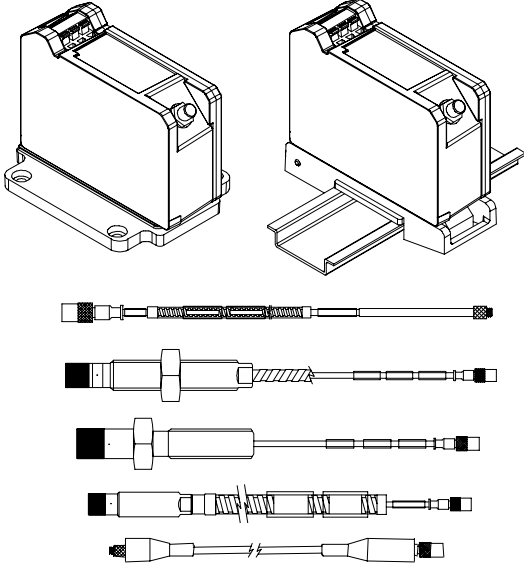


Installation Manual

Bently Nevada™ Asset Condition Monitoring



3300 XL 8mm & 3300 5mm Proximity Transducer System

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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

Best Practices Document - Proximity Probes and Related Accessories: The Installation and Application of Eddy Current Proximity Transducers.

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

Installation of Electrical Equipment in Hazardous Areas.

Considerations when using Eddy Current Proximity Probes for Overspeed Protection Applications.

“Glitch”: Definition of and Methods for Correction, Including Shaft Burnishing to Remove Electrical Runout.

Transducer Installation Accessories

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

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

Housings for Proximito[®]r Sensors and Interface Modules Data Sheet (Part Number 141599-01)

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

Electrical and Mechanical Runout

API 670, Fourth Edition, Sections 6.1.1 (Location and Orientation – Radial Shaft Vibration Probes) and 6.1.2 (Location and Orientation – Axial Position Probes). Available from the American Petroleum Institute, Publications and Distribution, 1220 L Street NW, Washington DC, 20005, USA.

Reference (133055-01)

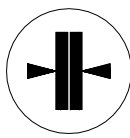
Bently Nevada Glossary.

Product Disposal Statement

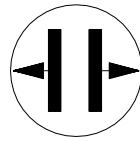
Customers and third parties, who are not member states of the European Union, who are in control of the product at the end of its life or at the end of its use, are solely responsible for the proper disposal of the product. No person, firm, corporation, association or agency that is in control of product 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.

Symbols

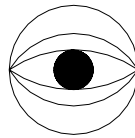
Procedures in this manual use the following symbols:



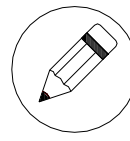
Connect



Disconnect



Observe



Record
Value

European CE mark for the Bently Nevada 3300 XL Transducer System

In this Document

is a list of the 3300 XL 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 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 Proximity Transducer System consists of a Proximito[®] Sensor, Proximity Probe, and Extension Cable.

TCF through TUV Rheinland of North America

A Technical Construction File has been prepared through TUV Rheinland of North America (TUV Rheinland File Number: P9472350.07). The Certificate of Compliance is for Directive 89/336/EEC (EMC Directive). The applicable Generic Norms are: EN50081-2 and EN50082-2.

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
1	3300 XL 8mm and 3300 5mm	330180, 330101*, 330102*, 330103*, 330104*, 330105*, 330106*, 330140, 330141, 330145, 330171, 330172, 330173, 330174, 330191, 330192, 330193, 330194, 330195, 330196, 330197, 330198, 330255, 330130, and 330190**

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

*--Pre XL probes and cables may be used as part of a CE XL system.

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

Testing and Test Levels

Title	Test Levels	Criteria (See Note 6)
EN 55011 Emissions	Emission Class A	N/A
EN 61000-4-2 ESD	4 kV; 8 kV See Note 1	A
ENV 50140 (EN61000-4-3) Radiated RFI	10 V/m See Note 2	A
ENV 50204 Radiated RFI	10 V/m See Note 3	A
EN 61000-4-4 EFT	2 kV See Note 4	B
ENV 50142 (EN61000-4-5) Surge	0.5 kV See Note 4	A
ENV 50141 (EN 61000-4-6) Conducted RFI	10 V See Note 5	B
EN 61000-4-8 Magnetic Fields	30 A/m, 50 Hz	A

Notes for the table "Testing and Test Levels"

1. Discharge method: Contact; Air
2. 80-1000 MHz sweep with 80% 1 kHz sine wave amplitude modulation
3. 900 MHz dwell with 100% 200 Hz square wave modulation
4. Lines tested: I/O
5. 150 kHz-80 MHz sweep with 80% 1 kHz sine wave amplitude modulation
6. For the purposes of the 3300 XL 8mm and 3300 5mm System CE certification, the following criteria are defined as follows:

- Criteria A: Transducer system will output less than one third of a 3mil p-p meter scale (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

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1. System Description

1.1 Transducer Systems

The 3300 XL 8 mm Proximity Transducer System consists of:

- a 3300 XL 8 mm probe
- a 3300 XL extension cable¹
- a 3300 XL Proximator® Sensor²

The 3300 XL 8 mm system represents our most advanced performance in an eddy current proximity transducer system. The standard 3300 XL 8 mm system is also 100% compliant with the American Petroleum Institute's (API) 670 Standard (4th Edition) for such transducers. All 3300 XL 8 mm Proximity Transducer Systems achieve this level of performance while allowing complete interchangeability of probe, extension cable, and Proximator Sensor without the need for individual component matching or bench calibration.

Each component of the 3300 XL 8 mm Transducer System is backward compatible and interchangeable⁴ with other non-XL 3300 series 5 and 8 mm transducer system components⁵. This includes the 3300 5 mm probe, which is used when an 8 mm probe is too large for the available mounting space^{4, 5, and 6}.

The 3300 5mm Proximity Transducer System consists of:

- a 3300 5 mm probe ^{5, 6, 7}
- a 3300 XL extension cable¹
- a 3300 XL Proximator® Sensor²

Like the 3300 XL 8mm, the 3300 5mm system also provides an accurate, stable signal output over a wide temperature range while allowing complete interchangeability of probe, extension cable, and Proximator Sensor without the need for individual component matching or bench calibration.

Both systems provide an output voltage directly proportional to the distance between the probe tip and the observed conductive surface. They are capable of both static (position) and dynamic (vibration) measurements, and are primarily used for vibration and position measurement applications on fluid-film bearing machines, as well as Keyphasor® measurement and speed measurement applications³.

1.2 Proximito[®] Sensor

The 3300 XL Proximito Sensor incorporates numerous improvements over previous designs. Its physical packaging permits high-density DIN-rail installation. It can also be mounted in a traditional panel mount configuration, where it shares an identical “footprint” to older 4-hole mounted 3300 Proximito Sensor. The mounting base for either option provides electrical isolation, eliminating the need for separate isolator plates. The 3300 XL Proximito Sensor is highly immune to radio frequency interference, allowing installation in fiberglass housings without adverse effects from nearby radio frequency signals. Improved RFI/EMI immunity allows the 3300 XL Proximito Sensor to achieve European CE mark approvals without requiring special shielded conduit or metallic housings, resulting in lower installation costs and complexity.

The 3300 XL’s SpringLoc terminal strips require no special installation tools and facilitate faster, more robust field wiring connections by eliminating screw-type clamping mechanisms that can loosen.

1.3 Proximity Probe and Extension Cable

The 3300 XL probe and XL extension cable also reflect improvements over previous designs. A patented TipLoc[™] molding method provides a more robust bond between the probe tip and the probe body. The probe’s cable is more securely attached as well, incorporating a patented CableLoc[™] design that provides 330 N (75 lbf) pull strength where the probe cable attaches to the probe tip.

3300 XL 8 mm Probes and XL Extension Cables can also be ordered with an optional FluidLoc[®] cable option. This option prevents oil and other liquids from leaking out of the machine through the cable’s interior.

1.4 Connectors

The 3300 XL 8mm and 3300 5mm probe, extension cable, and Proximito Sensor have corrosion-resistant, gold-plated ClickLoc connectors. These connectors require only finger-tight torque (connectors will “click”), and the specially engineered locking mechanism prevents the connectors from loosening. They do not require any special tools for installation or removal.

3300 XL 8 mm Probes and Extension Cables can also be ordered with connector protectors already installed. Connector protectors can also be supplied separately for installation in the field (such as when the cable must be run through restrictive conduit). Connector protectors are recommended for all installations and provide increased environmental protection⁸.

1.5 Extended Temperature Range Applications

An Extended Temperature Range (ETR) Probe and Extension Cable are available for applications where either the probe lead or extension cable may exceed the 177 °C (350 °F) temperature specification. The Extended Temperature Range Probe has an extended temperature rating for up to 260 °C (500 °F) for the probe lead and connector. The probe tip must remain below 177 °C (350 °F). The Extended Temperature Range Extension Cable is also rated for up to 260 °C (500 °F). Both the ETR probe and cable are compatible with standard temperature probes and cables. For example, you can utilize an ETR probe with the 330130 extension cable. The ETR system uses the standard 3300 XL Proximitor Sensor. When using any ETR component as part of your system, the accuracy is limited to the accuracy of the ETR system.

Notes:

1. 1-metre systems do not use an extension cable.
2. Proximitor® Sensors are supplied by default from the factory calibrated to AISI 4140 steel. Calibration to other target materials is available upon request.
3. Consult Bently Nevada Applications Note *Considerations when using Eddy Current Proximity Probes for Overspeed Protection Applications* when considering this transducer system for tachometer or overspeed measurements.
4. 3300 XL 8 mm components are both electrically and physically interchangeable with non-XL 3300 5 and 8 mm components. Although the packaging of the 3300 XL Proximitor® Sensor differs from its predecessor, it is designed to fit in the same 4-hole mounting pattern when used with the 4-hole mounting base, and will fit within the same mounting space specifications (when minimum permissible cable bend radius is observed).
5. When XL and non-XL 3300-series 5 and 8 mm system components are mixed, system performance is limited to the specifications for the non-XL 3300 5 and 8 mm Transducer System.
6. A 5 mm probe uses smaller physical packaging while providing the same linear range as a 3300 XL 8 mm probe (ref 141194-01); however, it does not permit reduced side view clearances or tip-to-tip spacing requirements compared to an XL 8 mm probe. It is used when physical (not electrical) constraints preclude the use of an 8 mm probe, such as mounting between thrust bearing pads or other constrained spaces. When narrow side view probes are required, use the 3300 XL NSv™ probe and extension cable with the 3300 XL NSv Proximitor® Sensor (refer to Specifications and Ordering Information p/n 147385-01).
7. XL 8 mm probes provide a thicker encapsulation of the probe coil in the molded PPS plastic probe tip. This results in a more rugged probe than the 3300 5 mm probe. The larger diameter of the probe body also provides a stronger, more robust case. Bently Nevada®, LLC recommends the use of XL 8 mm probes when possible to provide optimal robustness against physical abuse.
8. Silicone tape is also provided with each 3300 XL 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.

1.6 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 on page 42 for environmental specifications.

1.7 Customer Service

We maintain numerous Sales and Service offices worldwide. To locate the office nearest you, visit our website <http://www.bently.com>. Here, 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 Bently Nevada, LLC Sales sales and service office.

For general product pricing, delivery, or other ordering information, contact your local BN office or contact Customer Service Department, Minden, Nevada, USA
Phone: 1-775-215-1011 Fax: 1-775-215-2873.

For technical questions or problems regarding our 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: 1-775-215-2890

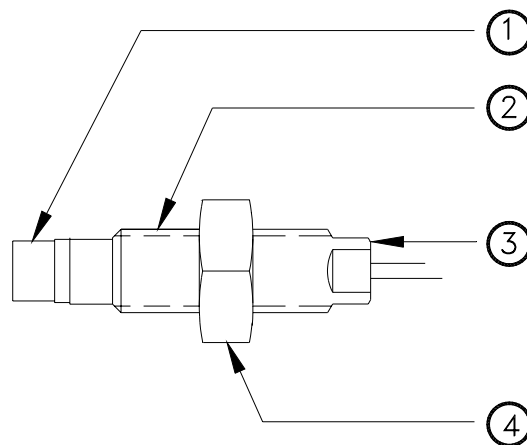
Technical Support (UK)
Phone: (44) 1925 818504 Fax: (44) 1925 817819

2. Installation

This section contains a checklist of items that you must consider when you install a 3300 XL Transducer system.

