

# Model 3100/3200

Standard & Heavy Duty OEM Industrial Pressure Transducers



## DESCRIPTION

The 3100/3200 Series high-pressure OEM transducers feature a sputtered thin-film sensor to provide high levels of performance and stability for large volume OEM installations. A wide choice of outputs as well as electrical and pressure connections means that the unit is suitable for most applications without modification. In addition, the compact construction of the 3100/3200 Series makes it ideal for installations where space is at a premium.

The Model 3200 features a thicker diaphragm and a restrictor (optional) to handle environments where extreme positive or negative pressure spikes are a concern. Proof pressures on the Model 3200 are 3x full scale on 50 psi up to 10,000 psi pressure ranges.

## PRINCIPLE OF OPERATION

### Sputtered Thin Film Strain Gauge Pressure Sensors

Using the well proven Wheatstone Bridge principle, molecular layers are sputtered onto a 17-4PH stainless steel diaphragm and the circuit is etched to provide excellent resistor definition and uniformity. Sputtered thin film technology allows the design of simple, highly accurate and compact strain gauges deposited onto the back of the sensing diaphragm, which is in direct contact with the media. This method virtually eliminates drift, while offering enhanced sensitivity.

## FEATURES

- Low Cost for High Volume OEM Installations
- Thin Film Tech. Assures Long-Term Stability
- No Oil Fill Prevents Thermal Instability & Leakage
- Wide Choice of Pressure Ranges from 50 PSI up to 32,000 PSI
- Long-Term Stability Better Than  $\pm 0.1\%$  FS/Yr
- 0.25% Full Scale Accuracy
- Dual Temperature and Pressure Output on Voltage Units
- Small Footprint -Less than 1 inch Diameter
- Choice of Current, Voltage, or Ratiometric Outputs
- Reverse Wiring Protected
- Accuracy Specified Over Full Temperature Range
- All Welded Stainless Steel Construction
- No Internal Elastomers or O-Rings, no RTV's or Epoxies
- CE, RoHS Compliant & UL Approved

## APPLICATIONS

- Refrigeration
- HVAC/R Compressors
- Medical
- Hydraulic Pressure
- Variable Speed Pumps
- Industrial/OEM
- Pumps

## PRESSURE CAPABILITY

Application pressure should be restricted to the rated-range of the transducer. The maximum overpressure is the pressure limit at which the transducer will not show significant offset shift. The minimum burst pressure is the test-rating for fluid containment. The data in the tables is "times rate ranges" (xRR).

Pressure Range PSI (BAR)	Proof Pressure (x Full Scale)		Burst Pressure (x Full Scale)	
	3100	3200	3100	3200
50-300 (3.5-25)	3.00 x FS	3.00 x FS	40 x FS	40 x FS
500-1,500 (35-100)	2.00 x FS		20 x FS	20 x FS
2,000-6,000 (160-400)			8 x FS	10 x FS
7,500-9,000 (600)			4 x FS	10 x FS
10,000 (700)	1.40 x FS	2.50 x FS	2.2 x FS	>60,000 PSI (4,000 Bar)
15,000 (1,000)				
25,000 (1,600)				
30,000 (2,200)	—	—	1.8 x FS	—

