MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

BENTLY NEVADA

330330-070-00-00

MATCHED HIGH-TEMPERATURE EXTENSION CABLE

Used with the applicable 3300 XL 16 mm HTPS configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Bently Nevada 3300 XL 16 mm HTPS Datasheet 141623 Rev. H, applicable specification, ordering and dimensional sections.

3300 XL High Temperature Proximity System

Datasheet

Cordant™

141623 Rev. H



Description

Gas and steam turbines can produce temperatures hot enough to damage or destroy conventional proximity probes. The 3300 High Temperature Proximity System (HTPS) is designed to withstand the extreme temperatures found inside gas turbines, steam turbines and other types of rotating machinery. The HTPS measures vibration, thrust position, differential expansion and other parameters inside the hot areas of these machines. High temperature installations include:

- Near a labyrinth seal in steam turbines
- Differential expansion in steam turbines
- When probe cables are routed through struts that support the bearing housing of a gas turbine
- When probe cables are routed out through the exhaust path of a gas turbine
- Monitoring a troublesome bearing in a high temperature area
- Mode shape analysis at the mid-span location on steam and gas turbines for online machinery diagnostics
- Interstage radial and axial seal clearance measurements at the mid-span location of multi-stage steam turbines to minimize seal rubs
- Most hot bearing locations that can destroy conventional proximity probes

Baker Hughes

Specifications

Unless otherwise noted, the following specifications are for a a 3300 XL 16 mm HTPS Proximitor Sensor, matched extension cable and probe at 22 +4.4°C (72 +8°F) at a maximum altitude of 2000m, with a -24 Vdc power supply, a 10 kΩ load, a Bently Nevada supplied AISI 4140 steel target that is 31 mm (1.2 in) diameter or larger, and a probe gap of 2.5 mm (100 mils). The system accuracy and interchangeability specifications do not apply when using a transducer system calibrated to any target other than a Bently Nevada AISI 4140 steel target.

Electrical

Proximitor Sensor Input	Accepts one noncontacting 3300 XL HTPS 16 mm Proximity Probe with matched Extension Cable.
Power	Requires -19.6 Vdc to -26 Vdc at 12 mA maximum consumption. Operation at a more positive voltage than -23.5 Vdc can result in reduced linear range.
Supply Sensitivity	Less than 13 mV change in output voltage per volt change in input voltage.
Output resistance	50 Ω

Probe dc Resistance	
Probe Length (m)	Resistance from the Center Conductor to the Outer Conductor (RpROBE) (ºhms)
1.0	5.06
2.0	5.82
5.0	8.11

Extension Cable dc Resistance		
Length of Extension Cable (m)	Resistance from CenterConductor to Center Conductor (RCORE) (ohms)	Resistance from Coaxial Conductor to Coaxial Conductor (rjacket) (ohms)
4.0	0.88	0.26
7.0	1.62	0.49
8.0	1.84	0.55

Extension cable capacitance	69.9 pF/m (21.3 pF/ft) typical
Field wiring	Maximum length of 305 metres (1,000 feet) between the 3300 XL HTPS Proximitor Sensor and the monitor. See the frequency response graph for signal rolloff at high frequencies when using longer field wiring lengths.
Linear Range	4.0 mm (160 mils). Linear range begins at approximately 0.5 mm (20 mils) from target and is from 0.5 to 4.5 mm (20 to 180 mils) (approximately -2 to -18 Vdc).
Recommended Gap Setting	2.5 mm (100 mils)

Incremental Scale Factor (ISF)	3.94 V/mm (100 mV/mil) ±9.65% including interchangeability error when measured in increments of 0.5 mm (20 mils) over the 4.0 mm (160 mil) linear range.
Deviation from best fit straight line (DSL)	Less than ±78 |xm (±3.1 mils).
System performance over extended temperatures	Over a probe temperature range of 22ºCto+350ºC (72ºFto+662ºF) the ISF remains within ±30% of 3.94 V/mm (100 mV/mil), the DSL remains within ±0.51 mm (±20 mils).
Frequency Response	0 to 6 kHz: +0, -3 dB typical, with up to 305 metres (1000 feet) of field wiring.
Recommended Minimum Target Size	30.5 mm (1.2 in) diameter (flat target)
Recommended Minimum Shaft Diameter	152 mm (6.0 in)

