# Bently Nevada 330103-00-07-05-02-CN

## 01 Probe construction and measuring function

## A displacement-sensitive electrical circuit

The probe is one component of a three-part eddy-current measurement system. Its coil responds to the distance from a conductive target. A matched extension cable and Proximitor sensor complete the circuit and provide a voltage proportional to that distance. The average voltage represents static gap; the changing part carries shaft vibration.

## Selected probe construction

| Characteristic | Selected value |
|---|---|
| Sensing principle | Non-contact eddy current |
| Probe tip diameter | 8 mm |
| Mounting thread | M10 x 1 |
| Unthreaded length | 0 mm |
| Case length | 70 mm |
| Total probe length | 0.5 m |
| Cable construction | 75 Ω triaxial, FEP insulation; unarmored |

## Material and connection choices

| | |
|---|---|
| **Nominal probe DC resistance**<br>7.45 ± 0.50 Ω, center to outer conductor | **Minimum cable bend radius**<br>25.4 mm |
| **Recommended standard forward-mount torque**<br>11.2 N·m | **Connector maximum torque**<br>0.565 N·m |
| **Probe case material**<br>AISI 303 or 304 stainless steel | **Probe tip material**<br>PPS |

## What the probe measures

The signal represents motion relative to the probe mounting location. For a fluid-film bearing, this permits shaft vibration measurement relative to the bearing housing. It is different from an accelerometer measuring housing motion: movement of the housing can change the relationship between the two measurements.

## Interchangeable system components

3300 XL 8 mm probes, extension cables and Proximitor sensors support interchangeability within the appropriate electrical-length system. The assembled cable length and sensor calibration must agree.

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## 02 System transfer characteristic

## Matched XL 8 mm reference performance

| System characteristic | Value or condition |
|---|---|
| Linear measurement range | 2 mm (80 mils) |
| Approximate linear gap interval | 0.25 to 2.3 mm |
| Approximate output interval | -1 to -17 V DC |
| Recommended radial gap | 1.27 mm, approximately -9 V DC |
| Nominal scale factor | 7.87 V/mm (200 mV/mil) |
| 1 m and 5 m scale-factor tolerance | ±5%, with components between 0 and +45 °C |
| 9 m scale-factor tolerance | ±6.5%, with components between 0 and +45 °C |
| 1 m and 5 m straight-line deviation | Within ±0.025 mm |
| 9 m straight-line deviation | Within ±0.038 mm |

## Reference conditions define the comparison

The standard reference uses an AISI 4140 steel target, an 18–27 °C ambient temperature, a -24 V DC supply, a 10 kΩ load and a nominal 1.27 mm gap. Apply the complete system specification under its stated conditions. These are not independent accuracy ratings for a disconnected probe.

## Signal interpretation

At the nominal scale factor, a 0.10 mm change corresponds to about 0.787 V of output change; this is a calculated example, not an additional tolerance. A monitor must use the matching sensitivity to convert voltage into displacement. Check polarity and direction with a controlled target movement.

## Mixed-component performance

A compatible non-XL 3300 component can constrain an otherwise XL channel to the non-XL specification. An XL probe does not upgrade every connected cable and conditioner to XL performance. Identify the complete signal chain before assigning an accuracy class.

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## 03 Conditioner power and signal transmission

## Proximitor-side electrical requirements

| Interface item | System requirement |
| --- | --- |
| Without safety barriers | -17.5 to -26 V DC |
| With safety barriers | -23 to -26 V DC |
| Maximum current consumption | 12 mA |
| Output impedance | 50 Ω |
| Supply sensitivity | Less than 2 mV output change per volt of supply change |
| Low-voltage limitation | A supply more positive than -23.5 V may reduce the linear range |
| Frequency response | 0 to 10 kHz, +0/-3 dB, under the specified system conditions |
| Field-wiring reference | Frequency specification applies with up to 305 m of field wiring |

## Two different cable functions

The probe and extension cable form the calibrated transducer circuit. The field wiring carries conditioned power and signal between the Proximitor and the monitor. Treating those two routes as interchangeable can cause an incorrect electrical-length selection even though the monitor wiring appears complete.

