MANUFACTURER DOCUMENT PACKAGE

# Manufacturer's Manual

Reference package for procurement and maintenance review

BENTLY NEVADA

## 330901-00-40-10-11-05

**3300 XL NSV PROXIMITY PROBE**

Used with the applicable 3300 XL NSV Proximity Transducer configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

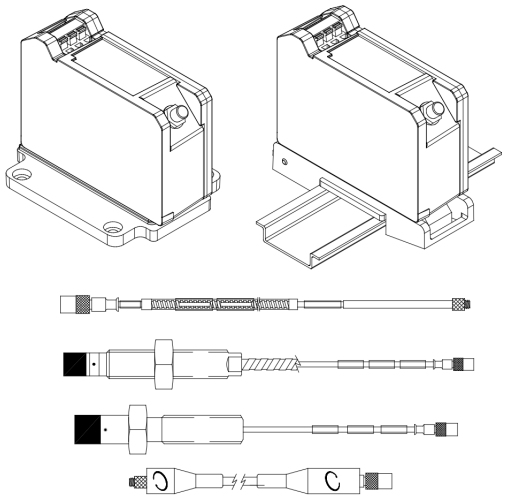
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# 3300 XL NSv Proximity Transducer System

## 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 where a small shaft or reduced side-view is present:

- Radial vibration and radial position measurements
- Axial (thrust) position measurements
- Tachometer and zero speed measurements
- Phase reference (Keyphasor signals)

The 3300 XL NSv Transducer System design allows it to replace both the 3300 RAM Transducer Systems and the 3000-series or 7000-series 190 Transducer System. Upgrades from the 3300 RAM system to the 3300 XL NSv system may use the existing probe, extension cable, and monitoring

Baker Hughes

# Specifications

Unless otherwise noted, the following specifications are for a 3300 XL NSv Proximitor Sensor, extension cable and probe between 0°C and +45°C (+32°F to +113°F) at a maximum altitude of 2000 m, 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 1.0 mm (40 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 non-contacting 3300 RAM or 3300 NSv Proximity Probe and Extension Cable. |
| Power | Requires -17.5 Vdc to -26 Vdc without barriers 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 |
| **Probe dc Resistance** | |
| Probe Length (m) | Resistance from the Center Conductor to the Outer Conductor ($R_{PROBE}$) (ohms) |
| 0.5 | 4.0 ± 0.5 |
| 1.0 | 4.2 ± 0.5 |
| 5.0 | 5.3 ± 0.7 |
| 7.0 | 5.9 ± 0.9 |
| Extension cable dc resistance | Center conductor: 0.220 Ω/m (0.067 Ω/ft)<br><br>Shield: 0.066 Ω/m (0.020 Ω/ft) |
| Extension cable capacitance | 69.9 pF/m (21.3 pF/ft) typical |
| Field Wiring | 0.2 to 1.5 mm² (16 to 24 AWG)[0.25 to 0.75 mm² (18 to 23 AWG) with ferrules]. Recommend using three-conductor shielded triad cable. Maximum length of 305 meters (1,000 feet) between the 3300 XL NSv Proximitor Sensor and the monitor. See the frequency response graphs Figure 16 and Figure 17 for signal rolloff at high frequencies when using longer field wiring lengths. |
| Linear Range | 1.5 mm (60 mils). Linear range begins at approximately 0.25 mm (10 mils) from target and is from 0.25 to 1.75 mm (10 to 70 mils) (approximately -1 to -13 Vdc). |
| Recommended Gap Setting | 1.0 mm (40 mils) |
| **System performance over ambient temperature range (0°C to 45°C)** | |
| Incremental Scale Factor (ISF) | 7.87 V/mm (200 mV/mil) +12.5%/-20% including interchangeability error when measured in increments of 0.25 mm (10 mils) over the 1.5 mm (60 mil) linear range. |
| Deviation from best fit straight line (DSL) | Less than ±0.06 mm (±2.3 mils). |

| | |
|---|---|
| Counterbore | Minimum: 9.5 mm (0.375 in)<br><br>Recommended minimum: 13 mm (0.5 in)<br><br>Counterbores smaller than 13 mm (0.5 in) generally result in a change in scale factor at far gaps. Reducing the gap between the probe and the target will allow the transducer system to maintain its Average Scale Factor (ASF) over a reduced linear range. See Figure 9 for additional information. |

| Effects of 60 Hz Magnetic Fields Up to 300 Gauss (5 meter system) | | | |
|---|---|---|---|
| **Output voltage in mil pp/gauss** | | | |
| Gap | Proximitor Sensor | Probe | Ext. Cable |
| 0.25 mm (10 mils) | 0.006 | 0.001 | 0.001 |
| 1.0 mm (40 mils) | 0.007 | 0.002 | 0.001 |
| 1.75 mm (70 mils) | 0.008 | 0.002 | 0.003 |

