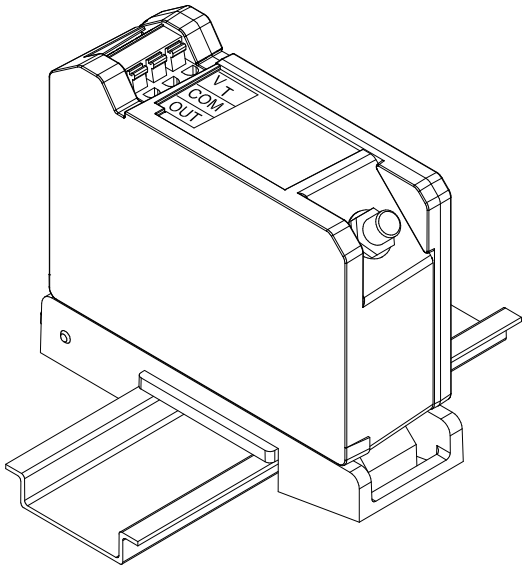
Installation Manual

Bently Nevada™ Asset Condition Monitoring



3300 XL NSv™ Proximity Transducer System

imagination at work

Part Number 147357-01
Rev. D (10/07)

Contact Information

The following contact information is provided for those times when you cannot contact your local representative:

Mailing Address	1631 Bently Parkway South Minden, Nevada USA 89423 USA
Telephone	1.775.782.3611 1.800.227.5514
Fax	1.775.215.2873
Internet	www.ge-energy.com/bently

Additional Information

Notice:

This manual does not contain all the information required to operate and maintain the product. Refer to the following manuals for other required information.

Installing the Transducer

Guidelines for Grounding (Earthing) Bently Nevada Rotating Machinery Information Systems (AN013).

Installation of Electrical Equipment in Hazardous Areas (AN015).

Transducer Installation Accessories

31000/32000 Proximity Probe Housing Manual (Part Number 124200-01).

31000/32000 Proximity Probe Housing Data Sheet (Part Number 141610-01)

Housing for Proximitor® Sensors and Interface Modules Data Sheet (Part Number 141599-01)

3300 XL Monitor and Transducer Verification Kits Data Sheet (141196-01)

Electrical and Mechanical Runout

"Glitch": Definition of and Methods for Correction, Including Shaft Burnishing to Remove Electrical Runout (AN002).

API 670, Fourth Edition, Section 4.1.1.2 and 4.1.1.3: Machine Shaft Requirements for Electrical and Mechanical Runout. Available from the American Petroleum Institute, Publications and Distribution, 1220 L Street NW, Washington DC, 20005, USA.

Reference

Performance Specifications for the 3300 XL NSv™ Transducer System (147347-01).

Bently Nevada Glossary (133055-01).

Product Disposal Statement

Customers and third parties, who are not member states of the European Union, who are in control of the product at the end of its life or at the end of its use, are solely responsible for the proper disposal of the product. No person, firm, corporation, association or agency that is in control of product shall dispose of it in a manner that is in violation of any applicable federal, state, local or international law. Bently Nevada LLC is not responsible for the disposal of the product at the end of its life or at the end of its use.

European CE mark for the Bently Nevada 3300 XL NSv™ Transducer System

In this Document is a list of the 3300 XL NSv Transducer Assemblies that have the CE mark, applicable standards used for certification, and installation instructions required for compliance.

Proximity Transducer Systems are electronic devices typically used in industrial applications. The 3300 XL NSv Transducer System has been certified using the same Technical Construction File (TCF) and Declaration of Conformity as the 3300 8mm Transducer System because they are similar in design and application. The 3300 XL NSv Proximity Transducer System consists of a Proximitor® Sensor, Proximity Probe, and Extension Cable.

Installation Instructions

These instructions are an addition to the Installation Instructions in Section 2.

- Proximity Probes
    - All probe cases must have a solid connection to earth ground.

Compliant Systems and Component Part Numbers

#	Model	Model Numbers
2	3300 XL NSv	330901, 330902, 330903, 330904, 330905, 330906, 330907, 330908, 330909, 330910, 330930, 330980, **

Includes all options and all approval versions of the base model numbers listed

**--any proximity probe, or extension cable which works correctly with the listed module.

Testing and Test Levels

Title	Test Levels	Criteria See Note 6
EN55011 Emission	Emission Class A	N/A
EN61000-4-2 ESD	4 kV; 8 kV See Note 1	A
ENV50140 (EN61000-4-3) Radidated RFI	10 V/m See Note 2	A

Title	Test Levels	Criteria See Note 6
ENV50204 Radiated RFI	10 V/m See Note 3	A
EN61000-4-4 EFT	2 kV See Note 4	B
ENV50142 (EN61000-4-5) Surge	0.5 kV See Note 4	A
ENV50141 (EN61000-4-6) Conducted RFI	10 V See Note 5	B
EN61000-4-8 Magnetic Fields	30 A/m, 50 Hz	A

These notes listed below apply only to the table "Testing and Test Levels"

1. Discharge method: Contact; Air
2. a80-1000 MHz sweep with 80% 1 kHz sine wave amplitude modulation
3. a900 MHz dwell with 100% 200 Hz square wave modulation
4. Lines tested: I/O
5. a150 kHz - 80 MHz sweep with 80% 1 kHz sine wave amplitude modulation
6. For the purposes of the 3300 XL NSv System CE certification, the following criteria are defined as follows:
    - Criteria A: Transducer system will output less than one third of a 3 mil p-p meter scale (so less than 1 mil p-p) and will return to steady state after test completion.
    - Criteria B: Transducer system may react in any manner during test, but must self recover after test completion.
    - Criteria C: N/A

Contents

1. System Description

1.1 Transducer System

The 3300 XL NSv Proximity Transducer system is intended for 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.

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

The primary uses for the 3300 XL NSv Transducer System are for areas where either counter bore, side view or rearview restrictions limit the use of our standard 3300 and 3300 XL 5 and 8 mm Transducer Systems. It is also ideal for small target applications, such as when 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 is designed to replace both the 3300 RAM Transducer Systems and the 3000-series or 7000-series 190 Transducer System. When upgrading from the 3300 RAM system to the 3300 XL NSv system, the existing probe, extension cable, and monitoring system may be used with 3300 XL NSv Proximitor Sensor. When upgrading from the 3000-series or 7000-series

Transducer System, the probe, extension cable and Proximitor Sensor must be replaced 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. Because of its enhanced side-view and small target characteristics, it has a shorter linear range than our 3300 XL-series 5 and 8 mm Transducer System. With 1.5 mm (60 mils) of linear range, it exceeds the linear range of the 3000-series 190 Transducer System.

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

1.2 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 it to be mounted 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 the transducer system from being adversely affected by nearby high frequency radio signals. SpringLoc terminal strips on the Proximitor Sensor require no special installation tools and facilitate faster, highly robust field wiring connections.

1.3 Proximity Probe and Extension Cable

The 3300 NSv probe and extension cable are mechanically and electrically compatible and interchangeable with our previous 3300 RAM proximity probe and extension cable. The NSv probe has increased chemical resistance compared to the 3300 RAM probe, allowing it to be used in many process compressor applications. The 3300 NSv probe also has superior side-view characteristics compared to 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, M8 X 1 and M10 X 1 probe threads. The reverse mount 3300 NSv probe comes standard with either 3/8-24 or M10 X 1 threads. All components of the transducer system have gold-plated brass ClickLoc™ connectors. ClickLoc connectors lock into place, preventing the

connection from loosening. The patented TipLoc™ molding method provides a robust bond between the probe tip and the probe body. The probe cable is securely attached to the probe tip utilizing our patented CableLoc™ design that provides 220 N (50 lb) pull strength.

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.

NOTE
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.

1.4 Receiving, Inspecting, and Handling the System

The probe, extension cable and Proximitor Sensor are shipped as separate units and must be interconnected at the installation site by the user. Carefully remove all equipment from the shipping containers and inspect the equipment for shipping damage. If shipping damage is apparent, file a claim with the carrier and submit a copy to the nearest Bently Nevada LLC office. Include part numbers and serial numbers on all correspondence. If no damage is apparent and the equipment is not going to be used immediately, return the equipment to the shipping containers and reseal until ready for use.

Store the equipment in an environment free from potentially damaging conditions such as high temperature or a corrosive atmosphere. See Environmental Limits on page 35 for environmental specifications.

1.5 Customer Service

Bently Nevada LLC maintains numerous Sales and Service offices worldwide. To locate the office nearest you, visit our website at

www.ge-energy.com/bently

There you can also find specifications on all standard product offerings.

Support for products and services should be directed to one of these departments:

For product quotations, product applications, product ordering, scheduling on-site Services, and questions regarding existing orders, please contact your nearby sales and service office.

For general product pricing, delivery, or other ordering information, contact your local office or contact

Customer Service Department
1631 Bently Parkway South
Minden, Nevada, USA
Phone: 1-775-782-9913
Fax: 1-775-782-9259.

For technical questions or problems regarding installed Bently Nevada LLC products, contact our technical support staff at:

techsupport@bently.com

or at the following locations:

Technical Support (North America)
Phone: 1-775-782-1818 Fax: 1-775-782-1815

Technical Support (UK)
Phone: (44) 1925 818504 Fax: (44) 1925 817819

2. Installation

This section contains a checklist of items that you must consider when you install a 3300 XL Transducer system. For detailed information about designing installations for specific applications, refer to document AN028.

2.1 Installing the Probe

Figure 2-1 through Figure 2-4 show the probe sizes and the minimum values for probe separation, side clearance and target configuration. Refer to Section 4.3, Mechanical on page 33 for proper torque and the dimensions of the thread.

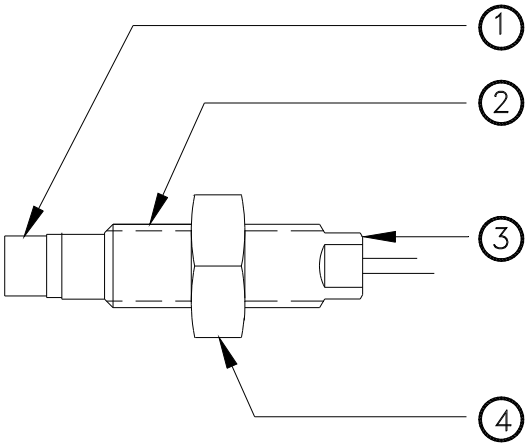
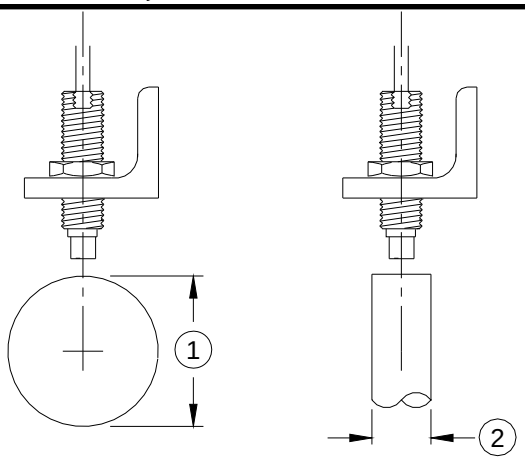


Figure 2-1: Generic Probe Dimensions

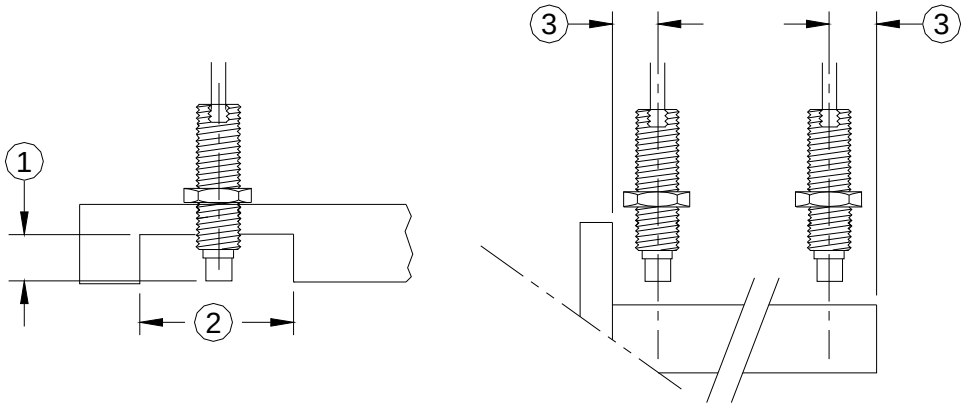
Table 2-1: Parts Specific Probe Dimensions

	Part Number	330901 330902	330903 330904	330905 330910	330906	330907	330908 330909
①	Probe tip diameter	5mm	5mm	5mm	5mm	5mm	5mm
②	Thread types	1/4-28 UNF	M8x1	M10x1	3/8-24 Rev. Mount	M10x1 Rev. Mount	3/8-24
③	Wrench Flats	7/32 in	7 mm	8 mm	7/16 in hex	10 mm	5/16 in hex
④	Lock nut	7/16 in hex	13 mm hex	17 mm	Not Supplied	Not Supplied	9/16 in hex



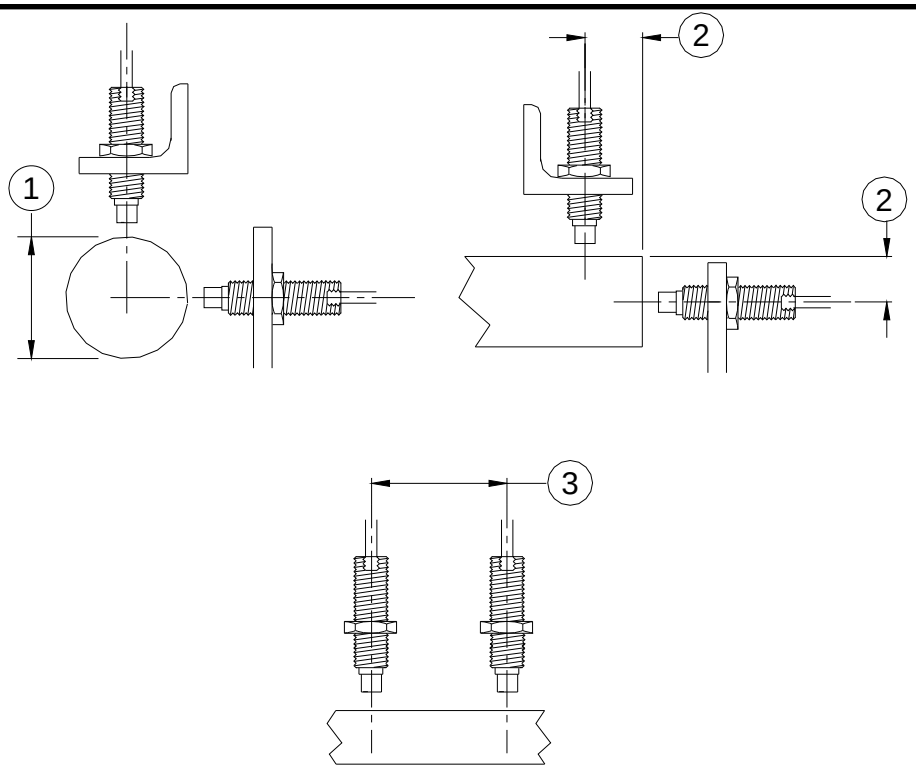
1. 20 mm (0.80 in) minimum (See Note 1 below)
2. 13 mm (0.50 in) minimum

Figure 2-2: Recommended Probe Target Sizes



1. 6.5 mm (0.25 in) minimum
2. 13 mm (0.50 in) minimum
3. 3.2 mm (0.125 in) minimum

Figure 2-3: Recommended Probe Mounting Dimensions



1. 30 mm (1.2 in) minimum (See Note 2 below)
2. 10 mm (0.40 in) minimum
3. 25 mm (1.00 in) minimum

Figure 2-4: Recommended Probe to Probe Separation Due to Cross Talk

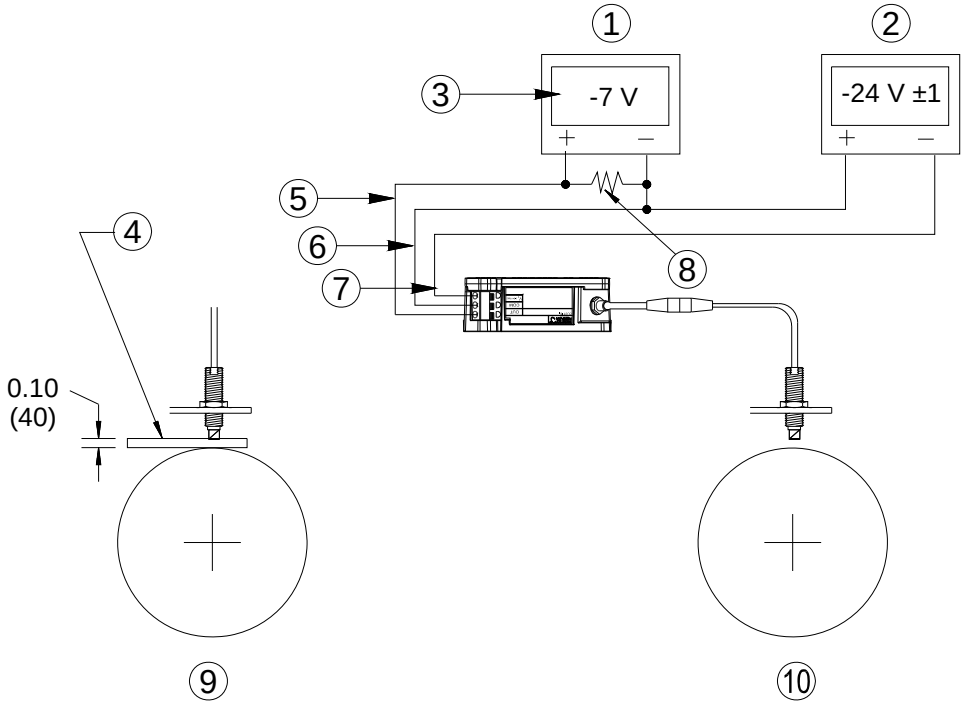
NOTES

1. At or below 20 mm (0.8 in), Average Scale Factor (ASF) will increase as the target size is reducedas indicated in Figure 4-13: Radial Sensitivity to Shaft Size. See the application alert below.
2. At or below 30 mm (1.20 in), cross talk will produce a small vibration signal as indicated in Figure 4-15: Probe Cross-talk with Probes Mounted in X-Y Configuration.