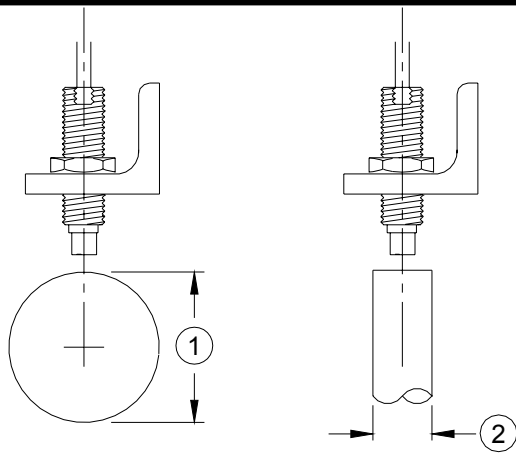
2.1 Installing the Probe

The following figures show the probe sizes and the minimum values for probe separation, side clearance and target configuration. Refer to Table 4-6 on page 41 for proper torque and the dimensions of the thread.



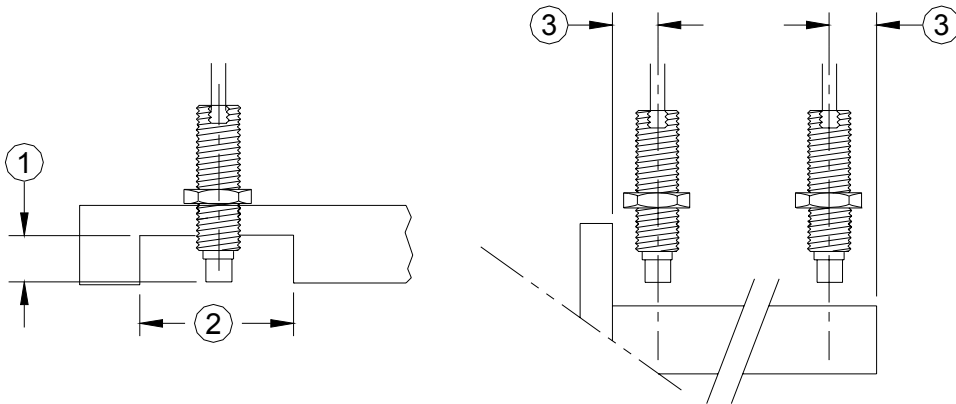
Callout	Description	XL 8 mm probe	5 mm probe
①	Probe tip	8 mm	5 mm
②	Thread types	M10x1, 3/8-24, or unthreaded	M8x1 or 1/4-28
③	Wrench Flats	8 mm or 5/16 in	7 mm or 7/32 in
④	Lock nut	17 mm or 9/16 in Hex	13 mm or 7/16 Hex

Figure 2-1: Probe Dimensions



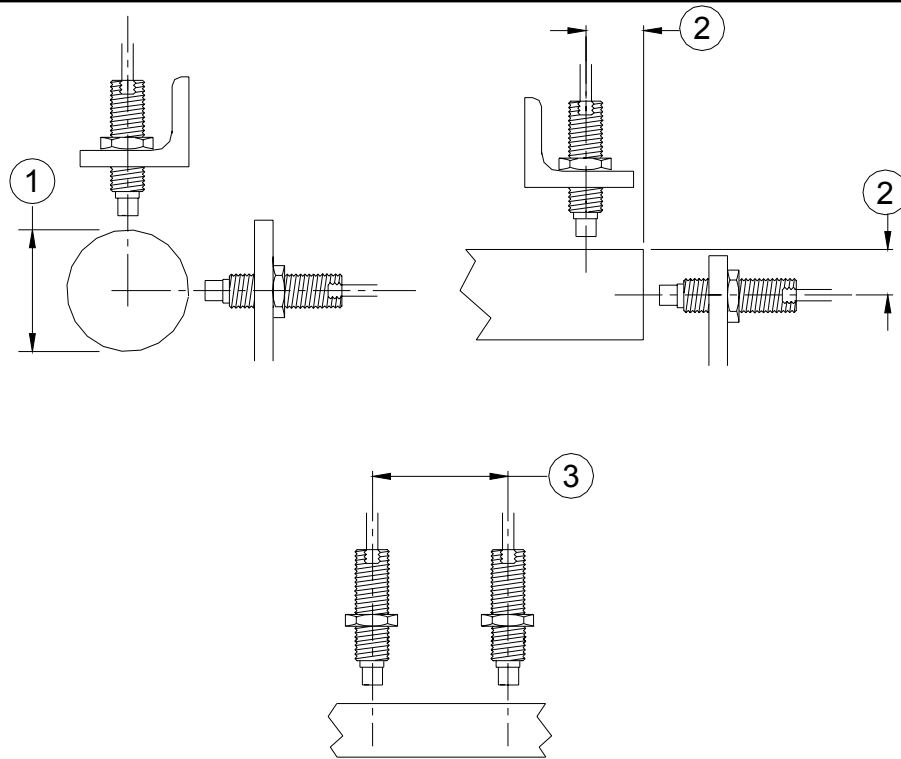
- 1. 76.2 mm (3.00 in) minimum (See Note 1 below)
- 2. 15.2 mm (0.60 in) minimum

Figure 2-2: 5mm and XL 8mm Probe Target Sizes



- 1. 6.4 mm (0.25 in) minimum
- 2. 17.8 mm (0.70 in) minimum
- 3. 8.9 mm (0.35 in) minimum

Figure 2-3: 5mm and XL 8mm Probe Mounting Dimensions



1. 50.8 mm (2.00 in) minimum (See Note 2 below)
2. 16.0 mm (0.63 in) minimum
3. 40.6 mm (1.60 in) minimum

Figure 2-4: 5mm and XL 8mm Probe-to-Probe Separation Due To Cross Talk

NOTES

1. At or below 76.2 mm (3.00 in), scale factor will increase as the target size is reduced per performance specification 159484. See the application advisory below.
2. At or below 50.8 mm (2.00 in), cross talk will produce a small vibration signal per performance specifications 159484, due to cross talk.

Application Advisory

Mounting dimensions and target size affect the scale factor of proximity transducer systems. The minimum recommended dimensions above were chosen to minimize error yet retain flexibility for different mounting situations.

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

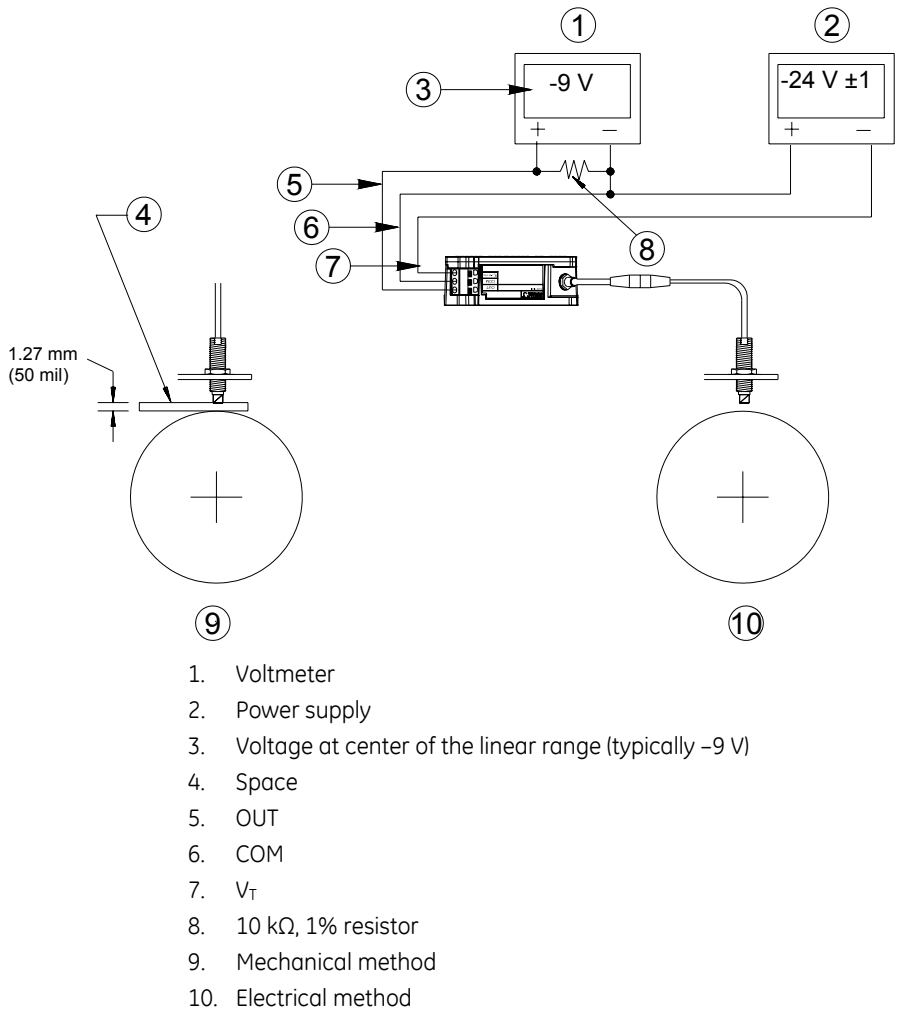
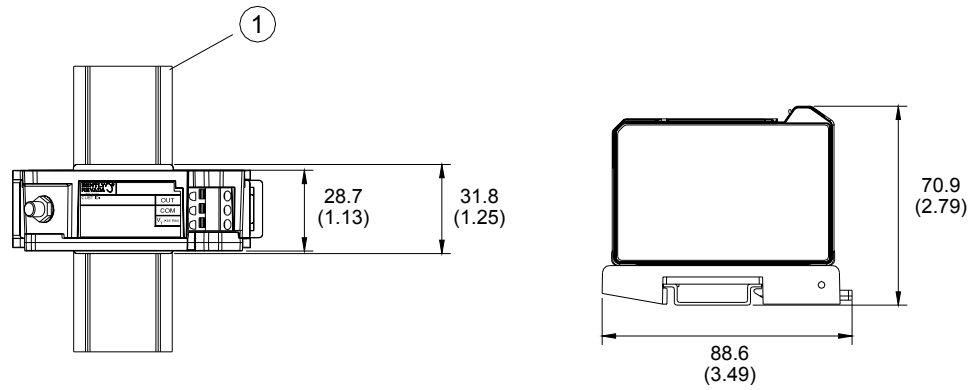


Figure 2-5: Methods for Setting the Probe Gap

2.2 Mounting the Proximator® Sensor

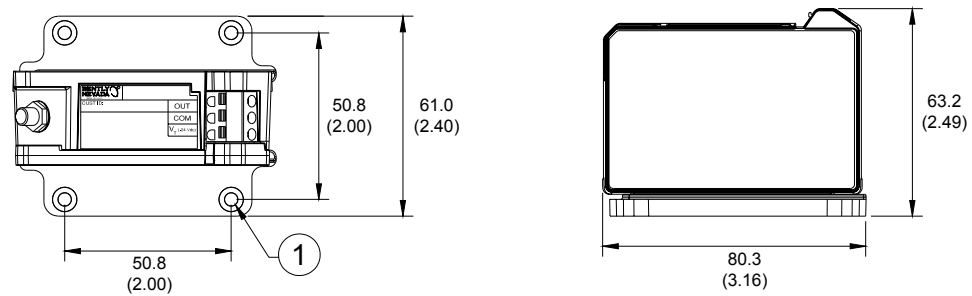
Mount the Proximator Sensor in a location that is compatible with its environmental specifications (see Environmental Limits on page 42).

