. Three-wire configuration (power, signal, ground)
1502	Pressure Transducer, Amplified 0-10 VDC FS output. Three-wire configuration (power, signal, ground)
1503	Pressure Transmitter, Loop-powered, 4-20 mA FS output. Two-wire configuration (+, -)

2.) Accuracy (verified by 2-point calibration for "A" version and 11-point calibration for "B" and "C" versions)

- A Accuracy: $\pm 0.5\%$ of FS span; Thermal Error: $< \pm 1.5\%$ of FS span over -5 to $+180$ °F (-20 to $+80$ °C); Proof Pressure: $4 \times$ FS ($\leq 4,000$ psi $2k$ FS)
 - B Accuracy: $\pm 0.25\%$ of FS span; Thermal Error: $< \pm 1.0\%$ of FS span over -5 °F to $+180$ °F (-20 to $+80$ °C); Proof Pressure: $2 \times$ FS
 - C Accuracy: $\pm 0.1\%$ of FS span; Thermal Error: $< \pm 1.0\%$ of FS span over -5 to $+180$ °F (-20 to $+80$ °C); Proof Pressure: $2 \times$ FS (Special Order, Call Factory)
- Note:** Not available on sensors below 300 psi

3.) Pressure Port (consult factory for other sizes.) Styles without restrictor. (Contact factory for restrictor options.)

02	1/4"-18 NPT Male Threads	21	7/16"-20 UNF Male	42	M14 x 1.5 Male Threads
03	1/2"-14 NPT Male Threads	22	3/8"-24 UNF Male Threads		
12	1/4"-18 NPT Female Threads	31	7/16"-20 UNF Female Threads		
		41	M10 x 1 Male Threads		

4.) Electrical connection

- EZ Solder Tabs (mates with EX style DIN connector (supplied). Not compatible with absolute or sealed gauge pressure reference).
- HG Mini DIN-style connector and mate, with integral, polyurethane-jacketed, multi-conductor, Series 059 cable, 10 ft. (3 m) length, with pigtail termination (for use with all Series gage versions)
- FG Hermetic 6-pin bayonet jack, MS-26462 style (mates with PT06E-10-6S or EW style 6-pin, MS3116-10-6S plug)
- GC Hermetic 6-pin bayonet jack, MS-26462 style (mates with PT06E-10-6S or EW style 6-pin, MS3116-10-6S plug) with 95% FS internal shunt
- GD Hermetic 6-pin bayonet jack, MS-26462 style (mates with PT06E-10-6S or EW style 6-pin, MS3116-10-6S plug) with 95% FS external shunt
- FK Hermetic 2-pin threaded jack, MIL-C-5015 style (for use with Series 1503 only)
- FJ Hermetic 3-pin threaded jack, MIL-C-5015 style
- FH Integral, injection-molded, submersible to 750 psi (52 bar), polyurethane-jacketed, 2-conductor, Series 052 cable, 10 ft (3 m) length, with pigtail termination (for use with Series 1503 absolute and sealed gage versions only)
- FB Integral, injection-molded, submersible to 750 psi (52 bar), polyurethane-jacketed, multi-conductor, Series 059 cable, 10 ft (3 m) length, with pigtail termination (for use with Series 1501 & 1502 absolute and sealed gage versions only)
- GL Integral, injection-molded, submersible to 750 psi (52 bar), polyurethane-jacketed, multi-conductor, Series 077 cable with vent tube, 10 ft (3 m) length, with pigtail termination (for use with all Series gage versions)

5.) Pressure Range (other ranges are available, contact factory for pressure ranges not shown)

(Calibration certificates list psi & kPa)

10 psi	0 to 10 psi	1k psi	0 to 1000 psi	15v15g psi	Vac to 15 psi
100 psi	0 to 100 psi	2k psi	0 to 2000 psi	15v45g psi	Vac to 45 psi
500 psi	0 to 500 psi	5k psi	0 to 5000 psi		

6.) Pressure Reference (type)

- G Gage (Vented to atmosphere through GORE-TEX® filter on hermetic connector versions and through vent tube on integral cable versions. Gage reference is not available with FH and FB non-vented, integral cables.)
- S Sealed Gage (not available with EZ connector option)
- A Absolute (not available with EZ connector option)
- * Compound (Vacuum to upper range. Vented to atmosphere through GORE-TEX® filter on hermetic connector versions and through vent tube on integral cable versions. Compound reference is not available with FH and FB non-vented, integral cables.) *leave character blank

7.) Additional Integral Cable Length (Add only if desired integral cable length is other than standard 10 ft (3 m))

/xx	Specify total xx in feet. Cable is terminated with pigtails. Contact factory for other cable options.
/Mxx	Specify total xx in meters. Cable is terminated with pigtails. Contact factory for other cable options.