SPECIFICATIONS			
Performance Data		Physical Description	
<b>Accuracy<sup>1</sup> Data</b>		Pressure Port	See Ordering Instructions on page 4
Model 3100	±0.25% FS	Wetted Parts	17-4 PH Stainless Steel (Diaphragm) 304 Stainless Steel (Fittings)
Model 3200	±0.5% FS	Electrical Connections	See Ordering Instructions on page 4
<b>Thermal Effects<sup>2</sup></b>		Enclosure	IP67 (IP65 for Electrical Code A)
Compensated Range °F (°C)	-40 to +221 (-40 to +105)	Vibration	40G Peak to Peak Sinusoidal to 2000 Hz (Random Vibration: 20 to 1000 Hz @ approx. 40G Peak per MIL-STD-810E)
<b>Zero/Span Shift %FS/100°F) %FS/100°C)</b>		Shock	Withstands free fall to IEC 68-2-32 procedure 1
Model 3100	0.83 (1.5)	Weight	35 grams
Model 3200	0.94 (2.0) for <1000 PSI (60 BAR)	<b>Electrical Data (Voltage)<sup>6</sup></b>	
<b>Zero/Span Tolerance</b>		Circuit	3-Wire (Exc, Out, Com)
Model 3100	±0.5% of Span	Output	1 to 6 VDC, 1 to 5 VDC, 0.5 to 4.5 VDC, 0 to 5 VDC, 0 to 10 VDC <sup>7</sup>
Model 3200	1% FS for <1000 PSI (60 BAR)	Excitation	2 Volts above Full Scale to max 30 Volts @ 4.5 mA (6.5mA Dual Output Version)
Response Time	1 ms	Source and Sinks	2 mA
Long Term Stability	±0.2% FS/YR Non-Cumulative	<b>Electrical Data (Ratiometric)</b>	
Proof/Burst Pressure	See Table on Page 1	Output	0.5 to 4.5 VDC @ 4 mA (6.5 mA on Dual Output Version)
Fatigue Life	Designed for more than 100 M cycles	Excitation	5 VDC ± 10%
<b>Temperature Output Range °F(°C)<sup>3,4,5</sup></b>		<b>Electrical Data (Current)<sup>7</sup></b>	
Series 3101/2301	-40 to +221 (-40 to +105)	Circuit	2-Wire
Series 3201/3202	+32 to +212 (0 to +100)	Output	4 to 20 mA
Series 3103/3203	+32 to +176 (0 to +80)	Excitation	8 to 30 VDC (24 VDC max. above 110°C applications)
<b>Performance Data</b>		Max. Loop Resistance	(Supply Voltage -8) x 50 ohms
Operating/Storage Temp. °F(°C)	-40 to +221 (-40 to +105)	<b>Options</b>	
<b>Approvals</b>		Miswire Protection (Option 1)	
CE	Conforms to European Pressure Directive	Full miswire protection between all signal and power lines (any combination) Full short-circuit protection for Vout1 to 0V or Vout1 connected to supply, indefinitely. Ratiometric output not available Supply Voltage must be 4V above the maximum Vout1 output. This also accounts for worse-case customer output leads.	
EMC	Radiated Immunity is 100V/m		
RoHS	Fully Compliant		
UL	E312651		
<sup>1</sup> RSS of Non-Linearity, Hysteresis, and Non-Repeatability . <sup>2</sup> Note: Hydrogen not recommended for use with 17-4 PH Stainless Steel. <sup>3</sup> Temperature outputs are for voltage output pressure sensors only and limited to connections that have 4 pins (Electrical Codes -D, -E, -8). <sup>4</sup> Requires additional 2 mA of power. <sup>5</sup> For use with pull-down resistors, contact factory before ordering. <sup>6</sup> Reverse Wiring Protected. <sup>7</sup> Not available for pressure ranges lower than 100 PSI (7 BAR)			

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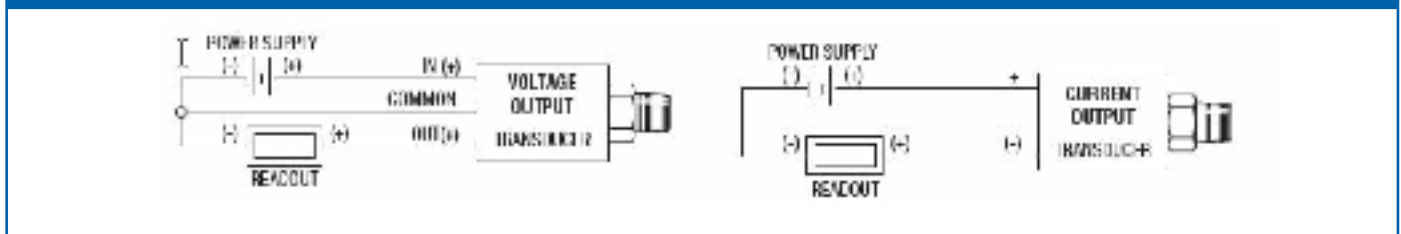