Consider the local electrical codes and the presence of hazardous or explosive gas at the installation site. (Refer to the document *Installation of Electrical Equipment in Hazardous Areas.*)



1. 35mm Din Rail

Figure 2-6: DIN Rail Mount Dimensions

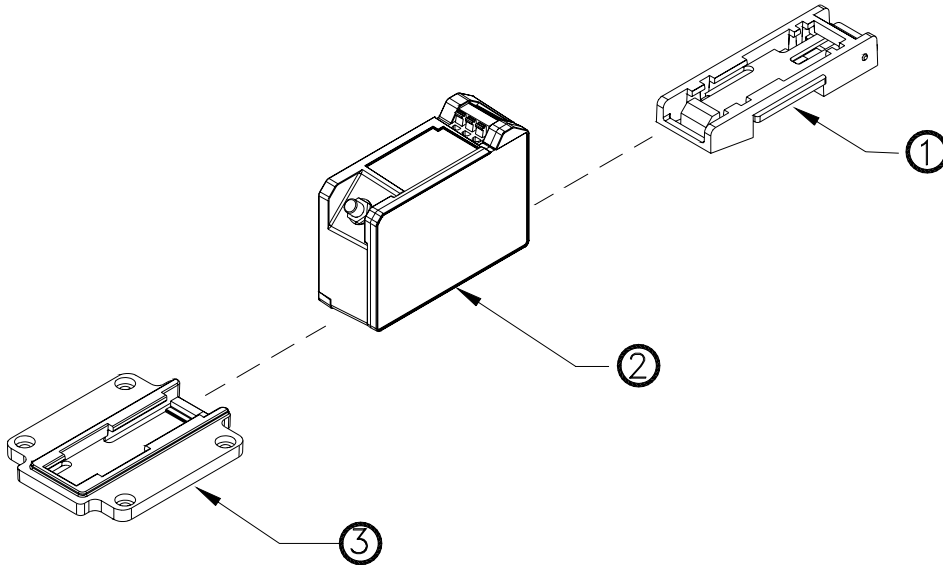


1. 4.0 mm (0.158 in) for M3.5 or #6 screw

Figure 2-7: Panel Mount Dimensions

2.3 Interchangeable Mounting Feet

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



1. DIN Mount Part (part number 138493-01)
2. 3300 XL Proximitor® Sensor
3. Panel Mount Part (part number 138492-01)

Figure 2-8: Mounting Foot Options

2.4 Mounting the Proximitor® Sensor with DIN Mount Part

To mount the 3300 XL Proximitor Sensor with a DIN Mount Part on a DIN rail:

1. Install the Proximitor Sensor into the DIN Mount Part (if not already installed) as shown in Figure 2-9.

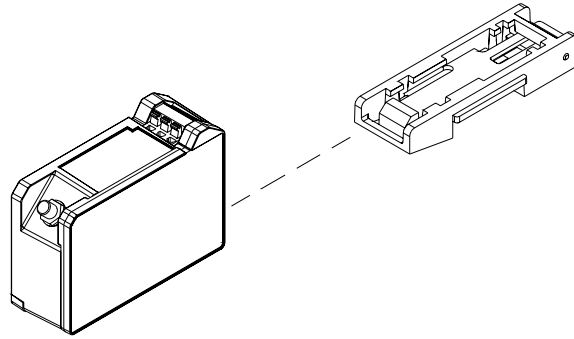
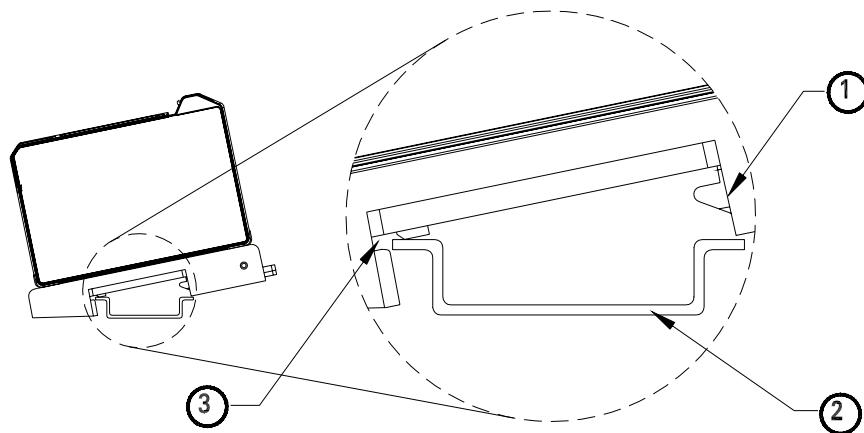


Figure 2-9: Installing the DIN Rail Mounting Foot

2. Examine the under side of the DIN Mounting Foot. This part 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 Proximity Sensor as shown in Figure 2-11 until the unit “snaps” into place. The unit is now installed.

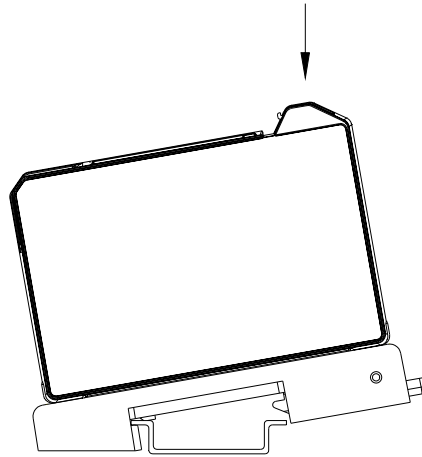


Figure 2-11: Snapping the Sensor Onto the DIN Rail

2.5 Removing the Proximito Sensor from the DIN Rail

Use a regular screwdriver to remove the Proximito 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 (see Figure 2-12). Push the top of the screwdriver towards the Proximito Sensor to pry the spring-loaded clip back so that you can remove the Proximito Sensor from the DIN rail.

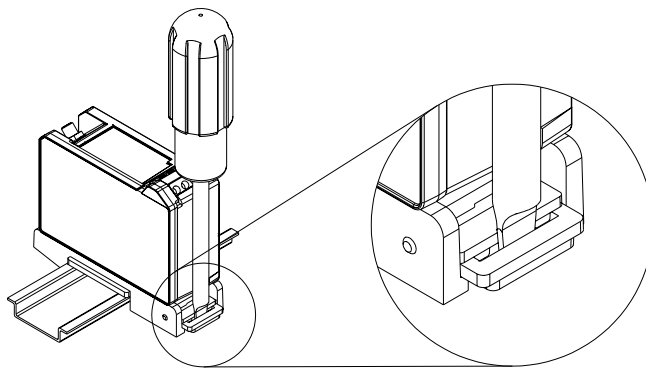


Figure 2-12: Retracting the Spring-Loaded Clip

2.6 Termination of Field Wiring in the Terminal Block

1. Strip the insulation from the field wiring you will install into the terminal block. The recommended strip length is 10 mm (0.4 in.).
2. You must twist the conductor strands together before installing the field wire into the terminal block (see Figure 2-13). We highly recommended that you tin the conductor strands as well.

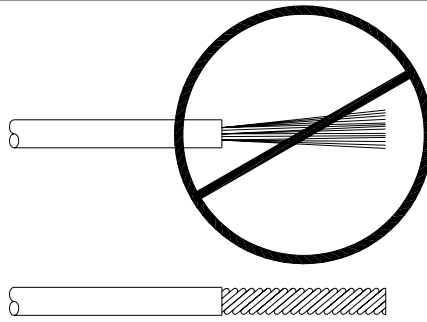


Figure 2-13: Proper Preparation of Wire Strands

3. The terminal block can accommodate field wiring conductor sizes of 0.2 – 1.5 mm² (16 – 24 AWG).
4. Use a small regular screwdriver to push down the orange lever that corresponds to the position in the terminal block where you will install the field wire and insert the field wire (see Figure 2-14).

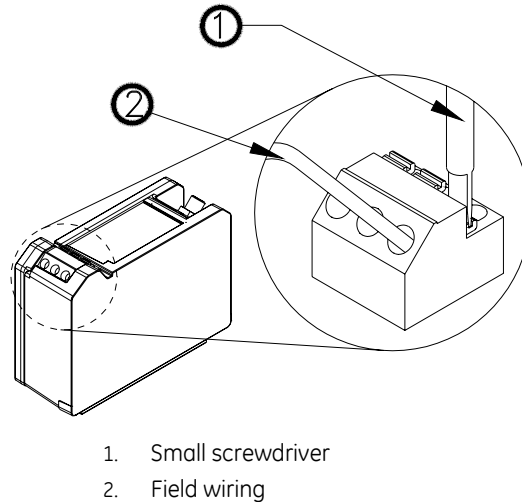


Figure 2-14: Inserting Field Wiring Into Proximator

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 the field wiring uses a stranded wire and a strand break off inside the terminal block, turn the Proximator Sensor upside down while pushing 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 equal the Proximator Sensor system length. (For example, a 9-metre Proximator Sensor will work with an 8-metre extension cable and a 1-metre probe.)

- Use the system color identification to verify component compatibility for all system components. For the 3300 XL 8 mm system and 3300 5 mm probe, components will be marked with a blue 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 insulate the connection between the probe lead and the extension cable. **Do not use self-fusing silicone tape to insulate a connection at locations that may expose the silicone tape to turbine oil.**
- 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 the documents *Guidelines for Grounding (Earthing) Bently Nevada Rotating Machinery Information System* and *Installation of Electrical Equipment in Hazardous Areas*.)

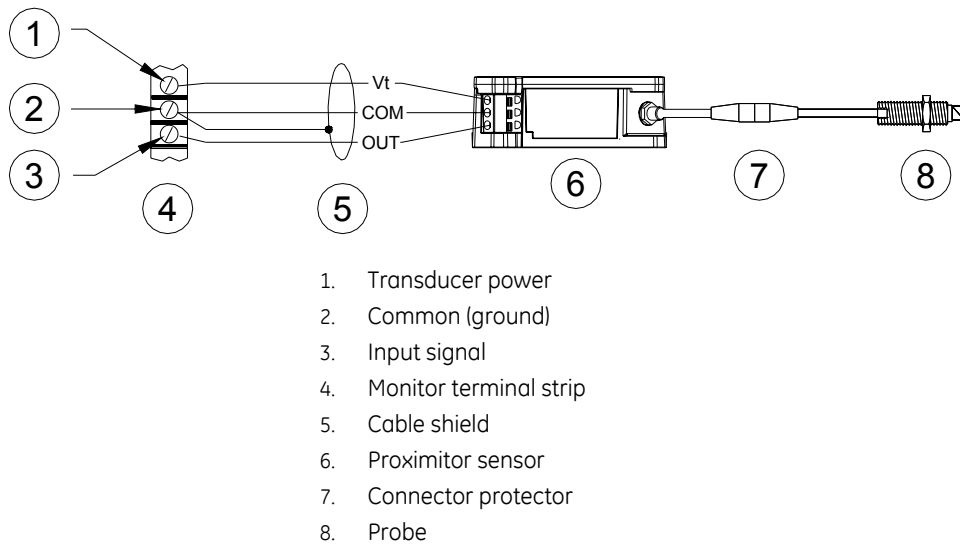
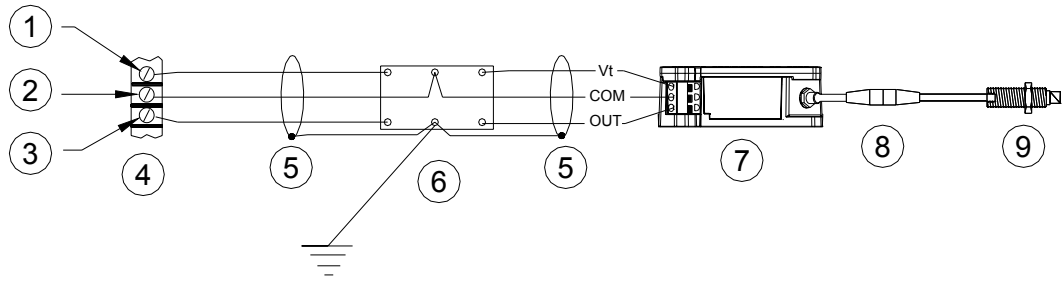


Figure 2-15: Installation With No Barriers or With 3300/3500 Internal Barriers



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

Figure 2-16: Installation With External Barriers

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 properly installed and verified the 3300 XL Transducer System (probe, cable and Proximator Sensor) does not need calibration or verification at regular intervals. If the monitor OK light (green) indicates a NOT OK condition (i.e., the light is **not** illuminated), then

- a fault has occurred in the field wiring/transducer system/power source,
- the probe is too close to target,
- the probe is detecting other material than the target,
- the target material is not AISI 4140, or
- the probe is too far from the target.

We recommend the following practices to ensure continued satisfactory operation of your 3300 XL system. Verify operation using the scale factor verification method on the following page, if you

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

Please note that a sudden 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 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 office.

NOTE

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

The scale factor verification requires the following instruments and equipment:

- Digital multimeter
- Spindle micrometer
- 10 kΩ fixed resistor
- Power supply (-24 Vdc ± 1 V)

The scale factor verification uses the test setup shown in Figure 3-1.

