



85BSD-F

Flush Mount, Digital Output Pressure Sensor

SPECIFICATIONS

- 13mm Flush diaphragm
- Pressure/temperature read-out
- Digital output
- ASIC calibrated
- Absolute, gage
- Cable/connector option
- Low power option

Features

- Flush Mount
- $\pm 0.25\%$ Accuracy
- ± 1.0 Total Error Band
- Cable/Connector Option
- Low Power Option
- I²C or SPI Interface Protocols

Applications

- Kidney Dialysis Machines
- Semiconductor Process Tools/
High Purity Gas Delivery
Systems
- Food Grade Processing
Equipment
- Paint Spray Systems

The 85BSD-F is a small profile, media compatible, piezoresistive silicon pressure sensor packaged in a 316L stainless steel housing. The 85BSD-F is designed for O-ring mounting where the diaphragm must not be shrouded by a weld ring or fitting. This 14-bit digital output pressure sensor supports I²C and SPI interface protocols in either a 3.3 or 5.0Vdc supply voltage. The sensing package utilizes silicone oil to transfer pressure from the 316L stainless steel diaphragm to the sensing element.

The 85BSD-F is designed for high performance, low pressure applications. A custom ASIC is used for temperature compensation, offset correction, and provides a digital output of 10~90% or 5~95%.

For a similar sensor without flush mount, refer to the 85BSD digital output pressure sensor.

Standard ranges

Range	psiG	psiA
0 to 015	•	•
0 to 030	•	•
0 to 050	•	•
0 to 100	•	•
0 to 150	•	•
0 to 200	•	•
0 to 300	•	•

Intermediate pressure ranges available, contact factory

Performance Specifications

Supply Voltage: 3.3V_{DC}

Ambient Temperature: 25°C (unless otherwise specified)

PARAMETERS	MIN	TYP	MAX	UNITS	NOTES
Zero Pressure Output (10% ~ 90%)		666		Count Hex	1
Zero Pressure Output (5% ~ 95%)		333		Count Hex	1
Full Scale Pressure Output (10% ~ 90%)		399A		Count Hex	1
Full Scale Pressure Output (5% ~ 95%)		3CCB		Count Hex	1
Pressure Accuracy	-0.25		0.25	%Span	2
Total Error Band Pressure	-1		1	%Span	3
Pressure Resolution	0.008			%Span	
Temperature Accuracy	-1.5		1.5	°C	4
Temperature Resolution		0.1		°C	
Input Voltage Range	2.7	3.3	5.5	V	1
Supply Current		3		mA	
Insulation Resistance (50V _{DC})	50			MΩ	5
Overpressure			2X	Rated	6
Burst Pressure			3X	Rated	7
Load Resistance (R _L)	10			KΩ	
Long Term Stability (Offset & Span)		±0.5		%Span/Year	
Compensated Temperature	0		+70	°C	
Operating Temperature	-20		+105	°C	
Storage Temperature	-20		+105	°C	
Output Pressure Resolution			14	Bits	
Output Temperature Resolution	8		11	Bits	
Start Time to Data Ready			8.4	ms	8
Output Type	10% to 90% or 5% to 95%				
Interface Type	I ² C (ADDR, 0x28H)				
	I ² C (ADDR, 0x36H)				
	I ² C (ADDR, 0x46H)				
	SPI				
Media – Pressure	Liquids and gases compatible with 316/316L Stainless Steel				

