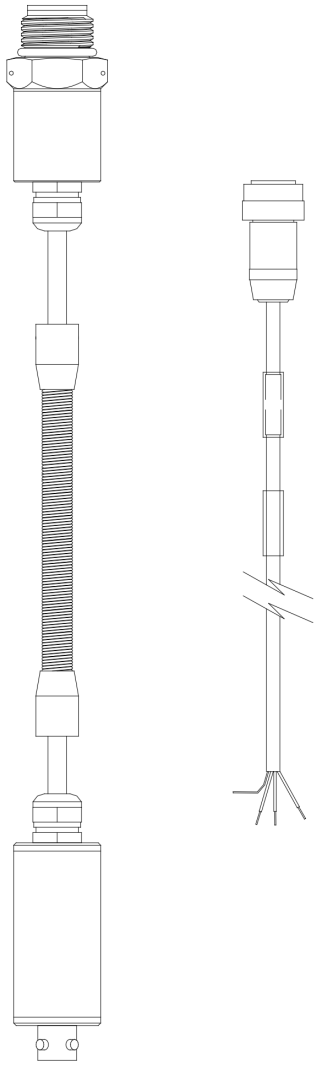
165855 Cylinder Pressure Transducer

Datasheet

Cordant™

166815 Rev. M



Description

The Cylinder Pressure System consists of the 165855 Cylinder Pressure Transducer and the 146824 Interconnect cable. It is intended for measuring the cyclic absolute pressure changes inside a reciprocating compressor cylinder. This transducer is an integral part of a Reciprocating Compressor Condition Monitoring and Asset Management System when utilized with our 3500/77M Cylinder Pressure Monitor and System 1 Plant Asset Management Software.

The Cylinder Pressure Transducer has a robust design for high reliability in harsh chemical environments. The unique, patent-pending design also allows the transducer to continue to provide an accurate pressure reading, even after being continually cycled over large pressure gradients for an extended period of time. The transducer can also withstand over-pressure situations caused by application upsets without diaphragm degradation, returning to normal operation when the operating pressure returns to the transducer's specified operating pressure range. The Cylinder Pressure Transducer is also designed to meet NEMA 4X and IP67 conditions for moisture ingression.

The wetted surface of the transducer is typically installed into an isolation valve or similar pressure indicator port on the compressor. A special adapter is usually required to provide a seal between the pressure indicator port and the transducer (such as the 166393 adapter). The electronics portion of the Cylinder Pressure Transducer is separated from the wetted surface by 1 metre of cable. The electronics must be secured on or near the compressor for optimal performance.

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Each pressure sensor will be shipped with pressure-temperature compensation data in order to optimize the measurement. Inputting the supplied data points into the 3500/77 Cylinder Pressure Monitor can minimize the operating temperature effects on the transducer.

Specifications

Cylinder Pressure Transducer System

Operation outside the specified limits will result in false or inaccurate readings.

Transducer Characteristics	
Measurement Range	0 to 100/ 250/ 500/ 1000/ 2500/ 5000/ 10,000 psia 0 to 6.8/ 17/ 34.5/ 69/172/ 345/ 689 bar
Proof (Over) Pressure	1.5X Full Scale
Burst Pressure	3X Full Scale (2X FS on 689 bar/ 10,000 psia units)
Full Scale Output	10 ± 0.3 Vdc
Zero	0.5 ± 0.1 Vdc
Power Supply	18 to 30 Vdc
Max. Current	< 15 mA
Compensated Temperature	-40 to 85° C -40 to 185° F
Thermal Zero Shift	-1.0 to +2.0 (for 6.8 and 17 bar/ 100 and 250 psia) %FS -0.5 to +1.5 (for all other pressure ranges) Note: Within compensated temperature range.
Thermal Sensitivity Shift	See Graphs and Figures on page 7.
Linearity, Hysteresis, Repeatability	£ ±0.3 %FS
Frequency response	0Hz to 5500 Hz ± 1 dB
Operating Temperature	-40 to 85 (electronics housing) °C -40 to 150 (sensor head) °C -40 to 185 (electronics housing) °F -40 to 302 (sensor head) °F
Overvoltage Category	II

Physical & Environmental

Outdoor Use: Standard installation for these sensors is in a protected enclosure with wiring protected in conduit. Splash boots can be added for additional protection if needed by customer's requirements.