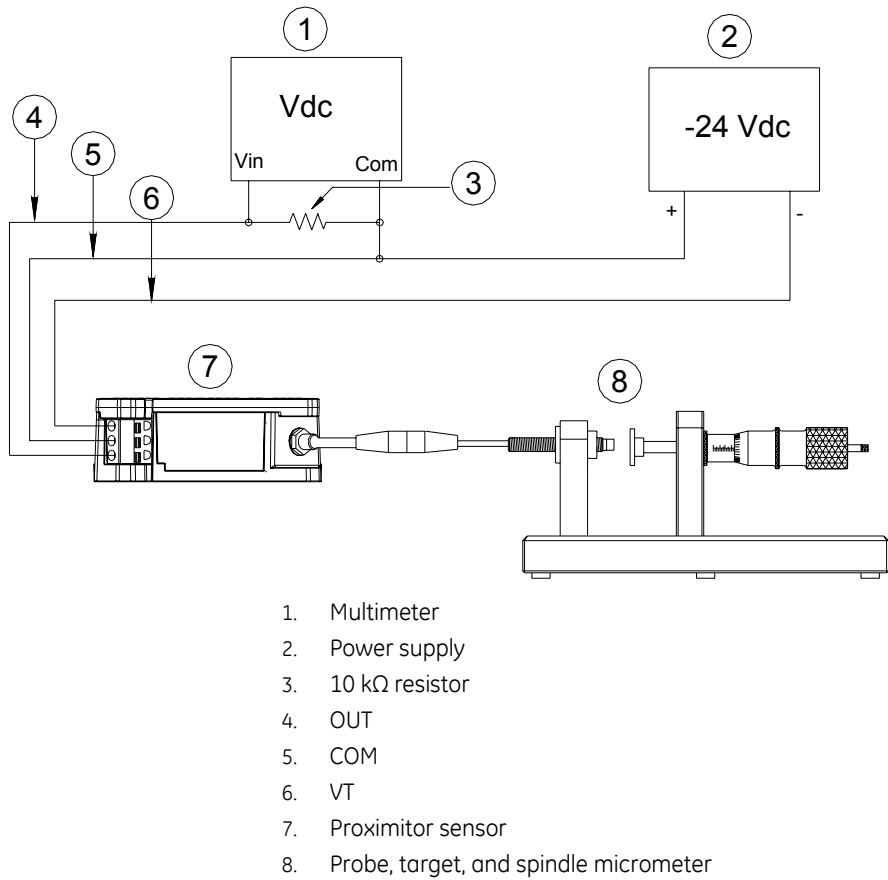
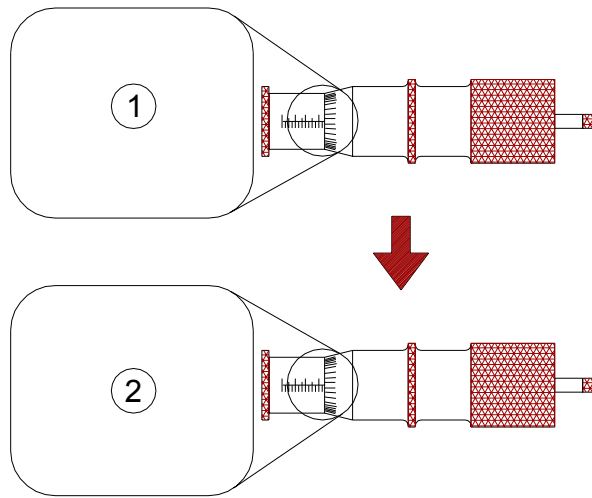


Figure 3-1: Scale Factor Verification Test Setup

3.1 Scale Factor Verification

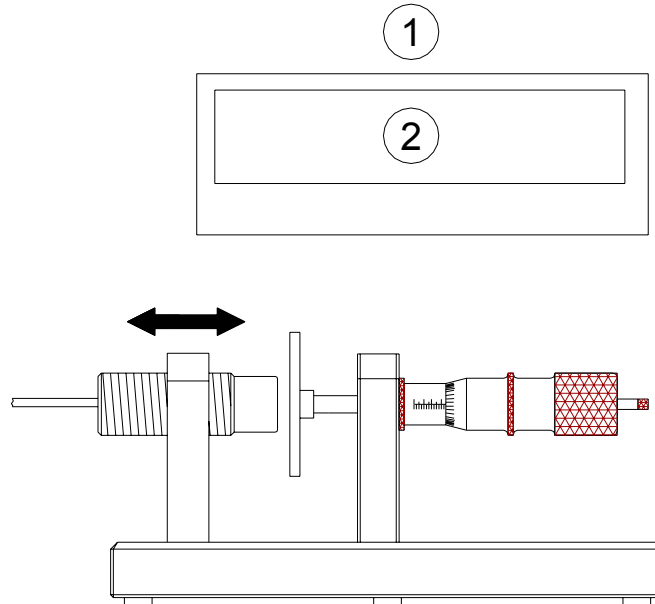
1. Compensate for mechanical backlash and adjust the spindle micrometer for electrical zero.



1. 0.46 mm (18 mils)
2. 0.50 mm (20 mils)

Figure 3-2: Adjusting Spindle Micrometer for Electrical Zero

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



1. Multimeter
2. -3.00 Vdc ± 0.1 Vdc

Figure 3-3: Adjusting Gap for Electrical Zero

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

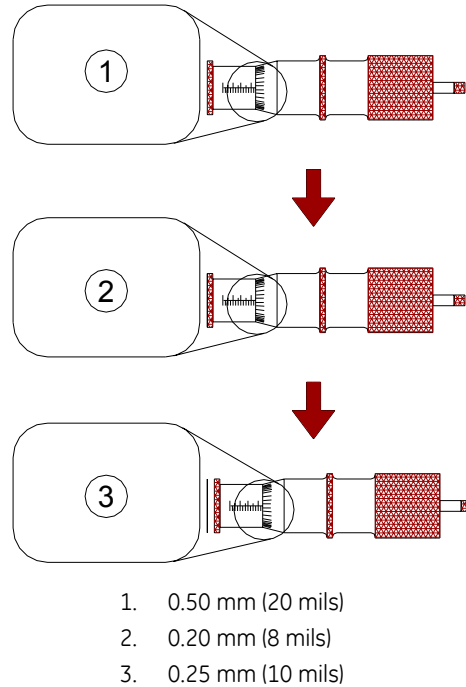


Figure 3-4: Compensating for Mechanical Backlash

4. Record voltages in Table 3-1 and calculate Incremental Scale Factors (ISFs) and Average Scale Factor (ASF) using the equations given below.

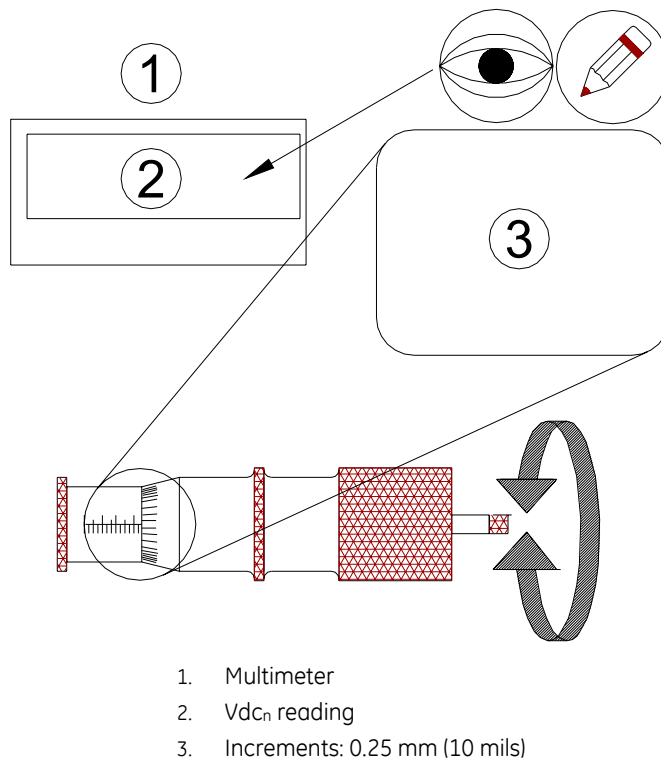


Figure 3-5: Adjusting Spindle Micrometer for Recording Voltages

Table 3-1: Table for Recording Measurement Voltages

N	Adjust Micrometer to...		Record Voltages	Calculate Scale Factor	
	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	>>	>>	>>
9	2.25	90	>>	>>	>>
>> = Enter values into these cells				ASF (Average Scale Factor)	
				>>	

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

$$ASF_{(V/mm)} = \frac{Vdc_{0.25mm} - Vdc_{2.25mm}}{2}$$

$$ISF_{n(mV/mil)} = \frac{Vdc_{n-1} - Vdc_n}{0.01}$$

$$ASF_{(mV/mil)} = \frac{Vdc_{10mil} - Vdc_{90mil}}{0.08}$$

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

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

5. Use the following formula to determine maximum Deviation from Straight Line (DSL):

$$DSL(mm) = \frac{Vdif(max) - Vdif(min)}{15.74} = \underline{\hspace{2cm}} \text{ mm}$$

$$DSL(mil) = \frac{Vdif(max) - Vdif(min)}{0.4} = \underline{\hspace{2cm}} \text{ mil}$$

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

The preceding pages indicate scale factor verification using a TK-3. This is suitable for rough verification. For API 670 system verification a more precise micrometer and target must be used. There are two different 3300 XL Micrometer Kits that you can use to verify the calibration of Bently Nevada 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 Systems. Both micrometer kits 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 average scale factor (ASF). The transducer systems also have a maximum deviation from straight line (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.

The **3300 XL Shaft Micrometer** (part number 330186) is used 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 installed the system correctly 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 given procedures 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:

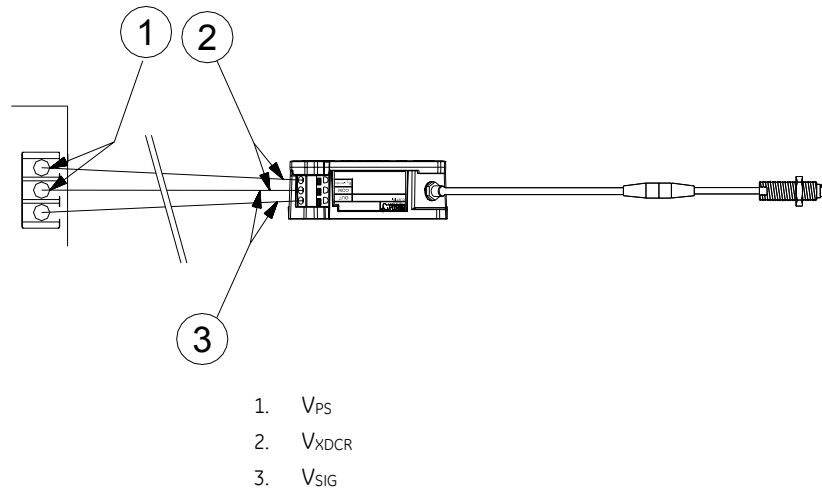


Figure 3-6: Troubleshooting Voltages

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.

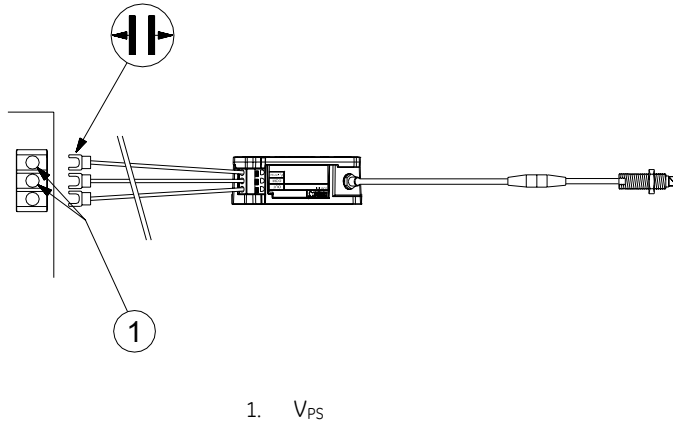
Table 3-3: Definitions

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 (or very close) to "B"	$-24.1 = -24.0$

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

Possible causes:

- Faulty power source
- Faulty field wiring
- Faulty Proximitator Sensor

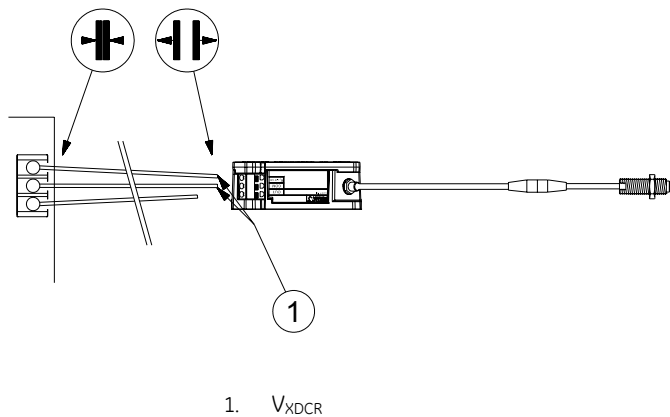


1. V_{PS}
Figure 3-7: Fault Type 1 Measurement 1

Measure V_{PS} : Is $V_{PS} > -23 \text{ Vdc}$ or $V_{PS} < -26 \text{ Vdc}$?