Measurements on shaft diameters smaller than 76 mm (3.0 in) usually require close spacing of radial vibration or axial position transducers with the potential for their electromagnetic emitted fields to interact with one another (cross talk), resulting in erroneous readings. Care should be taken to maintain minimum separation of transducer tips, generally at least 64 mm (2.5 in) for dual axial position measurements or 54 mm (2.1 in) for radial vibration measurements to prevent cross talk. Radial vibration or position measurements on shaft diameters smaller than 152 mm (6.0 in) will generally result in a change in scale factor due to the curvature of the shaft surface. Consult Performance Specification 159132 for additional information.

Effects of 60 Hz Magnetic Fields Up to 300 Gauss

Output voltage in mil pp/gauss			
Gap	Proximitor Sensor	Probe	Ext. Cable
0.5 mm (20 mil)	0.0020	0.0030	0.0011
2.5 mm (100 mil)	0.0042	0.0034	0.0046
4.5 mm (180 mil)	0.0096	0.0070	0.0157
Electrical Classification		Complies with the European CE mark.	

Mechanical

Probe Tip Material	Ceramic
Probe Case Material	AISI 316L stainless steel (SST).
Probe Cable	1, 2 or 5 metre length of AISI 304L SST hardline cable.
Extension Cable Material	75 Q triaxial, fluoroethylene propylene (FEP) insulated.
Proximitor Sensor Material	Aluminum with epoxy powder coat finish.
System Length	9 metres including extension cable
Extension Cable Armor (optional)	Flexible AISI 302 SST with FEP outer jacket.
Tensile Strength (maximum rated)	289 N (65 pounds) probe to extension cable.
Connector material	Stainless steel
Probe case torque (maximum rated)	81 N.m (720 in.lb)
Connector-to-connector Torque	
Recommended torque	Finger tight + 1/8 turn
Maximum torque	0.565 N.m (5 in.lb)
Minimum Bend Radius (with or without SST armor)	25.4 mm (1.0 in)
System Weight (typical)	
Probe	117 g/m (1.26 oz/ft) of hardline cable + 12 g/cm (1.07 oz/in) of case
Extension Cable	45 g/m (0.5 oz/ft)
Armored Extension Cable	140 g/m (1.5 oz/ft)
Proximitor Sensor	255 g (9 oz)

Environmental Limit:

Probe Temperature Range	
Operating and Storage Temperature	-34°C to+350°C (-30°F to +662°F)
Extension Cable Temperature Range	
Operating and Storage Temperature	52°C to +177°C (-60°F to +351 °F)
Proximitor Sensor Temperature Range	
Operating Temperature	-52°C to +100°C (-60°F to +212°F)
Storage Temperature	-52°C to +105°C (-60°F to +221°F)
Probe Relative Humidity	100% condensing, submersible when connectors are protected.
Extension Cable and Proximitor Sensor Relative Humidity	100% condensing, non-submerged when connectors are protected.
Probe Pressure	3300 XL High Temperature Probes are designed to seal differential pressure between the probe tip and case. Probes are not pressure tested prior to shipment. Contact our custom design department if you require a test of the pressure seal for your application.

