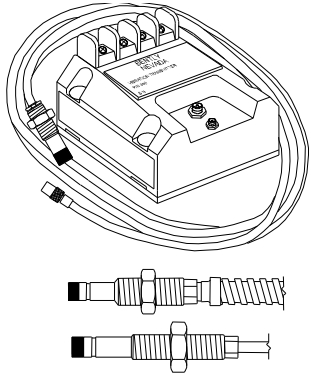


# 990 Vibration Transmitter

Bently Nevada\* Asset Condition Monitoring



## Description

The 990 Vibration Transmitter is intended primarily for the original equipment manufacturers (OEMs) of centrifugal air compressors or small pumps, motors, or fans who prefer to provide a simple 4 to 20 mA proportional vibration signal as the input to their machinery control system. The transmitter is a 2-wire, loop-powered device that accepts input from our 3300 NSV\* proximity probe and its matching extension cable (available in 5 m and 7 m system length options). The transmitter conditions the signal into appropriate peak-to-peak vibration amplitude engineering units, and provides this value as a proportional 4 to 20 mA industry-standard signal as the input to the control system where machinery protection alarming and logic occurs<sup>1</sup>.

The 990 transmitter provides the following notable features:

- Integrated Proximator\* Sensor requires no external unit
- Non-isolated "PROX OUT" and "COM" terminals plus a coaxial connector to provide a dynamic vibration and gap voltage signal output for diagnostics<sup>2</sup>.
- Non-interacting zero and span potentiometers under the Transmitter label supports loop adjustment.
- Test Input pin for quick verification of loop signal output, using a function generator as the input.
- A Not OK/Signal Defeat circuit prevents high outputs or false alarms due to a faulty proximity probe or loose connection.
- Choice of DIN-rail clips or bulkhead mounting screws as standard options simplifies mounting.
- Potted construction for high humidity (up to 100% condensing) environments.
- Compatibility with 3300 NSv proximity probe allows transducer installation in small areas with minimal clearance, typical of centrifugal air compressors.

### Notes:

1. Vibration transmitters have many limitations when compared to a continuous vibration monitoring system. They are a practical solution in some applications for measuring general vibration levels and are a valuable tool for overall vibration trending. However, they provide limited capability for machinery diagnostics using the vibration signal and do not capture dynamic vibration signals (used for diagnostics) in the event of a vibration alarm. While the



transmitter is capable of peak vibration alarming and non-OK checking, the 4-20 mA signal cannot be used to determine the phase of vibration, and monitor functions such as gap alarms, phase alarms, Timed OK channel defeat, Danger Bypass, and Trip Multiply cannot be used. In addition, PLCs attached to the vibration transmitter can only provide peak-to-peak trending data and are not suitable for plant-wide diagnostic systems such as System 1 or Rule Paks.

- The 990 Vibration Transmitter's "Prox Out" coaxial connector provides a non-isolated dynamic transducer signal for machinery diagnostics. You can connect this signal directly to battery-powered or isolated test equipment to diagnose machinery problems. However, since the "PROX OUT" signal is not isolated from the 4 to 20 mA loop signal, an interface is available (and strongly recommended) for signal isolation. The 990/991 Test Adapter conditions the 990 Transmitter's "PROX OUT" signal for use with ac-powered test equipment. It also inverts and isolates the 990's transducer signal, making it suitable for equipment such as oscilloscopes and analyzers, and preserving industry-standard conventions for signal polarity. We strongly recommend the use of this test adapter for all applications to maintain isolation between test equipment and the loop signal, and ensure that the installation maintains machinery protection integrity.

## Specifications

Unless otherwise noted, the following specifications apply at +22 °C (+72 °F) using a 3300 NSv Probe and Extension Cable, and an AISI 4140 steel target.

Note: These specifications also apply to 990 with modifications 147202-01 and 165335-01.

### Electrical

#### Input

Accepts 1 non-contacting 3300 NSv Proximity Probe and extension cable.

#### Power

Requires +12 to +35 Vdc input at the transmitter terminal.

#### 4 to 20 mA Signal Output

4 to 20 mAdc over specified full-scale range in 2-wire configuration.

#### 4 to 20 mA Loop Accuracy

Within ±1.5% over specified full-scale range. Accuracy is rated from the TEST signal input to the voltage measured across a 250 Ω loop resistance.

#### Probe Gap

Probe must be gapped between 0.5 and 1.75 mm (20 and 55 mils) from target to ensure full scale range.

#### Maximum Loop Resistance

1,000 Ω including cable at 35 Vdc.

#### Current Limiting

23 mA typical.

#### Zero and Span

Non-interacting external adjustments.

#### NOT OK/Signal Defeat

Signal output will go to less than 3.6 mA within 100 μs after a Not OK condition occurs. Signal output is restored within 2-3 seconds after the Not OK condition is removed.

#### Power-up Inhibit

Signal output stays at less than 3.6 mA (NOT O.K.) for 2 to 3 seconds after power is applied. The purpose is to signal that the device is not yet ready. Transients may be observed when device goes O.K.

#### Proximito Sensor Output

Compatible with ungrounded, portable test equipment. When using grounded, ac-powered test equipment, use the 122115-01 Test Adapter for signal isolation.

#### Output Impedance

Prox Out has a 10 kΩ output impedance calibrated for a 10 MΩ load.

#### Prox Out Linear Range

1.4 mm (55 mils). Begins at approximately 0.25 mm (10 mils) from target surface.