Application Advisory

Mounting dimensions and target size affect the Average Scale Factor (ASF) of proximity transducer systems. The minimum recommended dimensions above were chosen to minimize error yet retain flexibility for different mounting situations. Consult system graphs is this document or performance specification 147347 to determine the effect of each of the above factors for your particular installation.

Use one of the methods shown in Figure 2-5 to adjust the distance between the probe tip and the shaft. The electrical method for setting the probe gap is preferred.

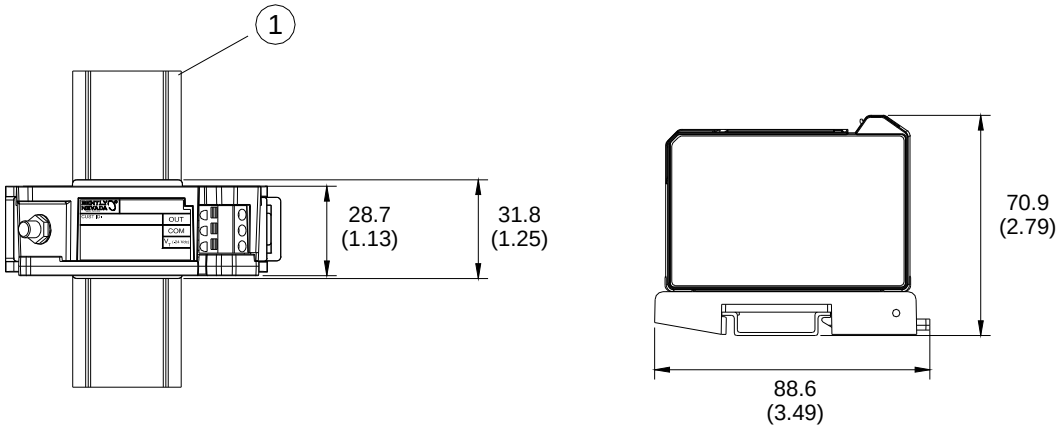


1. Voltmeter
2. Power source
3. Voltage at the center of the linear range (typically –7 Vdc)
4. 0.10 mm (40 mil) spacer
5. OUT
6. COM
7. V_T
8. 10 kΩ 1% resistor
9. Mechanical method
10. Electrical method

Figure 2-5: Methods For Setting the Probe Gap

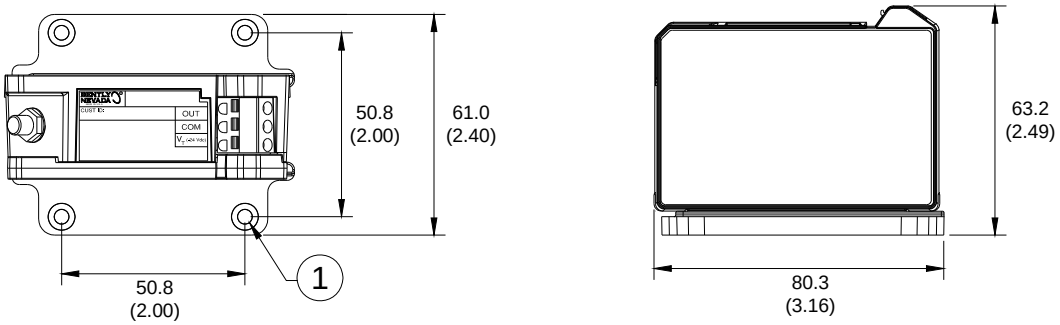
2.2 Mounting the Proximitor Sensor

Mount the Proximitor Sensor in a location that is compatible with its environmental specifications (see Section 4.4, Environmental Limits on page 35). Consider the local electrical codes and the presence of hazardous or explosive gas at the installation site. (Refer to document AN015.)



1. 35mm DIN rail

Figure 2-6: DIN Rail Mount Dimension in Millimetres (Inches)

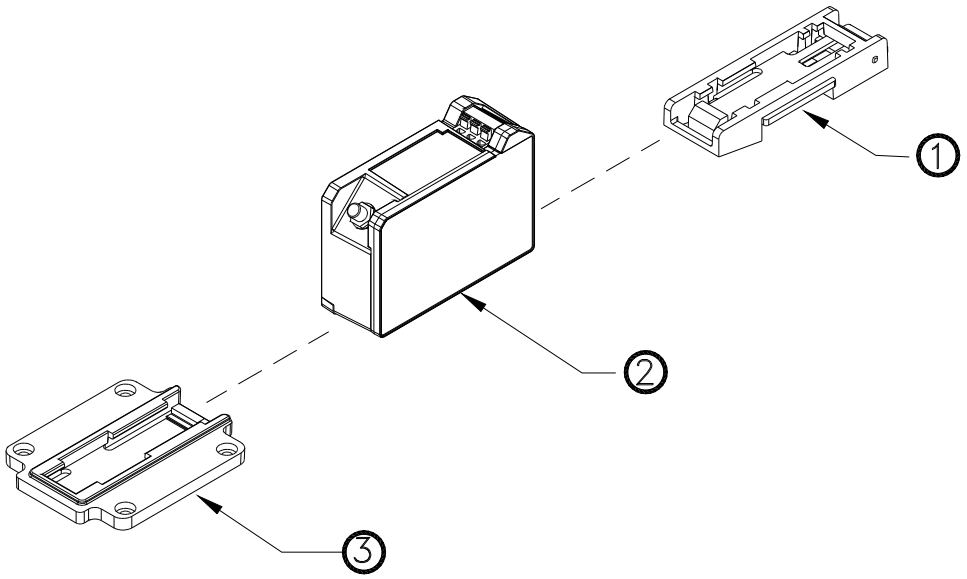


1. 4.0 (0.158) for M3.5 or #6 screw

Figure 2-7: Panel Mount Dimension in Millimetres (Inches)

2.3 Interchangeable Mounting Feet

The mounting feet for the 3300 XL NSv Proximitor Sensor are interchangeable. If you purchase a Proximitor Sensor with either the DIN mount option or the panel mount option, you can change the mounting hardware simply by removing the mounting foot that is currently on the Proximitor Sensor and replacing it with the other type mounting foot.



1. DIN Mounting Foot (part number 138493-01)
2. 3300 XL NSv™ Proximitor Sensor
3. Panel Mounting Foot (part number 138492-01)

Figure 2-8: Mounting Foot Options

2.4 Mounting the Proximitor Sensor with DIN Mounting Foot

To mount the 3300 XL NSv Proximitor Sensor with a DIN Mounting Foot on a DIN rail:

1. Install the Proximitor Sensor into the DIN Mounting Foot (if not already installed).

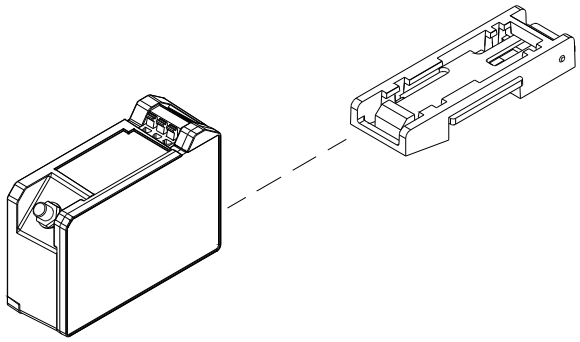
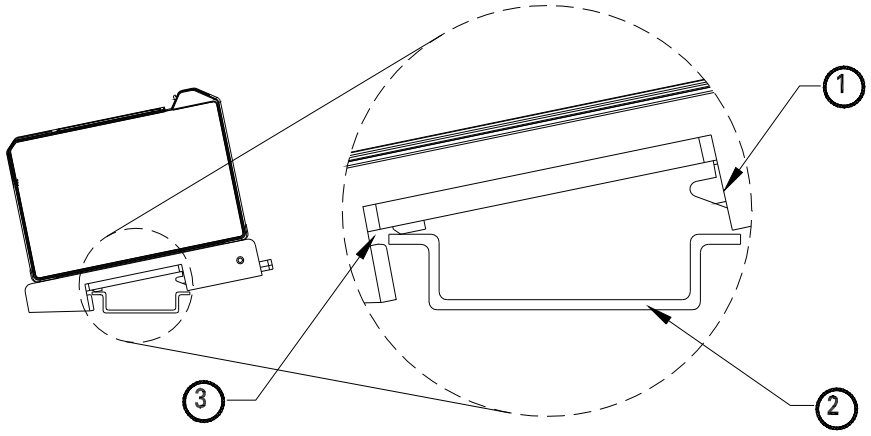


Figure 2-9: Installing the DIN Mounting Foot

2. Examine the underneath side of the DIN Mounting Foot. The mounting foot has a spring-loaded clip on one side and two protrusions that will catch the edge of the DIN rail on the other side. You must install the side with the two protrusions so that the edge of the DIN rail fits into the gap, as shown in Figure 2-10.



1. Spring-loaded clip
2. DIN rail
3. Edge of DIN rail must fit into this gap

Figure 2-10: Inserting the Mounting Foot Onto the DIN Rail

3. Push down on the Proximitor Sensor until the unit “snaps” into place. The unit is now installed.

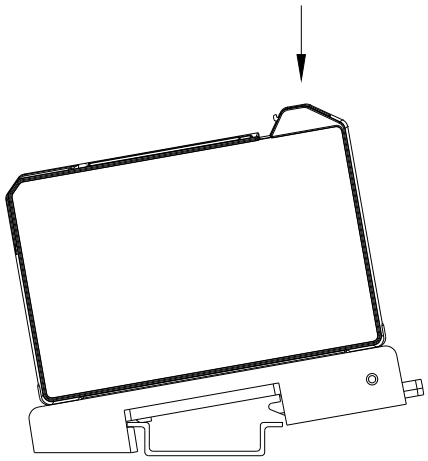


Figure 2-11: Snapping the Sensor Onto the DIN Rail

2.5 Removing the Proximitor Sensor from the DIN Rail

Remove the Proximitor Sensor from the DIN rail by using a regular screwdriver to unclip the unit from the rail.

Insert a regular screwdriver into the rear of the spring-loaded clip and push the top of the screwdriver towards the Proximitor Sensor to pry the spring-loaded clip back so that you can remove the Proximitor Sensor from the DIN rail.

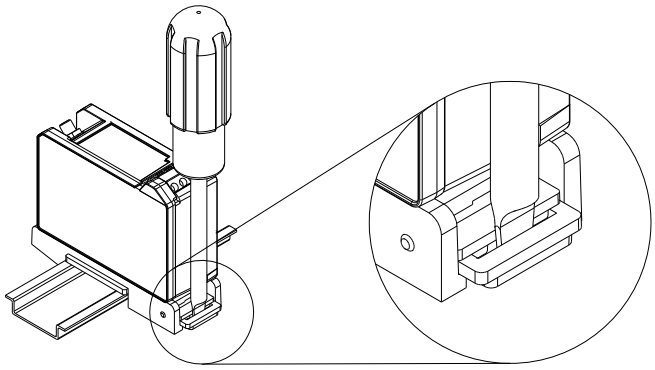


Figure 2-12: Retracting the Spring-Loaded Clip

2.6 Termination of Field Wiring in the Terminal Block

1. Strip the insulation from the field wiring to be installed into the terminal block. The recommended strip length is 10 mm (0.4 in.).

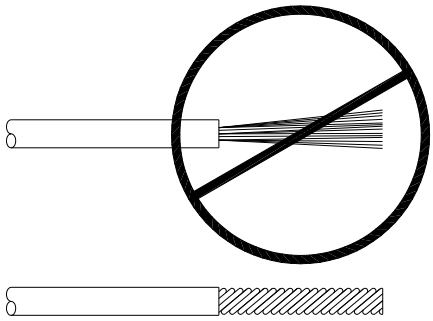
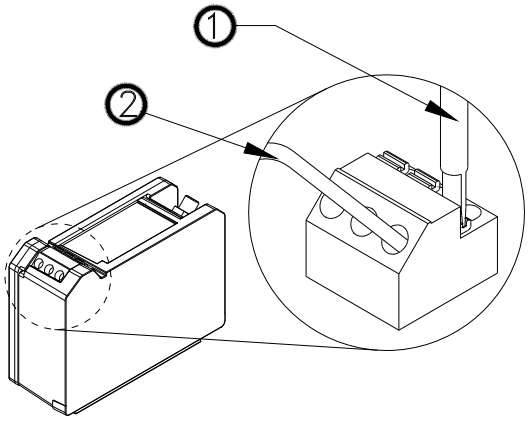


Figure 2-13: Proper Preparation of Wire Strands

2. If you will not use ferrules on the stripped conductor and are using a stranded wire, then you must twist the strands of the conductor together before installing the field wire into the terminal block.

   The terminal block can accommodate field wiring conductor sizes of 0.2 – 1.5 mm^2 (16 – 24 AWG). The terminal block can also accommodate field wiring with ferrules ranging in size from 0.25 – 0.75 mm^2 (18 – 23 AWG).

3. Use a small regular screwdriver to push down on the orange lever that corresponds to the position in the terminal block where the field wire will be installed and insert the field wire, as shown in Figure 2-14.



1. Small screwdriver
2. Field wiring

Figure 2-14: Inserting Field Wiring Into Proximitor

To remove the field wire, push down on the orange lever and pull on the field wire to remove it from the terminal block. If stranded wire is used for the field wiring and a strand breaks off inside the terminal block, turn the Proximitor Sensor upside down, and push down the orange lever, and remove the strand from the terminal block.

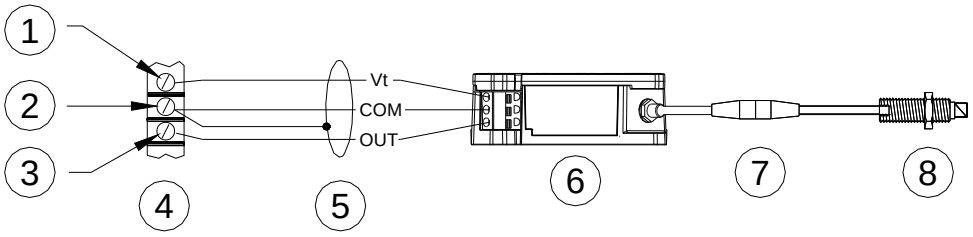
2.7 Routing the Extension Cable and Field Wiring

Route the extension cable using the following guidelines.

- Verify that the sum of the extension cable and probe lead lengths equals the Proximitor Sensor system length. For example, a 7-metre Proximitor sensor will work with an 6-metre extension cable and a 1-metre probe. The color code of all components must also be consistent. For the 3300 XL NSv system, components will be marked with a gray color code.
- Use mounting clips or similar devices to secure the extension cable to supporting surfaces.
- Identify the probe and both ends of the extension cable by inserting labels under the clear Teflon® sleeves and applying heat to shrink the tubing.
- Join the coax connectors between the Proximitor Sensor, extension cable, and probe lead. Tighten connectors to finger tight.
- Use either a connector protector or self-fusing silicone tape to protect the connection between the probe lead and the extension cable. For additional protection, place a female connector protector over the cable to Proximitor Sensor connection. **Do not use self-fusing silicone tape to insulate a connection made inside of a machine.**

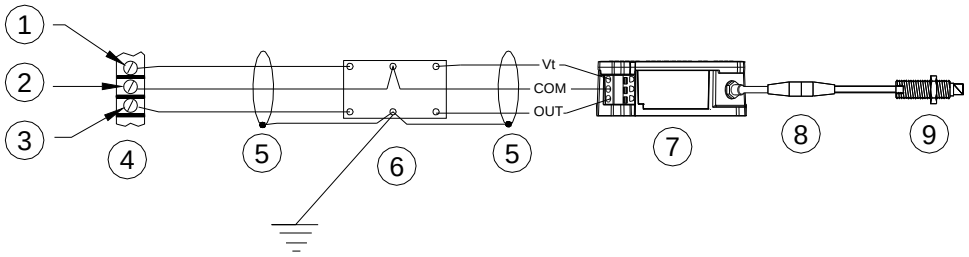
- If the probe is in a part of the machine that is under pressure or vacuum, use appropriate cable seals and terminal boxes to seal the hole where the extension cable exits the machine.

Use Figure 2-15 and Figure 2-16 to connect the field wiring between the Proximitor Sensor and the monitoring instruments. Refer to documents AN013 and AN015.



1. Transducer power
2. Common (ground)
3. Input signal
4. Monitor terminal strip
5. Cable shield
6. Proximitor Sensor
7. Connector protector
8. Probe

Figure 2-15: Installation With No Barriers or With 3300/3500 Internal Barriers



1. Transducer power
2. Common (ground)
3. Input signal
4. Monitor terminal strip
5. Cable shield
6. External barrier
7. Proximitor sensor
8. Connector protector
9. Probe

Figure 2-16: Installation with External Barrier

3. Maintenance and Troubleshooting

This section shows how to verify that the system is operating properly and identify parts of the system that are not working properly.

