



- 0-150°C Operating Temperature
- Compact Absolute Pressure Sensor
- 1ms Response Time
- Pressure/temperature read-out
- 3.3V Operation
- ± 0.10% Linearity Error
- ± 0.2% Full Scale Error
- 15 Bit Digital Output – SPI
- 6,000 PSI Pressure Range
- Media – Harsh Liquid, Air, & Gas

DESCRIPTION

The APS80 is a pressure transducer manufactured for a high operating temperature range for the most challenging of applications. This silicon pressure transducer was designed for demanding industrial and commercial applications. The stainless steel media isolated port design allows for pressure measurement of liquid or gas media.

The APS80 series utilizes MEMS piezo-resistive sensors pressurized on the passive backside of the SS diaphragm which has superior long term stability and accuracy (.10% Linearity).

The design is simple and proves value for OEM customers. Please contact us for Custom design availability.

APPLICATIONS

- Mil/Aero
- Industrial Automation
- HVAC
- Automotive Engine
- Compressor
- Pneumatic

Maximum Environmental Ratings

Operating Temperature 0°C to 150°C
 Storage Temperature Range-55°C to 175°C

Proof pressure 3x full scale pressure
 Burst pressure 5x full scale pressure

Package

The one piece body design is made of 316L stainless steel, which allows for easy manufacturability and long term stability.

Stability

The silicon MEMS pressure sensor is welded into a 316 stainless media isolated housing. That in turn is mounted in the 316 stainless hex housing with the threaded port.

Additional stability is gained from a 2 week factory burn-in.

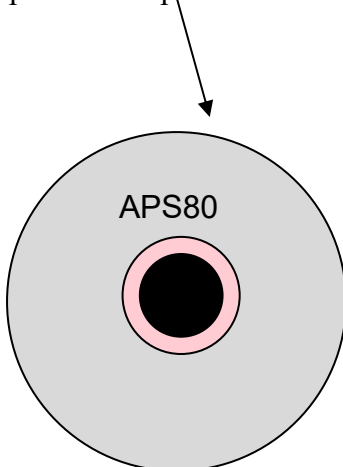
Pressure port

The port for the 7/16-20 UNF-3A thread should be made with a porting tool. The recommended O-Ring: AS568-012. The APS80 should be tightened to 25 Newton Meter.

Cover Marking

Part Number

Serial Number and Date Code is added to the side of the cover on a high temperature Kapton label.



Media

The 316 media isolated pressure port is tolerant to most media including oil, air, gas, some corrosive media, and salt water.

Wetted parts

The wetted surfaces are composed of 316L stainless steel.

Pressure Range

The standard pressure range is 5,800.

Soldering

The electrical connection wires for the APS80 sensor can be easily attached to a connector or soldered directly to a board.

APS80 Digital Output Operational Characteristics

$V_+ = 5V$, $V_- = 0V$, Temperature = 25°C

PARAMETER	SYMBOL	Min	Typ	Max	UNITS
Supply Voltage	V_{DD}	2.7	3.3	5.5	V
Operating Temperature	T_s	0		175	°C
Supply Current (Note 1)	I_{DD}	70	120	2500	μA
Accuracy					
Pressure Error		-0.2		0.2	%Full Scan
Non-Linearity (Note 2)		-1		.1	%Full Scan
Temperature Error (Note 3)		-2		2	°C
Response Time	t_R	1	2	20	ms
Analog-to-Digital					
Resolution	ADC		15		Bits
Temperature Resolution			0.1		°C
SPI Interface					
Input Low Level	V_{in_low}	0		.2	Vdd
Input High Level	V_{in_high}	.8		1	Vdd
Output Low Level	V_{o_low}			.1	Vdd
Load Capacitance @SDA	C_{sda} @400khz			200	pF
Pull-Up Resistor	R_{I2C_PU}	500			Ω
Input Capacitance (each pin)	C_{I2C_in}			10	pF

Notes: 1) Measured at zero pressure. 2) Defined as best straight line 3) Measured from 0°C to 150°C.