Yes: Faulty power supply.

No: Go to next step.



1. V_{XDCR}
Figure 3-8: Fault Type 1 Measurement 2

Measure V_{XDCR} : Is $V_{XDCR} > -23 \text{ Vdc}$ or $V_{XDCR} < -26 \text{ Vdc}$?

Yes: Faulty Field wiring.

No: Faulty Proximito Sensor.

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

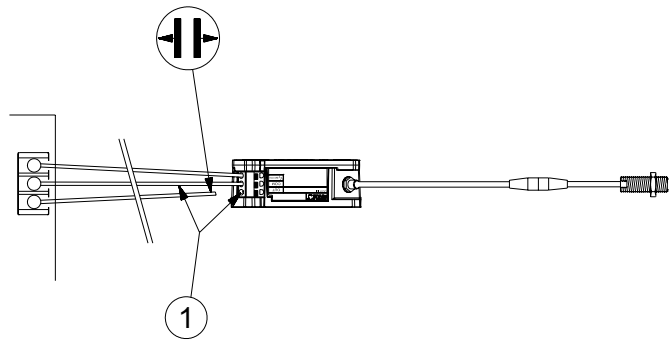
Possible causes:

- Incorrect power source voltage
- Short circuit in field wiring
- Short circuit at Proximito Sensor terminal connection
- Faulty Proximito 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 $V_{SIG} = 0 \text{ Vdc}$?

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

Yes: Faulty Proximito® Sensor.

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

Possible causes:

- Probe is incorrectly gapped (too close to target)

- Incorrect power source voltage
- Faulty Proximitior Sensor
- Probe is detecting other material than target (counter bore 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?

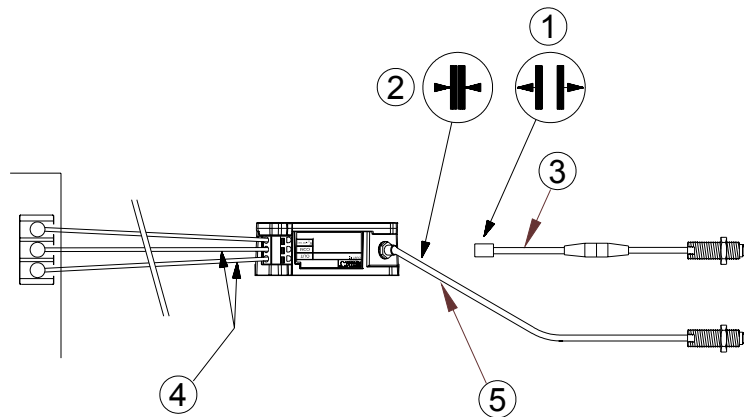
Yes: Use the procedure for fault type 1

No: Go to the next step

Is the probe gapped correctly? Are counter bore dimensions correct? (See Installing the Probe on page 5.)

No: Regap the probe or check counter bore. Retest system.

Yes Go to the next step.



1. Step 1
2. Step 2
3. Original probe extension cable
4. VSIG
5. Known good probe with correct length cable (open gap with probe held away from conductive material)

Figure 3-10: Fault Type 3 Measurement 1

Measure V_{SIG} : Is $V_{SIG} < V_{XDCR} + 1 \text{ Vdc}$?

No: Faulty Proximitior Sensor

Yes: Go to next step

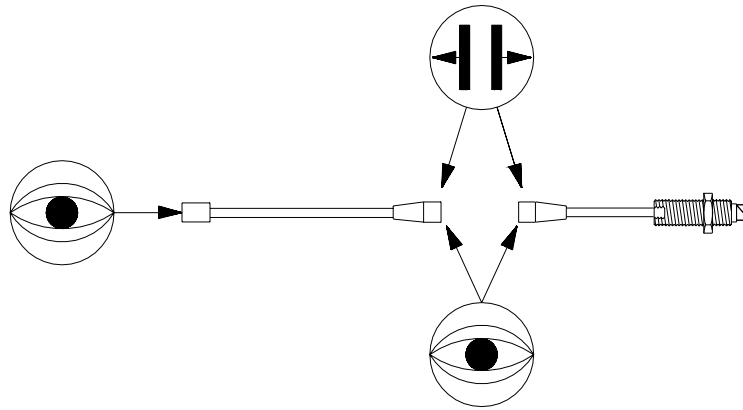
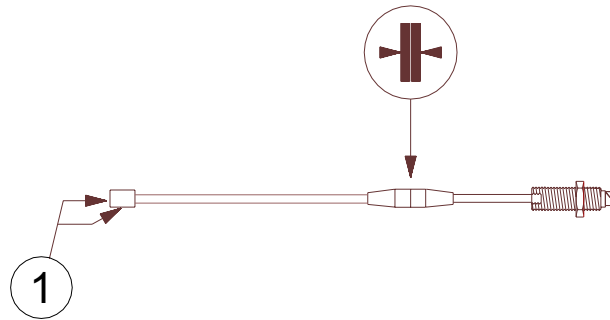


Figure 3-11: Fault Type 3 Measurement 2

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?

1 m system: Go to the next step.

5 m system: $8.75 \pm 0.70 \Omega$

9 m System: $9.87 \pm 0.90 \Omega$

Yes: Retest original system

No: Go to the next step

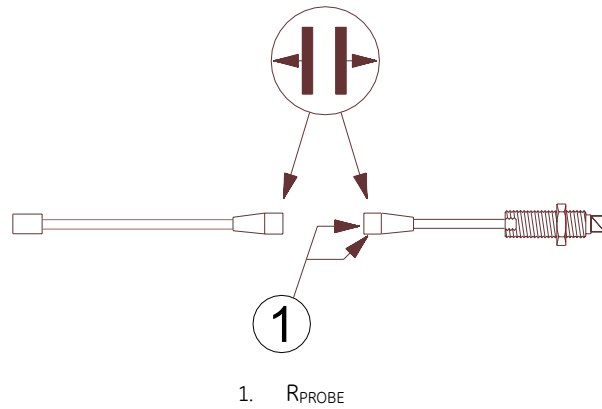


Figure 3-13: Fault Type 3 Measurement 4

Measure resistance, R_{PROBE} : Is R_{PROBE} within specifications (see Table 4-1: Probe Nominal DC Resistance (R_{PROBE}) on page 31).

No: Faulty probe

Yes: Go to next step

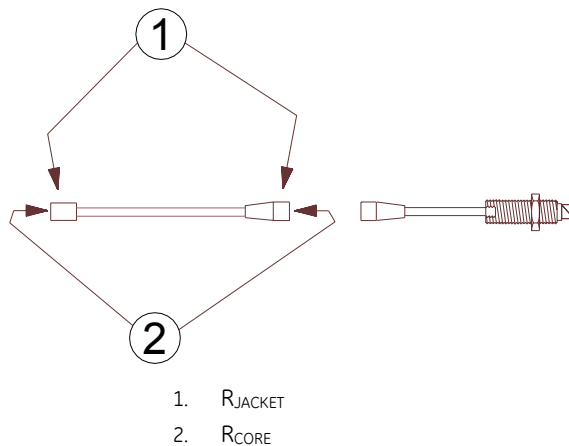


Figure 3-14: Fault Type 3 Measurement 5

Measure the resistance, R_{JACKET} and R_{CORE} : Is the resistance within specifications (see "Table 4-2: Extension Cable Nominal DC Resistance" on 32).

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:

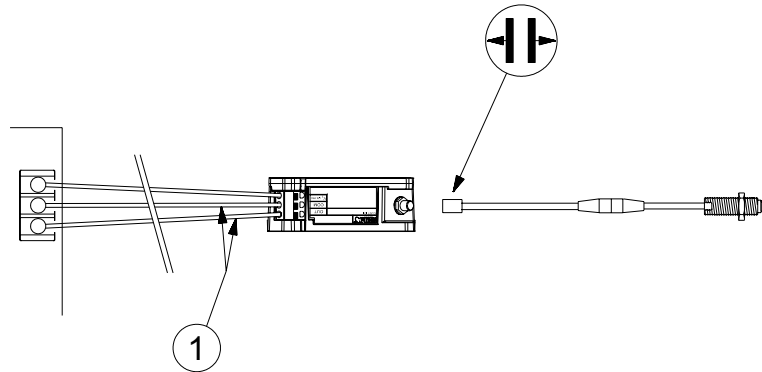
- Faulty Proximitior Sensor

- 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 Proximitior sensor

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

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

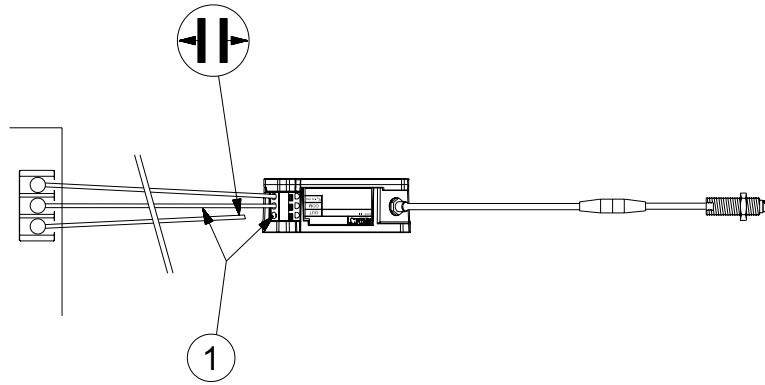
Possible causes:

- Incorrect power source voltage
- Faulty Proximitior 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 Proximity Sensor

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

Bently Nevada LLC performs failure analysis on all returned transducers that are in warranty. 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 Bently Nevada headquarters in Minden, Nevada for analysis:

Bently Nevada LLC

Attn: Product Repair Department

1631 Bently Parkway South

Minden, Nevada 89423 USA

4. System Specifications

Unless otherwise noted, the following specifications are for a 3300 XL 8/5 mm Proximator Sensor, extension cable and XL 8 mm or 3300 5 mm probe between +18 °C and +27 °C (+64 °F to +80 °F), with a -24 Vdc power supply, a 10 kΩ load, an AISI 4140 steel target, and a probe gapped at 1.27 mm (50 mils). Performance characteristics are applicable for systems that consist solely of 3300 XL 8 mm or 3300 5 mm components. 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.

4.1 Electrical

Proximator Sensor Input

Accepts one non-contacting 3300-series 5 mm, **or** 3300 XL 8 mm Proximity Probe and XL 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

Table 4-1: Probe Nominal DC Resistance (R_{PROBE})

Probe Length (Meters)	Resistance from the Center Conductor to the Outer Conductor (R_{PROBE}) (ohms)
0.5	7.45 ± 0.50
1.0	7.59 ± 0.50
1.5	7.73 ± 0.50

Probe Length (Meters)	Resistance from the Center Conductor to the Outer Conductor (R_{PROBE}) (ohms)
2.0	7.88 ± 0.50
5.0	8.73 ± 0.70
9.0	9.87 ± 0.90

Table 4-2: Extension Cable Nominal DC Resistance

Length of Extension Cable (Meters)	Resistance from Center Conductor to Center Conductor (R_{CORE}) (ohms)	Resistance from Outer Conductor to Outer Conductor (R_{JACKET}) (ohms)
3.0	0.66 ± 0.10	0.20 ± 0.04
3.5	0.77 ± 0.12	0.23 ± 0.05
4.0	0.88 ± 0.13	0.26 ± 0.05
4.5	0.99 ± 0.15	0.30 ± 0.06
7.0	1.54 ± 0.23	0.46 ± 0.09
7.5	1.65 ± 0.25	0.49 ± 0.10
8.0	1.76 ± 0.26	0.53 ± 0.11
8.5	1.87 ± 0.28	0.56 ± 0.11

Extension cable capacitance

69.9 pF/m (21.3 pF/ft) typical

Field wiring

0.2 to 1.5 mm² (16 to 24 AWG). Recommend using three-conductor shielded triad cable. Maximum length of 305 metres (1,000 feet) between the 3300 XL Proximitor Sensor and the monitor. See the frequency and phase response graphs in Figure 6-11 through Figure 6-14 for signal roll off at high frequencies when using longer field wiring lengths.