## Mechanical

| | |
|---|---|
| Probe Tip Material | Polyphenylene sulfide (PPS). |
| Probe Case Material | AISI 304 stainless steel (SST). |
| Probe Cable Specifications | 75 Ω coaxial, fluoroethylene propylene (FEP) insulated probe cable in the following total probe lengths: 0.5, 1, 5, or 7 meters. |
| Extension Cable Material | 75 Ω coaxial, fluoroethylene propylene (FEP) insulated. |
| Proximitor Sensor Material | A380 aluminum |
| System Length | 5 or 7 meters including extension cable |
| Extension Cable Armor (optional) | Flexible AISI 302 SST with/without FEP outer jacket. |
| Tensile Strength (maximum rated) | 220 N (50 lb) probe case to probe lead. 220 N (50 lb) at probe lead to extension cable connectors. 220 N (50 lb) probe case to stainless steel armor. |
| Connector material | Gold-plated brass |

| Connector-to-connector Torque | | |
|---|---|---|
| **Probe Case Torque** | **Maximum Rated** | **Recommended** |
| 1/4-28 or M8X1 probe cases | 7.3 N•m (65 in•lb) | 5.1 N•m (45 in•lb) |
| 3/8-24 or M10X1 probe cases | 33.9 N•m (300 in•lb) | 11.3 N•m (100 in•lb) |
| 3/8-24 or M10X1 probe cases – first three threads | 22.6 N•m (200 in•lb) | 7.5 N•m (66 in•lb) |
| Reverse mount probes | 22.6 N•m (200 in•lb) | 7.5 N•m (66 in•lb) |

| | |
|---|---|
| Recommended torque | Finger tight |
| Maximum torque | 0.56 N•m (5 in•lb) |

| | |
|---|---|
| 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

| | |
|---|---|
| **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. |

# 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

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

| | |
|---|---|
| **330910** 3300 NSv Probe, M10X1 thread, with armor | |
| **Part Number-AA-BB-CC-DD-EE** | |
| **A: Unthreaded Length Option** | |
| | Unthreaded length must be at least 20 mm less than the case length.<br>Order in increments of 10 mm.<br>Length configuration:<br>Maximum unthreaded length:<br>230 mm<br>Minimum unthreaded length:<br>0 mm<br>Example:<br>**06** = 60 mm |
| **B: Overall Case Length Option** | |
| | Order in increments of 10 mm.<br>Metric thread configurations:<br>Maximum length: 250 mm<br>Minimum length: 20 mm<br>Example: **06** = 60 mm |
| **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 Reverse Mount Probe

| | |
|---|---|
| **330906-02-12-CC-DD-EE** 3/8-24 UNF threads | |
| **330907-05-30- CC-DD-EE** M10X1 threads | |
| **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 Option** | |
| **02** | Miniature coaxial ClickLoc connector, standard cable |
| **12** | Miniature coaxial ClickLoc connector, FluidLoc cable |
| **E: Agency Approval Option** | |
| **00** | Not required |

| | |
|---|---|
| **05** | Multiple Approvals<br>For a shorter delivery time, order commonly stocked probes. Currently, stocked probes consist of the following part numbers: 330901-00-24-05-02-00, 330901-00-90-05-02-00, 330902-00-50-05-02-00, 330902-00-95-05-02-00, 330903-00-02-10-02-00, 330903-00-03-10-02-00, 330906-02-12-05-02-00. |

## 3300 XL NSv Proximitor Sensor

| **330980-AA-BB** | |
|---|---|
| **A: Total Length and Mounting Option** | |
| **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[1] |
| **70** | 7.0 meters (23.0 feet) system length, panel mount |
| **71** | 7.0 meters (23.0 feet) system length, DIN mount |
| **72** | 7.0 meters (23.0 feet) system length, no mounting hardware[1] |
| **B: Agency Approval Option** | |
| **00** | Not required |
| **05** | Multiple approvals |

## 3300 NSv Extension Cable

**330930-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** | |
|---|---|
| **040** | 4.0 meters (13.1 feet) |
| **045** | 4.5 meters (14.8 feet) |
| **060** | 6.0 meters (19.7 feet) |
| **065** | 6.5 meters (21.3 feet) |
| **B: Connector and Cable Option** | |
| **00** | Without stainless steel armor |
| **01** | With stainless steel armor, with FEP jacket |
| **02** | With stainless steel armor, without FEP jacket |
| **03** | Without stainless steel armor, with connector protector |
| **04** | With stainless steel armor, with FEP jacket, with connector protector |
| **05** | With stainless steel armor, without FEP jacket, with connector protector |
| **06** | FluidLoc cable without stainless steel armor |
| **07** | FluidLoc cable with stainless steel armor, with FEP jacket |
| **08** | FluidLoc cable with stainless steel armor, without FEP jacket |
| **09** | FluidLoc without stainless steel armor, with connector protector |