GENERAL PURPOSE/OEM

## ELECTRICAL FITTINGS

	Din 9.4 mm		M12 x 1P		Amp Superseal 1.5		Deutsch DT4-4P		Packard Metri Pack		3-Pin Deutsch			
	Code B		Code E		Code 6		Code 8		Code 9		Code C			
Pin #	Voltage Mode	Current Mode	Voltage Mode	Current Mode	Voltage Mode	Current Mode	Voltage Mode	Current Mode	Voltage Mode	Current Mode		Current Mode	Voltage Mode	
1	V <sub>out1</sub> (pressure)	No Connect	V <sub>supply</sub>	V <sub>supply</sub>	V <sub>out1</sub> (pressure)	No Connect	Ground	Return	V <sub>out1</sub> (pressure)	No Connect	C	V <sub>supply</sub>	V <sub>supply</sub>	A
2	V <sub>supply</sub>	V <sub>supply</sub>	V <sub>out1</sub> (pressure)	No Connect	Ground	Return	V <sub>supply</sub>	V <sub>supply</sub>	Ground	Return	A	Ground	Ground	B
3	V <sub>out2</sub> (temp)	No Connect	Ground	Return	V <sub>supply</sub>	V <sub>supply</sub>	V <sub>out2</sub> (temp)	No Connect	V <sub>supply</sub>	V <sub>supply</sub>	B	No Connect	V <sub>out1</sub> (pressure)	C
4	Ground	Return	V <sub>out2</sub> (temp)	No Connect	—	—	V <sub>out1</sub> (pressure)	No Connect	—	—	—	—	—	—

## WIRING

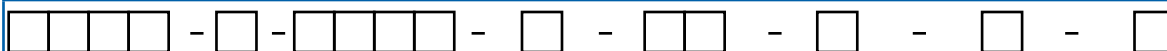


## PRESSURE FITTINGS

<b>SAE Dimensions in Inches</b>					
<b>Fitting Code</b>	0L = M12 x 1.5	01 = G1/4 Ext.	1G = 1/4- SAE Female 7/16 UNF w/Schraeder	1J = 7/16-20Ext.(SAE#4, J1926-2)w/O-Ring	1P = SAE6 (9/16-18UNF 2A)
<b>Torque</b>	28-30 NM	30-35 NM	18-20 NM	18-20 NM	18-20 NM
<b>Fitting Code</b>	2T = M12 x 1.5	04 = 7/16-20 Ext. (SAE #4, J514 w/37° Flare)	4C = 1/4NPTF Dryseal EXT.	4D = 1/8NPTF Dryseal EXT.	05 = G 1/4 Ext. Face Seal
<b>Torque</b>	30-35 NM	15-16 NM	2-3 TFFT*	2-3 TFFT*	
<b>Fitting Code</b>	02 = 1/4-18 PT Ext.	0E = Female 1/4-18NPT	08 = 1/8-27 NPT Ext.	0K = M14 x 1.5 Straight	
<b>Torque</b>	2-3 TFFT*	2-3 TFFT*	2-3 TFFT*	2-3 TFFT*	

Dimensions: in. (mm)

### ORDERING INFORMATION



Model	Output	Range Code	Pressure Type	Pressure Fittings	Electrical Conn.	Restrictor (3200 only)	Option
See Table 1	B 4-20 mA	See Table 2	C Compound	See Table 3	See Table 4	O No Restrictor	1 Miswire Protection?
	C 1-6 VDC		G Gauge			R Restrictor	None
	H 1-5 VDC		S Sealed Gauge <sup>2</sup>				
	N 0.5-4.5 VDC						
	R 0-5 VDC						
	S 0-10 VDC						
	T 0.5-4.5 V Ratiometric						

CODE	DESCRIPTION
3100	Std. 3100
3200	Std. 3200
Voltage Units w/Temp. Ouput	
3101 <sup>1</sup>	Temp. Output Range: -40°C to +105°C
3102 <sup>1</sup>	Temp. Output Range: -0°C to +100°C
3103 <sup>1</sup>	Temp. Output Range: -0°C to +80°C
3201 <sup>1</sup>	Temp. Output Range: -40°C to +105°C
3202 <sup>1</sup>	Temp. Output Range: -0°C to +100°C
3203 <sup>1</sup>	Temp. Output Range: -0°C to +80°C