3300 XL High Temperature Probe, Smooth Case

330303-AAA- BB-CC-DD-EE

A: Overall Case Length Option:	
Mounting bracket is included with the proximity probe.	
Order in increments of 0.1 in (2.54 mm)	
Threaded length configurations	
Maximum case length	9.9 in (251.5 mm)
Minimum case length	0.6 in (15.2 mm)
Example	**0 6 0** = 6.0 in (152.4 mm)
B: Hardline Length Option:	
10	1.0 metre (3.3 feet)
20	2.0 metres (6.6 feet)
50	5.0 metres (16.4 feet)
C: Total Length Option:	
Extension cable is included with the proximity probe.	
90	9.0 metres (30 feet)
D: Extension Cable Armor Option:	
00	Without stainless steel armor
01	With stainless steel armor
E: Agency Approval Option:	
00	Not required

3300 XL 16mm High Temperature Proximitor Sensor

330380-AA-BB (replaced 330300)

A: Total Length and Mounting Option	
90	9 meter, panel mount
91	9 meter, DIN mount
92	9 meter, no mounting hardware
B: Agency Approval	
00	Not required

Accessories

125M6030	3300 XL 16mm High Temperature Proximity System User Guide
159132	Performance Specification
134835-01	Mounting bracket for 330303 smooth case probe (spare).

Spare Extension Cable

330330-AAA-BB-CC

A: Cable Length Option:	
The 3300 XL 16 mm HTPS extension cable is matched to the probe. If you lose or damage an extension cable, a replacement cable can be trimmed to the same capacitance as the original. A probe serial number will be required when ordering a spare extension cable for matching.	
040	4.0 metres (13.1 feet)
070	7.0 metres (23.0 feet)
080	8.0 metres (26.3 feet)

B: Armor Option:	
00	Without stainless steel armor
01	With stainless steel armor
C: Agency Approval Option:	
00	Not required
Armor Length	
Cable Length Option	Armor Length ±0.05 m (0.17 ft)
040	1.9 metres (6.25 ft)
070	5.6 metres (18.4 ft)
080	6.6 metres (21.7 ft)

Field Wiring Cable

132501-AA

1.0 mm2 (18 AWG), 3 conductor twisted, shielded cable for connections between Proximitor sensor and monitor. Terminal ring lugs are installed at each end, including an extra shield ring lug at the monitor end.	
A: Cable Length Option in Feet:	
Order in increments of 1.0 foot (0.3 metres)	
Minimum length	2 feet (0.6 metres)
Maximum length	99 feet (30 metres)
Example	**15** = 15 feet (4.6 metres)