Weight	250 g (0.55 lbm) Sensor Head 150 g (0.33 lbm)
Dimensions	See diagram
Materials	Gold plated, per MIL-G-45204 Type III Grade A, C-276 welded to a 316L stainless steel body. (patent pending)
Humidity	95% condensing on exposed surfaces excluding connector
Body	Designed to meet IP67
Operating Temperature	Dependent upon O-ring material Hifluor: -26°C to 150 °C (-15 °F to 302 °F) Ethylene Propylene: -40°C to 150 °C (-40 °F to 302 °F)
Pressure Media	Fluid media compatible with C-276 and either Hifluor or Ethylene Propylene o-ring material (common media below)
Pollution Degree	2
Maximum Use Altitude	2000 meters above sea level

Sensor, adapters, isolation valves, or sealing rings that are not compatible with process gases will corrode and fail. This failure may result in gas leaks, fire, explosion, or projectiles. To prevent corrosion and failure, verify that all components are compatible.

O-rings

The o-ring utilized must be compatible with the type of gas or fluid that the transducer will be operated in. Consult your local representative for additional assistance.

Hifluor (black)	Hydrogen sulfide, sulfuric acid, butane, fuel oil, petroleum oil, turbine oil, propane, propylene, butylenes, and natural gas.
Ethylene Propylene (purple)	Ammonium hydroxide, anhydrous ammonia
Mounting Torque	68 N-m (50 lbf-ft)

Accessories

29660-01	Mounting clamp for electronics housing
166393-01	¾-14 NPT Adapter
166393-02	½-14 NPT Adapter
04500022	ADH Dow 4 Elec Ins Comp 4cc Tub
3500/77M	Cylinder Pressure Monitor

Notes

1. 165855 designed to mate per SAE J1926. Transducer does not seal pressure sufficiently if not mated per SAE J1926.
2. Transducer diaphragm may become damaged upon contact with any foreign object. Care must be taken to protect diaphragm during handling and installation to help ensure proper performance.
3. O-ring must be adequately lubricated with supplied Parker Super-O-Lube prior to installation.
4. Depending upon application, acoustic resonance may occur. For specific details on acoustic resonance and indicator valves, contact your local sales or service representative for more information.
5. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

It is highly recommended that an isolation valve be used in conjunction with the 165855 Cylinder Pressure Transducer. Valve materials must be compatible with sour gas environments.

For more information about installing and maintaining this product, refer to the Cylinder Pressure Transducer User Guide (document 166820).

Compliance and Certifications

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

EMC

EN 61326-1

EMC Directive 2014/30/EU

RoHS

RoHS Directive 2011/65/EU

ATEX

EN 60079-01

EN 60079-07

EN 60079-11

EN 60079-15

ATEX Directive 2014/34/EU

Hazardous Area Approvals

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

For additional technical documentation, please log in to bntechsupport.com and access the Bently Nevada Media Library.

Required Hazardous Area Markings on the product will match the approvals option chosen.

ATEX/IECEx

II 1 G Ex ia IIC T4 Ga

II 3 G Ex nA IIC T4 Gc
T4 @ Ta = -40°C to +85°C

cNRTLus

Ex ia IIC T4 Ga;
Class I, Zone 0, AEx ia IIC T4 Ga;
Class I, Division 1, Groups A, B, C & D, T4

Ex nA IIC T4 Gc;
Class I, Zone 2, AEx nA IIC T4 Gc;
Class I, Division 2, Groups A, B, C & D, T4

Ex ec IIC T4 Gc;
Class I, Zone 2, AEx ec IIC T4 Gc;
Class I, Division 2, Groups A, B, C & D, T4

T4 @ Ta = -40 °C to 85 °C

This sensor may only be powered by a power supply unit with a limited energy electric circuit in accordance with CAN/CSA C22.2 No. 61010-1-12 and ANSI/UL 61010-1, or Class 2 as defined in the Canadian Electrical Code C22.1, Section 16-200 and/or National Electrical Code (NFPA 70), article 725.121.

Ordering Information

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

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165855 Cylinder Pressure Transducer

All transducers have 7/8-14 UNF thread.

