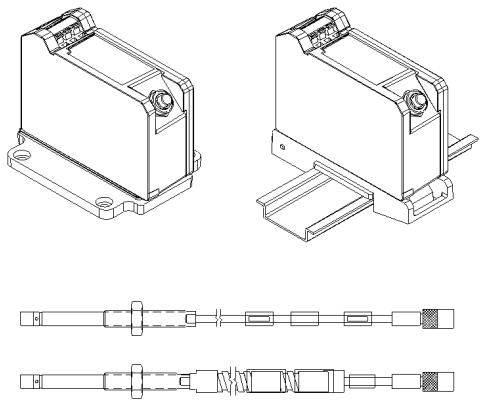
3300 5 mm Transducer System

Datasheet

Cordant™

172036 Rev. T



Description

Transducer System

The 3300 5 mm Proximity Transducer System consists of:

- a 3300 5 mm probe [1, 2]
- a 3300 XL extension cable (ref 141194-01)
- a 3300 XL Proximitor Sensor [3, 4, 5] (ref 141194-01)

When combined with a 3300 XL Proximitor Sensor and XL extension cable, the system provides an output voltage that is directly proportional to the distance between the probe tip and the observed conductive surface. The system can measure both static (position) and dynamic (vibration) data. Its primary use is in vibration and position measurement applications on fluid-film bearing machines, as well as Keyphasor measurement and speed measurement applications[6].

The system provides an accurate, stable signal output over a wide temperature range. All 3300 XL Proximity Transducer Systems achieve this level of performance with complete interchangeability of probe, extension cable, and Proximitor sensor, eliminating the need for individual component matching or bench calibration.

Proximity Probe

The 3300 5 mm probe improves upon previous designs. A patented TipLoc molding method provides a more robust bond between the probe tip and the probe body. The 3300 5 mm system is orderable with Fluidloc cable options for preventing oil and other liquids from leaking out of the machine through the cable's interior.

Baker Hughes

Specifications

Unless otherwise noted, the following specifications are for a proximity transducer system between +18°C and +27°C (+64°F to +80°F) with a -24 Vdc power supply, a 10 kW load, an AISI 4140 steel target, and a probe gapped at 1.27 mm (50 mils).

Electrical

XL Proximitor Sensor Input	Accepts one noncontacting 33005 mm Proximity Probe and XL Extension Cable.
Power	Requires -17.5 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 2 mV change in output voltage per volt change in input voltage.
Output Resistance	50 W

Probe DC Resistance	
Probe Length (m)	**Resistance from the Center Conductor to the Outer Conductor (Ω)**
0.5	7.45 ± 0.50
1.0	7.59 ± 0.50
1.5	7.73 ± 0.50
2.0	7.88 ± 0.50
5.0	8.73 ± 0.70
9.0	9.87 ± 0.90

Extension Cable DC Resistance		
Length of Extension Cable (m)	**Resistance from Center Conductor to Center Conductor (R_{CORE}) (Ω)**	**Resistance from Outer Conductor to Outer Conductor (R_{JACKET}) (Ω)**
3.0	0.66 ± 0.10	0.20 ± 0.04
3.5	0.77 ± 0.12	0.23 ± 0.05
4.0	0.88 ± 0.13	0.26 ± 0.05
4.5	0.99 ± 0.15	0.30 ± 0.06
7.0	1.54 ± 0.23	0.46 ± 0.09
7.5	1.65 ± 0.25	0.49 ± 0.10
8.0	1.76 ± 0.26	0.53 ± 0.11
8.5	1.87 ± 0.28	0.56 ± 0.11

Outer conductor refers to the shielded conductor that is attached to the connector, not the armor braid.

Extension Cable Capacitance	69.9 pF/m (21.3 pF/ft) typical.
Field Wiring	Recommend using 3-conductor shielded triad cable 0.2 mm to 1.5 mm (16 AWG to 24 AWG). 305 meters(1,000 feet) maximum length between 3300 XL Proximity Transducer and monitor. Consult Performance Specification, document 155687, for signal rolloff at high frequencies when using longer field wiring lengths or external safety barriers located some distance from the monitoring system.