When correctly installed, the 3300 XL NSv Transducer System (probe, cable and Proximitor Sensor) does not require periodic calibration or verification. If the green monitor OK light indicates a Not OK condition (i.e., light is **not** illuminated), then:

- a fault has occurred in the field wiring, transducer system, or power source, and/or
- the probe is gapped incorrectly or detecting material other than the target.

We recommend the following practices to ensure continued satisfactory operation. Verify operation by using the scale factor verification method on the following page, if:

- you replace any of the system components (probe, cable or Proximitor Sensor),
- you remove and reinstall or move and remount any of the components,
- you believe that any of the components are damaged, or
- you overhaul the machine being monitored.

Please note that a step change in the output of the transducer system, or other output that is not consistent with the associated machinery's trended data is, in most instances, not a transducer problem but a machinery problem. You can verify the transducer system under these conditions at your discretion.

Under harsh operating conditions, some users prefer to verify all transducers at a regular interval. As noted above, the 3300 XL NSv Transducer System does not require this. Users who wish to verify the system on a regular interval should use an interval consistent with their own practices and procedures, which may or may not be based upon ISO 10012-1 "Quality Assurance Requirements for Measuring Equipment" (section 4.11).

For target materials other than AISI 4140 steel and for other special applications, contact your local sales and service office.

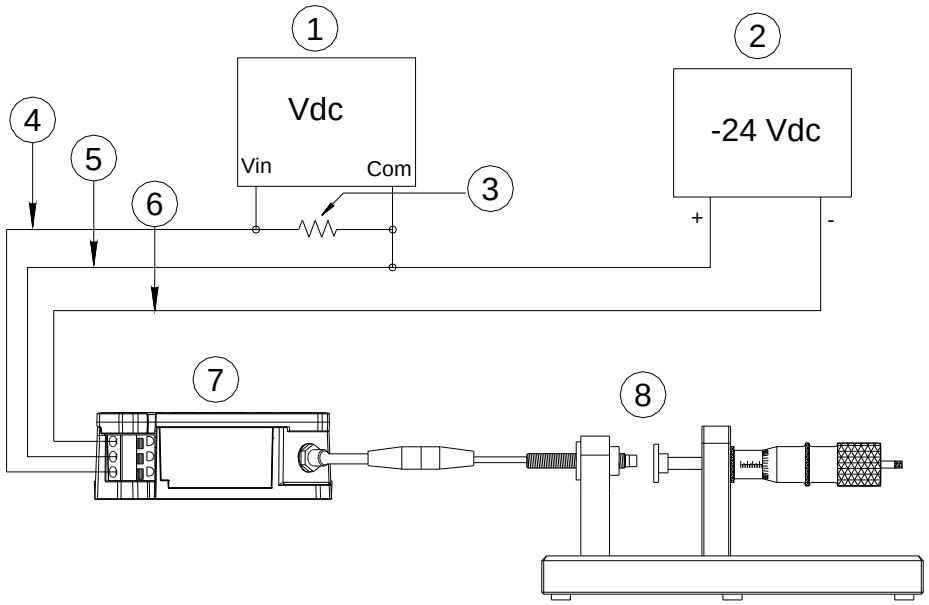
Application Alert
Hazardous location areas must be free of hazardous material before any maintenance or troubleshooting can be performed.

3.1 Scale Factor Verification

Scale factor verification requires the following instruments and equipment:

- Digital multimeter
- Spindle micrometer (Precision Micrometer Kit p/n 330185 recommended)
- AISI 4140 precision target, p/n 136534-01 (included in 330185)
- 10 kΩ fixed resistor
- Power supply (-24 Vdc ±1 Vdc)

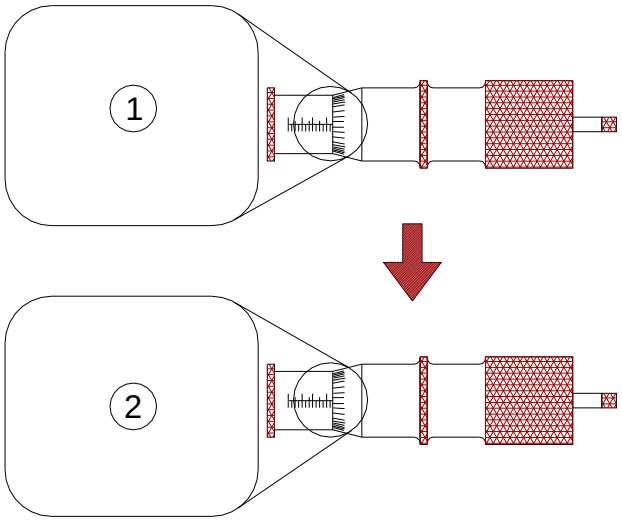
Scale factor verification uses the test setup as shown in Figure 3-1.



1. Multimeter
2. Power supply
3. 10 kΩ resistor
4. OUT
5. COM
6. V_T
7. Proximitor sensor
8. Probe, target, and spindle micrometer

Figure 3-1: Scale Factor Verification Test Setup

1. Compensate for mechanical backlash and adjust the spindle micrometer for electrical zero.



1. 0.4 mm (18 mils)
2. 0.5 mm (20 mils)

Figure 3-2: Adjust Spindle Micrometer for Electrical Zero

2. Adjust the gap to electrical zero by moving the probe.

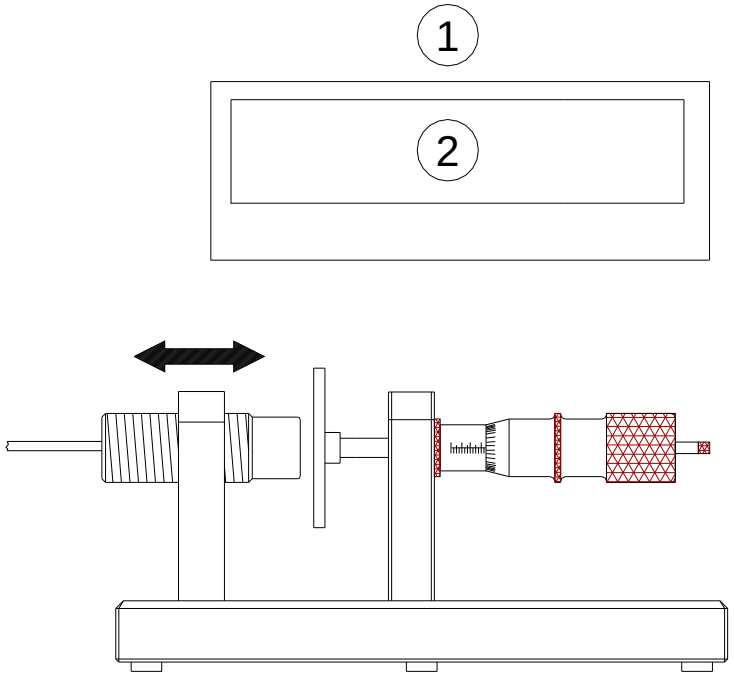
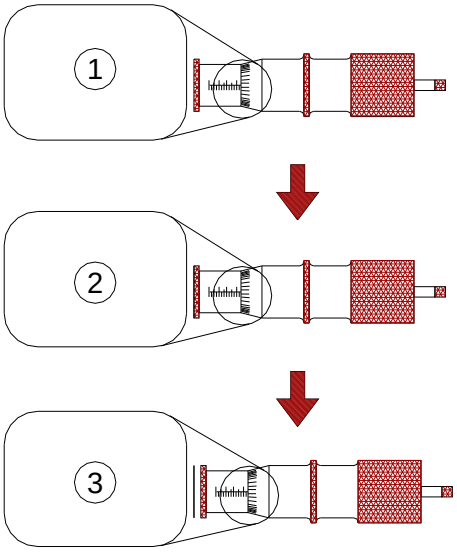


Figure 3-3: Adjusting Gap to Electrical Zero

1. Multimeter
2. -3.00 ± 0.1 Vdc

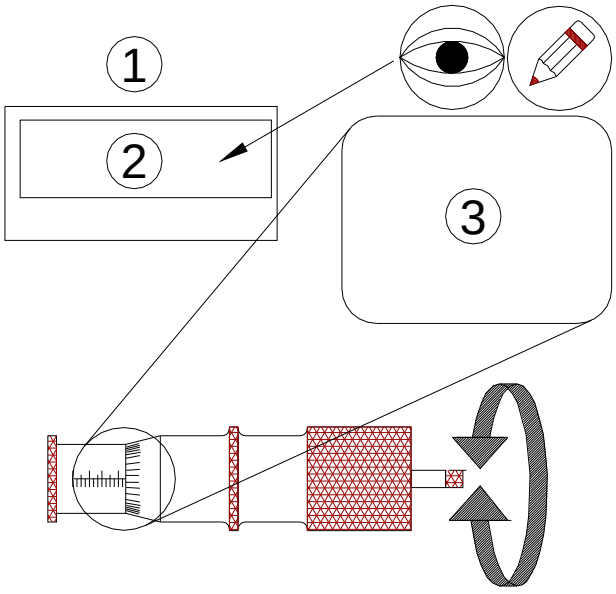
3. Compensate for mechanical backlash in the micrometer and adjust to the start of the linear range.



1. 0.5 mm (20 mils)
2. 0.2 mm (8 mils)
3. 0.25 mm (10 mils)

Figure 3-4: Adjusting For Mechanical Backlash

4. Record voltages in Table 3-1 and calculate incremental scale factors, average scale factor and difference voltages using the given equations.



1. Multimeter
2. Vdc_n reading
3. Increments: 0.25 mm or 10 mils

Figure 3-5: Adjusting Spindle Micrometer for Recording Voltages

Table 3-1: Table For Recording Measurement Voltages

N	Adjust Micrometer to...		Record Voltages	Calculate Scale Factor and Difference Voltages	
	mm_n	mil_n	Vdc_n	ISF_n (Incremental Scale Factor)	$Vdiff_n$ (Difference Voltage)
1	0,.25	10	>>		>>
2	0.50	20	>>	>>	>>
3	0.75	30	>>	>>	>>
4	1.00	40	>>	>>	>>
5	1.25	50	>>	>>	>>
6	1.50	60	>>	>>	>>
7	1.75	70	>>	>>	>>
8	2.00	80	>>	>>	>>
>> = Enter values into these cells				**ASF (Average Scale Factor)**	
				>>	

$$ISF_{n\ (V/mm)} = \frac{Vdc_{n-1} - Vdc_n}{0.25} \qquad ASF_{(V/mm)} = \frac{Vdc_{0.25mm} - Vdc_{1.75mm}}{1.5}$$

$$Vdiff_n = Vdc_n + (mm_n \bullet 7.87)$$

$$ISF_{n\ (mV/mil)} = \frac{Vdc_{n-1} - Vdc_n}{0.01} \qquad ASF_{(mV/mil)} = \frac{Vdc_{10mil} - Vdc_{70mil}}{0.06}$$

$$Vdiff_n = Vdc_n + (mil_n \bullet 0.2)$$

Use the following formulas to determine maximum Deviation from Straight Line (DSL). Include the last difference voltage (n = 8) for extended DSL range only.

$$DSL_{(mm)} = \frac{Vdif_{(max)} - Vdif_{(min)}}{15.75} = \_\_\_\_\_ mm$$

$$DSL_{(mil)} = \frac{Vdif_{(max)} \quad Vdif_{(min)}}{0.4} = \_\_\_\_\_ mil$$

If the ISF or DSL of the system is out of tolerance, contact Bently Nevada LLC for further information on possible calibration problems.

You can use a Bently Nevada TK-3 unit to perform the scale factor verification, although this is suitable only for rough verification. To verify the system to the performance specification, you must use a more precise micrometer and target. There are two different 3300 XL Micrometer Kits that you can use to verify the calibration of our transducer systems or to check the scale factor of specific shafts. Both micrometer kits will work with Bently Nevada eddy current transducers ranging in size from the 3300 XL NSv transducer system up to the 3300 XL 11 mm transducer system. Both micrometers also have options for either a metric or English micrometer.

The **3300 XL Precision Micrometer** (part number 330185) is a highly accurate verification device. You should use this device when performing acceptance testing on our transducer systems. All of our transducer systems have a specified linear range and ASF, as well as maximum DSL and ISF tolerances for ambient and extended temperatures. The 3300 XL Precision Micrometer comes with a high precision 4140 steel target to make precise measurements and verify whether the transducer system is working properly and within published specifications.

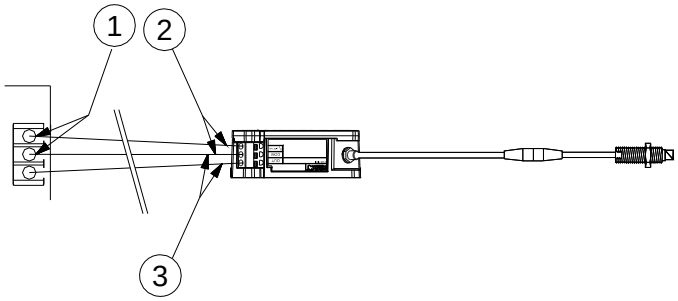
Use the **3300 XL Shaft Micrometer** (part number 330186) to check the scale factor of the transducer system directly on your shaft. You can compare the scale factor of your transducer system with that of a 4140 steel target supplied by Bently Nevada LLC to check whether errors in the measurement are due to runout, target material or a problem in the transducer system.

3.2 Troubleshooting

This section shows how to interpret a fault indication and isolate faults in an installed transducer system. Before beginning this procedure, be sure that you have correctly installed the system and properly secured all connectors in the correct locations.

When a malfunction occurs, locate the appropriate fault, check the probable causes for the fault indication, and follow the procedure to isolate and correct the fault. Use a digital voltmeter to measure voltage. If you find faulty transducers, contact your local sales and service office for assistance.

The troubleshooting procedures use measured voltages as shown in Figure 3-6, Table 3-2, and Table 3-3:



1. V_{PS}
2. V_{XDCR}
3. V_{SIG}

Figure 3-6: Measured Voltages For Troubleshooting Procedures

Table 3-2: Symbols for Measured Voltages

Symbol	Meaning	Voltage measured between...
V_{SIG}	Signal voltage from the transducer	OUT and COM
V_{PS}	Power supply voltage	Power Source and Common
V_{XDCR}	Supply voltage at transducer	$-V_T$ and COM

NOTE

V_{SIG}, V_{PS}, and V_{XDCR} are all negative voltage values.

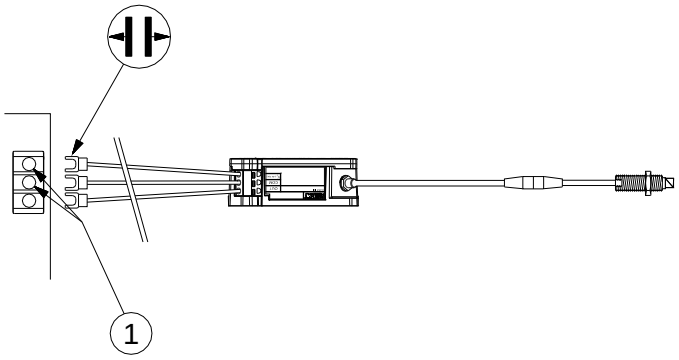
Table 3-3: Definitions

Symbol	Definition	Example
A > B	"A" value is more positive than "B"	-21 > -23
A < B	"A" value is more negative than "B"	-12 < -5
A = B	"A" same value as (or very close to) "B"	-24.1 = -24.0

3.3 Fault Type 1: V_{XDCR} > -17.5 Vdc or V_{XDCR} < -26 Vdc

Possible causes:

- Faulty power source
- Faulty field wiring
- Faulty Proximitor Sensor



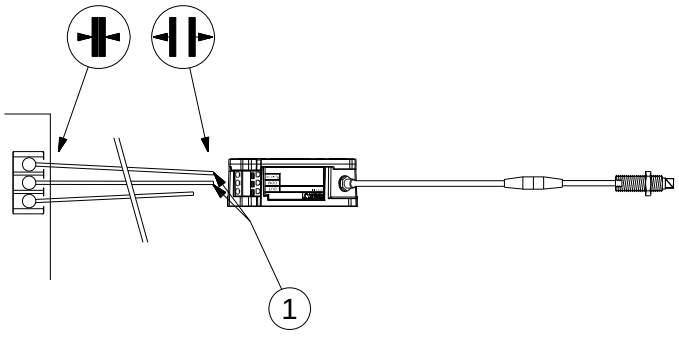
1. V_{PS}

Figure 3-7: Fault Type 1 Measurement 1

Measure V_{PS}: Is V_{PS} > -17.5 Vdc or V_{PS} < -26 Vdc?

Yes: Faulty power supply.

No: Go to next step.



1. V_{XDCR}

Figure 3-8: Fault Type 1 Measurement 2

Measure V_{XDCR}: Is V_{XDCR} > -17.5 Vdc or V_{XDCR} < -26 Vdc?

Yes: Faulty Field wiring.

No: Faulty Proximitor Sensor.

