3300 XL 8 mm Proximity Transducer System

Datasheet

Cordant™

141194 Rev. AN



Description

The 3300 XL 8 mm Proximity Transducer System consists of:

- One 3300 XL 8 mm probe,
- One 3300 XL extension cable[1], and
- One 3300 XL Proximitor Sensor[2].

The system provides an output voltage that is directly proportional to the distance between the probe tip and the observed conductive surface and can measure both static (position) and dynamic (vibration) values. The system's primary applications are vibration and position measurements on fluid-film bearing machines, as well as Keyphasor reference and speed measurements[3].

The 3300 XL 8 mm system delivers the most advanced performance in our eddy current proximity transducer systems. The standard 3300 XL 8 mm 5-meter system also fully complies with the American Petroleum Institute's (API) 670 Standard for mechanical configuration, linear range, accuracy, and temperature stability. All 3300 XL 8 mm proximity transducer systems provide this level of performance and support complete interchangeability of probes, extension cables, and Proximitor sensors, eliminating the need to match or bench calibrate individual components.

Each 3300 XL 8 mm Transducer System component is backward compatible and interchangeable[4] with other non-XL 3300 series 5 mm and 8 mm transducer system components[5]. This compatibility includes the 3300 5 mm probe, for applications in which an 8 mm probe is too large for the available mounting space[6,7].

Baker Hughes

Proximitor Sensor

The 3300 XL Proximitor Sensor incorporates numerous improvements over previous designs. Its physical packaging allows you to use it in high-density DIN-rail installations. You can also mount the sensor in a traditional panel mount configuration, where it shares an identical 4-hole mounting “footprint” with older Proximitor Sensor designs. The mounting base for either option provides electrical isolation and eliminates the need for separate isolator plates. The 3300 XL Proximitor Sensor is highly immune to radio frequency interference, allowing you to install it in fiberglass housings without adverse effects from nearby radio frequency signals. The 3300 XL Proximitor Sensor’s improved RFI/EMI immunity satisfies European CE mark approvals without requiring special shielded conduit or metallic housings, resulting in lower installation costs and complexity.

The 3300 XL’s SpringLoc terminal strips require no special installation tools and facilitate faster, more robust field wiring connections by eliminating screw-type clamping mechanisms that can loosen.

Proximity Probe and Extension Cable

The 3300 XL probe and extension cable also reflect improvements over previous designs. A patented TipLoc molding method provides a more robust bond between the probe tip and the probe body. The probe’s cable incorporates a patented CableLoc design that provides 330 N (75 lbf) pull strength to more securely attach the probe cable and probe tip.

You can also order 3300 XL 8 mm probes and extension cables with an optional FluidLoc cable option. This option prevents oil and other liquids from leaking out of the machine through the cable’s interior.

Connectors

The 3300 XL probe, extension cable, and Proximitor sensor have corrosion-resistant, gold-plated ClickLoc connectors. These connectors require only finger-tight torque (the connectors will "click" when tight), and the specially-engineered locking mechanism prevents the connectors from loosening. These connectors require no special tools for installation or removal.

You can order the 3300 XL 8 mm probes and extension cables with connector protectors already installed. We can also supply connector protectors separately for field installations (such as when an application must run the cable through restrictive conduit). We recommend connector protectors for all installations to provide increased environmental protection[8].

Extended Temperature Range Applications

An extended temperature range (ETR) probe and ETR extension cable are available for applications in which either the probe lead or extension cable may exceed the standard 177°C (350°F) temperature specification. The ETR probe has an extended temperature rating for up to 218°C (425°F). The ETR extension cable rating is up to 260°C (500°F). Both the ETR probe and cable are compatible with standard temperature probes and cables, for example, you can utilize an ETR probe with the 330130 extension cable. The ETR system uses the standard 3300 XL Proximitor Sensor. Note that when you use any ETR component as part of your system, the ETR component limits the system accuracy to the accuracy of the ETR system.

Description Notes:

1. One-meter systems do not use an extension cable.

2. Proximitor sensors are supplied by default from the factory calibrated to AISI 4140 steel. Calibration to other target materials is available upon request.

3. Consult Bently Nevada Applications Note, Considerations when using Eddy Current Proximity Probes for Overspeed Protection Applications, when considering this transducer system for tachometer or overspeed measurements.

Specifications

Unless otherwise noted, the following specifications are for a 3300 XL 8 mm Proximitor Sensor, extension cable and 8 mm probe between +18°C and +27°C (+64°F to +80°F) at a maximum altitude of 2000 meters, with a -24 Vdc power supply, a 10 kΩ load, an AISI 4140 steel target, and a probe gapped at 1.27 mm (50 mils). Performance characteristics apply to systems that consist solely of 3300 XL 8 mm components. The system accuracy and interchangeability specifications do not apply to transducer systems that are calibrated to any target other than our AISI 4140 steel target.