Linear Range	2 mm (80 mils). Linear range begins at approximately 0.25 mm (10 mils) from target and is from 0.25 to 2.3 mm (10 to 90 mils).
Recommended Gap Setting	1.27 mm (50 mils).
Incremental Scale Factor	7.87 V/mm (200 mV/mil) ±6.5% typical, including interchangeability error when measured in increments of 0.25mm (10 mils) over the linear range.
Deviation from Best Fit Straight Line (DSL)	Less than ±0.038 mm (±1.5 mil) typical deviation from best fit straight line.
Probe Temperature Stability (typical)	Over probe temperature range of -35°C to +177°C (-31°F to +350°F), the incremental scale factor remains within ±10% of 7.87 V/mm (200 mV/mil) and the deviation from the best fit straight line remains within ±0.076 mm (±3 mils).
Frequency Response	0 to 10 kHz: +0, -3 dB, with up to 305 meters (1000 feet) of field wiring.
Minimum Target Size	15.2 mm (0.6 in) diameter (flat target)
Shaft Diameter	
Minimum	50.8 mm (2 in)
Recommended minimum	76.2 mm (3 in)

When gapped at the center of the linear range, the interaction between 2 separate transducer systems (cross-talk) will be less than 50 mV on shaft diameters of at least 50 mm (2 in) or greater. Care should be taken to maintain minimum separation of transducer tips, generally at least 40 mm (1.6 in) for axial position measurements or 38 mm (1.5 in) for radial vibration measurements to limit cross-talk to 50 mV or less. Radial vibration or position measurements on shaft diameters smaller than 76.2 mm (3 in) will generally result in a change in scale factor. Consult Performance Specification 155687 for additional information.

Effects of 60 Hz Magnetic Fields Up to 300 Gauss

Output Voltage in Mil (pk-pk)/Gauss (5-Meter System)			
Gap	**XL Proximitor Sensor**	**Probe**	**XL Ext. Cable**
10 mil	0.0119	0.0004	0.0004
50 mil	0.0131	0.0014	0.0014
90 mil	0.0133	0.0045	0.0045

Electrical Certification

Complies with the European CE mark.

Mechanical

Probe Tip Material	Polyphenylene sulfide (PPS)
Probe Case Material	AISI 303 or 304 stainless steel (SST)
Probe Cable	75 Ω triaxial, fluoroethylene propylene (FEP) insulated probe cable in the following lengths: 0.5, 1, 2, 5, or 9 meters (1.6, 3.3, 16.4, or 29.5 feet)
System Length	5 or 9 meters (16.4 or 29.5 feet) including extension cable
Extension Cable Material	75 W triaxial, fluoroethylene propylene (FEP) insulated
Probe and Extension Cable Armor	Flexible AISI 302 or 304 SST with FEP outer jacket

5mm Probe Tensile Strength	222 N (50 lbf) probe case to probe lead. 222 N (50 lbf) probe lead to extension cable connectors
Connector material	Gold-plated brass or gold-plated beryllium copper
Probe case torque	5.1 N·m (45in·lb) recommended 7.3 N·m (65 in·lb) maximum
Connector-to-connector torque	Refer to the table below: Recommended Torque
Maximum torque	0.565 N·m (0.42 ft•lbf)
Minimum Cable Bend Radius	25.4 mm (1.0in)
Weight	
Total System	0.71 kg (1.6 lb), typical
3300 5mm Probe	323 g (11.39 oz).
XL Extension Cable	34 g/m (0.4 oz/ft) 103 g/m (1.5 oz/ft) (armored)
XL Proximitor Sensor	246 g (8.7 oz)

Recommended Torque	
Connector Type	**Tightening Instructions**
2 3300 XL gold "click" type connectors	Finger tight
1 non-XL stainless steel connector and 1 3300 XL connector	Finger tight plus 1/8 turn using pliers

Thread Engagement Limits

Probe Case Thread	Maximum Length of Thread Engagement
1/4-28	0.375 in
M8x1	12 mm

Maximum thread engagement lengths are per the industry standard of 1.5 times the nominal thread diameter. A fit class matching that of the external probe thread is assumed for all internal threads. Applications with thread engagement lengths exceeding the values in the table above may exhibit binding during installation. Contact your Bently Nevada representative if you require probe thread engagement lengths exceeding the values above. Bently Nevada does not replace proximity probes under warranty due to excessive thread engagement lengths.

When drilling and tapping a mounting hole **for a 1/4-28 probe**, a **#3 or larger tap drill** is recommended.

Environmental Limits

Probe Temperature Range	-35°C to +177°C (-31°F to +351°F)

Exposing the probe to temperatures below –34°C (-30°F) may cause premature failure of the pressure seal.

Extension Cable Temperature Range	-51°C to +177°C (-60°F to +351°F) for standard extension cable. ref 141194-01

Probe Pressure

3300 5mm probes are designed to seal differential pressure between the probe tip and case. The probe sealing material consists of a fluorocarbon O-ring. We do not pressure test probes prior to shipment. Contact our custom design department if a test of the pressure seal for your application is required.



It is the responsibility of the customer or user to ensure that all liquids and gases are contained and safely controlled should a proximity probe leak. In addition, solutions with high or low pH values may erode the tip assembly of the probe causing media to leak into surrounding areas. Bently Nevada does not be held responsible for any damages resulting from leaking 3300 5 mm proximity probes. In addition, Bently Nevada does not replace 3300 5 mm proximity probes under the service plan due to probe leakage.