3.4 Fault Type 2: V_{SIG} = 0 Vdc

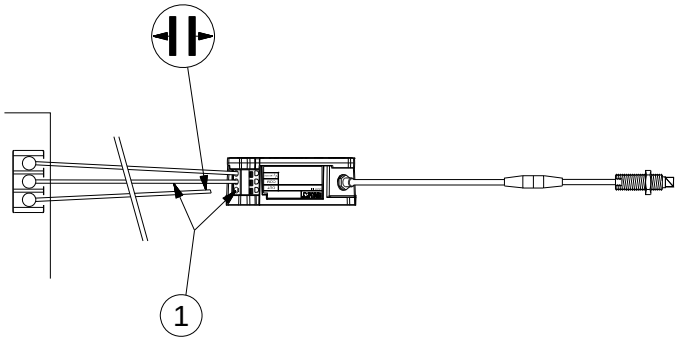
Possible causes:

- Incorrect power source voltage
- Short circuit in field wiring
- Short circuit at Proximitor Sensor terminal connection
- Faulty Proximitor Sensor

Does fault condition type 1 exist?

Yes: Use the procedure for fault type 1

No: Go to the next step



1. V_{SIG}

Figure 3-9: Fault Type 2 Measurement

Measure V_{SIG}: Is V_{SIG} = 0 Vdc?

No: Incorrect power source voltage or short in field wiring or short at Proximitor Sensor terminal connection.

Yes: Faulty Proximitor Sensor.

3.5 Fault Type 3: -1 Vdc < V_{SIG} < 0 Vdc

Possible causes:

- Probe is incorrectly gapped (too close to target)
- Incorrect power source voltage
- Faulty Proximitor Sensor

- Probe is detecting other material than target (counterbore or machine case)
- Short or open circuit in a connector (dirty or wet) or loose connectors
- Short or open circuit in the probe
- Short or open circuit in extension cable

Does fault condition type 1 exist?

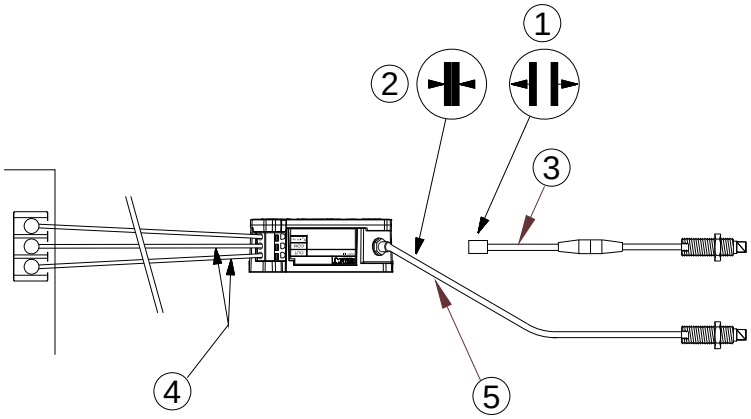
Yes: Use the procedure for fault type 1

No: Go to the next step

Is the probe gapped correctly? Do counterbore dimensions meet recommended minimum? (See Section 2.1, Installing the Probe on page 5.)

No: Regap the probe or modify counterbore. Retest system.

Yes Go to the next step.



1. Step 1
2. Step 2
3. Original probe and extension cable
4. V_{SIG}
5. Known good probe with correct length cable (open probe with gap held away from conducting material)

Figure 3-10: Fault Type 3 Measurement 1

Measure V_{SIG}: Is $V_{SIG} < V_{XDCR} + 2$ Vdc?

No: Faulty Proximitor Sensor

Yes: Go to next step

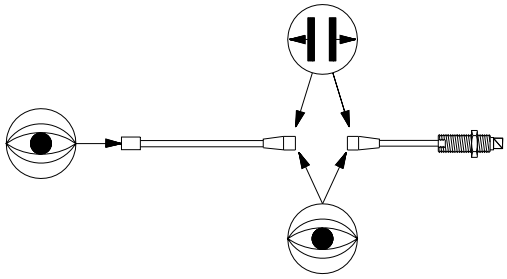
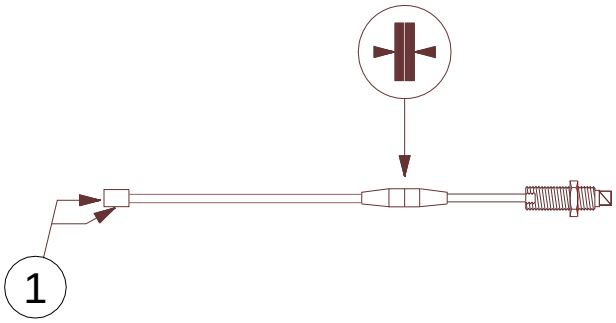


Figure 3-11: Fault Type 3 Measurement 2

Inspect for clean connection: Is the connection dirty, rusty, or a poor connection?

Yes: Clean the connector using isopropyl alcohol or electronic terminal cleaner, reassemble and retest the system.

No: Go to the next step.



1. R_{TOTAL}

Figure 3-12: Fault Type 3 Measurement 3

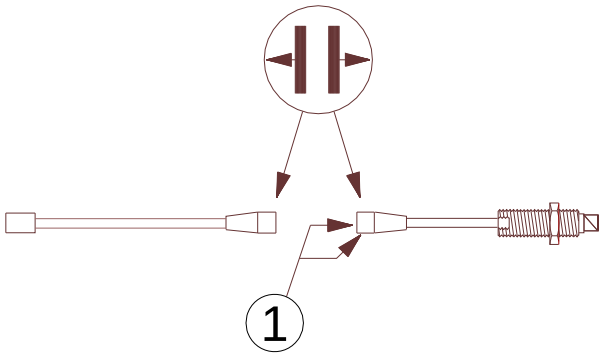
Measure resistance R_{TOTAL}: Is R_{TOTAL} within specifications?

5 m system: $5.3 \pm 0.7\ \Omega$

7 m System: $5.9 \pm 0.9\ \Omega$

Yes: Retest original system

No: Go to the next step



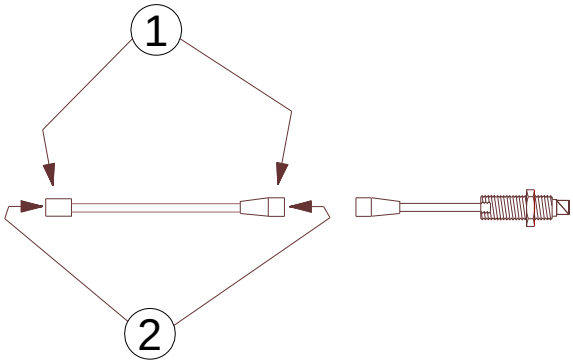
1. R_{PROBE}

Figure 3-13: Fault Type 3 Measurement 4

Measure resistance, R_{PROBE}: Is R_{PROBE} within specifications (see **Error! Reference source not found.** on page **Error! Bookmark not defined.**)?

No: Faulty probe.

Yes: Go to next step.



1. R_{JACKET}
2. R_{CORE}

Figure 3-14: Fault Type 3 Measurement 5

Measure the resistance, R_{JACKET} and R_{CORE}: Is the resistance within specifications (see Extension Cable DC Resistance on page 30)?

No: Faulty extension cable

Yes: Retest the original system

3.6 Fault Type 4: $V_{XDCR} < V_{SIG} < V_{XDCR} + 2.5$ Vdc

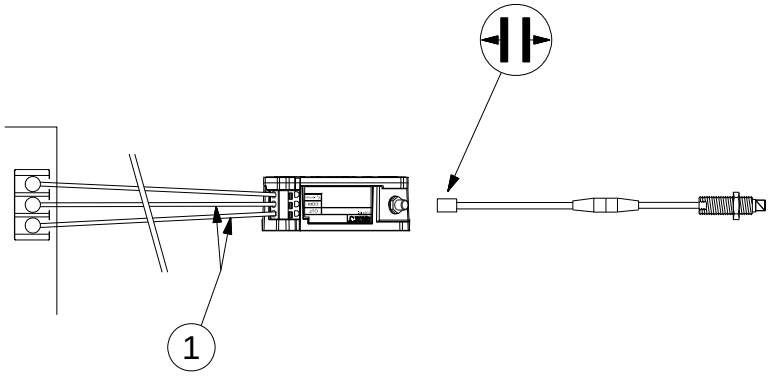
Possible causes:

- Faulty Proximitor Sensor
- Probe is incorrectly gapped (too far from target)

Does fault condition type 1 exist?

Yes: Use the procedure for fault type 1

No: Go to the next step



1. V_{SIG}

Figure 3-15: Fault Type 4 Measurement

Measure V_{SIG}: Is $-1.2 < V_{SIG} < -0.3$ Vdc?

No: Faulty Proximitor Sensor

Yes: Reconnect the system. Regap the probe. Retest the system.

3.7 Fault Type 5: $V_{SIG} = V_{XDCR}$

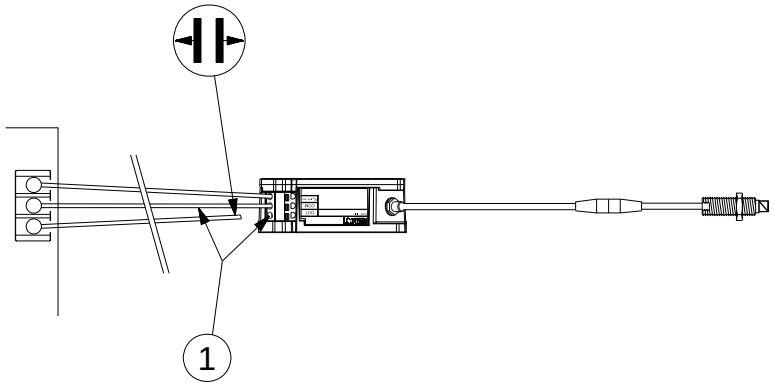
Possible causes:

- Incorrect power source voltage
- Faulty Proximitor Sensor
- Faulty field wiring (between Out and V_T)

Does fault condition type 1 exist?

Yes: Use the procedure for fault type 1

No: Go to the next step



1. V_{SIG}

Figure 3-16: Fault Type 5 Measurement

Measure V_{SIG}: Is $V_{SIG} = V_{XDCR}$?

Yes: Faulty Proximitor Sensor

No: Faulty field wiring (short between Out and V_T)

Bently Nevada LLC performs failure analysis on all returned transducers. We use the information gained during analysis of failed products to improve our current and future products. If you encounter a part that has failed, return the part with a brief description of the product application and symptoms observed to our corporate headquarters in Minden, Nevada for analysis:

Bently Nevada, LLC
Attn: Product Repair Department
1631 Bently Parkway South
Minden, Nevada 89423 USA

4. 3300 XL NSv™ System 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), with a -24 Vdc power supply, a 10 kΩ load, a 31 mm (1.2 in) diameter or larger AISI 4140 steel target supplied by Bently Nevada LLC, 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 an AISI 4140 steel target supplied by Bently Nevada LLC.

4.1 Electrical

Proximitor Sensor Input

Accepts one noncontacting 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 voltage more positive than -23.5 Vdc can reduce the 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

See Table 4-1.

Table 4-1: 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

0.220Ω/m (0.067 Ω/ft)

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 mm^2 (16 to 24 AWG) [0.25 to 0.75 mm^2 (18 to 23 AWG) with ferrules]. We recommend using 3-conductor shielded triad cable with a maximum length of 305 metres (1,000 feet) between the 3300 XL NSv Proximitor Sensor and the monitor. See the frequency response graphs in Figure 4-16 and Figure 4-17 for signal roll off 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).

Frequency Response

0 to 10 kHz: +0, -3 dB typical, with up to 305 metres (1000 feet) of field wiring.

Target Size (Flat Target)

Axial position measurements on shaft diameters smaller than 13mm (0.5 in) will generally change the scale factor. Reducing the gap between the probe and target will help limit the change in scale factor. See Figure 4-12 for additional information.

Minimum

8.9 mm (0.35 in) diameter

Recommended Minimum

13 mm (0.5 in) diameter

Shaft Diameter

Measurements on shaft diameters smaller than 30 mm (1.2 in) usually require close spacing of radial vibration or axial position transducers and increase 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 4-14 and Figure 4-15 for additional information.) Radial vibration or radial position measurements on shaft diameters smaller than 20 mm (0.8 in) will generally change the Average Scale Factor (ASF) by at least 10%. See Figure 4-13 for additional information.

Minimum (standard X-Y probe configuration)	30 mm (1.2 in)
Minimum (X-Y proximity probes offset axially by 23 mm (0.9 in))	20 mm (0.8 in)

Counterbore

Counter bores smaller than 13 mm (0.5 in) generally change the 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 4-9 for additional information.

Minimum	9.5 mm (0.375 in)
Recommended Minimum	13 mm (0.5 in)

Effects of 60 Hz Magnetic Fields Up to 300 Gauss (5-metre system):

See Table 4-2.

Table 4-2: Output Voltage in Mil pp/Gauss

Gap	Proximitor Sensor	Probe	Ext. Cable
0.25 mm (10 mil)	0.006	0.001	0.001
1.0 mm (40 mil)	0.007	0.002	0.001
1.75 mm (70 mil)	0.008	0.002	0.003

Electrical Classification

Complies with the European CE mark.

4.2 Hazardous Area Approvals

Multiple approvals for hazardous areas certified by Canadian Standards Association (CSA/NRTL/C) in North America and by BASEEFA/CENELEC in Europe.

North America

Ex ia IIC T5; Class I Zone 0 or Exia IIC T5 for Class 1 Division 1; Groups A, B, C, and D, when installed with intrinsically safe zener barriers per drawing 141092 or when installed with galvanic isolators.

ExnA IIC T5 Class I Zone 2 or ExnA IIC T5 for Class I, Division 2, Groups A, B, C, and D when installed without barriers per drawing 140979.

T_5 @ T_a = -35 °C to +85 °C.

Europe

EExia IIC T5 for Zones 0, 1 and 2, Group IIC, BASEEFA certificate number BAS99ATEX1101, when installed with intrinsically safe zener barriers or galvanic isolators,

T5 @ Ta= -35 °C to +85 °C.

EEx nA for Zone 2, Group IIC, BASEEFA certificate number BAS99ATEX3100U.

4.3 Mechanical

Probe Tip Material:

Polyphenylene sulfide (PPS).

Probe Case Material:

AISI 304 stainless steel (SST).

Probe Cable Specifications:

75Ω coaxial, fluoroethylene propylene (FEP) insulated probe cable in the following total probe lengths: 0.5, 1, 5, or 7 metres.

Extension Cable Material:

75Ω coaxial, fluoroethylene propylene (FEP) insulated.

Proximitor Sensor Material:

A380 aluminum

System Length:

5 or 7 metres including extension cable

Extension Cable Armor (optional):

Flexible AISI 302 SST with/without FEP outer jacket.

Tensile Strength (maximum rated):

220 N (50 lbf) probe case to probe lead. 220 N (50 lbf) at probe lead to extension cable connectors. 220 N (50 lbf) probe case to stainless steel armor.

Connector material:

Gold-plated brass

Connector-to-connector torque

See Table 4-3.

Table 4-3: Maximum and Recommended Probe Case Torque

Probe Case	Maximum Rated	Recommended
1/4-28 or M8x1 probe cases	7.3 N•m (65 in•lbf)	5.1 N•m (45 in•lbf)
3/8-24 or M10x1 probe cases	33.9 N•m (300 in•lbf)	11.3 N•m (100 in•lbf)
3/8-24 or M10x1 probe cases – first three threads	22.6 N•m (200 in•lbf)	7.5 N•m (66 in•lbf)
Reverse mount probes	22.6 N•m (200 in•lbf)	7.5 N•m (66 in•lbf)

Recommended torque

Finger tight

Maximum torque

0.56 N•m (5 in•lbf)

Minimum Bend Radius (with or without stainless steel armor)

25.4 mm (1.0 in)

System Weight (typical)

Probe

Approximately 14 to 150 g (0.5 to 5 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)

4.4 Environmental Limits

Probe Temperature Range

Operating Temperature:

-34 °C to +177 °C (-30 °F to +351 °F)

Storage Temperature:

-51 °C to +177 °C (-60 °F to +351 °F)

Application Alert
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

-51 °C to +177 °C (-60 °F to +351 °F)

Proximitor Sensor Temperature Range

Operating Temperature

-35 °C to +85 °C (-31 °F to +185 °F)

Storage Temperature

-51 °C to +105 °C (-60 °F to +221 °F)

Relative Humidity

100% condensing, non-submersible when connectors are protected. Tested to IEC 68-2-3 damp heat.

Probe Pressure

3300 NSv probes are designed to seal differential pressure between the probe tip and case. The probe sealing material consists of a Viton® O-ring. We do not pressure test probes prior to shipment. Contact our custom design department if you require a test of the pressure seal for your application

Application Advisory

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 LLC will not be held responsible for any damages resulting from leaking 3300 NSv Proximity Probes. In addition, 3300 NSv Proximity Probes will not be replaced under the service plan due to probe leakage.

Patents

Components or procedures in one or more of the following patents apply to this product: 5,016,343; 5,126,664; 5,351,388; and 5,685,884.