Electrical

Proximitor Sensor Input	Accepts one non-contacting 3300-series 5 mm, 3300 XL 8 mm Proximity Probe and Extension Cable.
Power	Requires -17.5 Vdc to -26 Vdc when installed with non-incendive circuit connected per installation drawing 140979 at 12 mA maximum consumption, -23 Vdc to -26 Vdc with barriers. 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 Ω

Nominal Probe DC Resistance	
Resistance (R_{PROBE}) from Center Conductor to Outer Conductor	
Probe Length (m)	**R_{PROBE}(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
3.0	8.17 ± 0.50
5.0	8.73 ± 0.50
9.0	9.87 ± 0.50

Nominal Extension Cable DC Resistance	
Resistance (R_{CORE}) from Center Conductor to Center Conductor	
Length of Extension Cable (m)	**RCORE (Ω)**
3.0	0.66 ± 0.10
3.5	0.77 ± 0.12
4.0	0.88 ± 0.13
4.5	0.99 ± 0.15
6.0	1.32 ± 0.21
7.0	1.54 ± 0.23
7.5	1.65 ± 0.25
8.0	1.76 ± 0.26
8.5	1.87 ± 0.28

Connector-to-Connector Recommended Torque	
Connector Type	**Tightening Instructions**
Two 3300 XL gold "click" type connectors	Finger tight
One non-XL stainless steel connector and one 3300 XL connector	Finger tight plus 1/8 turn using pliers
Materials	
Proximitor Sensor Material	A308 aluminum
Connector Material	Gold-plated brass or gold-plated beryllium copper.
Length	
System Length	5 or 9 meters (including extension cable) or 1 meter (probe only).
Weight	
Total System Weight (Typical)	0.7 kg (1.5 lb m)
Probe	323 g/m (11.4 oz)
Extension Cable	34 g/m (0.4 oz/ft)
Armored Extension Cable	103 g/m (1.5 oz/ft)
Proximitor Sensor	246 g (8.67 oz)

Thread Engagement Limits

Probe Case Thread	Maximum Length of Thread Engagement
3/8-24	0.563 in
M10x1	15 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.

Environmental Limits

Probe Temperature Range	
Operating and Storage Temperature	
Standard Probe	-52°C to +177°C (-62°F to +350°F)
Extended Temperature Range Probe	-52°C to +218°C (-62°F to +425°F) for the probe tip; -51°C to +260°C (-60°F to +500°F) for the probe cable and connector.

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

Probe Pressure
3300 XL 8 mm probes are designed to seal differential pressure between the probe tip and case. The probe sealing material consists of a Viton® O ring. 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.

It is the responsibility of the customer or user to ensure that all liquids and gases are contained and safely controlled should leakage occur from a proximity probe. In addition, solutions with high or low pH values may erode the tip assembly of the probe causing media leakage into surrounding areas. Bently Nevada does not be held responsible for any damages resulting from leaking 3300 XL 8 mm proximity probes. In addition, 3300 XL 8 mm proximity probes does not be replaced under the service plan due to probe leakage.

Extension Cable Temperature Range	
Operating and Storage Temperature	
Standard Cable	-52°C to +177°C (-62°F to +350°F)
Extended Temperature Range Cable	-52°C to +260°C (-62°F to +500°F)

Proximitor Sensor Temperature Range	
Operating Temperature	-52°C to +100°C (-62°F to +212°F)
Storage Temperature	-52°C to +105°C (-62°F to +221°F)

Probe Relative Humidity
Less than a 3% change in Average Scale Factor (ASF) when tested in 93% humidity in accordance with IEC standard 68 2 3 for up to 56 days.

330101-00-08-05-02-00, 330101-00-08-05-02-05, 330101-00-08-10-02-00, 330101-00-08-10-02-05, 330101-00-12-10-02-00, 330101-00-12-10-02-05, 330101-00-16-10-02-00, 330101-00-16-10-02-05, 330101-00-20-05-02-00, 330101-00-20-10-02-00, 330101-00-20-10-02-05, 330101-00-30-10-02-00, 330101-00-30-10-02-05, 330101-00-40-05-02-00, 330101-00-40-10-02-00, 330101-00-40-10-02-05, 330101-00-60-10-02-00, 330101-00-60-10-02-05, 330102-00-20-10-02-00, 330103-00-02-10-02-05, 330103-00-04-10-02-00, 330103-00-05-10-02-00, 330104-00-06-10-02-00, 330104-01-05-50-02-00, 330105-02-12-05-02-00, 330105-02-12-05-02-05, 330105-02-12-10-02-00, 330105-02-12-10-02-05, 330106-05-30-05-02-00, 330106-05-30-05-02-05, 330106-05-30-10-02-00, 330106-05-30-10-02-05.