Electrical Pin Configuration (Digital [SPI])

Yellow - SCLK
 Green - MISO
 White- INT/SS
 Red - V+
 Black - GND
 Orange – MOSI

Fig. 1

Digital Interface – SPI

- SPI Clock Speed: 125kHz
- Data Order: MSB First
- Clock Polarity: SCK low, idle
- Clock Phase: sample trailing edge
- Chip Select: CS on, idle high

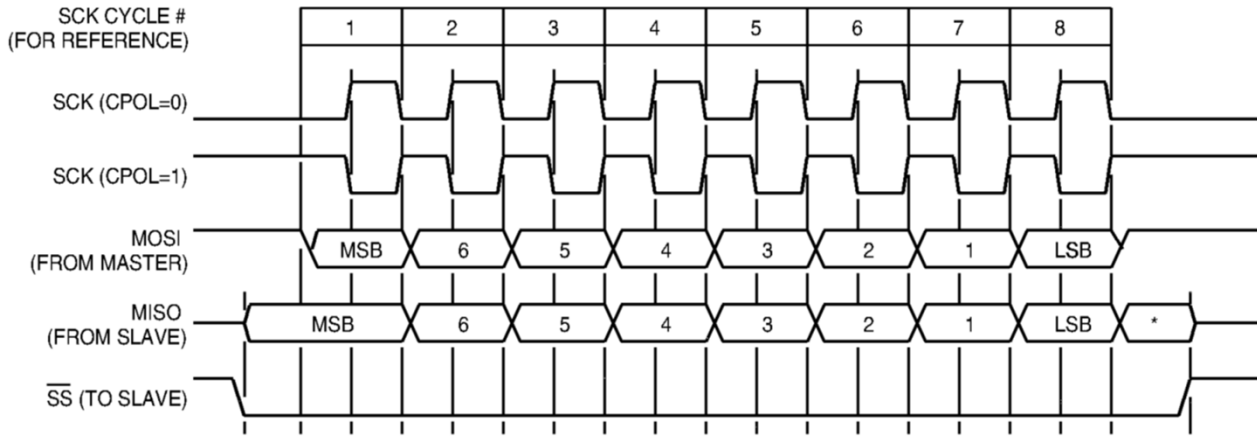


Figure 2

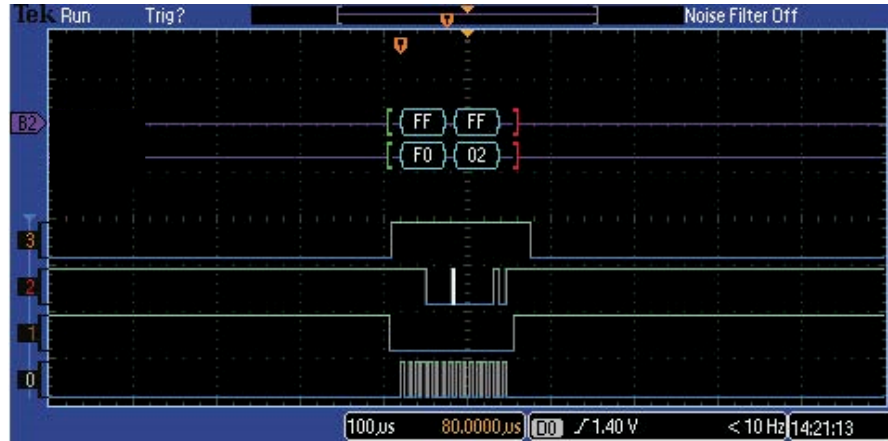
Nr.	Parameter	Symbol	min	typ	max	Unit	Conditions
1	SCK to internal clock frequency ratio	f_{SCK_CLK}			$f_{CLK}/5$		f_{SCK} must be 5 times smaller than f_{CLK}
2	MISO hold time after SCK sample slope	$t_{SPI_HD_MISO}$	200			ns	
3	MOSI setup time before SCK sample slope	$t_{SPI_SU_MISO}$	$2/f_{CLK}$				
4	/SS setup time before SCK sample slope	$t_{SPI_SU_SS}$	10			ns	
5	/SS hold time after SCK sample clk	$t_{SPI_HD_SS}$	$1/f_{SCK_CLK}^*$				