4.5 Graphs and Dimensional Drawings

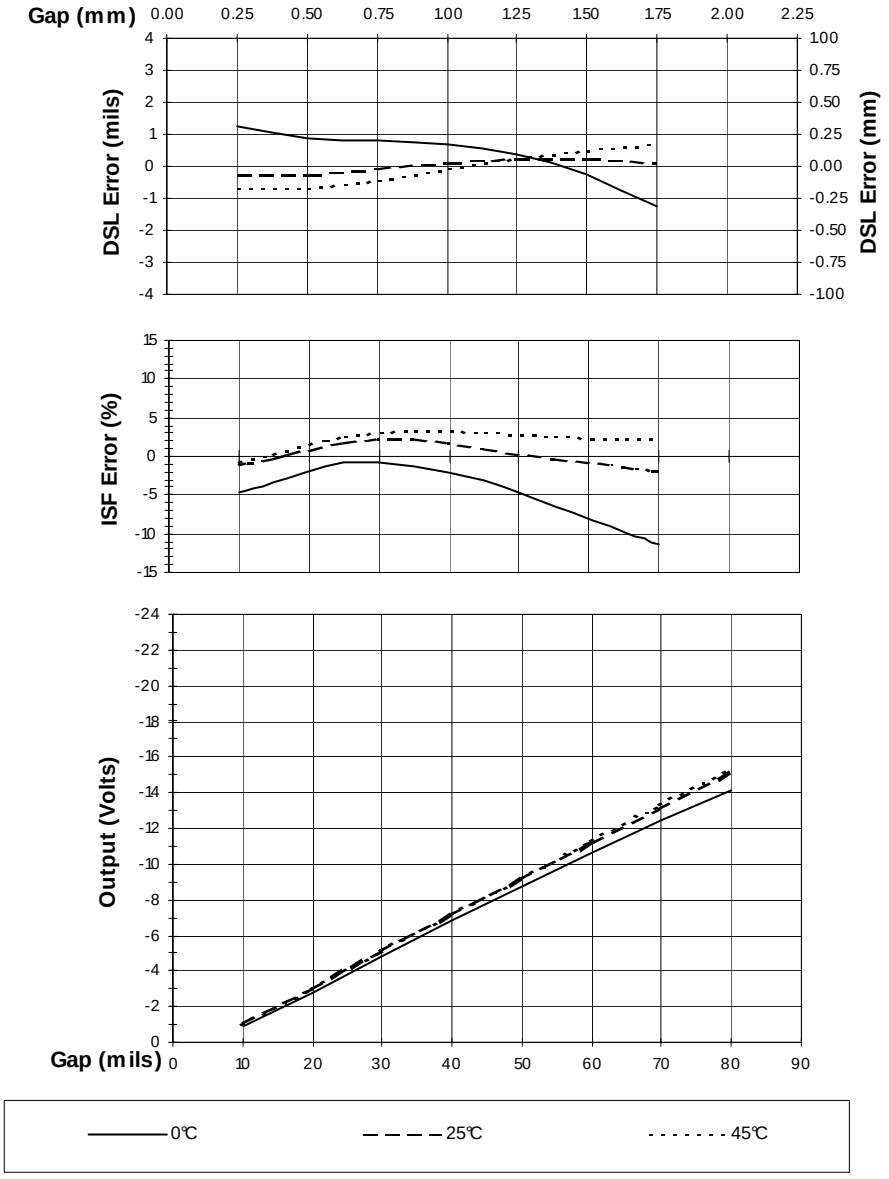


Figure 4-1: Typical 3300 XL NSv 5m System Over Ambient Temperature Range

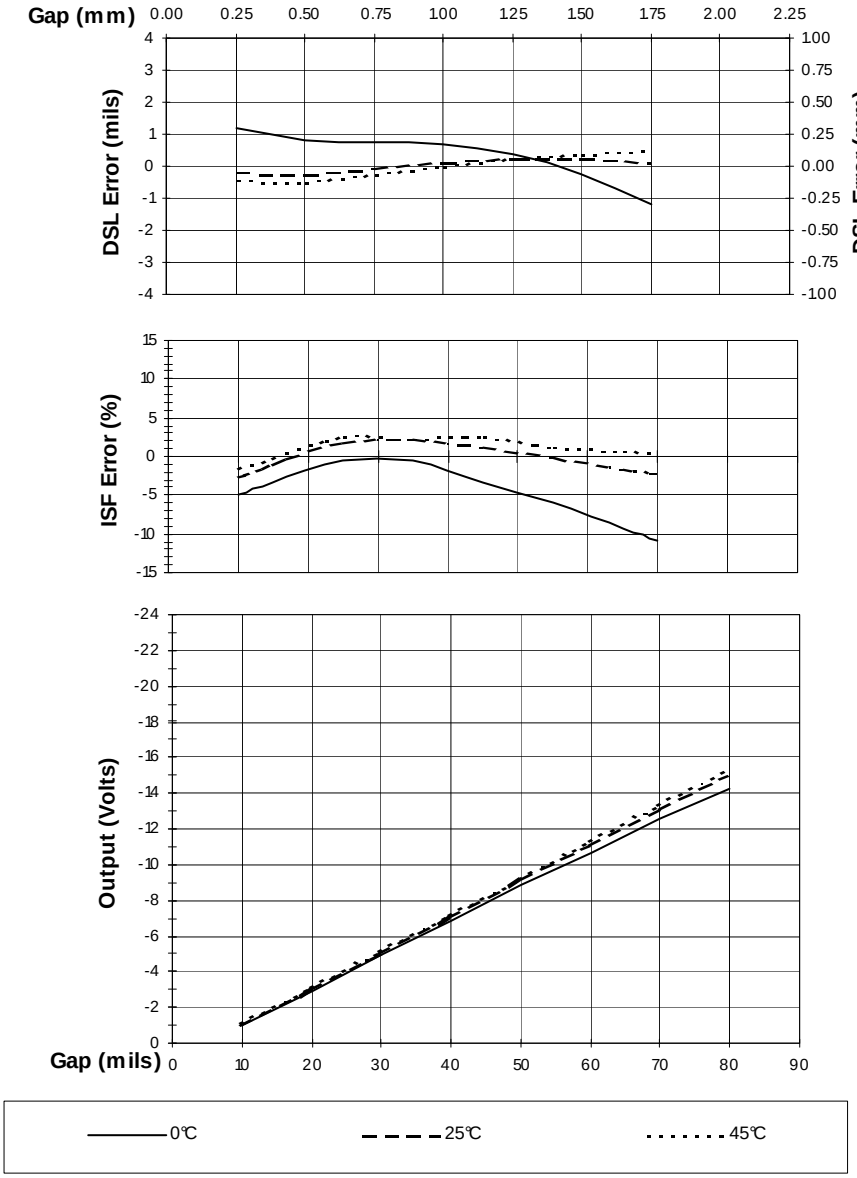


Figure 4-2: Typical 3300 XL NSv 7m System Over Ambient Temperature Range

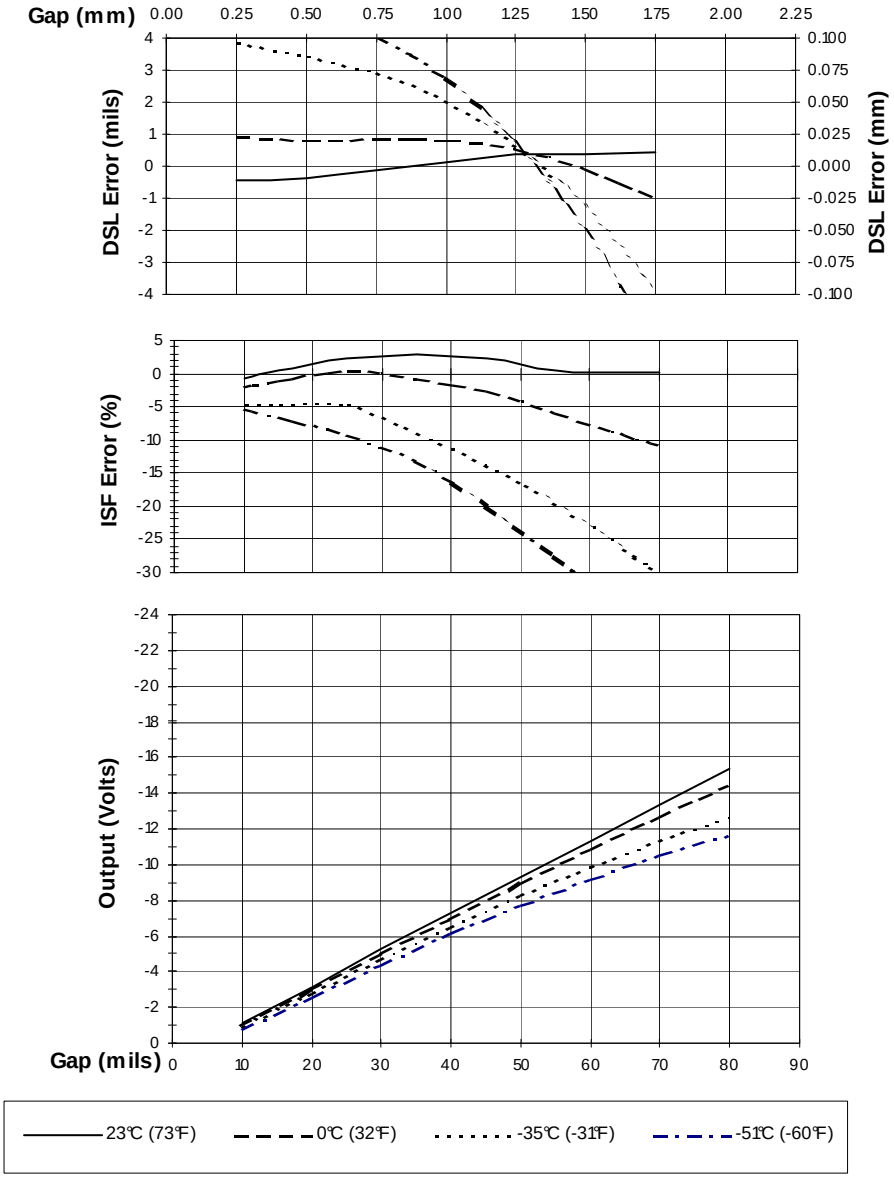


Figure 4-3: Typical 3300 NSv Probe + 1m Cable @ Low Temperature (Proximitor Sensor + 4 Metres of Extension Cable @ 25 °C)

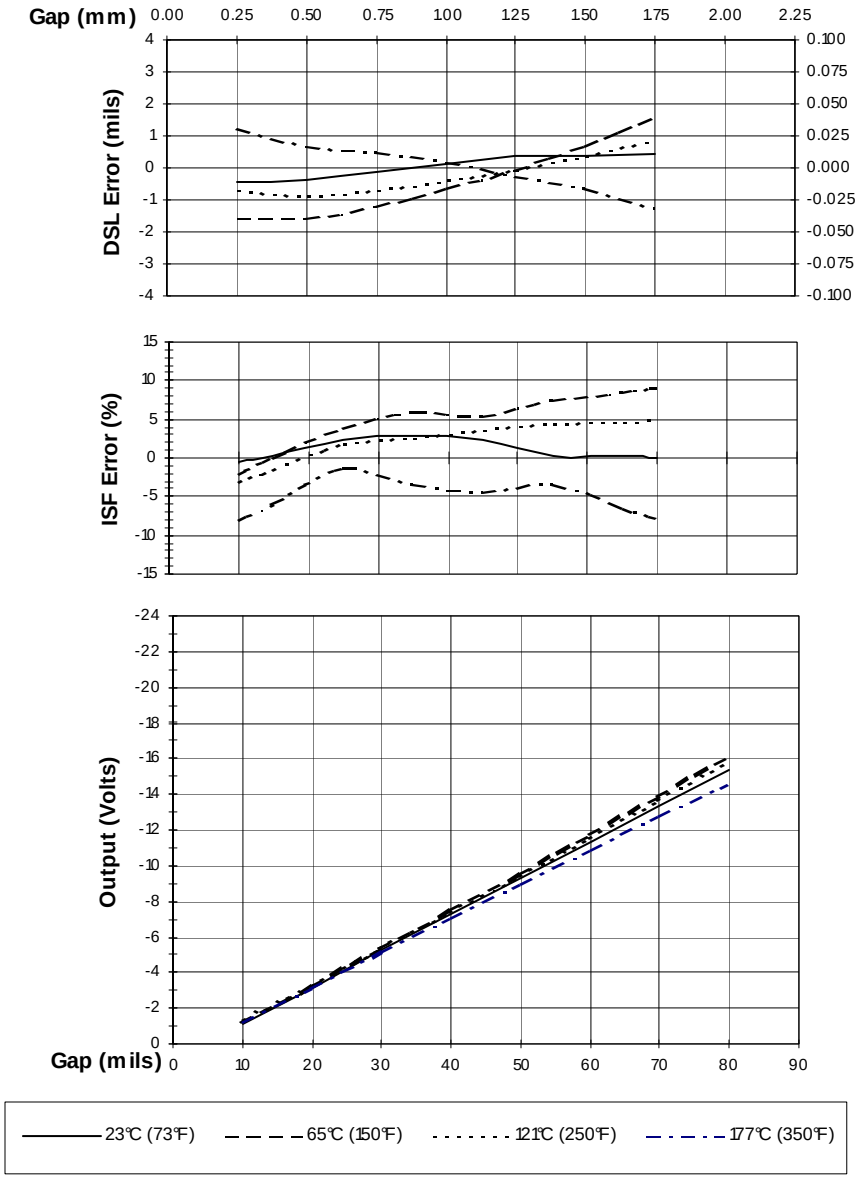


Figure 4-4: Typical 3300 NSv Probe + 1m Cable @ High Temperature (Proximitor Sensor + 4 Metres of Extension Cable @ 25 °C)

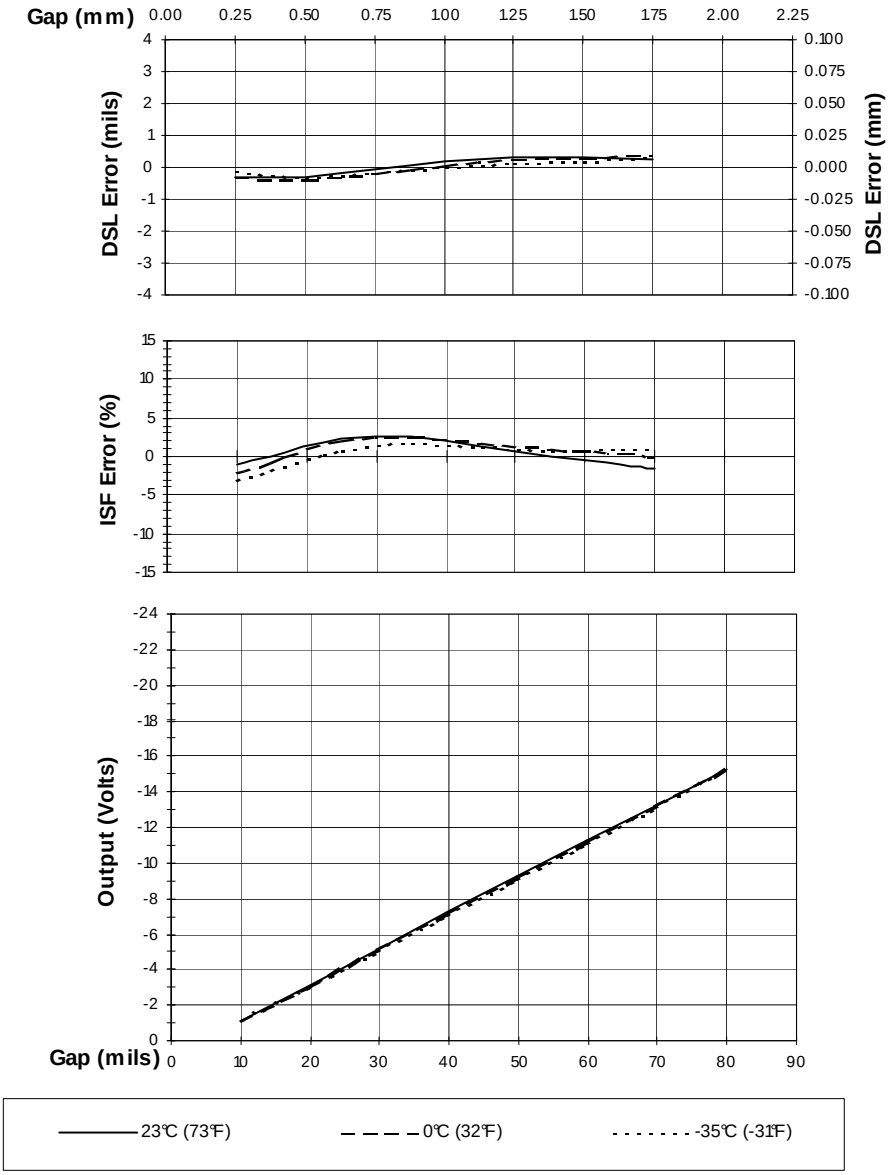


Figure 4-5: Typical 3300 XL NSv 5m Proximitor® Sensor with 4 Metres of Extension Cable @ Low Temperature (Probe is at 25 °C)

