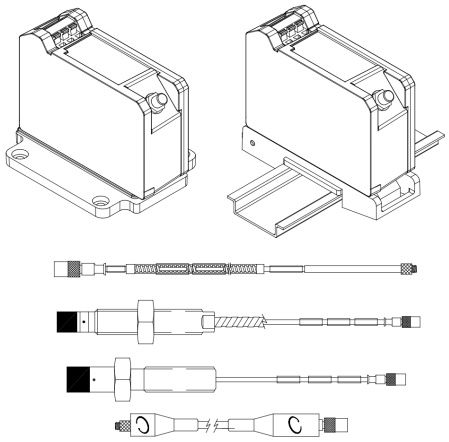
# 3300 XL NSv Proximity Transducer System

## Datasheet

Cordant™

147385 Rev. R



## Description

The 3300 XL NSv Proximity Transducer system is intended for use with centrifugal air compressors, refrigeration compressors, process gas compressors, and other machines with tight installation requirements. The 3300 XL NSv Proximity Transducer System consists of:

- a 3300 NSv probe
- a 3300 NSv extension cable
- a 3300 XL NSv Proximitor Sensor(1)

The primary uses for the 3300 XL NSv Transducer System are for areas where counter bore, sideview, or rearview restrictions limit the use of standard Bently Nevada 3300 and 3300 XL 5 and 8 mm Transducer Systems. It is also ideal for small target applications, such as measuring radial vibration on shafts smaller than 51 mm (2 in) or axial position on flat targets smaller than 15 mm (0.6 in). It is primarily used in the following applications on fluid-filmed bearing machines
nall shaft or reduced side-view is present:

- ıl vibration and radial position measurements
- (thrust) position measurements
- ometer and zero speed measurements
- e reference (Keyphasor signals)

. NSv Transducer System design allows it to
h the 3300 RAM Transducer Systems and the
s or 7000-series 190 Transducer System. Upgrades
00 RAM system to the 3300 XL NSv system may
sting probe, extension cable, and monitoring



Baker Hughes

system with 3300 XL NSv Proximitor Sensor. Upgrades from the 3000-series or 7000-series Transducer System must replace the probe, extension cable, and Proximitor Sensor with NSv components.

The 3300 XL NSv Transducer System has an Average Scale Factor of 7.87 V/mm (200 mV/mil), which is the most common output for eddy current transducers. Its enhanced side-view and small target characteristics give it a shorter linear range than the Bently Nevada 3300 XL-series 5 and 8 mm Transducer System. The 1.5 mm (60 mils) of linear range exceeds the linear range of the 3000-series 190 Transducer System.

Although the terminals and connector on the Proximitor Sensor have protection against electrostatic discharge, take reasonable precautions to avoid electrostatic discharge during handling.

## Proximitor Sensor

The 3300 XL NSv Proximitor Sensor has similar features to those found in the 3300 XL 8 mm Proximitor Sensor. Its thin design allows the user to mount it in either a high-density DIN-rail installation or a more traditional panel mount configuration. Improved RFI/EMI immunity allows the 3300 XL NSv Proximitor Sensor to achieve European CE mark approvals without any special mounting considerations. This RFI immunity also prevents nearby high frequency radio signals from adversely affecting the transducer system. SpringLoc terminal strips on the Proximitor Sensor require no special installation tools and facilitate faster, highly robust field wiring connections.

## Proximity Probe and Extension Cable

The 3300 NSv probe and extension cable are mechanically and electrically compatible and interchangeable with Bently Nevada's previous 3300 RAM proximity probe and extension cable. The NSv probe has increased chemical resistance compared to the 3300 RAM probe, which allows its use in many process compressor applications. The side-view characteristics of the 3300 NSv probe are also superior to those of the 3000-series 190 probe when gapping the 3300 NSv probe at the same distance from the probe target.

The 3300 NSv probe comes in varying probe case configurations, including armored and unarmored 1/4-28, 3/8-24, M8X1 and M10X1 probe threads. The reverse mount 3300 NSv probe comes standard with either 3/8-24 or M10X1 threads. All components of the transducer system have gold-plated brass ClickLoc connectors. ClickLoc connectors lock into place and prevent the connection from loosening. The patented TipLoc molding method provides a robust bond between the probe tip and the probe body. Bently Nevada's patented CableLoc design provides 220 N (50 lb) of pull strength and securely attaches the probe cable to the probe tip. Connector protectors are recommended for use on the probe-to-extension cable connection, as well as on the cable-to-Proximitor Sensor connection. Connector protectors prevent most liquids from entering into the ClickLoc connectors and adversely affecting the electrical signal(2).