RANGE CODE	PSI	RANGE CODE	BAR
050P <sup>2,6</sup>	50	0004 <sup>2,6</sup>	4
075P <sup>2</sup>	75	0005 <sup>2</sup>	5
100P <sup>2</sup>	100	0007 <sup>2</sup>	7
150P <sup>2</sup>	150	0010 <sup>2</sup>	10
230P <sup>2</sup>	230	0016 <sup>2</sup>	16
250P	250	0020 <sup>2</sup>	20
300P <sup>2</sup>	300	0035 <sup>2</sup>	35
500P <sup>2</sup>	500	0070 <sup>2</sup>	70
10CP <sup>2</sup>	1000	0100 <sup>2</sup>	100
15CP <sup>2</sup>	1500	0160	160
23CP	2300	0250	250
36CP	3600	0400	400
60CP	6000	0700	700
10KP	10000	1000 <sup>3</sup>	1000
15KP <sup>3</sup>	15000	1800 <sup>3</sup>	1800
25KP <sup>3</sup>	25000	1600 <sup>3</sup>	1600
32KP <sup>3,5</sup>	32000		

CODE	DESCRIPTION
08	1/8-27 NPT Ext.
02	1/4-18 NPT Ext.
4C	1/4 NPTF Dryseal Ext.
4D	1/8 NPTF Dryseal Ext.
04	7/16-20 Ext. (SAE #4, J1514) w/37° Flare
1J	7/16-20 Ext.(SAE #4, J1926-2) w/O-Ring
1G <sup>5</sup>	1/4 -SAE Female 7/16 UNF w/ Schraeder Deflater/European Threads
1P	SAE6 (9/16-18UNF 2A
01	G 1/4 Ext.
05	G 1/4 Ext. Face Seal
0L	M12 x 1.5 (<1000 bar, <15,000 psi)
2T <sup>3</sup>	M12 x 1.5 (6g) (≥1000 bar, ≥15,000 psi)
OK	M14 x 1.5 Straight
OE	Female 1/4-18NPT

CODE	DESCRIPTION
B	Industrial DIN
C	3-Pin Deutsch (Sealed Only)
E	M12xP,4-Pin
6	AMP Superseal 1.5 Series
8	Deutsch DT04-4P
9	Packard Metri Pack

1	Temperature outputs are for voltage output pressure sensors only (applies temperature span. Requires additional 2mA of power.
2	Sealed gauge not available on ranges ≤1500 psi (≤100 bar).
3	Ranges 1000 bar (15,000 psi) and above available with 2T pressure port only.
4	For use with pull-up or pull-down resistors, contact factory.
5	Pressure ports OE and 1G are NOT available with the Restrictor option.
6	0 to 50 PSI (4 bar) - Not available with 4 to 20 mA or 0 to 10 VDC outputs.
7	Temperature outputs not available with Option 1 Miswire Protection PCB Ratiometric output not available

Part No.	Description	For Code	Part No.	Description	For Code
557230	Mini Din Connector, Strain Relief	B		Recommended Mating Parts (AMP p/n: Socket Conn. 1-967325-1, Consult AMP for Contacts, Wire Seal and Strain Relief options)	6
557703-01M0	M12 Cord Set - 1 Meter (Red 1, Green 2, Blue 3, Yellow 4)	E	210730	AMP 12" Flying Leads Cord Set	6
557703-03M0	M12 Cord Set - 3 Meters (Red 1, Green 2, Blue 3, Yellow 4)	E		Recommended Mating Parts (Deutsch p/n: Housing Plug DT0645-P012; Wedge W45-P012; Sockets 4X 0462-201-1631)	8
557703-04M0	M12 Cord Set - 4 Meters (Red 1, Green 2, Blue 3, Yellow 4)	E	224153	Deutsch Cord Set 3' Long (18 AWG PVC Cable - Black 1, Red 2, Green 3, White, 4)	8
557703-05M0	M12 Cord Set - 5 Meters (Red 1, Green 2, Blue 3, Yellow 4)	E		Recommended Mating Parts (Delphi Packard MetriPack p/n: Body 12065268; Seal 12052893; Consult Delphi for Contacts)	9
	Recommended Mating Parts (AMP p/n: Housing 282087-1; Contacts 3X 183025-1; Seal 281934-1; Boot 880811-2)	6	577	Packard Mate Kit	9
557701 210729	AMP Superseal Mate Kit	6	581	Packard Cord Set 3' Long	9
	AMP 3.5' Cable Cord Set - Clear Pos 1, Black Pos 2, Red Pos 3	6	582	Packard Cord Set 6' Long	9