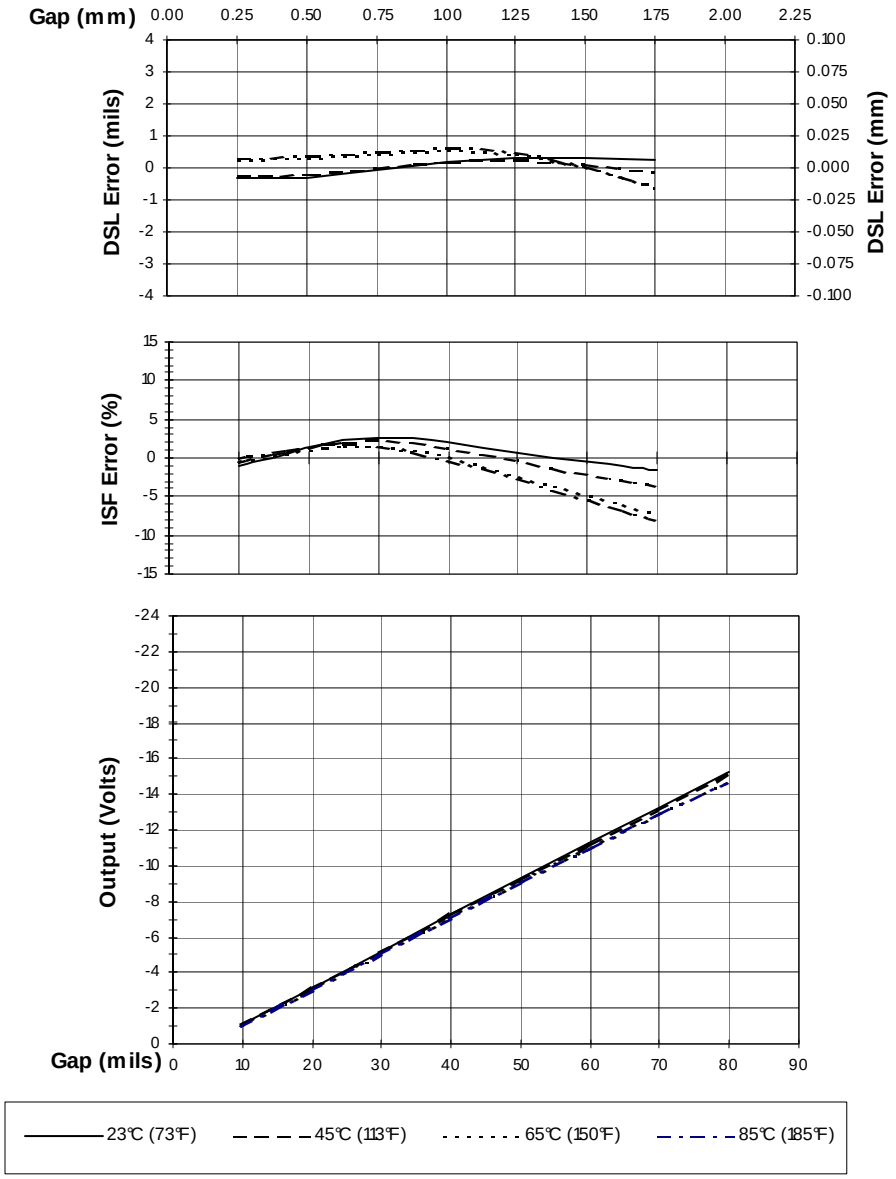


Figure 4-6: Typical 3300 XL NSv 5m Proximitor® Sensor with 4 Metres of Extension Cable @ High Temperature (Probe is at 25 °C)

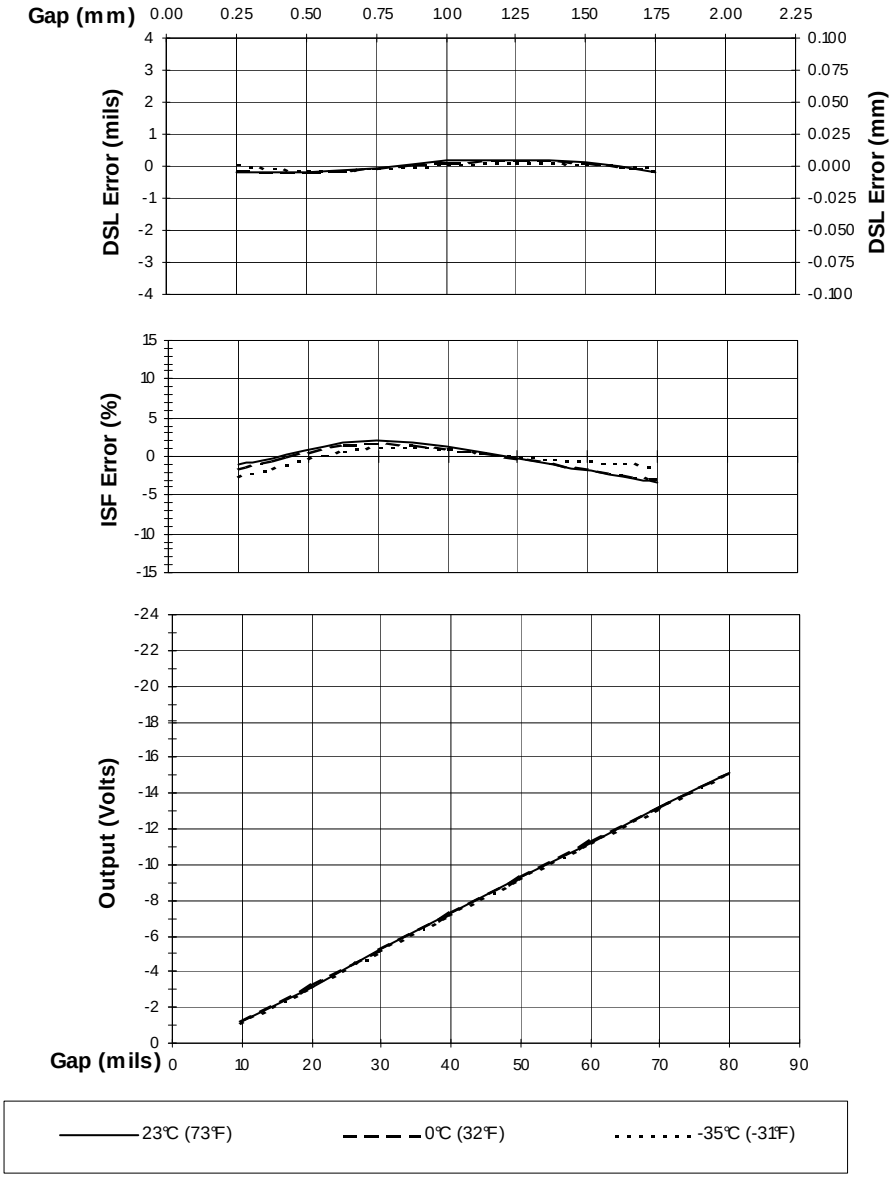


Figure 4-7: Typical 3300 XL NSv 7m Proximitor® Sensor with 6 Metres of Extension Cable @ Low Temperature (Probe is at 25 °C)

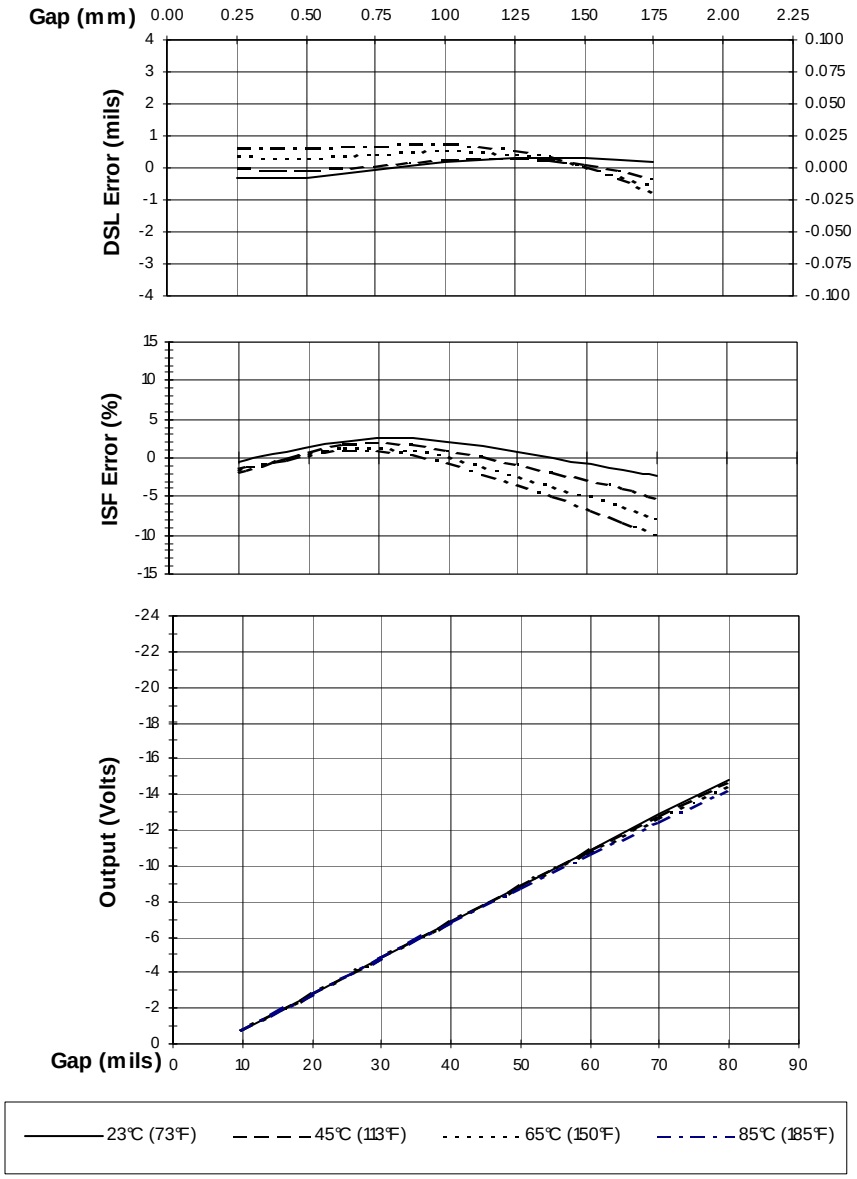


Figure 4-8: Typical 3300 XL NSv 7m Proximitor Sensor with 6 Metres of Extension Cable @ High Temperature (Probe is at 25 °C)

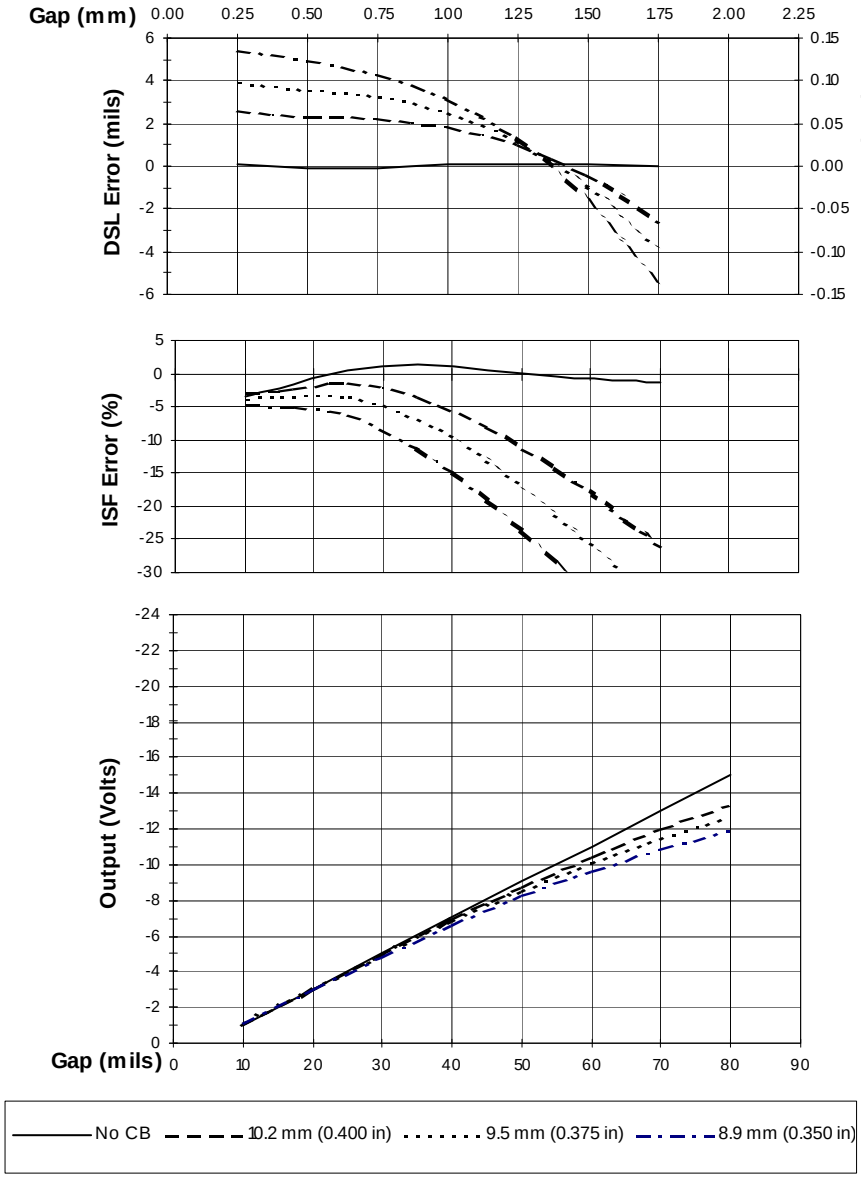


Figure 4-9: Effect of Counterbore Side Clearance (4140 Material)

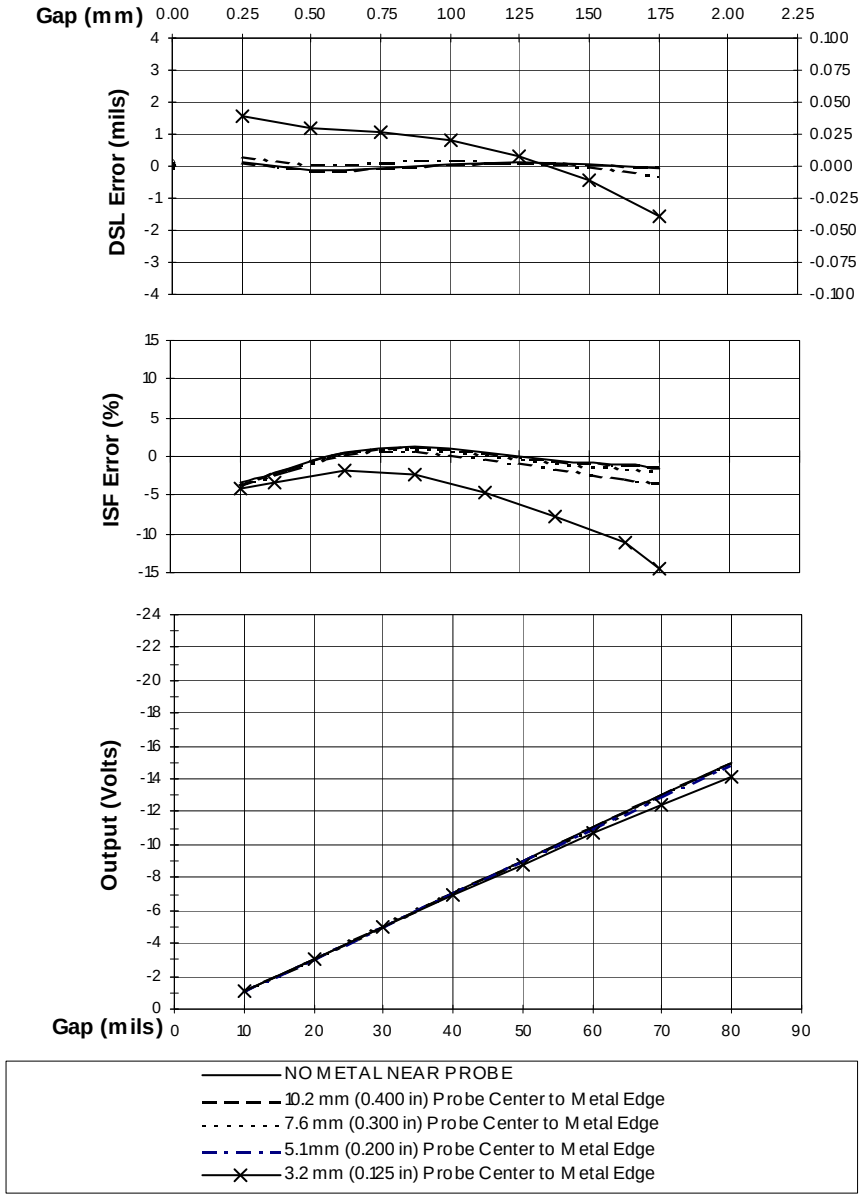


Figure 4-10: Effect of Flat Surface Side Clearance (4140 Material)