Figure 3

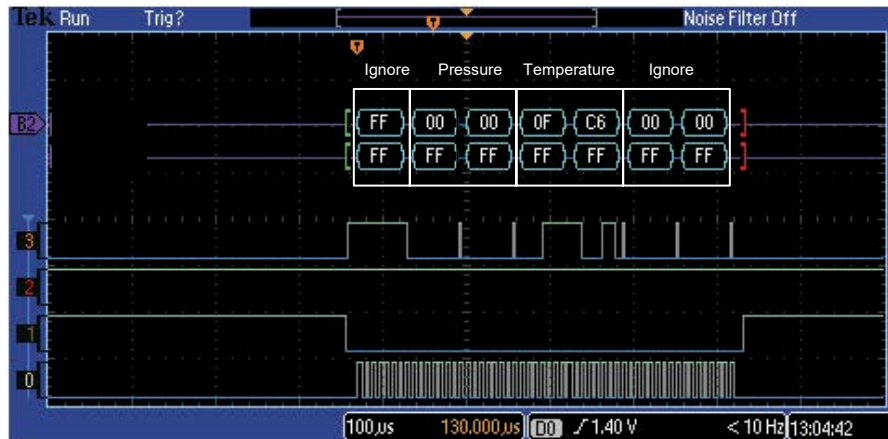
Sensor Outputs

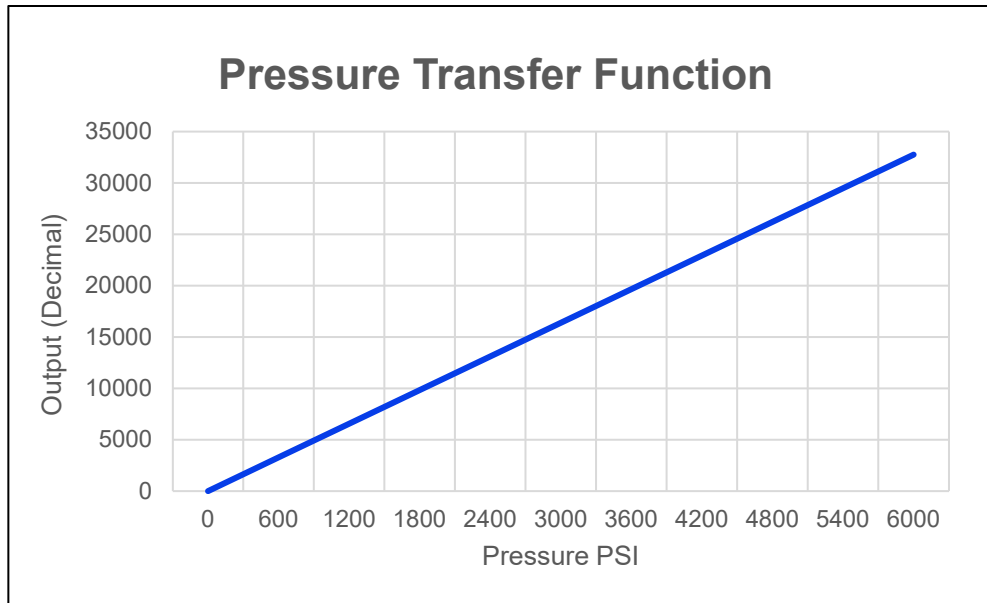
Digital Interface - SPI

Read Command
Send 0x02



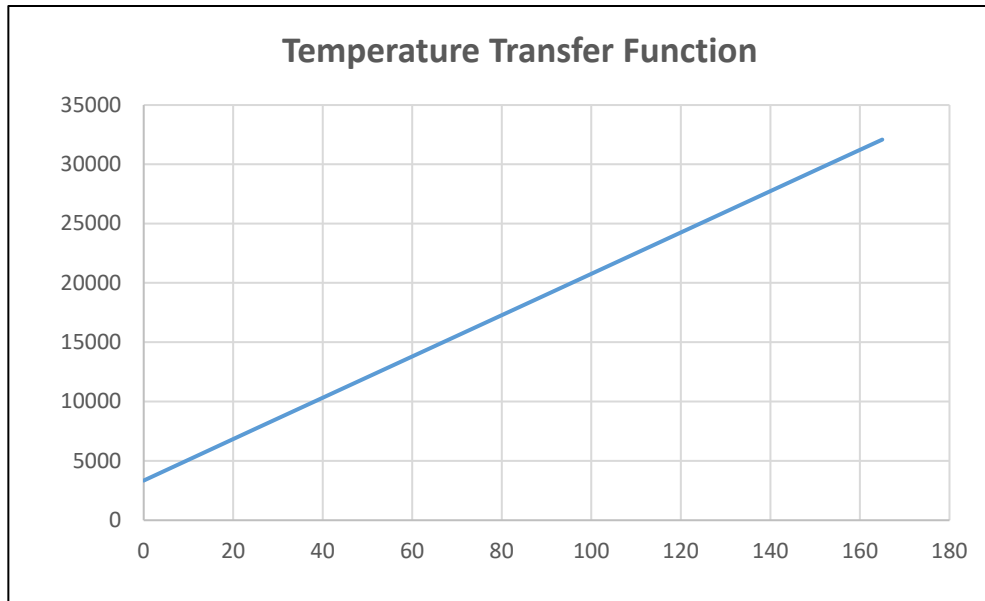
Data Output
CS/ (1) Pulled Low
Starts Data Output