Notes:

(1) Proximitor Sensors are supplied by default from the factory calibrated to AISI 4140 steel. Calibration to other target materials is available upon request.

(2) Silicone tape is also provided with each 3300 NSv extension cable and can be used instead of connector protectors. Silicone tape is not recommended in applications where the probe-to-extension cable connection will be exposed to turbine oil.

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| Frequency Response | 0 to 10 kHz: +0, -3 dB typical, with up to 305 meters (1000 feet) of field wiring. |
| Target Size (flat target) | Minimum: 8.9 mm (0.35 in) diameter<br><br>Recommended minimum: 13 mm (0.5 in) diameter<br><br>Axial position measurements on shaft diameters smaller than 13 mm (0.5 in) will generally result in a change in scale factor. Reducing the gap between the probe and target will help limit the change in scale factor. See Figure 12 for additional information. |

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| Shaft Diameter | Minimum (standard X-Y probe configuration): 30 mm (1.2 in)<br><br>Minimum (X-Y proximity probes offset axially by 23 mm [0.9 in]): 20 mm (0.8 in)<br><br>Measurements on shaft diameters smaller than 30 mm (1.2 in) usually require close spacing of radial vibration or axial position transducers. This creates the potential for their electromagnetic emitted fields to interact with one another (cross-talk), resulting in erroneous readings. To prevent cross-talk, maintain minimum separation of transducer tips of at least 25 mm (1.0 in) for axial position measurements or 23 mm (0.9 in) for radial vibration measurements. See Figure 14: Probe Cross-talk with Probes Mounted in Parallel and Figure 15: Probe Cross-talk with Probes Mounted in X-Y Configuration. Radial vibration or radial position measurements on shaft diameters smaller than 20 mm (0.8 in) will generally result in greater than a 10% change in Average Scale Factor (ASF). See Figure 13 for additional information. |

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| Minimum Bend Radius (with or without sst armor) | 25.4 mm (1.0 in) |
| **System Weight (typical)** | |
| Probe | Approximately 14 to 150 g (0.5 to 5.3 oz) |
| Extension Cable | 45 g/m (0.5 oz/ft) |
| Armored Extension Cable | 64 g/m (0.7 oz/ft) |
| Proximitor Sensor | 255 g (9 oz) |

## Thread Engagement Limits

| Probe Case Thread | Maximum Length of Thread Engagement |
|---|---|
| **1/4-28** | 0.375 in |
| **3/8-24** | 0.563 in |
| **M8x1** | 12 mm |
| **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.

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

## Environmental Limits

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| **Probe Temperature Range** | |
| Operating Temperature | -52°C to +177°C (-62°F to +351°F) |
| Storage Temperature | -52°C to +177°C (-62°F to +351°F)<br>Exposing the probe to temperatures below -34°C (-30°F) for a sustained period of time may cause premature failure of the pressure seal. |
| **Extension Cable Temperature Range** | |
| Operating and Storage Temperature | -52°C to +177°C (-62°F to +351°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) |
| Relative Humidity | 100% condensing, non-submersible when connectors are protected.Tested to IEC 68-2-3 damp heat. |

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

## 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 | |
| T280°C @ Ta | -55°C to +232°C |
| T225°C @ Ta | -55°C to +177°C |
| T170°C @ Ta | -55C to +120°C |
| T130°C @ Ta | -55°C to +80°C |
| T105°C @ Ta | -55°C to +100°C |
| T90°C @ Ta | -55°C to +40°C |

# Hazardous Area Conditions of Safe Use

## cNRTLus:

**ia**

Install per Bently Nevada drawing 141092.

**nA, ec**

Install per Bently Nevada drawing 140979.

## ATEX/IECEx:

**ia**

Install per Bently Nevada drawing 141092.

**nA, ec**

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

## Ordering Information

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.