3300 XL Probe

ia	Class I, Zone 0: Aex/Ex ia IIC T5...T1 Ga Class 1, Groups A,B,C, and D, Class II, Groups E, F, and G, Class III
When installed with intrinsically safe zener barriers per drawing 141092 or when installed with galvanic isolators. (See table below, Temperature Schedule)	
nA, ec	Class I, Zone 2: AEx/Ex nA IIC T5...T1 Gc Class I, Division 2, Groups A, B, C, and D Class I, Zone 2 AEx/Ex ec IIC T5...T1 Gc; Class I, Divison 2, Groups A, B, C, and D
When installed without barriers per drawing 140979 (See table below, Temperature Schedule)	

ATEX/IECEx

3300 XL Proximitor Sensor

ia	Ex ia IIIC T90C/T105C Dc
	For EPL Dc: T105°C @ Ta = -55°C to 100°C T90°C @ Ta = -55°C to +85°C
II 1 G Ex ia IIC T4/T5 Ga	
Ui= -28V Ii= 140mA Pi= 0.91W Ci- 47nF LI= 1460µH	Uo= -28V Io= 140mA Po= 0.742W Co= 1.5nF Lo= 610µH
nA,ec	
II 3 G Ex nA IIC T4/T5 Gc Ex ec IIC T4/T5 Gc	

Ui= -28V	Li= 140 Ma
	T5 @ Ta= -55˚ C to +40 ˚C T4 @ Ta= -55 ˚C to +80 ˚C

3300 XL Probe

Probe entity parameters are met when used with BN extension cables and connected to BN Prox.

ia	Ex ia IIIC T90°C ... T280°C Dc
For EPL Dc: (see Table 5: Temperature Schedule)	
II 1 G Ex ia IIC T5...T1 Ga, (see table below, Temperature Schedule)	
Ui = -28V Ci = 1.5 nF Ii = 140 mA Li =610 µH Pi = 0.91 W	
nA, ec	
II 3 G Ex nA IIC T5...T1 Gc, Ex ec IIC T5...T1 Gc, (see table below, Temperature Schedule).	
Ui = -28V Li= 140 mA	

The Prox must be installed so as to provide the terminals with a degree of protection of at least IP54.

Temperature Schedule	
Temperature Classification	**Ambient Temperature (Probe Only)**
For EPL Ga and Gc	
T1	-55°C to +232°C
T2	-55°C to +177°C
T3	-55°C to +120°C
T4	-55°C to +80°C
T5	-55°C to +40°C
For EPL Dc	
T280C @ Ta	-55°C to +232°C
T225C @ Ta	-55°C to +177°C
T170C @ Ta	-55°C to +120°C
T130C @ Ta	-55°C to +80°C
T90C @ Ta	-55°C to +40°C

Hazardous Area Conditions of Safe Use

Zone 0/1:

1. The exposed plastic surface of the Probes with 50 mm diameter, under certain extreme circumstances, may generate an ignition-capable level of electrostatic charge. Therefore, this version of the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on the plastic surface. In addition, the equipment shall only be cleaned with a damp cloth. This is particularly important if the equipment is installed in a Zone 0 location.
2. The end user is to ensure appropriate earthing upon installation.

Zone 2:

1. This product is not resistant to light as required by the relevant clause of EN 60079-0, therefore, it shall only be installed in a location where it is not exposed to direct sunlight or any other source of ultra-violet (UV) light.
2. The connector shall not be disconnected while the circuit is live unless the area is known to be non-hazardous.
3. The end user is to ensure appropriate earthing upon installation.

B: Overall Case Length Option	
Order in increments of 10mm **Metric thread configurations:** Maximum unthreaded length: **2 5** = 250mm Minimum unthreaded length: **0 2** = 20mm **Example:0 6** = 60mm	
C: Total Length Option	
0 5	0.5 meter (1.6 feet)
1 0	1.0 metre (3.3 feet)
2 0	2.0 metres (6.6 feet)
5 0	5.0 metres (16.4 feet)[1]
9 0	9.0 metres (29.5 feet)
D: Connector Option	
0 1	Miniature coaxial ClickLoc connector with connector protector, standard cable
0 2	Miniature coaxial ClickLoc connector, standard cable
1 1	Miniature coaxial ClickLoc connector with connector protector, FluidLoc cable
1 2	Miniature coaxial ClickLoc connector, FluidLoc cable
E: Agency Approval Option	
0 0	Agency Approval Option
0 5	Multiple Approvals