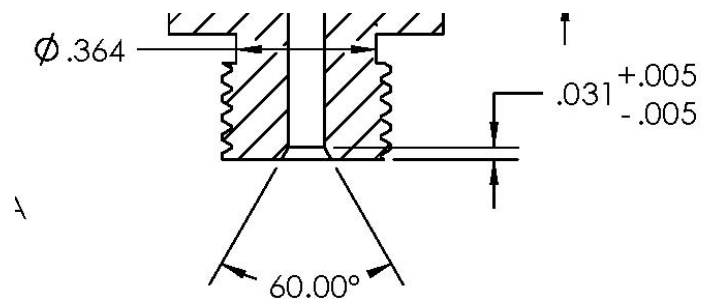
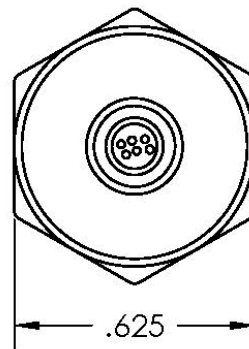
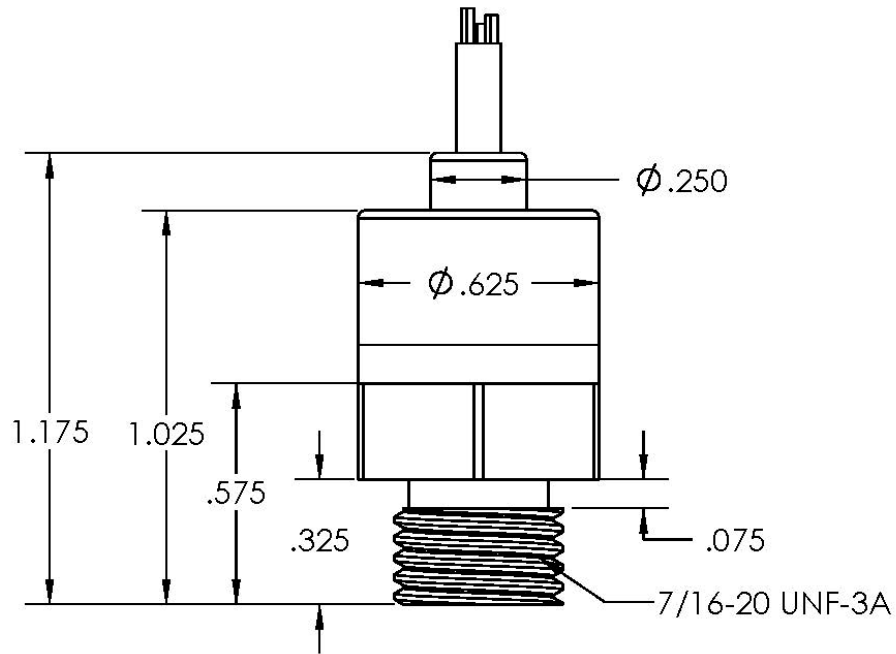
PSI	% Output	Decimal	Hex
0	0	0	0 x0000
600	10	3277	CCC
1200	20	6554	1999
1800	30	9830	2666
2400	40	13107	3333
3000	50	16384	4000
3600	60	19661	4CCC
4200	70	22938	5999
4800	80	26214	6666
5400	90	29491	7333
6000	100	32768	8000

Sensor Outputs



Temp C	Decimal	Hex
0	3250	CB2
25	7625	1DC9
50	12000	2EE0
75	16375	3FF7
90	19000	4A38
100	20750	510E
125	25125	6225
150	29500	733C
165	32125	7D7D

Mechanical Dimensions (inches)



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