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)
060	6.0 meters (19.7 feet)
070	7.0 meters (22.9 feet)
075	7.5 meters (24.6 feet)
080	8.0 meters (26.2 feet)
085	8.5 meters (27.9 feet)
B: Connector Protector and Cable Option	
00	Standard cable
01	Armored cable
02	Standard cable with connector protector

03	Armored cable with connector protector
10	FluidLoc cable
11	Armored FluidLoc cable
12	FluidLoc cable with connector protector
13	Armored FluidLoc cable with connector protector
C: Agency Approval Option	
00	Not required
05	CSA, ATEX, IECEx Approvals

3300 XL Extended Temperature Range (ETR) Extension Cable

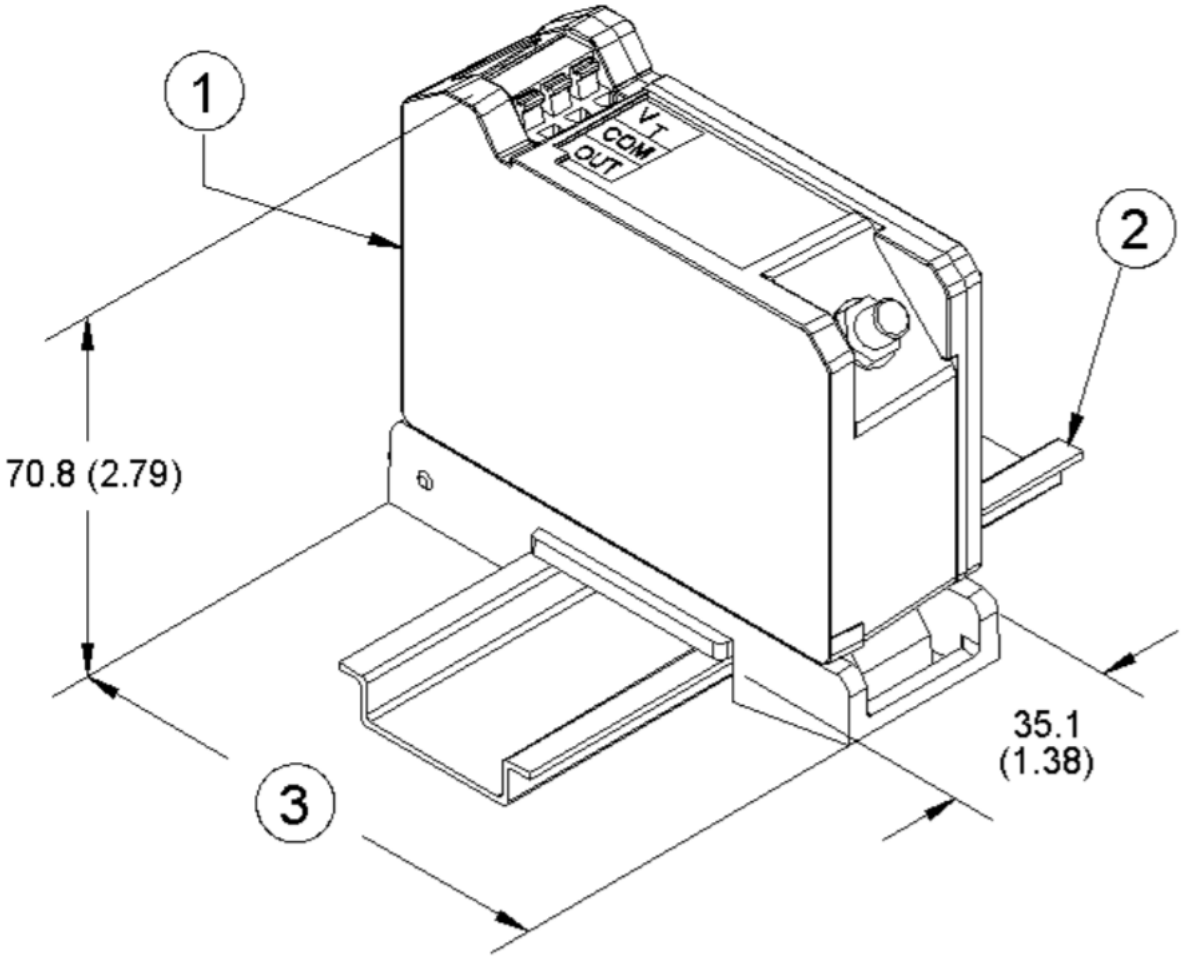
330190-AAA-BB-CC

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)
070	7.0 meters (22.9 feet)
075	7.5 meters (24.6 feet)
080	8.0 meters (26.2 feet)
085	8.5 meters (27.9 feet)
B: Cable Option	
00	Standard cable
01	Armored cable
C: Agency Approval Option	
00	Not required
05	CSA, ATEX, IECEx Approvals