Linear Range

2 mm (80 mils). Linear range begins at approximately 0.25 mm (10 mils) from target

and is from 0.25 to 2.3 mm (10 to 90 mils) (approximately -1 to -17 Vdc).

Recommended Gap Setting

1.27 mm (50 mils)

Incremental Scale Factor (ISF)

XL 8 mm standard 5- or 1-metre system

7.87 V/mm (200 mV/mil) $\pm 5\%$ including interchangeability error when measured in increments of 0.25 mm (10 mils) over the 80 mil linear range from 0 to +45 °C (+32 °F to +113 °F).

XL 8 mm standard 9-metre system

7.87 V/mm (200 mV/mil) $\pm 6.5\%$ including interchangeability error when measured in increments of 0.25 mm (10 mils) over the 80 mil linear range from 0 to +45 °C (+32 °F to +113 °F).

3300 5 mm standard 1-, 5- and 9-metre systems

7.87 V/mm (200 mV/mil) $\pm 6.5\%$ typical, including interchangeability error when measured in increments of 0.25 mm (10 mils) over the linear range.

Extended Temperature Range (ETR) 5 and 9 metre systems

7.87 V/mm (200 mV/mil) $\pm 6.5\%$ including interchangeability error when measured in increments of 0.25 mm (10 mils) over the 80 mil linear range from 0 to +45 °C (+32 °F to +113 °F).

**Deviation from best fit
straight line (DSL)**

XL 8 mm standard 1 or
5metre system

Less than $\pm 0.025\text{mm}$ (± 1 mil) with
components at $0\text{ }^{\circ}\text{C}$ to $+45\text{ }^{\circ}\text{C}$ ($+32\text{ }^{\circ}\text{F}$ to $+113$
 $^{\circ}\text{F}$).

XL 8 mm standard
9metre system:

Less than $\pm 0.038\text{mm}$ (± 1.5 mil) with
components at $0\text{ }^{\circ}\text{C}$ to $+45\text{ }^{\circ}\text{C}$ ($+32\text{ }^{\circ}\text{F}$ to $+113$
 $^{\circ}\text{F}$).

3300 5 mm standard 1,
5 and 9metre systems

Less than $\pm 0.038\text{mm}$ (± 1.5 mil) with
components at $18\text{ }^{\circ}\text{C}$ to $27\text{ }^{\circ}\text{C}$ ($64\text{ }^{\circ}\text{F}$ to 80
 $^{\circ}\text{F}$)

Extended Temperature
Range 5 and 9metre
systems

Less than $\pm 0.038\text{mm}$ (± 1.5 mil) with
components at $0\text{ }^{\circ}\text{C}$ to $+45\text{ }^{\circ}\text{C}$ ($+32\text{ }^{\circ}\text{F}$ to $+113$
 $^{\circ}\text{F}$).

XL 8 mm and 3300 5
mm standard 1- and
5-metre system
performance over
extended temperatures

Over a probe temperature range of $-35\text{ }^{\circ}\text{C}$ to
 $+120\text{ }^{\circ}\text{C}$ ($-31\text{ }^{\circ}\text{F}$ to $+248\text{ }^{\circ}\text{F}$) with the
Proximitior Sensor and extension cable
between $0\text{ }^{\circ}\text{C}$ to $+45\text{ }^{\circ}\text{C}$ ($+32\text{ }^{\circ}\text{F}$ to $+113\text{ }^{\circ}\text{F}$), the
ISF remains within $\pm 10\%$ of 7.87 V/mm (200
 mV/mil) and the DSL remains within ± 0.076
 mm (± 3 mils).

Over a Proximitior Sensor and extension cable
temperature range of $-35\text{ }^{\circ}\text{C}$ to $+65\text{ }^{\circ}\text{C}$ ($-31\text{ }^{\circ}\text{F}$
to $+149\text{ }^{\circ}\text{F}$) with the probe between $0\text{ }^{\circ}\text{C}$ to
 $+45\text{ }^{\circ}\text{C}$ ($+32\text{ }^{\circ}\text{F}$ to $+113\text{ }^{\circ}\text{F}$), the ISF remains

within $\pm 10\%$ of 7.87 V/mm (200 mV/mil) and the DSL remains within ± 0.076 mm (± 3 mils).

XL 8 mm and 3300 5 mm standard 9 metre system performance over extended temperatures

Over a probe temperature range of -35 °C to $+120$ °C (-31 °F to $+248$ °F) with the Proximitor Sensor and extension cable between 0 °C to $+45$ °C ($+32$ °F to $+113$ °F), the ISF remains within $\pm 18\%$ of 7.87 V/mm (200 mV/mil) and the DSL remains within ± 0.152 mm (± 6 mils).

Over a Proximitor Sensor and extension cable temperature range of -35 °C to $+65$ °C (-31 °F to $+149$ °F) with the probe between 0 °C to $+45$ °C ($+32$ °F to $+113$ °F), the ISF remains within $\pm 18\%$ of 7.87 V/mm (200 mV/mil) and the DSL remains within ± 0.152 mm (± 6 mils).

Extended Temperature Range system performance over extended temperatures

Over a probe and extension cable temperature range of -35 °C to $+260$ °C (-31 °F to $+500$ °F) with the Proximitor Sensor between 0 °C to $+45$ °C ($+32$ °F to $+113$ °F), the ISF remains within $\pm 18\%$ of 7.87 V/mm (200 mV/mil) and the DSL remains within ± 0.152 mm (± 6 mils).

Frequency Response

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

Minimum Target Size

15.2 mm (0.6 in) diameter (flat target)

Shaft Diameter

Measurements on shaft diameters smaller than 50 mm (2 in) usually require close spacing of radial vibration or axial position transducers with the potential for their electromagnetic emitted fields to interact with one another (cross-talk), resulting in erroneous readings. Take care to maintain minimum separation of transducer tips, generally at least 40 mm (1.6 in) for axial position measurements or 38 mm (1.5 in) for radial vibration measurements. Radial vibration or position measurements on shaft diameters smaller than 76.2 mm (3 in) will generally change the scale factor.

Minimum

50.8 mm (2 in)

Recommended minimum

76.2 mm (3 in)

Effects of 60 Hz Magnetic Fields Up to 300 Gauss

See Table 4-3

Table 4-3: Output Voltages in mil pp/gauss

Gap	5-metre XL Proximitors Sensor	9-metre XL Proximitors Sensor	Probe	Ext. Cable
10 mil	0.0119	0.0247	0.0004	0.0004
50 mil	0.0131	0.0323	0.0014	0.0014
90 mil	0.0133	0.0348	0.0045	0.0045

Electrical Classification

Complies with the European CE mark.

Hazardous Area Approvals

NOTE
Multiple approvals for hazardous areas certified by Canadian Standards Association (CSA/NRTL/C) in North America and by Baseefa (2001) in Europe.

North America

Ex ia IIC T4/T5; Class I Zone 0 or 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.

Ex nA IIC T4/T5 Class I Zone 2 or Class I, Division 2, Groups A, B, C, and D when installed without barriers per drawing 140979.

T5 @ Ta = -35 °C to +85 °C.

T4 @ Ta = -51 °C to +100 °C.

Europe

II 1 G EEx ia IIC T4/T5. EC certificate number BAS99ATEX1101, when installed per drawing 141092.

II 3 G EEx nAII T4/T5. EC certificate number BAS99ATEX3100U, when installed per drawing 140979.

T5 @ Ta = -35 °C to +85 °C.

T4 @ Ta = -51 °C to +100 °C.

IEC Ex

*3300 XL Proximito
Sensor, ia*

IECEx BAS04.0055X

Ex ia IIC T4 / T5 (-51°C ≤ Ta ≤ +100°C / -35°C ≤ Ta ≤ +85°C)

*Terminal Block
Connections*

$U_i = -28V$ $C_i = 0$
 $I_i = 140mA$ $L_i = 10\mu H$
 $P_i = 0.84W$

*Coaxial
Connection*

$U_i = -28V$ $C_i = 5.7nF$
 $I_i = 140mA$ $L_i = 0.85mH$
 $P_i = 0.84W$

Load Parameters

The capacitance and either the inductance or the inductance to resistance (L/R) ratio of the load connected to the probe coaxial terminal, must not exceed the following values in Table 4-4

Table 4-4: Proximitor Sensor Load Parameters

Group	Capacitance μF	Inductance mH	L/R Ratio $\mu H/\Omega$
IIC	0.077	0.99	35
IIB	0.644	7.41	142
IIA	2.144	15.6	295

Installation of the XL Proximitor Sensor must minimize the risk of impact or friction with other metallic surfaces.

*3300 XL Proximitor
Sensor, nA*

IECEX BAS04.0057X

AEx nA II T4 / T5 (-51°C ≤ Ta ≤ +100°C / -35°C ≤ Ta ≤ +85°C)

The terminals must be provided with a level of protection of at least IP54.

$U_i = -28V$

3300 XL 8mm and
3300 5 mm Eddy
Current Probes, ia

IECEX BAS04.0056

AEx ia IIC Temperature Classification per
Table 4-5.

$U_i = -28V$ $C_i = 1.5nF$

$I_i = 140mA$ $L_i = 200\mu H$

$P_i = 0.84W$

3300 XL 8mm and
3300 5mm Eddy
Current Probes, nA

IECEX BAS04.0058X

Ex nA II Temperature Classification per Table
4-5.

Must be supplied from a voltage limited
source.

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

Table 4-5: Aex ia IIC Temperature Classification

Temperature Classification	Ambient Temperature (Probe Only)
T1	-51°C to +232°C
T2	-51°C to +177°C
T3	-51°C to +120°C
T4	-51°C to +80°C
T5	-51°C to +40°C

4.2 Mechanical

Probe Tip Material

Polyphenylene sulfide (PPS).

Probe Case Material

Forward Mount and
Smooth Case Probes

AISI 304 stainless steel (SST)

Reverse Mount Probes

AISI 303 SST

Probe Cable Specifications

XL 8 mm standard cable

75 Ω triaxial, fluoroethylene propylene (FEP) insulated probe cable in the following total probe lengths: 0.5, 1, 1.5, 2, 5, or 9 metres.

3300 5 mm standard
cable

75 Ω coaxial, fluoroethylene propylene (FEP) insulated probe cable in the following total probe lengths: 0.5, 1, 2, 5, or 9 metres.

**Extended Temperature
Range cable**

75 Ω triaxial, perfluoroalkoxy (PFA) insulated probe cable in the following total probe lengths: 0.5, 1, 1.5, 2, 5, or 9 metres.

Extension Cable Material

75 Ω triaxial, fluoroethylene propylene (FEP) insulated.

**Extended Temperature
Range (ETR) Extension
Cable Material**

75 Ω triaxial, perfluoroalkoxy (PFA) insulated.

Proximitior Sensor Material

A380 aluminum

System Length

5 or 9 metres including extension cable, or 1 metre.

Standard Probe and Extension Cable Armor (optional)

Flexible AISI 302 or 304 SST with FEP outer jacket.

Extended Temperature Range Probe and Extension Cable Armor (optional)

Flexible AISI 302 or 304 SST with PFA outer jacket.

XL 8 mm and ETR Tensile Strength (maximum rated)

330 N (75 lbf) probe case to probe lead. 270 N (60 lbf) at probe lead to extension cable connectors.

3300 5 mm Tensile Strength (maximum rated)

220 N (50 lbf) probe case to probe lead. 220 N (50 lbf) probe lead to extension cable connectors.

Connector material

Gold-plated brass and gold-plated beryllium copper.

Table 4-6: Probe Case Torque Specifications

Probe case torque:	Maximum Rated	Recommended
Standard forward-mounted XL 8 mm probes (3/8-24, M10x1)	33.9 N•m (300 in•lbf)	11.2 N•m (100 in•lbf)
Standard forward-mounted 3300 probes (1/4-28, M8x1)	7.3 N•m (65 in•lbf)	5.1 N•m (45 in•lbf)
Standard forward-mount XL 8 mm probes - first three threads (3/8-24, M10x1)	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)

Connector-to-connector torque

See Table 4-7 for recommended torque.