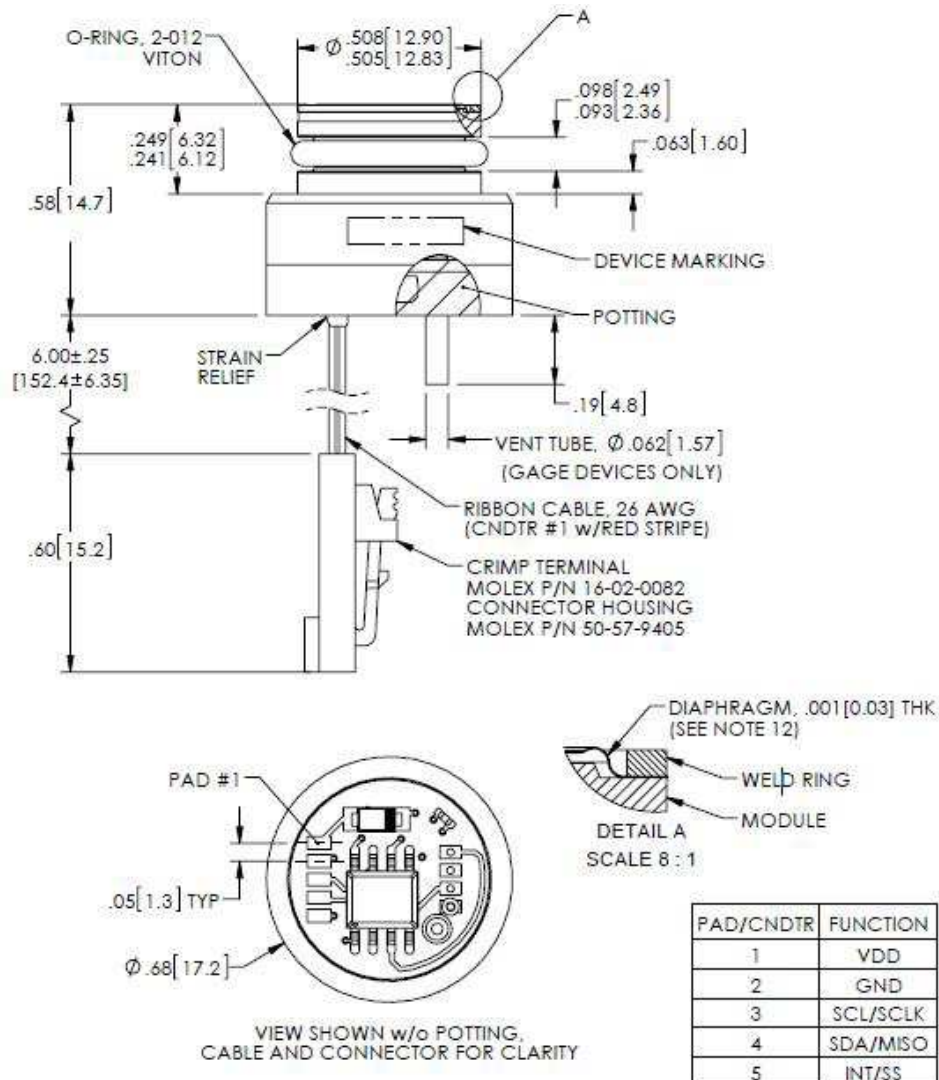
Notes

1. Measured at vacuum for absolute(A), ambient for gage(G) and sealed gage(S). Output is not proportional to supply voltage.
2. Accuracy: combined linearity, hysteresis and repeatability.
3. Total Error Band: includes calibration errors and temperature effects over the compensated range. See Figure 3.
4. The deviation from a best fit straight line (BFSL) fitted to the output measured over the compensated temperature range. For errors beyond the compensated temperature range, See Figure 2.
5. Between case and sensing element.
6. 2X or 400psi, whichever is less. The maximum pressure that can be applied to a transducer without changing the transducer's performance or accuracy.
7. 3X or 600psi, whichever is less. The maximum pressure that can be applied to a transducer without rupture of either the sensing element or transducer.
8. Start time to data ready is the time to get valid data after POR (Power on Reset). The time to get subsequent valid data is then specified by the response time specification.

Additional Notes

Direct mechanical contact with diaphragm is prohibited. Diaphragm surface must remain free of defects (scratches, punctures, dents, fingerprints, etc.) for device to operate properly. Caution is advised when handling parts with exposed diaphragms. Use protective cap whenever devices are not in use.

Potting feature applicable to devices with vent tube and absolute devices.

