



- 0-150°C Operating Temperature
- Calibrated Over The Operating Temperature Range
- 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 APS200 is a pressure transducer manufactured for monitoring pressure and temperature in down hole applications. The continuous operating temperature is 150°C with external pressures of up to 8,000 PSI. The 316L stainless steel media isolated port design allows for pressure measurement of liquid or gas media.

The APS200 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 the factory for custom design availability.

APPLICATIONS

- Oil and Gas Wells
- Water Wells
- Industrial Automation
- Compressor
- Pneumatic
- Hydraulic

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 body is made of 316L stainless steel, which is tolerant of most harsh chemicals.

Stability

The silicon MEMS pressure sensor is welded into a 316 stainless media isolated housing. That in turn is welded in the 316 stainless housing.

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

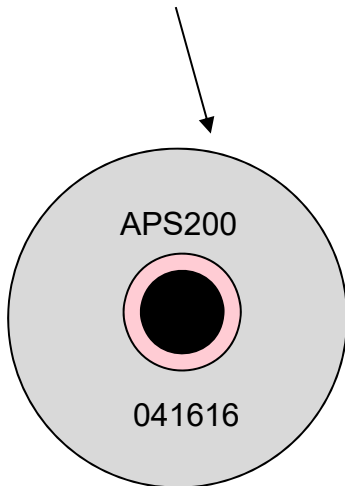
Pressure port

The pressure port is a 1/4" NPT fitting and the port for the electrical connection is 1/4" compression fitting.

Cover Marking

Part Number; Date Code

Serial Number is added to the side of the cover. 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 6,000.

Soldering

The electrical connection wires for the APS200 sensor can be easily attached to a connector or soldered directly to a board.

EEPROM Serialization

RAM-Register:					
Addr. Hex.	Write	Read	Write	Read	Addr. Hex.
0	2000	2000	0	0	10
1	1000	1000	7FFF	7FFF	11
2	0	0	0	0	12
3	0	0	0	0	13
4	0	0	FFFF	FFFF	14
5	0	0	0	0	15
6	0	0	48	48	16
7	0	0	34	34	17
8	0	0	7621	7621	18
9	7FF	7FF	DC09	DC09	19
A	1000	1000	92E4	92E4	1A
B	2000	2000	8063	8063	1B
C	0	0	9248	9248	1C
D	1000	1000	21DE	21DE	1D
E	2000	2000	0	0	1E
F	0	0	3011	3011	1F

← Date Code
 ← Serial Number
 XX XX X
 ↑ ↑ ↑
 Month Day Year
 Convert Hex to Decimal
 3011 → 12035
 December 03, 2015

APS200 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
Sleep Mode Supply Current	I_{stbby}		.5	32	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

On power-up, there is a 20ms delay before the data out transfer will start. There are two 16 bit output words. The first is the sensor output and the second is the temperature. The high byte and MSB come out first. The output is 15 bits and the MSB is always 0.

The serial clock (SCK) is active low.