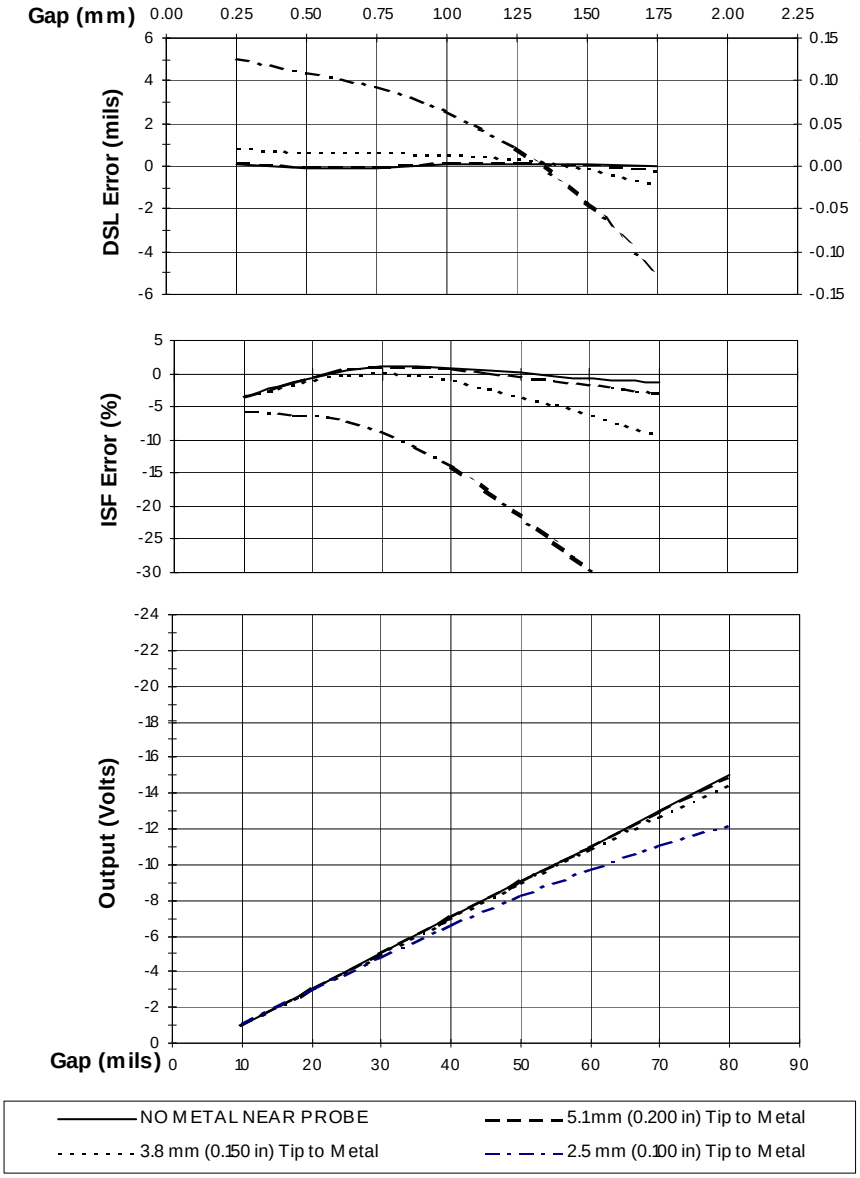


Figure 4-11: Effect of Rear Surface Clearance (4140 Material)

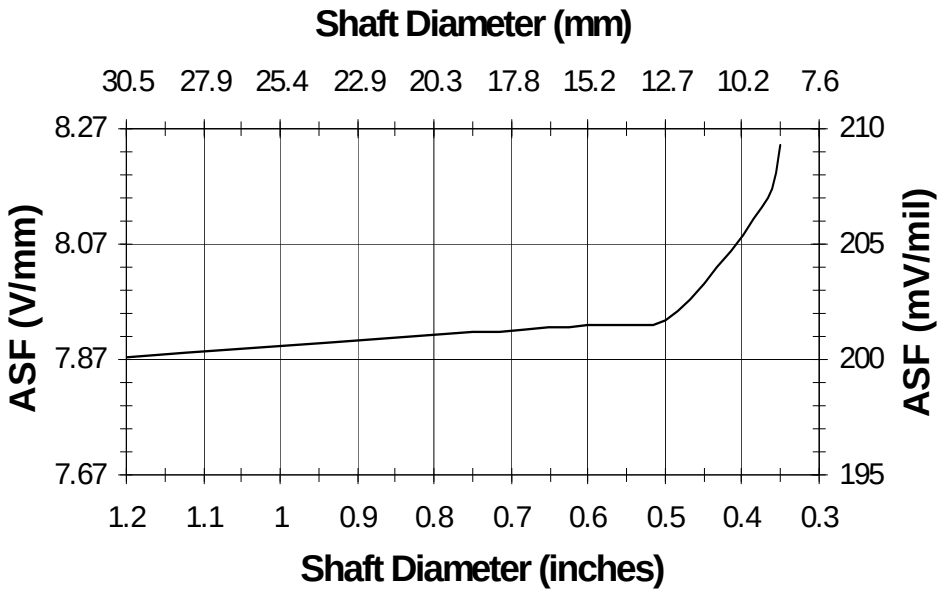


Figure 4-12: Axial Sensitivity to Shaft Size

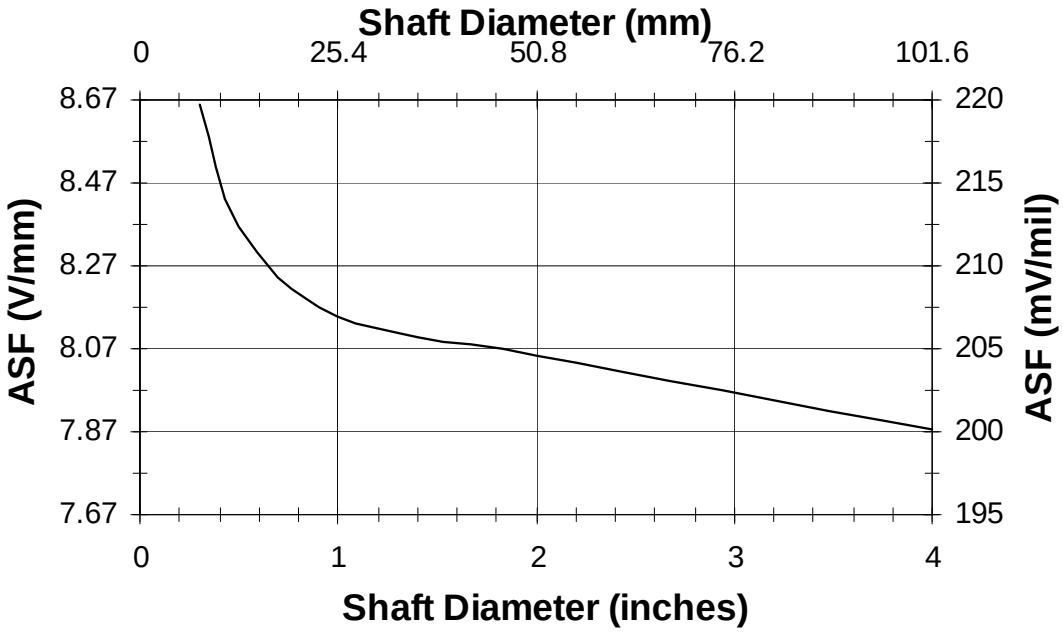


Figure 4-13: Radial Sensitivity to Shaft Size

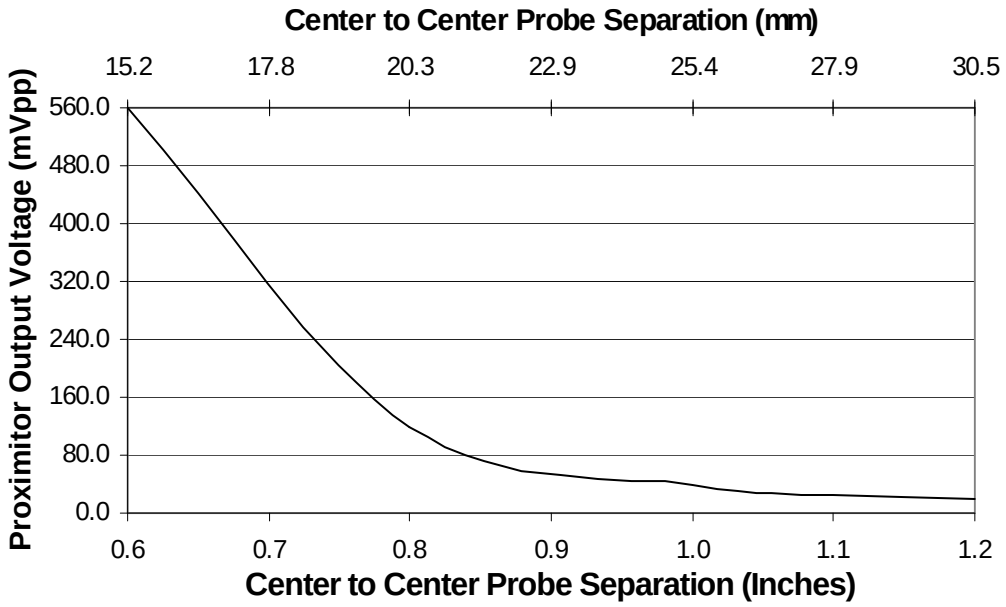


Figure 4-14: Probe Cross-talk with Probes Mounted in Parallel

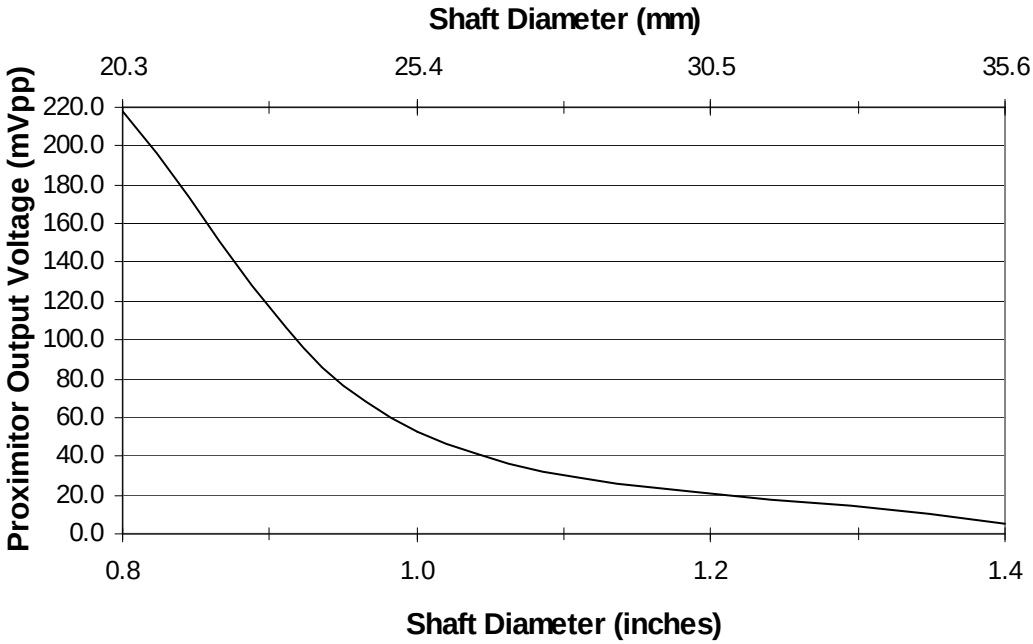


Figure 4-15: Probe Cross-talk with Probes Mounted in X-Y Configuration

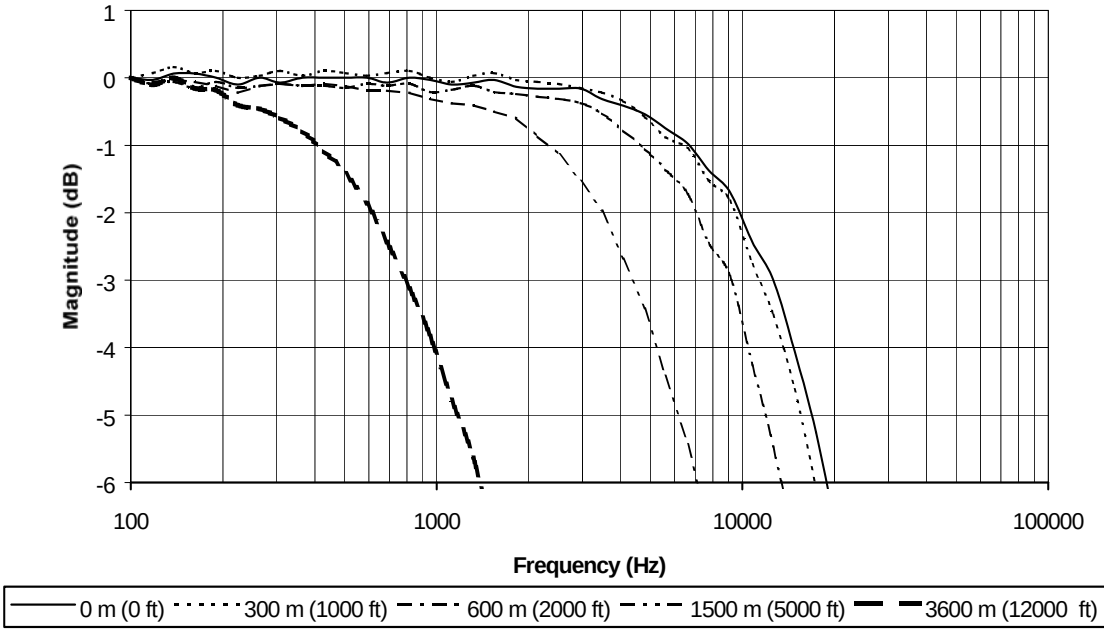


Figure 4-16: Frequency Response, magnitude of typical 3300 XL NSv System with various lengths of field wiring, no barriers

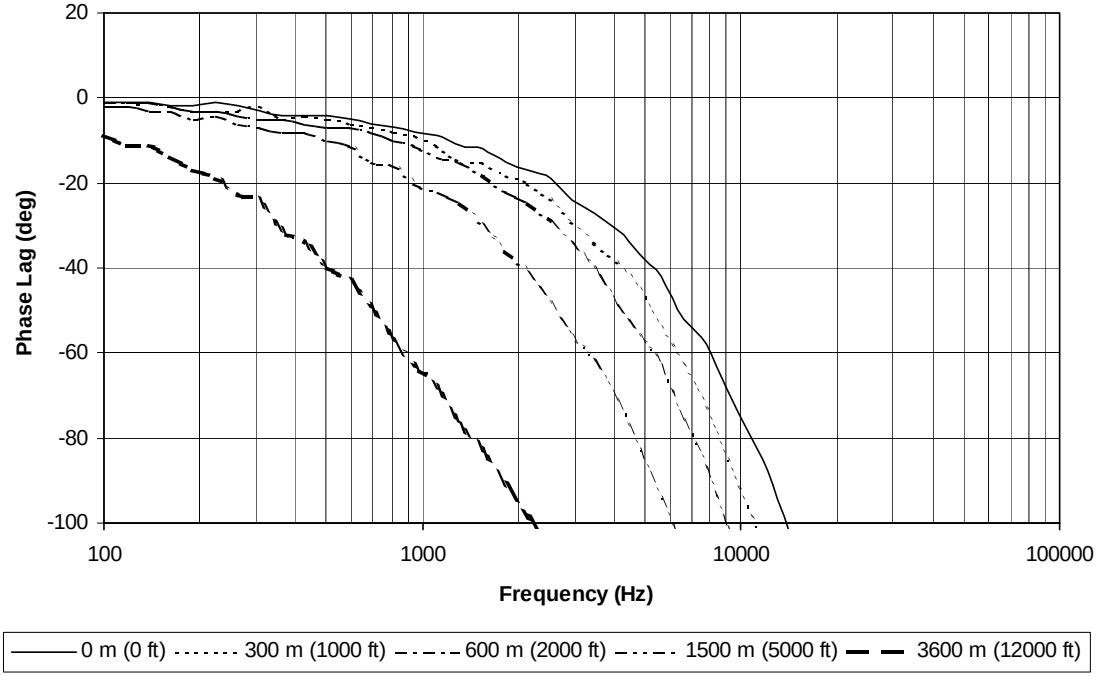
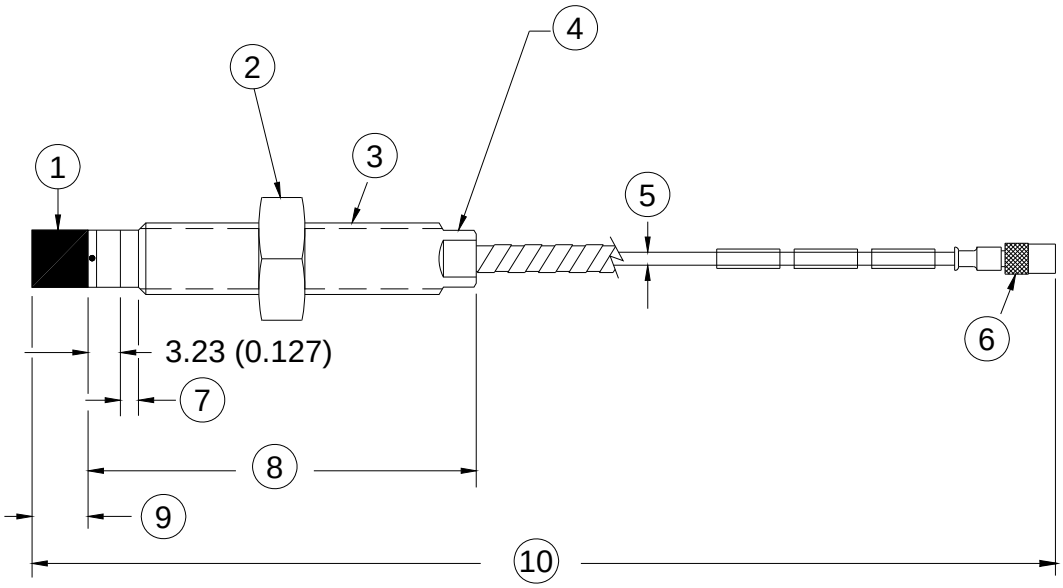


Figure 4-17: Frequency Response, phase change of typical 3300 XL NSv System with various lengths of field wiring, no barriers



1. Probe tip, 5.26 (0.207) maximum diameter
2. Hexagonal nut
3. Case thread
4. Wrench flats
5. 75Ω cable, 2.8 (0.11) maximum outside diameter, 7.6 (0.30) maximum outside diameter of armor
6. Miniature male coaxial connector, 7.23 (0.285) maximum outside diameter "D"
7. Unthreaded length "A"
8. Case length "B"
9. 2.92 (0.115) maximum
10. Total length "C", +30%, -0%