Example:

1501	B	02	FB	100 psi	A	/50	Amplified Output, 0-5 VDC FS Pressure Sensor: $\pm 0.25\%$ FS Accuracy, 1/4"-18 NPT Male Threaded Pressure Port, Integral 50 ft. Multi-Conductor Cable, 0 to 100 psi FS Range with Absolute Reference.
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Accessories



Model 080A158
Pressure Restrictor

Popular Cables (call factory for other cable types)

059EW010GF	EW 6-socket sensor mating connector, 4-conductor cable to pigtails, 10 ft (3 m) length
059FY010GF	FY 3-socket sensor mating connector, 4-conductor cable to pigtails, 10 ft (3 m) length
052AP010GF	AP 2-socket sensor mating connector, 2-conductor cable to pigtails, 10 ft (3 m) length

Sensor Mating Connectors

AP	2-socket MS-3106 style with strain relief (mates with FK)
EW	6-socket MS-3116 style with strain relief (mates with FG, GC, GD)
FY	3-socket MS-3106 style with strain relief (mates with FJ)

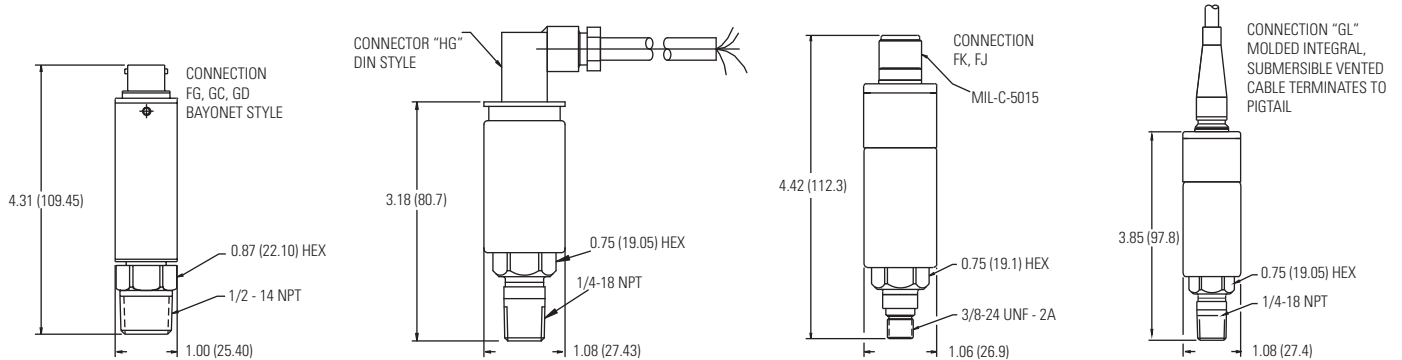


Electrical Connections and Wiring Guide

Series 1501, 1502 0 to 5, 0 to 10 VDC Output	Series 1503 4-20 mA Output	EZ Solder Tabs DIN-Style	HG DIN-Style Mate with HG 10 ft 059 Cable	FG, GC, GD 6-Pin Jack MS-26462 Style	FK 2-Pin Jack MIL-C-5015 Style	FJ 3-Pin Jack MIL-C-5015 Style	FH Integral 052 2-Wire Cable	FB Integral 059 4-Wire Cable	GL Integral 077 Vented Cable
+ Power	+ Power/Signal	Tab 1	Red	Pin A	Pin A	Pin A	Red	Red	Red
Common	- Power/Signal	Tab 2	Black	Pin B	Pin B	Pin B	Blue	Black	Black
+ Output	NC	Tab 3	White	Pin C		Pin C		White	Orange
Sensor Case*	Sensor Case*	Tab 4	Green	Pin D				Green	Brown
Shunt (option)	Shunt (option)			Pin E					
Shunt (option)	Shunt (option)			Pin F					
Sensor Case*	Sensor Case*		Shield	Shell	Shell	Shell	Shield	Shield	Shield

* Electronics are isolated from the sensor case

Typical Configurations



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24-hour SensorLineSM 716-684-0001

Fax 716-686-9129 E-mail pressure@pcb.com

Web site www.pcb.com

AS9100:2004 CERTIFIED ISO 9001:2000 CERTIFIED A2LA ACCREDITED to ISO 17025

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TM-1500-0708

Printed in U.S.A.

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