165855-AA-BB

A: Pressure Range Option	
1 1	0 to 6.8 bar (0 to 100 psia) w/ armor
1 2	0 to 17 bar (0 to 250 psia) w/ armor
1 3	0 to 34.5 bar (0 to 500 psia) w/ armor
1 4	0 to 69 bar (0 to 1,000 psia) w/ armor
1 5	0 to 172 bar (0 to 2,500 psia) w/ armor
1 6	0 to 345 bar (0 to 5,000 psia) w/ armor
1 7	0 to 689 bar (0 to 10,000 psia) w/ armor
B: Hazardous Areas Location Approval	
0 1	Multiple Approvals (CSA, ATEX, and IECEx)

146824 Cylinder Pressure Transducer Cable

146824-AAAA

A: Length Option	
0010	10 ft (3 m)
0025	25 ft (7.6 m)
0050	50 ft (15.2 m)
0100	100 ft (30.5 m)
0200	200 ft (61.0 m)
0300	300 ft (91.4 m)
0400	400 ft (121.9 m)
0500	500 ft (152.4 m)
1000	1,000 ft (304.8 m)

Graphs and Figures

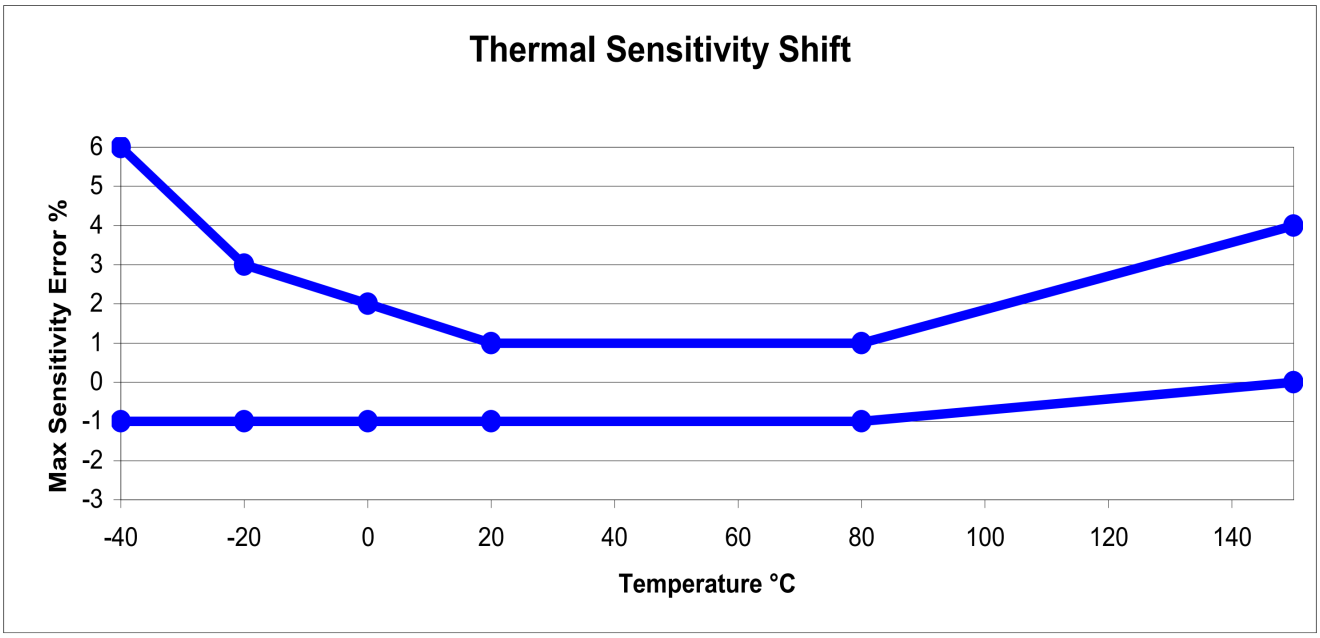
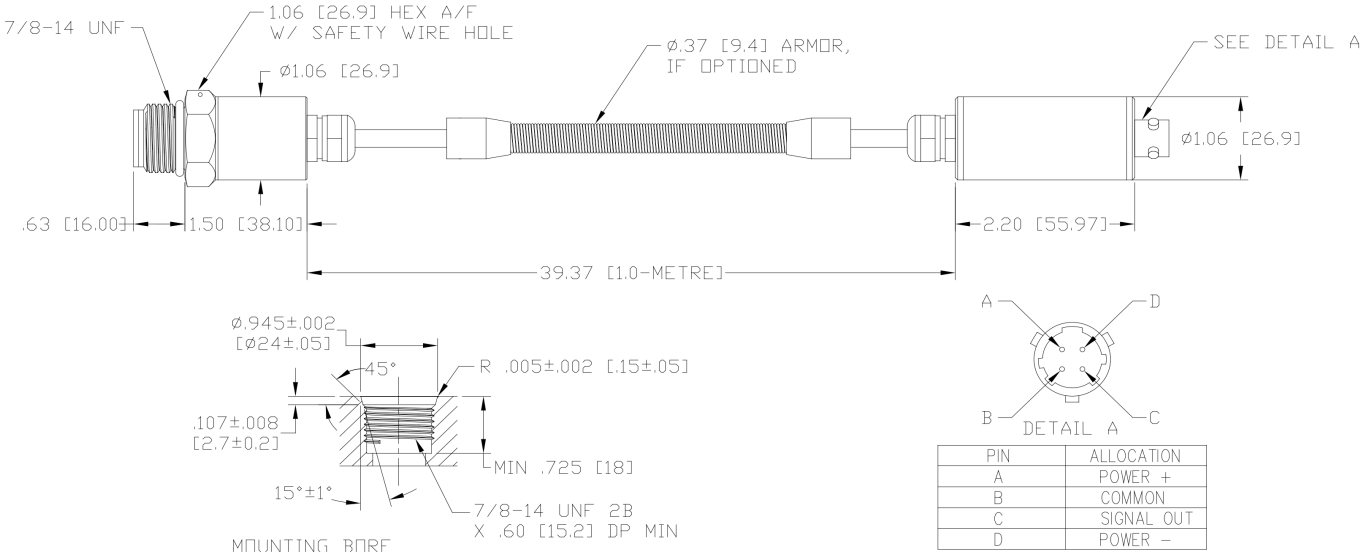
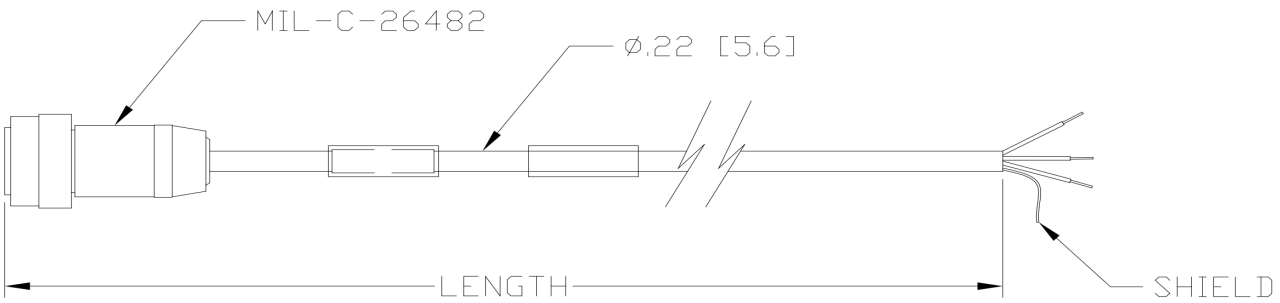