Ordering Information for Proximitor Sensor

3300 XL Proximitor Sensor

330180-AA-BB

A: Total Length and Mounting Option	
10	1.0 meter (3.3 feet) system length, panel mount
11	1.0 meter (3.3 feet) system length, DIN mount
12	1.0 meter (3.3 feet) system length,no mounting hardware
50	5.0 meters (16.4 feet) system length, panel mount
51	5.0 meters (16.4 feet) system length, DIN mount
52	5.0 meters (16.4 feet) system length, no mounting hardware
90	9.0 meters (29.5 feet) system length, panel mount
91	9.0 meters (29.5 feet) system length, DIN mount
92	9.0 meters (29.5 feet) system length, no mounting hardware
B: Agency Approval Option	
00	Not required
05	CSA, ATEX, IECEx Approvals

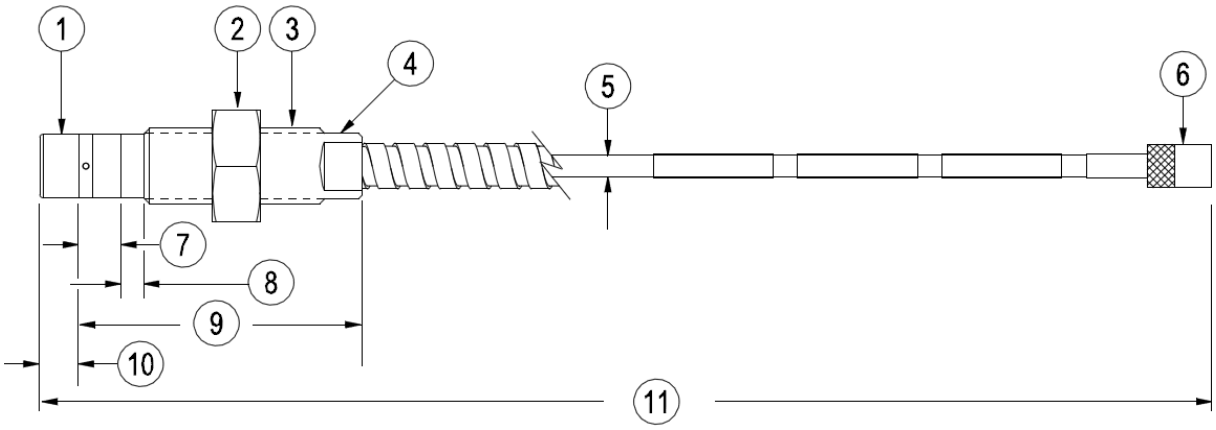
Ordering Information for Extension Cables

3300 XL Standard Extension Cable

330130-AAA-BB-CC

Make sure that the extension cable length and the probe length, when added together, equal the Proximitor Sensor total length.

A: Cable Length Option	
030	3.0 meters (9.8 feet)
035	3.5 meters (13.1 feet)
040	4.0 meters (11.5 feet)
045	4.5 meters (14.8 feet)



1. Probe tip, 5.2mm [0,21 in] diameter
2. 11.1 mm [7/16in] for 1/4-28 threads, 13.0mm [0.51in] for M8 thread. See Note 3.
3. Case thread
4. 5.6 [7/32] wrench flats for 1/4-28 threads, 7.0 [0.28] for M8 threads
5. 75Ω cable, 2.8mm [0.11 in] maximum outside diameter, 7.6mm [0.3 in] outside diameter of armor, 9.0mm [0.35in] maximum diameter of armor ferrule.
6. Miniature male coaxial connector, 7.23mm [0.285 in] maximum outside diameter “D”
7. 3.2 [0.13in]
8. Unthreaded length “A”
9. Case length “B”
10. 6.0mm [0.235in] maximum
11. Total length “C”, =30%, -0%. See Note.

Figure 3: 3300 5mm Proximity Probes, Standard Mount3

330171, 1/4-28 UNF-2A, without armor[7]

330172, 1/4-28 UNF-2A, with armor[6]

330173, M8X1 thread, without armor[7]

330174, M8X1 thread, with armor[6]

330130, 3300 XL Extension Cable (FEP armor and insulation)

1. All dimensions are in millimetres (inches) unless otherwise noted.
2. Standard mount 5mm probes supplied with 13 mm or 7/16-in lock nut.
3. Letters inside quotation marks refer to probe ordering options.
4. Stainless steel armor is supplied with FEP outer jacket for standard probes, PFA outer jacket for ETR probes.
5. FEP jacket is standard non-armored portion of the cable for standard probes, PFA jacket on non-armored portion for ETR probes.
6. Probes ordered with 5 or 9 meter integral cables have a length tolerance of +20%, -0%.
7. Five meter probes are designed for use with the five meter Proximitor Sensor only.