#### Prox Out Incremental Scale Factor

7.87 mV/μm (200 mV/mil) ± 6.5% typical including interchangeability errors when measured in increments of 0.25 mm (10 mils) over the linear

range using a flat 30 mm (1.2 inch) target. Worst case 7.87 mV/μm ± 10%. Typical Noise Level: 50 mV/pp.

### Temperature Stability

Incremental scale factor remains within ±10% of 7.87 mV/μm (200 mV/mil) from 0 °C to +70 °C (+32 °F to +158 °F).

### Frequency Response

5 Hz to 6,000 Hz +0, -3 dB.

### Minimum Target Size

9.5 mm (0.375 in) diameter.

### Leadwire Length

Maximum for Proximitor\* Sensor Output (BNC connector), maximum cable distance is 3 metres (10 feet).

### Non-Hazardous, Zone 2 or Div 2 Hazardous area locations

13 km (8 miles) maximum between transmitter and receiving device for signal output.

### Intrinsically Safe Hazardous area locations

68 metres (225 ft.) maximum between transmitter and receiving device for signal output.

### Electrical Classification:

General Purpose Approval by Canadian Standards Association (CSA/NRTL/C) in North America and by VDE in Europe. 990 has the CE mark for Europe.

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## Compliance and Certifications

### EMC

Standards:

EN 61000-6-2 Immunity for Industrial Environments  
EN 55011/CISPR 11 ISM Equipment  
EN 61000-6-4 Emissions for Industrial Environments

European Community Directives:

EMC Directive 2004/108/EC

### Electrical Safety

Standards:

EN 61010-1

European Community Directives:

2006/95/EC Low Voltage

For further certification and approvals information please visit the following website:

[www.ge-mcs.com/bently](http://www.ge-mcs.com/bently)

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## Hazardous Area Approvals

### CSA/NRTL/C


Class I, Div 2  
Groups A, B, C, D  
T5 @ Ta ≤ +85°C, Type 4  
Per Drawing 128838

### KTL/KC


Ex ia IIC T4 Ga  
T4 @ -20°C ≤ Ta ≤ +100°C

Ex nA IIC T4 Gc  
T4 @ -35°C ≤ Ta ≤ +85°C

### ATEX

 II 1 G

Ex ia IIC T4 Ga  
T4 @ -35°C ≤ Ta ≤ +85°C

 II 3 G

Ex nA IIC T4 Gc  
T4 @ -35°C ≤ Ta ≤ +85°C

### IECEX

Ex ia IIC T4 Ga  
T4 @ -35°C ≤ Ta ≤ +85°C

Ex nA IIC T4 Gc  
T4 @ -35°C ≤ Ta ≤ +85°C

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## Maritime Approvals

### American Bureau of Shipping (ABS) Type Approval

*Certification  
Number*

06-HS177078-3-PDA

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## Environmental Limits

### Transmitter Temperature

### Operating Temperature

-35 °C to +85 °C (-31 °F to +185 °F)

### Storage Temperature

-51 °C to +100 °C (-60 °F to +212 °F).

### Probe Temperature

### Operating Temperature

-35 °C to +177 °C (-31 °F to +350 °F).

### Storage Temperature

-51 °C to +177 °C (-60 °F to +350 °F).

### Relative humidity

100% condensing, non-submerged,  
with protection of coaxial connectors.

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## Mechanical

### Transducer Tip Material

Polyphenylene sulfide (PPS).

### Transducer Case Material

AISI 303 or 304 Stainless Steel (SST).

### Probe Cable

75Ω coaxial, fluoroethylene  
propylene (FEP) insulated.

### Cable Armor (optional)

Flexible AISI 302 SST with optional  
FEP outer jacket.

### Tensile Strength

222 N (50 lbf) probe case to probe  
lead, maximum.

### Transmitter Weight:

0.43 kg (0.9 lbm).

### Total System Weight:

0.82 kg (1.8 lbm) typical.

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## Ordering Information

### 990-AXX-BXX-CXX-DXX

#### A: Full-scale Option

**04** 0-4 mils pp (0-100 μm pp)  
**05** 0-5 mils pp (0-125 μm pp)

#### B: System Length Option

**50** 5.0 metres (16.4 feet)  
**70** 7.0 metres (23.0 feet)

#### C: Mounting Option

**01** 35 mm DIN rail clips  
**02** Bulkhead screws  
**03** DIN clips and screws

#### D: Agency Approval Option

**00** Not required  
**01** CSA Division 2  
**05** CSA Division 2, ATEX Zone 0, ATEX  
Zone 2 and includes ABS maritime  
approval

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### 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-AXX-BXX-CXX-DXX-EXX**

**Option Descriptions**

**A: Unthreaded Length Option**

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**Note:** Unthreaded length must be at least 0.7  
in less than the case length.

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Order in increments of 0.1 in

Length configurations:

**Minimum length:** 0 in

**Maximum length:** 9.2 in

**Example: 0 4** = 0.4 in

**B: Case Length Option**

Order in increments of 0.1 in

Threaded length configurations:

**Minimum length:** 0.8 in

**Maximum length:** 9.9 in

**Example: 3 5** = 3.5 in

**C: Total Length Option**

**0 5** 0.5 metre (1.67 feet)

**1 0** 1.0 metre (3.25 feet)

**5 0** 5.0 metres (16.4 feet)

**7 0** 7.0 metres (23 feet)