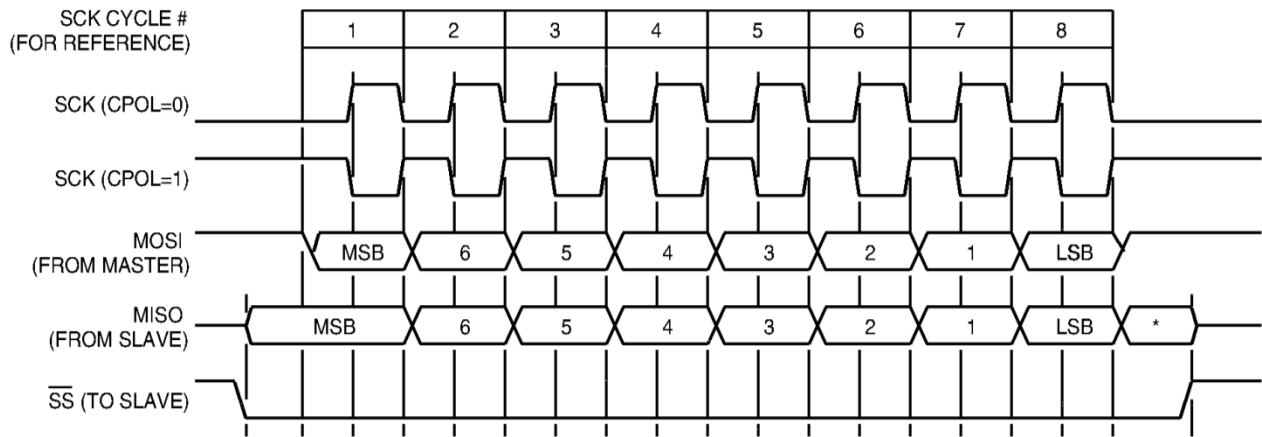


Figure 2

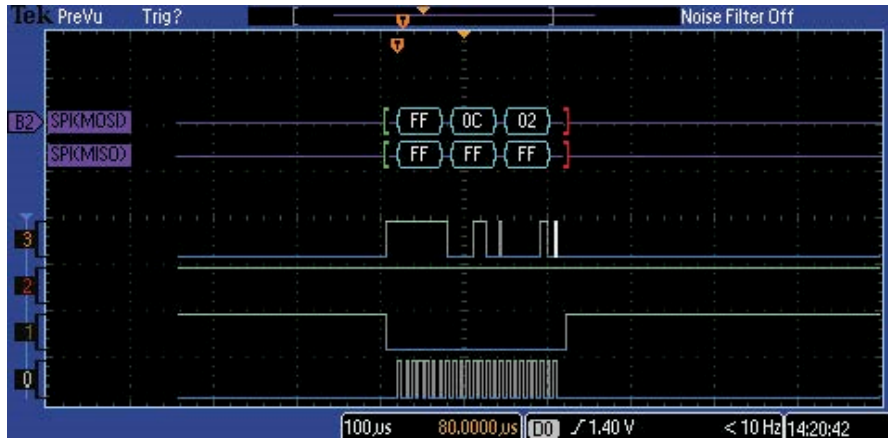
Nr.	Parameter	Symbol	min	typ	max	Unit	Conditions
1	SCK to internal clock frequency ratio	f_{SCK_CLK}			$f_{CLK}/5$		f_{SCK} must be 5 times smaller than f_{CLK}
2	MISO hold time after SCK sample slope	$t_{SPI_HD_MISO}$	200			ns	
3	MOSI setup time before SCK sample slope	$t_{SPI_SU_MISO}$	$2/f_{CLK}$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