Dimensions


Block Diagram

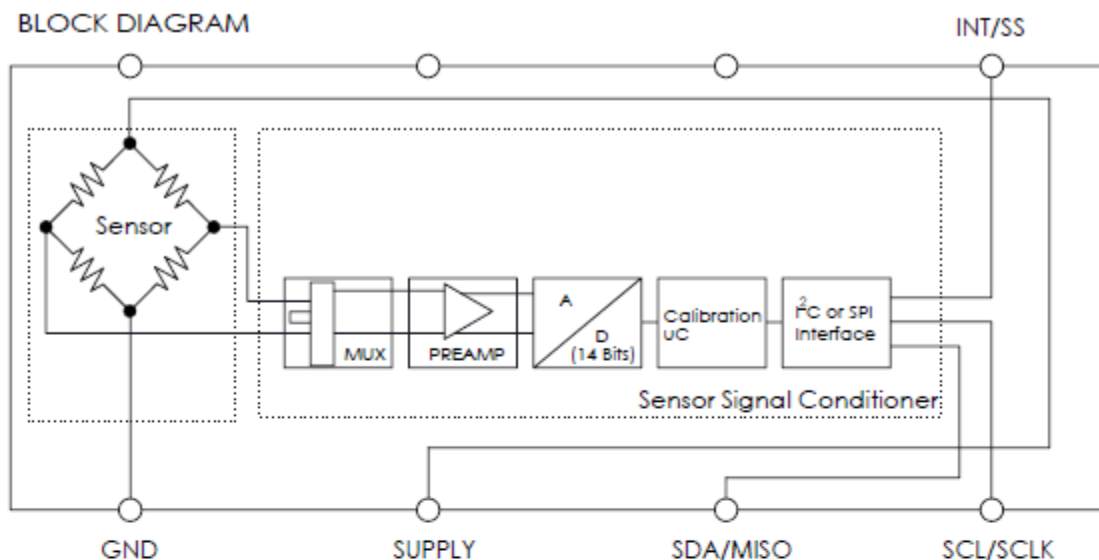


Fig 1

I2C INTERFACE PARAMETERS

PARAMETERS	SYMBOL	MIN	TYP	MAX	UNITS
SCLK CLOCK FREQUENCY	F _{SCL}	100		400	KHz
START CONDITION HOLD TIME RELATIVE TO SCL EDGE	t _{HDSTA}	0.1			μs
MINIMUM SCL CLOCK LOW WIDTH @1	t _{LOW}	0.6			μs
MINIMUM SCL CLOCK HIGH WIDTH @1	t _{HIGH}	0.6			μs
START CONDITION SETUP TIME RELATIVE TO SCL EDGE	t _{SUSTA}	0.1			μs
DATA HOLD TIME ON SDA RELATIVE TO SCL EDGE	t _{HDDAT}	0			μs
DATA SETUP TIME ON SDA RELATIVE TO SCL EDGE	t _{SUDAT}	0.1			μs
STOP CONDITION SETUP TIME ON SCL	t _{SUSTO}	0.1			μs
BUS FREE TIME BETWEEN STOP AND START CONDITION	t _{BUS}	2			μs

SPI INTERFACE PARAMETERS

PARAMETERS	SYMBOL	MIN	TYP	MAX	UNITS
SCLK CLOCK FREQUENCY	F _{SCL}	50		800	KHz
SS DROP TO FIRST CLOCK EDGE	t _{HDSS}	2.5			μs
MINIMUM SCL CLOCK LOW WIDTH @1	t _{LOW}	0.6			μs
MINIMUM SCL CLOCK HIGH WIDTH @1	t _{HIGH}	0.6			μs
CLOCK EDGE TO DATA TRANSITION	t _{CLKD}	0		0.1	μs
RISE OF SS RELATIVE TO LAST CLOCK EDGE	t _{SUSS}	0.1			μs
BUS FREE TIME BETWEEN RISE AND FALL OF SS	t _{BUS}	2			μs

@1 COMBINED LOW AND HIGH WIDTHS MUST EQUAL OR EXCEED MINIMUM SCL PERIOD.