Figure 1: Typical Thermal Sensitivity Shift



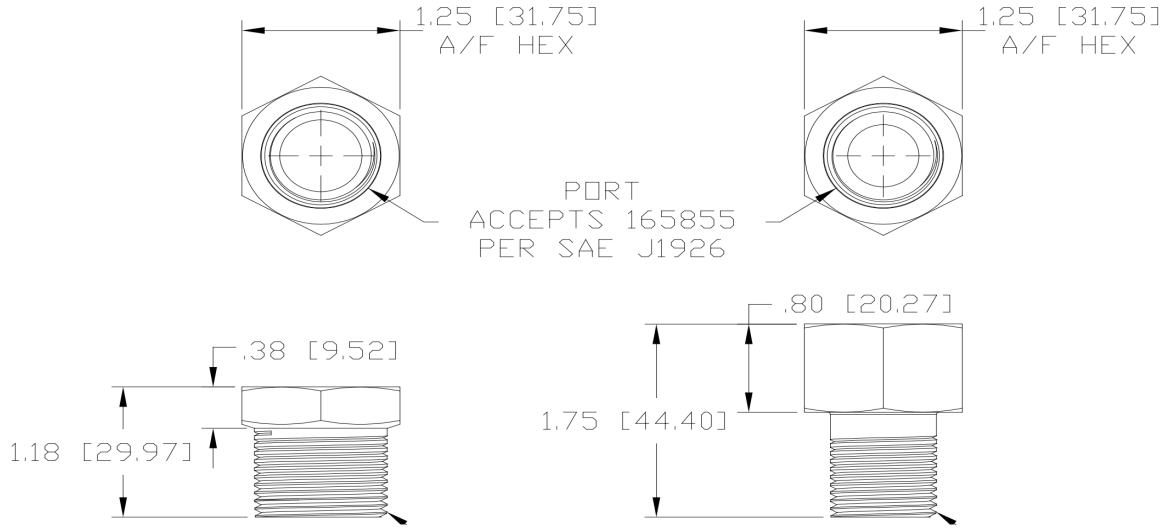
PIN	ALLOCATION
A	POWER +
B	COMMON
C	SIGNAL OUT
D	POWER –

Figure 2: 165855-AA Cylinder Pressure Transducer and Bore per SAE J1926



CONNECTOR	WIRE COLOR	WIRE DESCRIPTION
PIN "A"	RED	POWER
PIN "B"	BLACK	COMMON
PIN "C"	WHITE	SIGNAL
PIN "D"	N/C	

Figure 3: 146824-AAAA Cylinder Pressure Cable



Adapter notes:

1. The 166393-AA adapter is rated to 345 bar (5,000 psi) per ASME B31.1.
2. When exceeding 345 bar (5,000 psi), the 166393-AA is not recommended. In applications exceeding 345 bar (5,000 psi), direct mounting of the 165855 transducer per SAE J1926 is highly recommended.

Figure 4: 166393-AA Adapter

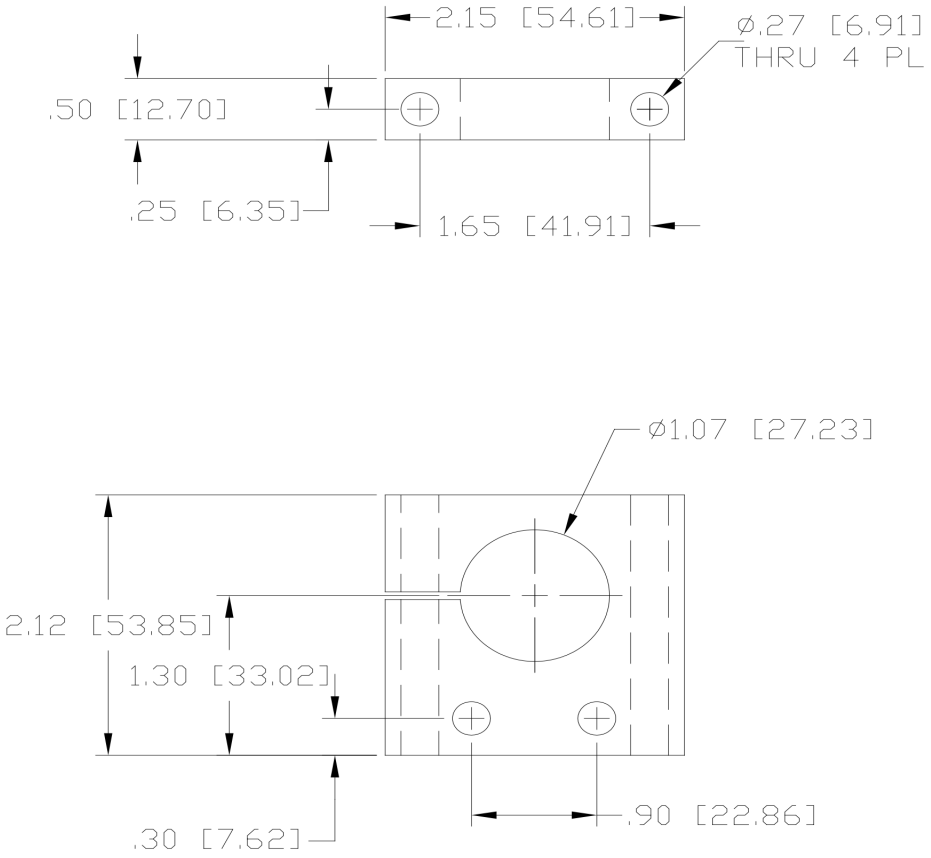


Figure 5: 29660-01 Mounting Clamp, use with M6 or ¼-20 (not supplied)

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