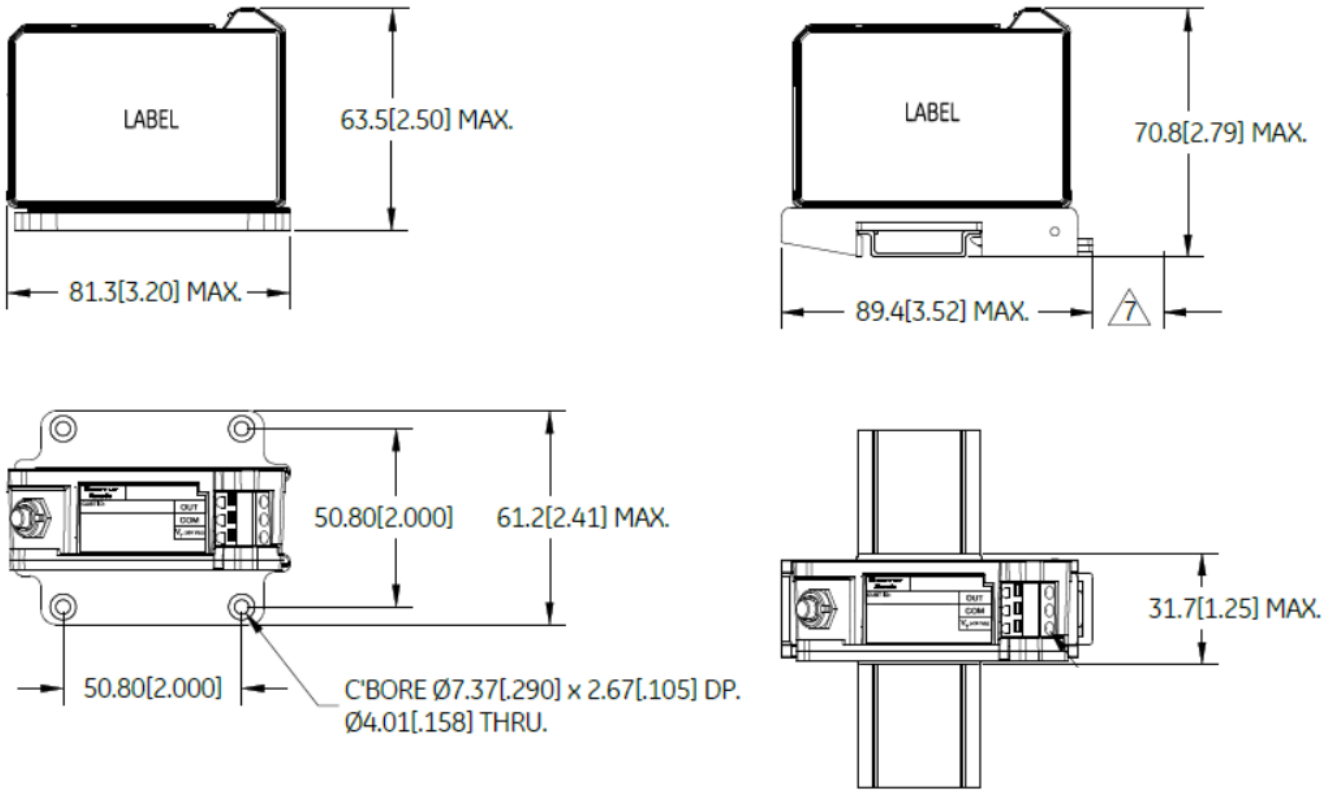


Figure 11: 330380 HTPS Proximitor Sensor (see drawing of same number)

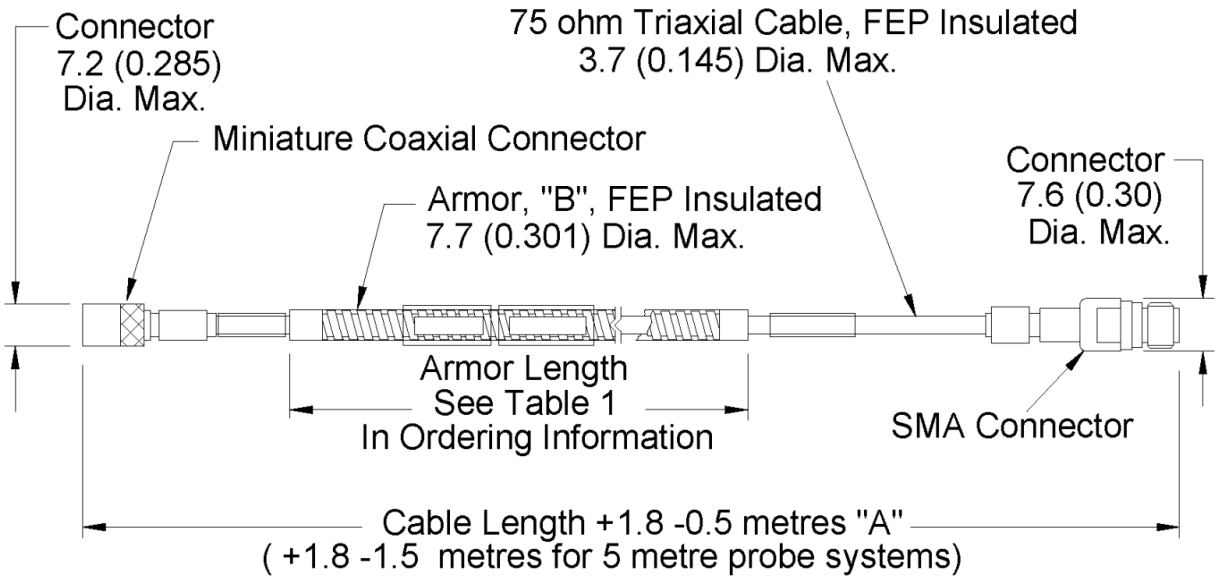


Figure 12: Spare Extension Cable, Part Number 330330