Temperature Accuracy / Total Error Band

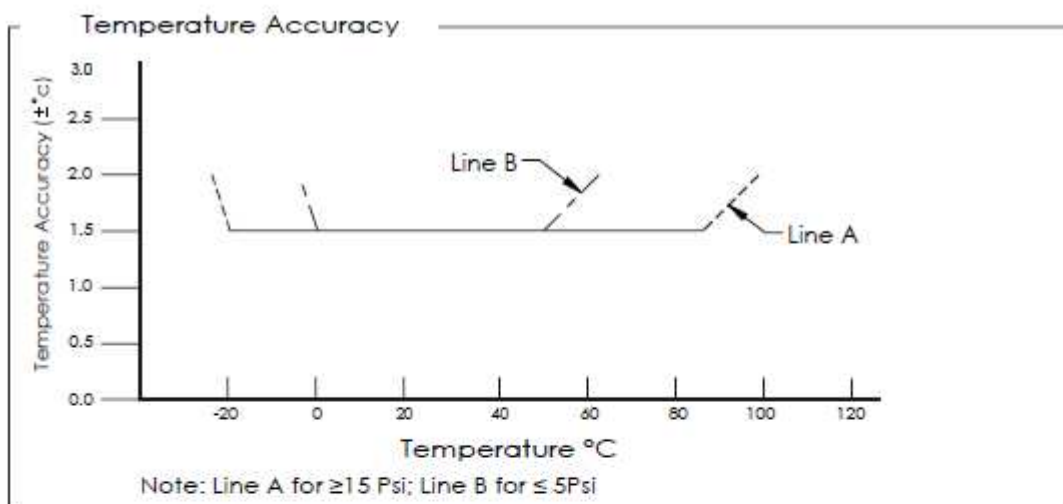


Fig 2

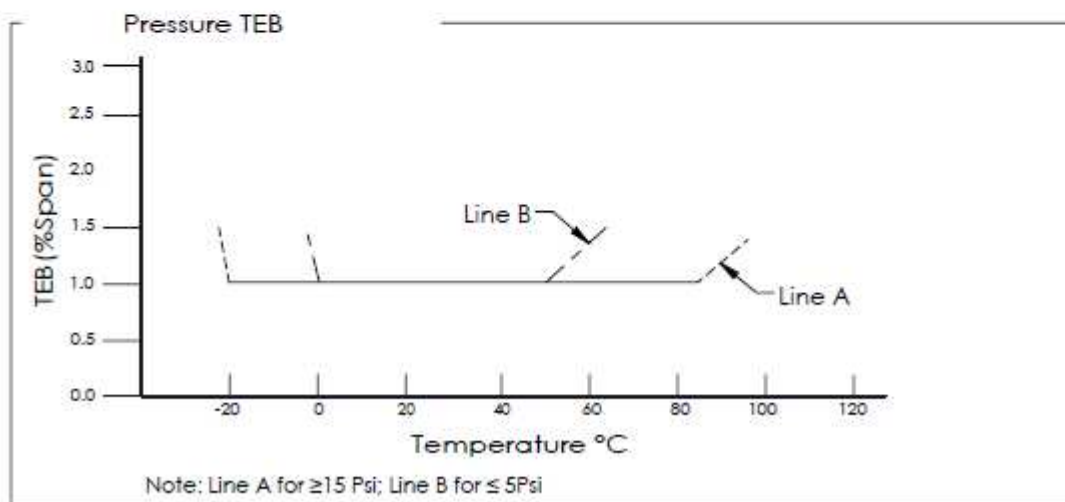


Fig 3

Pressure Transfer Functions

Pressure Transfer Functions

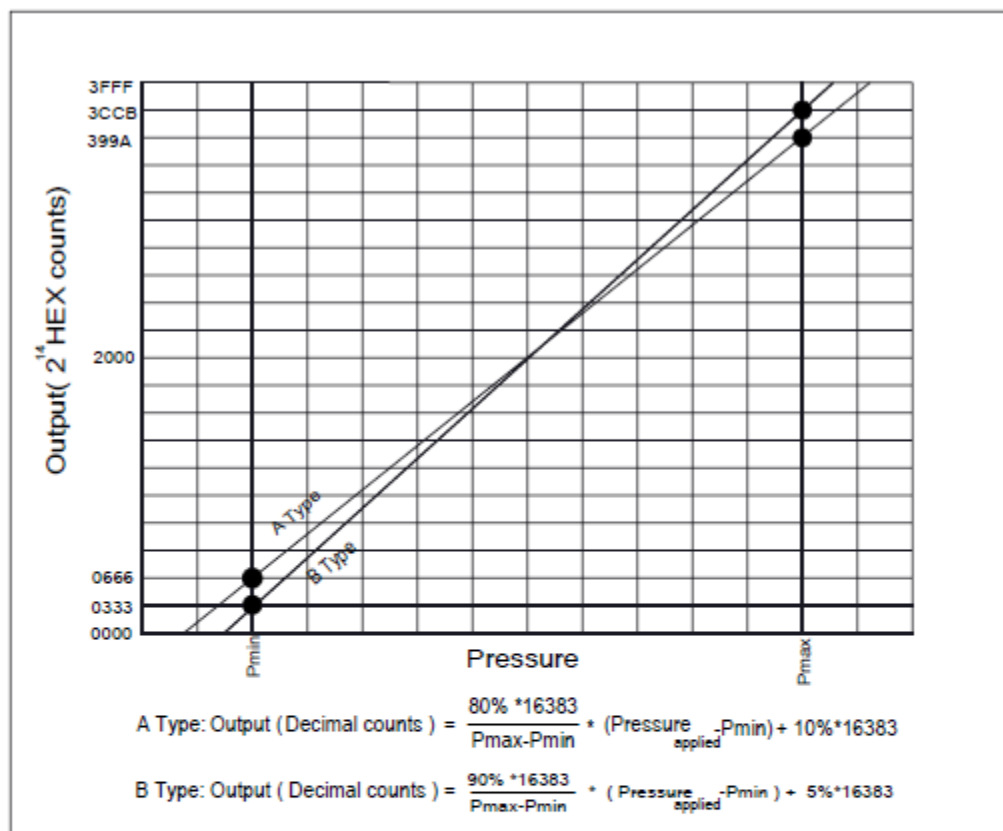


Fig 4

Sensor Output at Significant Percentages

% Output	Digital Counts (decimal)	Digital Counts (hex)
0	0	0 X 0000
5	819	0 X 0333
10	1638	0 X 0666
50	8192	0 X 2000
90	14746	0 X 399A
95	15563	0 X 3CCB
100	16383	0 X 3FFF