Figure 4-18: 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

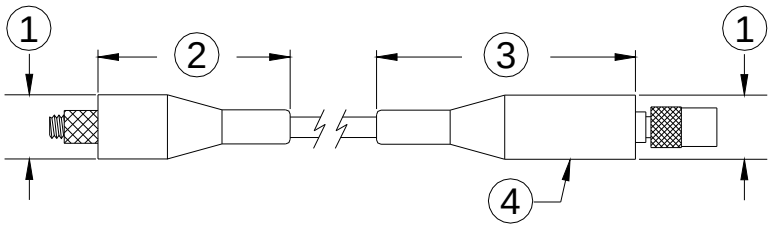
330904, M8x1 thread, with armor

330905, M10x1 thread, without armor

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

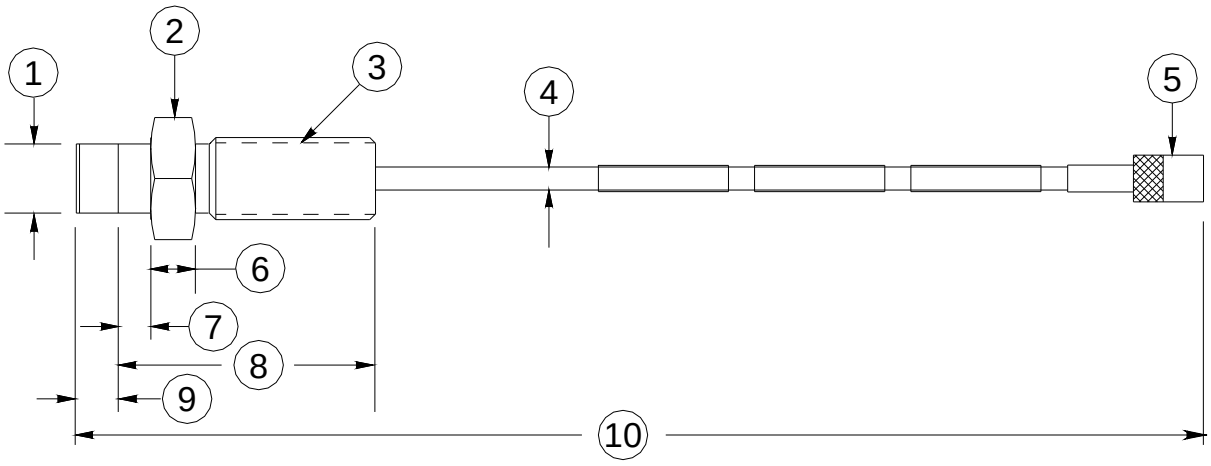
330909, 3/8-24 UNF 2A, with armor

330910, M10x1 thread, with armor



1. 12 (0.49) maximum diameter
2. 36.3 (1.43) maximum
3. 51.1 (2.01) maximum
4. Connector protector (fluorosilicone material)

Installed Figure 4-19: Connector Protectors

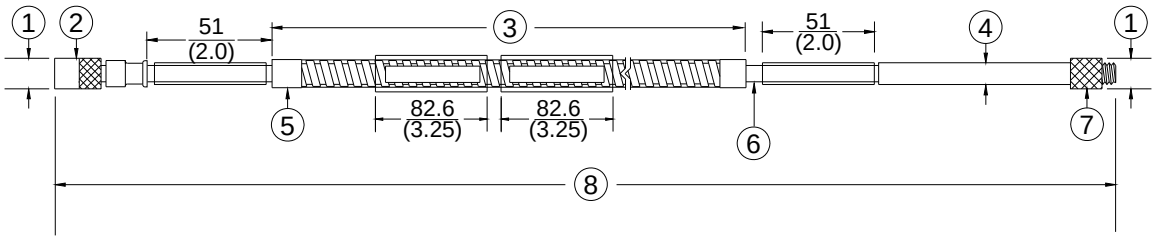


1. Probe tip, 5.26 (0.207) maximum diameter
2. 7/16 or 10mm hexagonal
3. Case thread
4. 75Ω cable, 2.8 (0.11) outside diameter
5. Miniature male coaxial connector, 7.23 (0.285) maximum outside diameter “D”
6. 5.08 (0.20)
7. Unthreaded length “A”, 5.08 (0.20)
8. Case Length “B”, 30.48 (1.20)
9. 2.92 (0.115) maximum
10. Total length “C”, +30%, -0%

Figure 4-20: 3300 NSv Proximity Probes, Reverse Mount

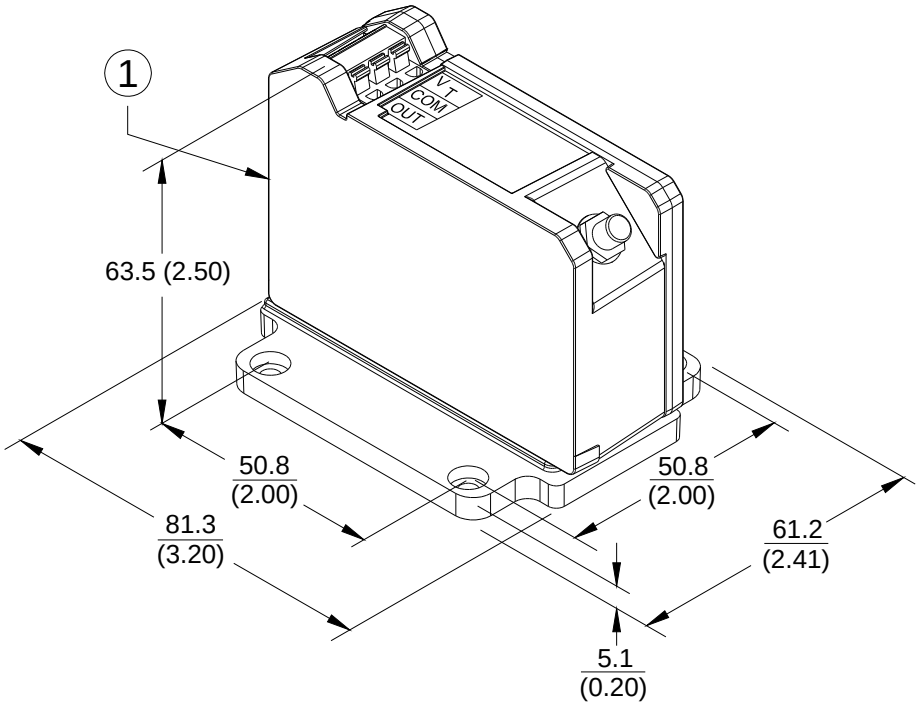
330906, 3/8-24 UNF-2A threads

330907, M10x1 threads



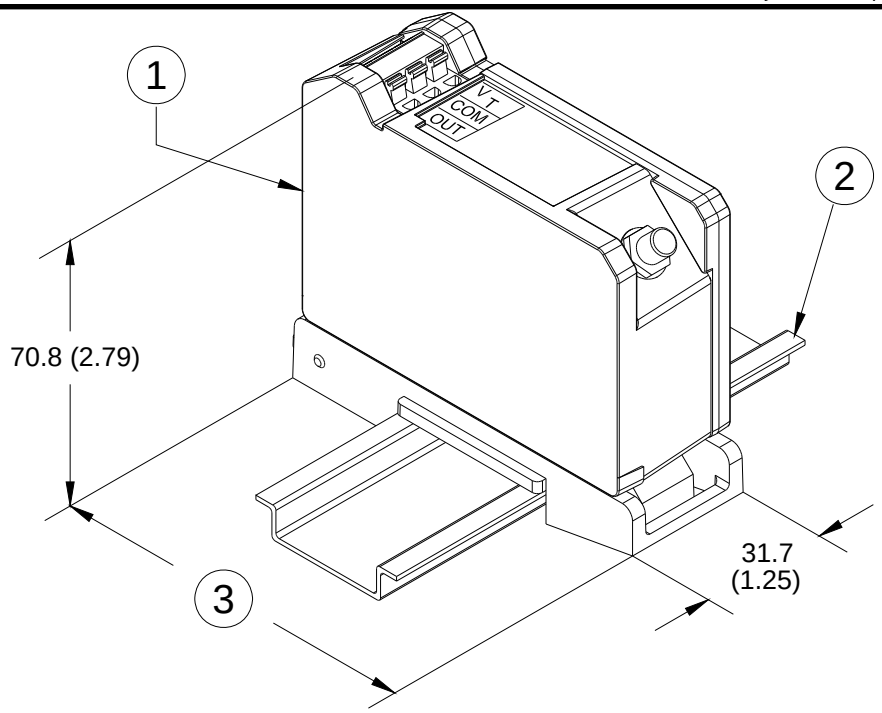
1. 7.2 (0.285) maximum diameter
2. Miniature male coaxial connector
3. FEP-coated or uncoated armor, 300 (11.8) less than cable length
4. 75Ω cable, 2.80 (0.11) maximum outside diameter, 7.6 (0.30) maximum outside diameter of armor, 7.0 (0.275) maximum outside diameter of uncoated armor
5. Stainless steel ferrules, 8.4 (0.33) diameter
6. FEP-insulated coaxial cable
7. Miniature female coaxial connector
8. Cable length +20%, -0%

Figure 4-21: 330930, 3300 NSv Extension Cable



1. Mounting Option “A”, Options –50 or -70

Figure 4-22: Panel Mount 3300 XL NSv Proximitor Sensor



1. Mounting Option "A", Options –51 or –71
2. 35mm DIN rail (not included)
3. 89.4 (3.52) (additional 3.05 (0.120) clearance required to remove DIN rail)

Figure 4-23: DIN Mount 3300 XL NSv Proximitor Sensor

Notes:

1. All dimensions on figures are in millimetres (inches) unless otherwise noted.
2. Standard mount 1/4-28 UNF thread probes are supplied with 7/16 inch lock nut and 7/32 wrench flats.
3. Standard mount M8x1 thread probes are supplied with 13 mm lock nut and 7 mm wrench flats.
4. Standard mount 3/8-24 UNF thread probes are supplied with 9/16 inch lock nut and 5/16 wrench flats.
5. Standard mount M10x1 thread probes are supplied with 17 mm lock nut and 8 mm wrench flats.
6. Reverse mount probes are not available with armor or connector protector options.
7. Letters inside quotation marks on figures refer to probe ordering options.
8. Stainless steel armor is supplied with or without FEP outer jacket.
9. FEP jacket is standard on all non-armored probes.

5. XL NSv System Ordering Information

5.1 3300 NSv Proximity Probes

3300 NSv Probe, 1/4-28 UNF thread, without armor
330901-AXX-BXX-CXX-DXX-EXX

3300 NSv Probe, 1/4-28 UNF thread, with armor
330902-AXX-BXX-CXX-DXX-EXX

3300 NSv Probe, 3/8-24 UNF thread, without armor
330908-AXX-BXX-CXX-DXX-EXX

3300 NSv Probe, 3/8-24 UNF thread, with armor
Part Number-AXX-BXX-CXX-DXX-EXX

A: Unthreaded Length Option

Order in increments of 0.1 in

Length configurations:

Maximum unthreaded length: 9.2 in

Minimum unthreaded length: 0.0 in

Example: 0 4 = 0.4 in

NOTE
Unthreaded length must be at least 0.7 inch less than the case length.

B: Overall Case Length Option

Order in increments of 0.1 in

Threaded length configurations:

Maximum case length: 9.9 in

Minimum case length: 0.8 in

Example: 2 4 = 2.4 in

C: Total Length Option

0 5 0.5 metre (20 in)

1 0 1.0 metre (39 in)

5 0 5.0 metres (16.4 feet)

7 0 7.0 metres (23.0 feet)

D: Connector and Cable-Type Option

0 0 No connector provided, standard cable

0 1 Miniature coaxial ClickLoc connector with connector protector

0 2 Miniature coaxial ClickLoc connector

E: Agency Approval Option

0 0 Not required

0 5 Multiple Approvals

5.2 3300 NSv Proximity Probes, Metric

3300 NSv Probe, M8 x 1 thread, without armor
330903-AXX-BXX-CXX-DXX-EXX

3300 NSv Probe, M8 x 1 thread, with armor
330904-AXX-BXX-CXX-DXX-EXX

3300 NSv Probe, M10 x 1 thread, without armor
330905-AXX-BXX-CXX-DXX-EXX

3300 NSv Probe, M10 x 1 thread, with armor
330910-AXX-BXX-CXX-DXX-EXX

A: Unthreaded Length Option

Order in increments of 10 mm.

Length configuration:

Maximum unthreaded length: 230 mm

Minimum unthreaded length: 0 mm

Example: 0 6 = 60 mm

NOTE
Unthreaded length must be at least 20 mm less than the case length.

B: Overall Case Length Option

Order in increments of 10 mm.

Metric thread configurations:

Maximum length: 250 mm

Minimum length: 20 mm

Example: 0 6 = 60 mm

C: Total Length Option

0 5 0.5 metre (20 in)

1 0 1.0 metre (39 in)

5 0 5.0 metres (16.4 feet)

7 0 7.0 metres (23.0 feet)

D: Connector and Cable-Type Option

- **0 0** No connector provided
- **0 1** Miniature coaxial ClickLoc™ connector with connector protector
- **0 2** Miniature coaxial ClickLoc™ connector

E: Agency Approval Option

- **0 0** Not required
- **0 5** Multiple Approvals

5.3 3300 NSv Reverse Mount Probe

3/8-24 UNF threads
330906-02-120-XX-DXX-EXX

M10 x 1 threads
330907-05-30- CXX-DXX-EXX

C: Total Length Option

- **0 5** 0.5 metre (20 in)
- **1 0** 1.0 metre (39 in)
- **5 0** 5.0 metres (16.4 feet)
- **7 0** 7.0 metres (23.0 feet)

D: Connector Option

- **0 0** No connector provided
- **0 2** Miniature ClickLoc™ coaxial connector

E: Agency Approval Option

- **0 0** Not required
- **0 5** Multiple Approvals

NOTE
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.

5.4 3300 XL NSv Proximitor Sensor

330980-AXX-BXX

A: Total Length and Mounting Option

- **5 0** 5.0 metres (16.4 feet) system length, panel mount
- **5 1** 5.0 metres (16.4 feet) system length, DIN mount
- **5 2** 5.0 metres (16.4 feet) system length, no mounting hardware
- **7 0** 7.0 metres (23.0 feet) system length, panel mount
- **7 1** 7.0 metres (23.0 feet) system length, DIN mount
- **7 2** 7.0 metres (23.0 feet) system length, no mounting hardware

Application Advisory
330980 Proximitor Sensor with A options -52 and -72 come without a mounting pad and should be ordered only as spares. Each Proximitor Sensor needs a mounting pad to ensure that it is properly isolated from the housing ground. See Section 5.6, Accessories for ordering mounting pads.

B: Agency Approval Option

- **0 0** Not required
- **0 5** Multiple approvals

5.5 3300 NSv Extension Cable

330930-AXXX-BXX-CXX

NOTE
Make sure that the extension cable length and the probe length, when added together, equal the Proximitor Sensor total length.

A: Cable Length Option

- **0 4 0** 4.0 metres (13.1 feet)
- **0 4 5** 4.5 metres (14.8 feet)
- **0 6 0** 6.0 metres (19.7 feet)
- **0 6 5** 6.5 metres (21.3 feet)

B: Connector and Cable Option

- **0 0** Without stainless steel armor
- **0 1** With stainless steel armor, with FEP jacket
- **0 2** With stainless steel armor, without FEP jacket
- **0 3** Without stainless steel armor, with connector protectors
- **0 4** With stainless steel armor, with FEP jacket, with connector protectors
- **0 5** With stainless steel armor, without FEP jacket, with connector protectors

C: Agency Approval Option

- **0 0** Not required
- **0 5** Multiple Approvals

5.6 Accessories

147357-01

Manual.

147347

Performance Specification.

175751

3300 XL Multi-Purpose Stainless Steel Housing. 12”x12”x6”

176467

3300 XL Multi-Purpose Stainless Steel Housing. 12”x8”x6”.

02120015

Bulk field wire. 1.0 mm^2 (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.

01609137

BNC (F) to banana plugs.

01609138

Proximitor Connector Test Pin wiring (two test pins to a BNC (F) connector).

40971-04

50 Ω cable with two BNC (M) connectors. Use this cable in combination with adapter 01609137 and adapter 01609138 when checking performance of the transducer system from the Proximitor Sensor test pin holes.

04310310

3300 XL Proximitor Sensor Panel-mount Screws. Package includes four 6-32 UNC thread forming mounting screws (supplied standard with 3300 XL Multi-Purpose housings when panel mount transducer option is ordered).

03200006

Silicone self-fusing tape. A 9.1-metre (10-yard) roll of easy-to-install silicone tape to protect connectors and provide excellent electrical isolation and protection from the environment. It is not recommended for use inside the casing of the machine.

40113-01

Connector Protector Kit. Connector Protector Kit for 3300 NSv probes and extension cables, including connector protectors and installation tools.

136536-01

Connector Protector Adapter. Connector Protector Adapter. Allows you to use connector protector installation tools manufactured prior to 1998 with 75Ω ClickLoc connectors.

40180-03

Connector Protectors. Package contains 10 pairs of connector protectors.

03800000

Male Connector Protector. Placed on the extension cable to connect to the female connector protector on the probe and provide environmental protection of connectors.

03800001

Female Connector Protector. Placed on the probe lead to connect to the male connector protector on the extension cable and provide environmental protection of connectors. Also placed on the extension cable to slide over the Proximitor sensor connection and protect it from the environment.

330153-01

3300 NSv Connector Kit. Used on 3300 NSv probes and extension cables. Contains one set of male and female ClickLoc connectors, sleeves and one strip of silicone tape.

163356

Connector Crimp Tool Kit. Includes one set of 75Ω ClickLoc inserts and connector installation instructions. Supplied with carrying case.