## Three voltage checks

**Supply at the conditioner**
Verify polarity and voltage at the installed Proximitor under operating load.

**Static output**
Compare the measured DC gap voltage with the intended operating point.

**Dynamic output**
Check the measured vibration component against the monitor sensitivity and range.

**Output loading**
Use the specified receiving impedance when evaluating the transfer characteristic.

## Bandwidth and installation

The stated frequency response is a system value. Target geometry, mounting stiffness, signal routing and the receiving monitor still affect an installed measurement. A correct DC gap reading alone does not demonstrate dynamic response across the whole operating frequency range.

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## 04 Target geometry and application limits

## Geometric planning data

| Geometry | Planning value |
| --- | --- |
| Minimum flat target diameter | 15.2 mm |
| Minimum shaft diameter | 50.8 mm |
| Recommended shaft diameter | 76.2 mm or larger |
| Typical minimum axial tip separation | 40 mm |
| Typical minimum radial tip separation | 38 mm |
| Cable minimum bend radius | 25.4 mm |

## A conductive target is part of the measurement

A target with a different material, shape or surrounding metal than the reference arrangement can alter scale factor and linearity. Check the response against the actual shaft material before using nominal conversion values for a precision gap or vibration result.

## Suitable measurement contexts

**Radial shaft vibration**
Sense shaft movement relative to a fluid-film bearing housing.

**Static position**
Track the average gap to a conductive target through a matched conditioner.

**Phase reference**
Provide a target passage signal for an appropriately configured Keyphasor channel.

**Accessible cable junctions**
Bring the short integral lead to a protected extension-cable joint near the measurement point.

## Neighbouring probes and metal

Electromagnetic interaction can arise from nearby metal or another proximity probe. The physical tip diameter is not the entire sensing field. Maintain the required separation and verify the assembled channel rather than assuming that clearance for the threaded body guarantees adequate electrical clearance.

## Environmental protection at the joint

A connector protector protects the electrical joint from its local environment. The standard cable does not provide the FluidLoc internal liquid-blocking construction. These functions should be assessed separately when oil can reach the cable route.

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## 05 Engineering questions and selection checks

## Interpreting this selected probe

**What does a lead resistance of about 7.45 ohms confirm for 330103-00-07-05-02-CN?**
The disconnected 0.5 m probe has a nominal center-to-outer-conductor resistance of 7.45 ±0.50 Ω. That checks electrical continuity, but not its calibrated displacement response.

**Will 330103-00-07-05-02-CN retain its standard calibration against a different shaft alloy?**
The reference calibration uses AISI 4140 steel. A different alloy can change the voltage-to-gap relationship; establish the response on the actual target before applying the nominal scale factor.

**Which extension length completes a five-metre channel with 330103-00-07-05-02-CN?**
Its 0.5 m probe length requires the corresponding 4.5 m extension cable and a five-metre Proximitor sensor. The assembled electrical length, rather than the 70 mm case length, determines that match.

**What accuracy limitation remains if 330103-00-07-05-02-CN is connected through a compatible non-XL component?**
The assembled channel is limited to the applicable non-XL 3300 performance. The XL probe alone does not establish XL accuracy for the complete transducer system.

## Selection checks before a replacement

| Decision | Technical check |
| --- | --- |
| Mechanical position | Compare the M10 x 1 thread, 70 mm case and sensing-tip location with the machine mounting. |
| Cable reach | Confirm that the 0.5 m lead reaches its planned joint without tension. |
| Electrical system | Match probe and extension lengths to the chosen Proximitor system. |
| Measurement setup | Use the correct scale factor, units and gap range in the receiving monitor. |

## Other measurement configurations

**Bently Nevada 330101-00-28-10-02-05**

**Bently Nevada 330102-22-58-10-02-00**

## Final engineering boundary

The recommended pages are separate configurations, not automatic drop-in replacements. Assess their mounting, cable construction, total electrical length and receiving channel before substituting a different probe.