Temperature Transfer Functions

Temperature Transfer Functions

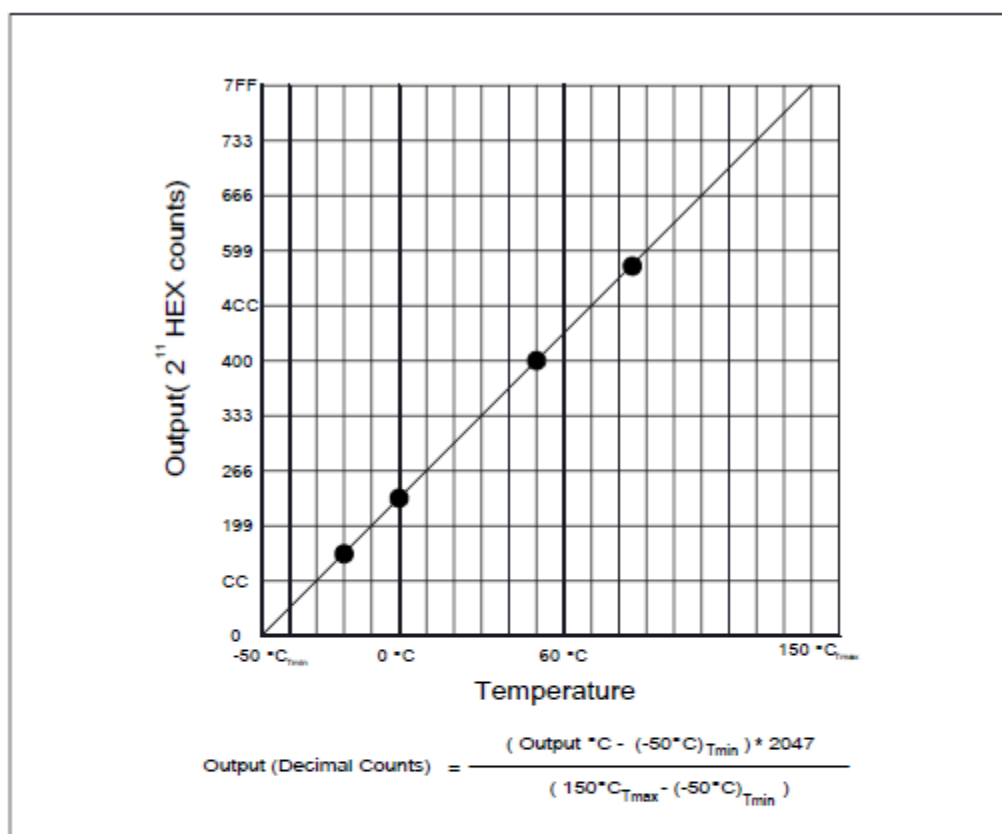


Fig 5

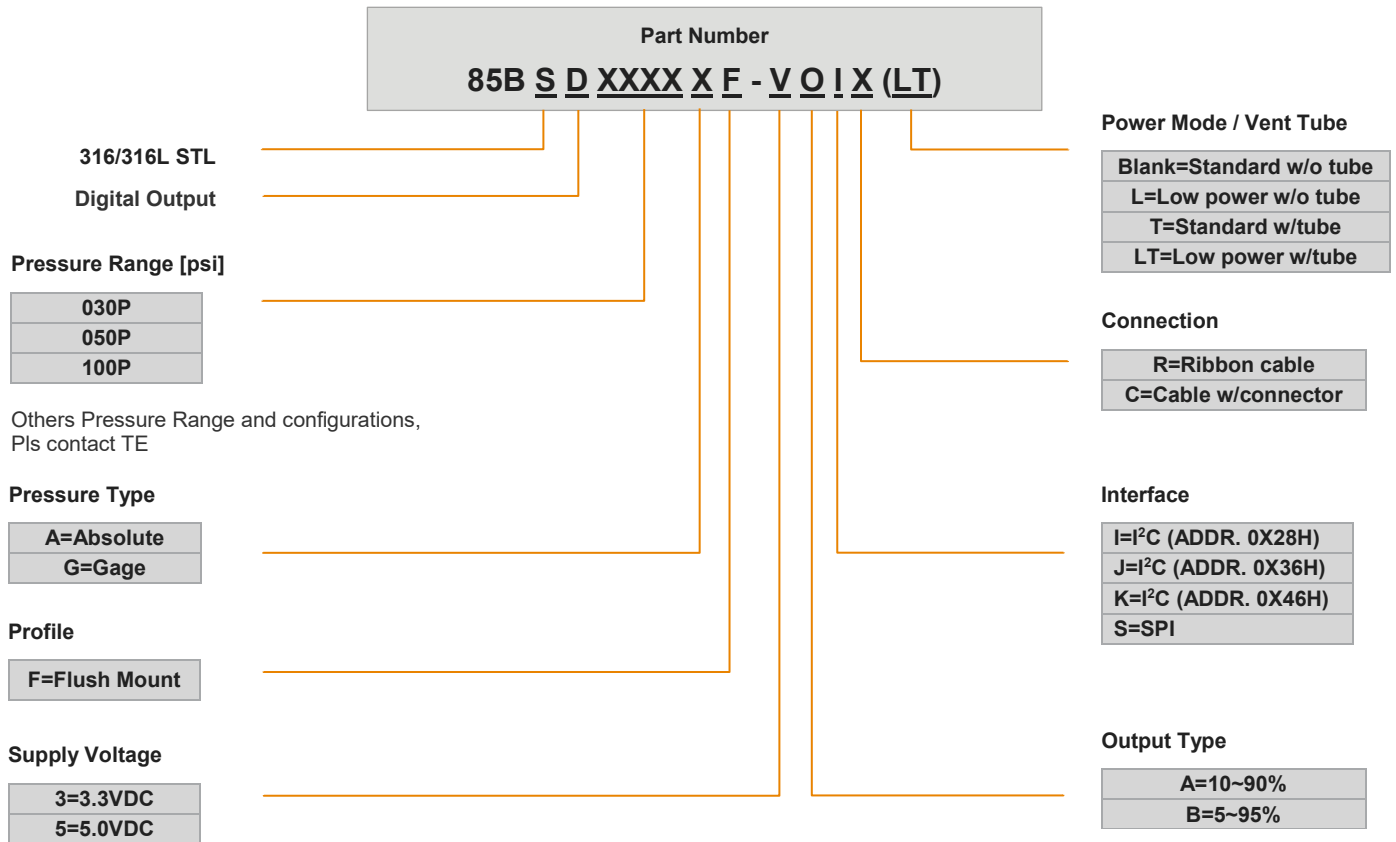
Temperature Output vs Counts

Output °C	Digital Counts (decimal)	Digital Counts (hex)
-50	0	0 X 0000
-20	307	0 X 0133
0	512	0 X 0200
25	767	0 X 02FF
50	1024	0X 0400
85	1381	0 X 0565
150	2047	0 X 07FF

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Ordering Information



TCPN	Description	Pressure Range	Type	W/O Tube
20011374-00	PRESS XDCR;NISO;85BSD050PGF-3BSC(T)	050PSI	Gauge	With
20011374-01	PRESS XDCR;NISO;85BSD030PAF-5BJC	030PSI	Absolute	Without
20011374-02	PRESS XDCR;NISO;85BSD100PAF-5BJC	100PSI	Absolute	Without
20011374-03	PRESS XDCR; 85BSD050PAF-3AIRL	050PSI	Absolute	Without

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