### 3300 NSv Proximity Probes

| | |
|---|---|
| **330901** 3300 NSv Probe, 1/4-28 UNF thread, without armor | |
| **330902** 3300 NSv Probe, 1/4-28 UNF thread, with armor | |
| **330908** 3300 NSv Probe, 3/8-24 UNF thread, without armor | |
| **330909** 3300 NSv Probe, 3/8-24 UNF thread, with armor | |
| **Part Number-AA-BB-CC-DD-EE** | |
| **A: Unthreaded Length Option** | |
| | Unthreaded length must be at least 0.7 inch less than the case length.<br>Order in increments of 0.1 in<br>Length configurations:<br>Maximum unthreaded length: 9.2 in<br>Minimum unthreaded length: 0.0 in<br>Example: **04** = 0.4 in |
| **B: Overall Case Length Option** | |
| | Order in increments of 0.1 in<br>Threaded length configurations:<br>Maximum case length: 9.9 in<br>Minimum case length: 0.8 in<br>Example: **2 4** = 2.4 in |
| **C: Total Length Option** | |
| **05** | 0.5 meter (20 in) |
| **10** | 1.0 meter (39 in) |
| **50** | 5.0 meters (16.4 feet) |
| **70** | 7.0 meters (23.0 feet) |
| **D: Connector and Cable-Type Option** | |
| **01** | Miniature coaxial ClickLoc connector with connector protector, standard cable |
| **02** | Miniature coaxial ClickLoc connector, standard cable |
| **11** | Miniature coaxial ClickLoc connector with connector protector, FluidLoc cable |
| **12** | Miniature coaxial ClickLoc connector, FluidLoc cable |
| **E: Agency Approval Option** | |
| **00** | Not required |
| **05** | Multiple Approvals |

### 3300 NSv Proximity Probes, Metric

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|---|
| **330903** 3300 NSv Probe, M8X1 thread, without armor |
| **330904** 3300 NSv Probe, M8X1 thread, with armor |
| **330905** 3300 NSv Probe, M10X1 thread, without armor |

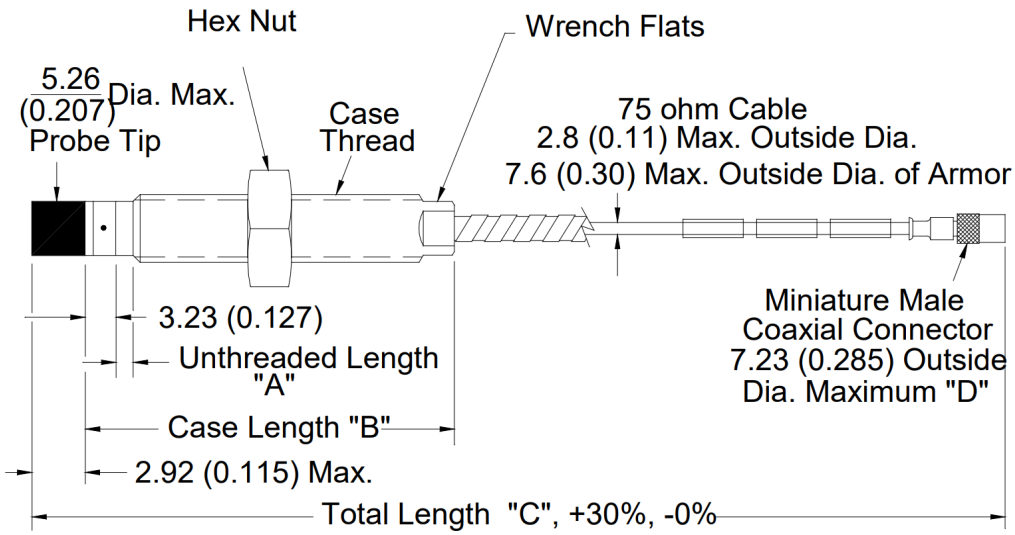



**Figure 18: 3300 NSv Proximity probes, Standard Mount**

330901, 1/4-28 UNF-2A, without armor

330902, 1/4-28 UNF-2A, with armor

330903, M8X1 thread, without armor

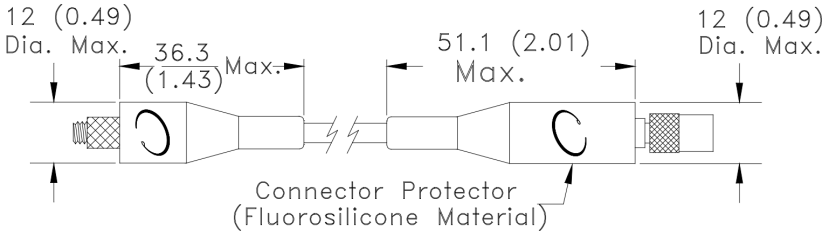
330904, M8X1 thread, with armor

330905, M10X1 thread, without armor

330908, 3/8-24 UNF-2A, without armor

330909, 3/8-24 UNF-2A, with armor

330910, M10X1 thread, with armor




Note: Connector Protector only installed on female end when optioned. Both ends available as accessories.

**Figure 19: Installed Connector Protectors**

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