Table 4-7: Recommended Connector-to-Connector Torque

Connector Type	Tightening Instructions
Two 3300 XL gold "click" type connectors	Finger tight
One non-XL stainless steel connector and one 3300 XL connector	Finger tight plus 1/8 turn using pliers

Maximum torque

0.565 N•m (5 in•lbf)

Minimum Bend Radius

25.4 mm (1.0 in)

Total System Mass (typical)

0.7 kg (1.5 lbf)

Probe

323 g (11.4 oz)

Extension Cable

34 g/m (0.4 oz/ft)

Armored Extension cable

103 g/m (1.5 oz/ft)

Proximito Sensor

246 g (8.7 oz)

4.3 Environmental Limits

4.3.1 Probe Temperature Range

Operating and Storage Temperature

Standard probe

-51 °C to +177 °C (-60 °F to +351 °F)

Extended Temperature
Range

Probe tip

-51 °C to +177 °C (-60 °F to +351 °F)

Probe cable and
connector

-51 °C to +260 °C (-60 °F to +500 °F)

NOTE

Exposing the probe to temperatures below -34 °C (-30 °F) may cause premature failure of the pressure seal.

4.3.2 Extension Cable Temperature Range

Operating and Storage Temperature

Standard cable

-51 °C to +177 °C (-60 °F to +351 °F)

Extended Temperature
Range cable

-51 °C to +260 °C (-60 °F to +500 °F)

4.3.3 Proximitor Sensor Temperature Range

Operating Temperature

-35 °C to +85 °C (-31 °F to +185 °F)

Storage Temperature

-51 °C to +100 °C (-60 °F to +212 °F)

Relative Humidity

Less than a 3% change in Average Scale Factor (ASF) when tested in 93% humidity in accordance with IEC standard 68-2-3 for up to 56 days.

Probe Pressure

3300 XL 8 mm and 3300 5 mm probes are designed to seal differential pressure between the probe tip and case. The probe sealing material consists of a Fluorocarbon O-ring. Probes are not pressure tested 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 XL 8 mm or 3300 5 mm proximity probes. In addition, 3300 XL 8 mm or 3300 5 mm proximity probes will not be replaced under the service plan due to probe leakage.

4.4 Patents

Components or procedures described 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.

5. System Ordering Information

5.1 3300 XL 8 mm Proximity Probes

3300 XL 8 mm Probe, 3/8-24 UNF thread, without armor³
330101-AXX-BXX-CXX-DXX-EXX

3300 XL 8 mm Probe, 3/8-24 UNF thread, with armor³
330102-AXX-BXX-CXX-DXX-EXX

A: Unthreaded Length Option

Order in increments of 0.1 in

Maximum unthreaded length: 8.8 in

Minimum unthreaded length: 0.0 in

Example: 0 4 = 0.4 in

NOTE
Unthreaded length must be at least 0.8 inches less than the case length.

B: Overall Case Length Option

Order in increments of 0.1 in

Maximum case length: 9.6 in

Minimum case length: 0.8 in

Example: 2 4 = 2.4 in

C: Total Length Option

0 5	0.5 metre (1.6 feet)
1 0	1.0 metre (3.3 feet)
1 5	1.5 metres (4.9 feet)
2 0	2.0 metres (6.6 feet)
5 0	5.0 metres (16.4 feet) ¹
9 0	9.0 metres (29.5 feet)

D: Connector and Cable-Type Option

0 1	Miniature coaxial ClickLoc™ connector with connector protector, standard cable
0 2	Miniature coaxial ClickLoc connector, standard cable
1 1	Miniature coaxial ClickLoc connector with connector protector, FluidLoc® cable

1 2 Miniature coaxial ClickLoc connector, FluidLoc cable

E: Agency Approval Option

0 0 Not required

0 5 Multiple Approvals

5.2 3300 XL 8 mm Proximity Probes, Metric

3300 XL 8 mm Probe, M10 x 1 thread, without armor³

330103-AXX-BXX-CXX-DXX-EXX

3300 XL 8 mm Probe, M10 x 1 thread, with armor³

330104-AXX-BXX-CXX-DXX-EXX

A: Unthreaded Length Option

Order in increments of 10 mm.

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.

Maximum length: 250 mm

Minimum length: 20 mm

Example: 0 6 = 60 mm

C: Total Length Option

0 5 0.5 metre (1.6 feet)

1 0 1.0 metre (3.3 feet)

1 5 1.5 metres (4.9 feet)

2 0 2.0 metres (6.6 feet)

5 0 5.0 metres (16.4 feet)¹

9 0 9.0 metres (29.5 feet)

D: Connector and Cable-Type Option

0 1 Miniature coaxial ClickLoc connector with connector protector, standard cable

0 2 Miniature coaxial ClickLoc connector, standard cable

- 1 1** Miniature coaxial ClickLoc connector with connector protector, FluidLoc cable
- 1 2** Miniature coaxial ClickLoc connector, FluidLoc cable

E: Agency Approval Option

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

5.3 3300 XL 8 mm Reverse Mount Probes

3/8-24 UNF Threads³

330105-02-12-CXX-DXX-EXX

M10 x 1 Threads³

330106-05-30-CXX-DXX-EXX

C: Total Length Option

- 0 5** 0.5 metre (1.6 feet)
- 1 0** 1.0 metre (3.3 feet)
- 1 5** 1.5 metre (4.9 feet)
- 2 0** 2.0 metres (6.6 feet)
- 5 0** 5.0 metres (16.4 feet)¹
- 9 0** 9.0 metres (29.5 feet)

D: Connector Option

- 0 2** Miniature ClickLoc coaxial connector
- 1 2** Miniature ClickLoc coaxial connector, FluidLoc cable

NOTE

The FluidLoc cable options -10 and -12 are not necessary on the vast majority of 330105 and 330106 installations due to the presence of the probe sleeve. Consider carefully the application before ordering the FluidLoc cable options

E: Agency Approval Option

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

5.4 3300 XL 8 mm Proximity Probes, Smooth Case

3300 XL 8 mm Probe without armor²

330140-AXX-BXX-CXX-DXX

3300 XL 8 mm Probe with armor²

330141-AXX-BXX-CXX-DXX

A: Overall Case Length Option

Order in increments of 0.1 in

Maximum length: 9.6 in

Minimum length: 0.8 in

Example: 2 4 = 2.4 in

B: Total Length Option

0 5 0.5 metre (1.6 feet)

1 0 1.0 metre (3.3 feet)

1 5 1.5 metres (4.9 feet)

2 0 2.0 metres (6.6 feet)

5 0 5.0 metres (16.4 feet)¹

9 0 9.0 metres (29.5 feet)

C: Connector and Cable-Type Option

0 1 Miniature coaxial ClickLoc connector with connector protector, standard cable

0 2 Miniature coaxial ClickLoc connector, standard cable

1 1 Miniature coaxial ClickLoc connector with connector protector, FluidLoc cable

1 2 Miniature coaxial ClickLoc connector, FluidLoc cable

D: Agency Approval Option

0 0 Not required

0 5 Multiple Approvals

5.5 3300 XL 8 mm Extended Temperature Range (ETR) Proximity Probes

3300 XL 8 mm ETR Probe, 3/8-24 UNF thread, without armor

330191-AXX-BXX-CXX-DXX

3300 XL 8 mm ETR Probe, 3/8-24 UNF thread, with armor

330192-AXX-BXX-CXX-DXX

A: Unthreaded Length Option

Order in increments of 0.1 in

Maximum unthreaded length: 8.8 in

Minimum unthreaded length: 0.0 in

Example: 1 5 = 1.5 in

NOTE
Unthreaded length must be at least 0.8 inches less than the case length.

B: Overall Case Length Option

Order in increments of 0.1 in

Maximum case length: 9.6 in

Minimum case length: 0.8 in

Example: 2 5 = 2.5 in

C: Total Length Option

- 0 5 0.5 metre (1.6 feet)
- 1 0 1.0 metre (3.3 feet)
- 1 5 1.5 metre (4.9 feet)
- 2 0 2.0 metres (6.6 feet)
- 5 0 5.0 metres (16.4 feet)¹
- 9 0 9.0 metres (29.5 feet)

D: Agency Approval Option

- 0 0 Not required
- 0 5 Multiple Approvals

5.6 3300 XL 8 mm Extended Temperature Range (ETR) Proximity Probes, Metric

3300 XL 8 mm Probe, M10 x 1 thread, without armor
330193-AXX-BXX-CXX-DXX

3300 XL 8 mm Probe, M10 x 1 thread, with armor
330194-AXX-BXX-CXX-DXX

A: Unthreaded Length Option

Order in increments of 10 mm.

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.

Maximum length: 250 mm

Minimum length: 20 mm

Example: 0 6 = 60 mm

C: Total Length Option

0 5 0.5 metre (1.6 feet)

1 0 1.0 metre (3.3 feet)

1 5 1.5 metres (4.9 feet)

2 0 2.0 metres (6.6 feet)

5 0 5.0 metres (16.4 feet)¹

9 0 9.0 metres (29.5 feet)

D: Agency Approval Option

0 0 Not required

0 5 Multiple Approvals

5.7 3300 XL 8 mm Extended Temperature Range (ETR) Reverse Mount Probes

3/8-24 UNF Threads

330195-02-12-CXX-DXX

M10 x 1 Threads

330196-05-30-CXX-DXX

C: Total Length Option

0 5 0.5 metre (1.6 feet)

1 0 1.0 metre (3.3 feet)

1 5 1.5 metre (4.9 feet)

2 0 2.0 metres (6.6 feet)

5 0 5.0 metres (16.4 feet)¹

9 0 9.0 metres (29.5 feet)

D: Agency Approval Option

0 0 Not required

0 5 Multiple Approvals

5.8 3300 XL 8 mm Extended Temperature Range (ETR) Proximity Probes, Smooth Case

3300 XL 8 mm Probe without armor²
330197-AXX-BXX-CXX

3300 XL 8 mm Probe with armor²
330198-AXX-BXX-CXX

A: Overall Case Length Option

Order in increments of 0.1 in

Maximum length: 9.6 in

Minimum length: 0.8 in

Example: 3 5 = 3.5 in

B: Total Length Option

0 5 0.5 metre (1.6 feet)

1 0 1.0 metre (3.3 feet)

1 5 1.5 metres (4.9 feet)

2 0 2.0 metres (6.6 feet)

5 0 5.0 metres (16.4 feet)¹

9 0 9.0 metres (29.5 feet)

C: Agency Approval Option

0 0 Not required

0 5 Multiple Approvals

5.9 3300 5 mm Proximity Probes

3300 5 mm Probe, 1/4-28 UNF thread, without armor
330171-AXX-BXX-CXX-DXX-EXX

3300 5 mm Probe, 1/4-28 UNF thread, with armor
330172-AXX-BXX-CXX-DXX-EXX

A: Unthreaded Length Option

Order in increments of 0.1 in

Maximum unthreaded length: 8.8 in

Minimum unthreaded length: 0.0 in

Example: 0 4 = 0.4 in

NOTE

Unthreaded length must be at least 0.8 inches less than the case length.

B: Overall Case Length Option

Order in increments of 0.1 in

Maximum case length: 9.6 in

Minimum case length: 0.8 in

Example: 2 4 = 2.4 in

C: Total Length Option

0 5 0.5 metre (1.6 feet)

1 0 1.0 metre (3.3 feet)

2 0 2.0 metres (6.6 feet)

5 0 5.0 metres (16.4 feet)¹

9 0 9.0 metres (29.5 feet)

D: Connector and Cable-Type Option

0 1 Miniature coaxial ClickLoc connector with connector protector, standard cable

0 2 Miniature coaxial ClickLoc connector, standard cable

E: Agency Approval Option

0 0 Not required

0 5 Multiple Approvals

5.10 3300 5 mm Proximity Probes, Metric

3300 5 mm Probe, M8 x 1 thread, without armor

330173-AXX-BXX-CXX-DXX-EXX

3300 5 mm Probe, M8 x 1 thread, with armor

330174-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.