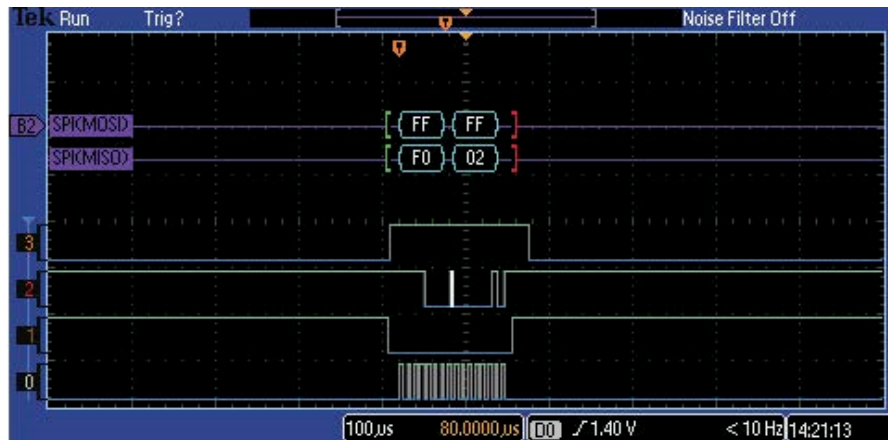
Sensor Outputs

Digital Interface - SPI

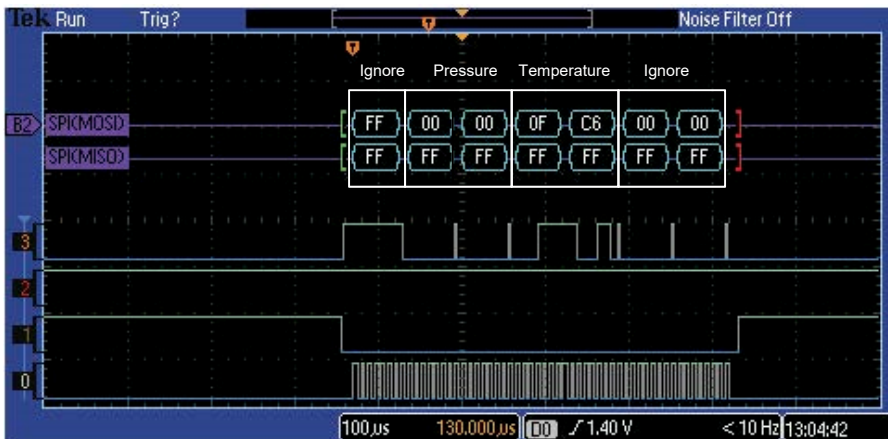
Power On
0C02 Sent from
Slave to Master

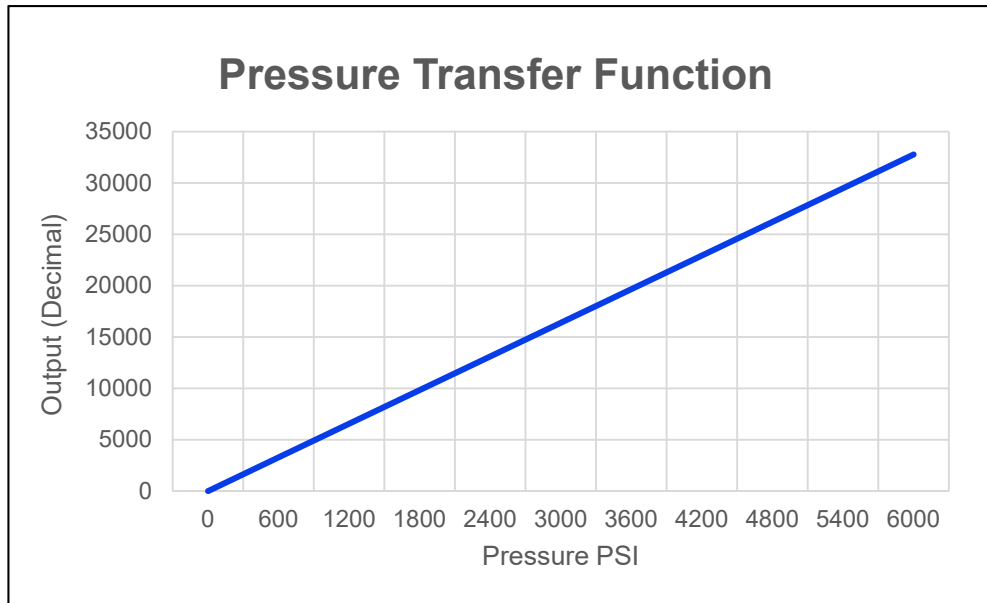


Read Command
F002 (address and
read command)
Sent from
Master to Slave



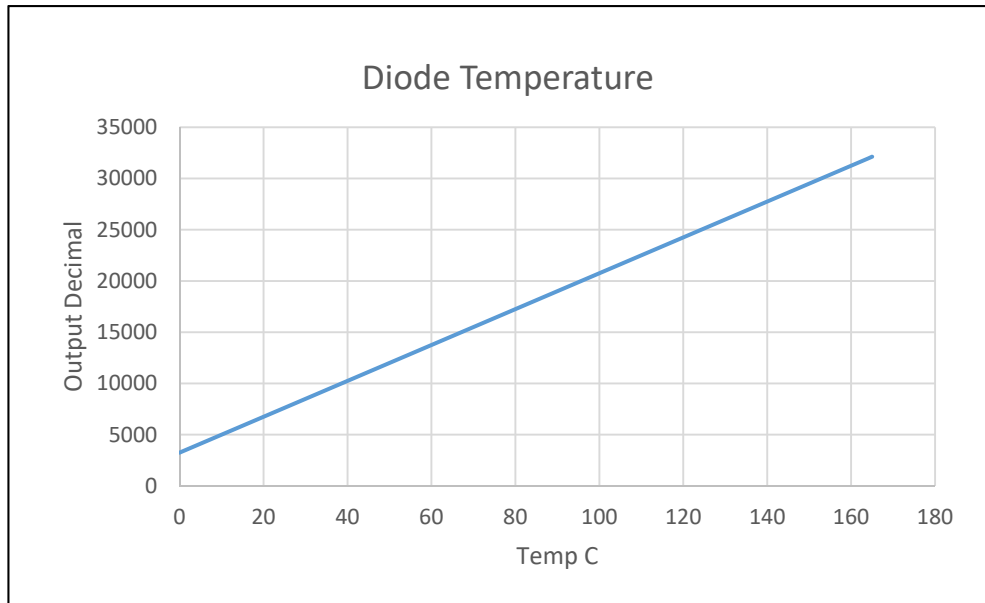
Data Output
CS/ (1) Pulled Low
Starts Data Output





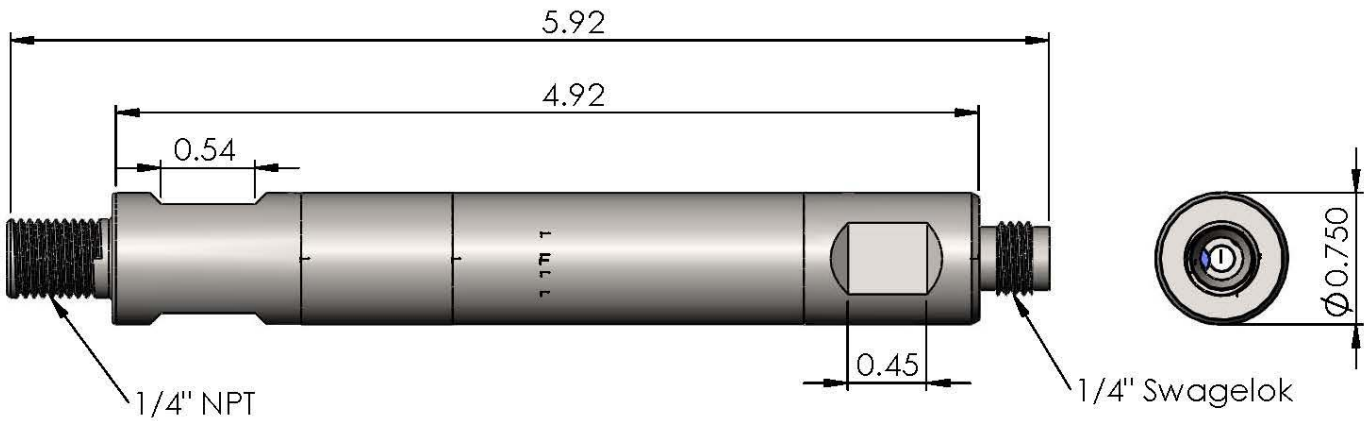
PSI	% Output	Decimal	Hex
0	0	0	0 x0000
600	10	3277	CCC
1200	20	6554	1999
1800	30	9830	2666
2400	40	13107	3333
3000	50	16384	4000
3600	60	19661	4CCC
4200	70	22938	5999
4800	80	26214	6666
5400	90	29491	7333
6000	100	32768	8000

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)



Ph: (520) 858-0251 Fax: (520) 468-2475 sales@azsenco.com

Notice:

AzSensCo LLC reserves the right to make changes to the product contained in this publication. AzSensCo LLC assumes no responsibility for the use of any circuits described herein, conveys no license under any patent or other right, and makes no representation that the circuits are free of patent infringement. While the information in this publication has been checked, no responsibility, however, is assumed for inaccuracies.

AzSensCo LLC does not recommend the use of any of its products in life support applications where the failure or malfunction of the product can reasonably be expected to cause failure of a life-support system or to significantly affect its safety or effectiveness. Products are not authorized for use in such applications.