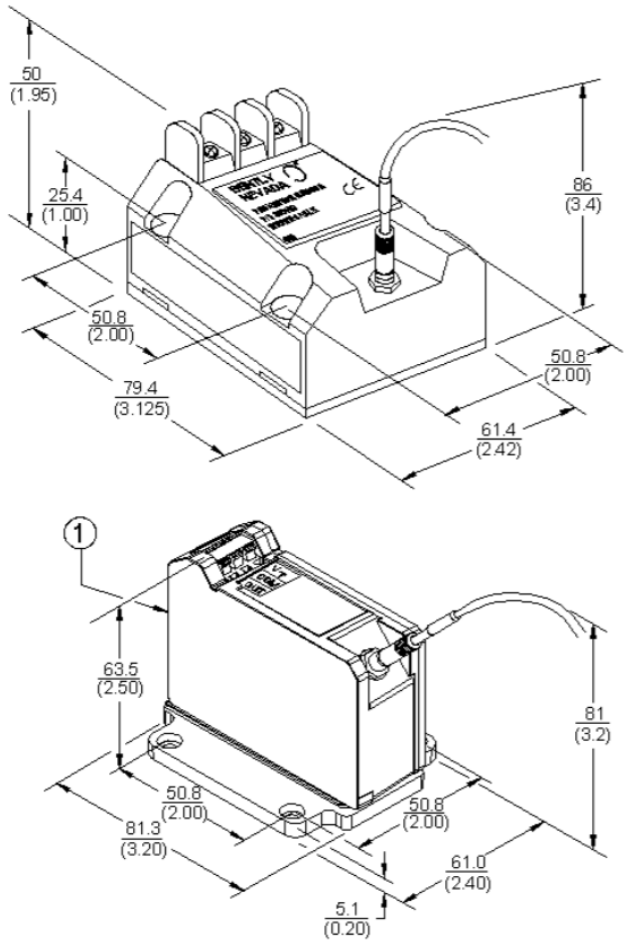
Accessories

141078	3300 XL 8 mm and 3300 5 mm Proximity Transducer System Manual.
175751	3300 XL Multi-Purpose Stainless Steel Housing. 12”x12”x6”. Can hold up to 8 Proximitor Sensors in a DIN-mount configuration or 6 Proximitor Sensors in a panel-mount configuration. (Available with ATEX/IECEx Zone 2 type << u >> certifications).
176467	3300 XL Multi-Purpose Stainless Steel Housing. 12”x8”x6”. Can hold up to 4 3300XL Proximitor Sensors in both DIN-mount and panel-mount configurations. (Available with ATEX/IECEx Zone 2 type << u >> certifications).
330181	3300 XL Multi-Purpose Stainless Steel Housing. 13”x9.5”x7”. Can hold up to 8 Proximitor sensors in a DIN-mount configuration or 6 Proximitor Sensors in a panel-mount configuration. Primarily used by customers requiring hazardous area approvals fro their installations. Available with North American type 4x certification suitable for installation in Div 2.
02120015	Bulk field wire. 1.0 mm2 (18 AWG), 3 conductor, twisted, shielded cable with drain wire. Specify length in feet.
138492-01	Replacement panel-mount mounting pad.
138493-01	Replacement DIN-mount mounting pad.



1. Mounting option “A”, Options –51 or –91
2. 35mm DIN rail (not included)
3. 89.4 mm (3.52 in). Additional 3.05 mm (0.120 in) clearance required to remove DIN rail.

Figure 20: DIN Mount 3300 XL Proximitor Sensor



1. Mounting option "A", Options –50 or -90

Figure 21: Physical Mounting Characteristics Showing Interchangeability of 3300 and 3300 XL Proximitor Sensors when 4-hole Mounting Option Is Used[8]

Figure Notes:

1. All dimensions on figures are in millimeters (inches) unless otherwise noted.
2. Standard mount 8 mm probes supplied with M17 or 9/16 inch lock nut.
3. Probes ordered with 5 or 9 meter integral cables have a length tolerance of +20%, -0%.
4. Reverse mount probes not available with armor or connector protector options.
5. Letters inside quotation marks on figures refer to probe ordering options.
6. Stainless steel armor is supplied with FEP outer jacket for standard probes, PFA outer jacket for ETR probes.
7. FEP jacket is standard non-armored portion of the cable for standard probes, PFA jacket on non-armored portion for ETR probes.
8. Use M3.5 or #6 screws for panel-mount Proximitor Sensors (screws provided when purchasing Bently Nevada housings).