Maximum length: 250 mm

Minimum length: 20 mm

Example: 0 6 = 60 mm

C: Total Length Option

0 5 0.5 metre (1.6 feet)

1 0 1.0 metre (3.3 feet)

2 0 2.0 metres (6.6 feet)

5 0 5.0 metres (16.4 feet)¹

9 0 9.0 metres (29.5 feet)

D: Connector and Cable-Type Option

0 1 Miniature coaxial ClickLoc connector with connector protector, standard cable

0 2 Miniature coaxial ClickLoc connector, standard cable

E: Agency Approval Option

0 0 Not required

0 5 Multiple Approvals

5.11 3300 XL Proximity Sensor

330180-AXX-BXX

A: Total Length and Mounting Option

1 0 1.0 metre (3.3 feet) system length, panel mount

1 1 1.0 metre (3.3 feet) system length, DIN mount

1 2 1.0 metre (3.3 feet) system length, no mounting hardware

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

9 0 9.0 metres (29.5 feet) system length, panel mount

9 1 9.0 metres (29.5 feet) system length, DIN mount

9 2 9.0 metres (29.5 feet) system length, no mounting hardware

B: Agency Approval Option

0 0 Not required

5.12 3300 XL Extension Cable

330130-AXXX-BXX-CXX

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

Option Descriptions

A: Cable Length Option

030	3.0 metres (9.8 feet)
035	3.5 metres (11.5 feet)
040	4.0 metres (13.1 feet)
045	4.5 metres (14.8 feet)
070	7.0 metres (22.9 feet)
075	7.5 metres (24.6 feet)
080	8.0 metres (26.2 feet)
085	8.5 metres (27.9 feet)

B: Connector Protector and Cable Option

00	Standard cable
01	Armored cable
02	Standard cable with connector protectors
03	Armored cable with connector protectors
10	FluidLoc cable
11	Armored FluidLoc cable
12	FluidLoc cable with connector protectors
13	Armored FluidLoc cable with connector protectors

C: Agency Approval Option

00	Not required
05	Multiple Approvals

5.13 3300 XL Extended Temperature Range (ETR) Extension Cable

330190-AXXX-BXX-CXX

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

A: Cable Length Option

0 3 0	3.0 metres (9.8 feet)
0 3 5	3.5 metres (11.5 feet)
0 4 0	4.0 metres (13.1 feet)
0 4 5	4.5 metres (14.8 feet)
0 7 0	7.0 metres (22.9 feet)
0 7 5	7.5 metres (24.6 feet)
0 8 0	8.0 metres (26.2 feet)
0 8 5	8.5 metres (27.9 feet)

B: Cable Option

0 0	Standard cable
0 1	Armored cable

C: Agency Approval Option

0 0	Not required
0 5	Multiple Approvals

5.14 Mounting Brackets

5.14.1 Aluminum Probe Clamp Bracket

The aluminum clamp bracket is an unthreaded mounting bracket designed for use with the smooth case probes (330140, 330141, 330197 and 330198). After gapping the probe, tighten the clamp bracket by tightening the screws. The mounting screws have pre-drilled holes for safety wire.

Order Number 137491-AXX

A: Mounting Screw Option

0 1	10-24 UNC-2A mounting screws
------------	------------------------------

5.14.2 Aluminum probe threaded mounting bracket

The aluminum probe threaded mounting bracket is the standard mounting bracket for most 3300 and 3300 XL probe installations. The -01 and -02 options are supplied with two 10-24 UNC-2A mounting screws. The -03 and -04 options are supplied with two M5 x 0.8-6g mounting screws. The mounting screws have pre-drilled holes for safety wire.

Order Number 137492-AXX

A: Thread Size

01	3/8-24
02	1/4-28
03	M8 x 1
04	M10 x 1

5.14.3 Phenolic threaded probe mounting bracket

We recommend the phenolic threaded mounting bracket if your installation requires additional electric isolation from the mounting location (as in some generator and electrical motor bearing locations). The -01 and -02 options are supplied with two 10-24 UNC-2A mounting screws. The -03 and -04 options are supplied with two M5 x 0.8-6g mounting screws. The mounting screws have pre-drilled holes for safety wire.

Order Number 27474-AXX

A: Thread Size

01	3/8-24
02	1/4-28
03	M8 x 1
04	M10 x 1

5.15 Accessories

141078-01

Manual

175751

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

176467

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

02120015

Bulk field wire. 1.0 mm² (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.

148722-01

3300 XL Test Plug. The 3300 XL Test Plug is contains three small test pins attached to three color-coded wires 1 metre in length, each terminated in a banana plug. The three-pin adapter plugs into the test pin holes on 3300 XL-style Proximitor Sensors. It is used to check the performance of the Proximitor Sensor from the test pin holes in the terminal strip without requiring the removal of the field wiring.

04310310

3300 XL Proximitor Sensor Panel-mount Screw. Package includes one 6-32 UNC thread forming mounting screw. (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 silicone tape to protect connectors. It is easy to install and provides excellent electrical isolation and protection from the environment. It is not recommended for use inside the casing of the machine.

40113-02

Standard Connector Protector Kit. Connector Protector Kit for 3300 XL 8 mm probes and extension cables, including connector protectors and installation tools.

40113-03

5 mm/NSv Connector Protector Kit. Connector Protector Kit for 3300 5 mm probes, including connector protectors and installation tools.

136536-01

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

40180-02

Standard Connector Protectors. Package contains 10 pairs of connector protectors for 3300 XL 8 mm probes and 3300 XL extension cables.

40180-03

5 mm/NSv Connector Protectors. Package contains 10 pairs of connector protectors for 3300 5 mm probes.

03839410

Standard Connector Protector - Male. Male connector protectors are installed onto the 3300 XL extension cable and attach to the female connector protector on the probe, providing environmental protection of connectors.

03839420

Standard Connector Protector - Female. Female connector protectors are installed onto the 3300 XL probe lead and attach to the male connector protector on the 3300 XL extension cable, providing environmental protection of connectors. Also placed on the 3300 XL extension cable to slide over the connection to the Proximitor® Sensor and protect it from the environment.

03800001

5mm/NSv Connector Protector - Female. Placed onto 3300 5 mm probe leads; attaches to the male connector protector on the extension cable to provide environmental protection of connectors.

04301007

3/8-24 Probe Lock Nut with safety wire holes. Single probe lock nut with two holes drilled through the nut in order to secure the lock nut in place with safety wire.

04301008

M10 x 1 Probe Lock Nut with safety wire holes. Single probe lock nut with two holes drilled through the nut in order to secure the lock nut in place with safety wire.

330153-01

3300 XL Connector Kit. Used on 3300 XL 8 mm probes and 3300 XL extension cables. Contains one pair of male and female ClickLoc connectors, two color-coded sleeves, two pieces of slit FEP tubing, and one strip of silicone tape.

330153-04

3300 5 mm Connector Kit. Used on 3300 5 mm probes. Contains one male ClickLoc connector, one color-coded sleeve, one piece of slit FEP tubing, and one strip of silicone tape.

330153-09

3300 XL ETR Connector Kit. Used on ETR 3300 XL 8 mm probes and 3300 ETR XL extension cables. Contains one pair of male and female ClickLoc connectors, two color-coded sleeves, two pieces of high temperature slit FEP tubing, and one strip of silicone tape.

163356

Connector Crimp Tool Kit. Includes one set of multiconnector inserts and connector installation instructions. Compatible only with 330153 connector kits or with probes shipped in 2003 or later with ClickLoc connectors uninstalled. Supplied with carrying case.

Notes:

1. 5-metre probes are designed for use with the 5-metre Proximity Sensor only.
2. Mounting clamps must be ordered separately for 330140, 330141, 330197, and 330198.
3. For a shorter delivery time, order commonly stocked probes. Currently, stocked probes consist of the following part numbers:

330101-00-08-05-02-00, 330101-00-08-05-02-05, 330101-00-08-10-02-00,
 330101-00-08-10-02-05, 330101-00-12-10-02-00, 330101-00-12-10-02-05,
 330101-00-16-10-02-00, 330101-00-16-10-02-05, 330101-00-20-05-02-00,
 330101-00-20-10-02-00, 330101-00-20-10-02-05, 330101-00-30-10-02-00,
 330101-00-30-10-02-05, 330101-00-40-05-02-00, 330101-00-40-10-02-00,
 330101-00-40-10-02-05, 330101-00-60-10-02-00, 330101-00-60-10-02-05,
 330102-00-20-10-02-00, 330103-00-02-10-02-05, 330103-00-03-10-02-05,
 330103-00-04-10-02-00, 330103-00-04-50-02-00, 330103-00-05-10-02-00,
 330103-00-06-10-02-00, 330104-00-06-10-02-00, 330104-01-05-50-02-00,
 330105-02-12-05-02-00, 330105-02-12-05-02-05, 330105-02-12-10-02-00,
 330105-02-12-10-02-05, 330106-05-30-05-02-00, 330106-05-30-05-02-05,
 330106-05-30-10-02-00 and 330106-05-30-10-02-05.

6. System Graphs and Dimensional Drawings

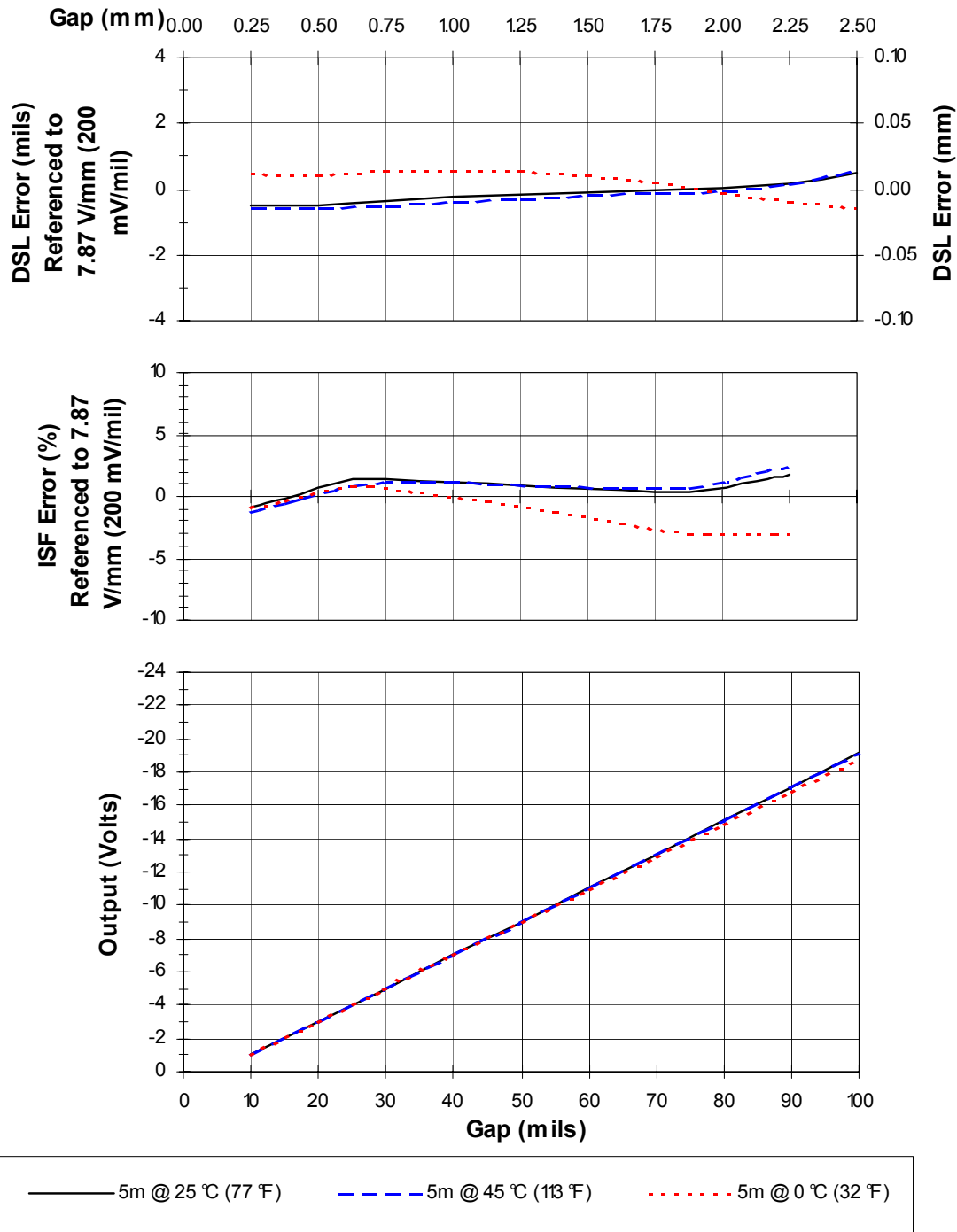


Figure 6-1: Typical 3300 XL 8mm 5m or 1m System over API 670 Testing Range

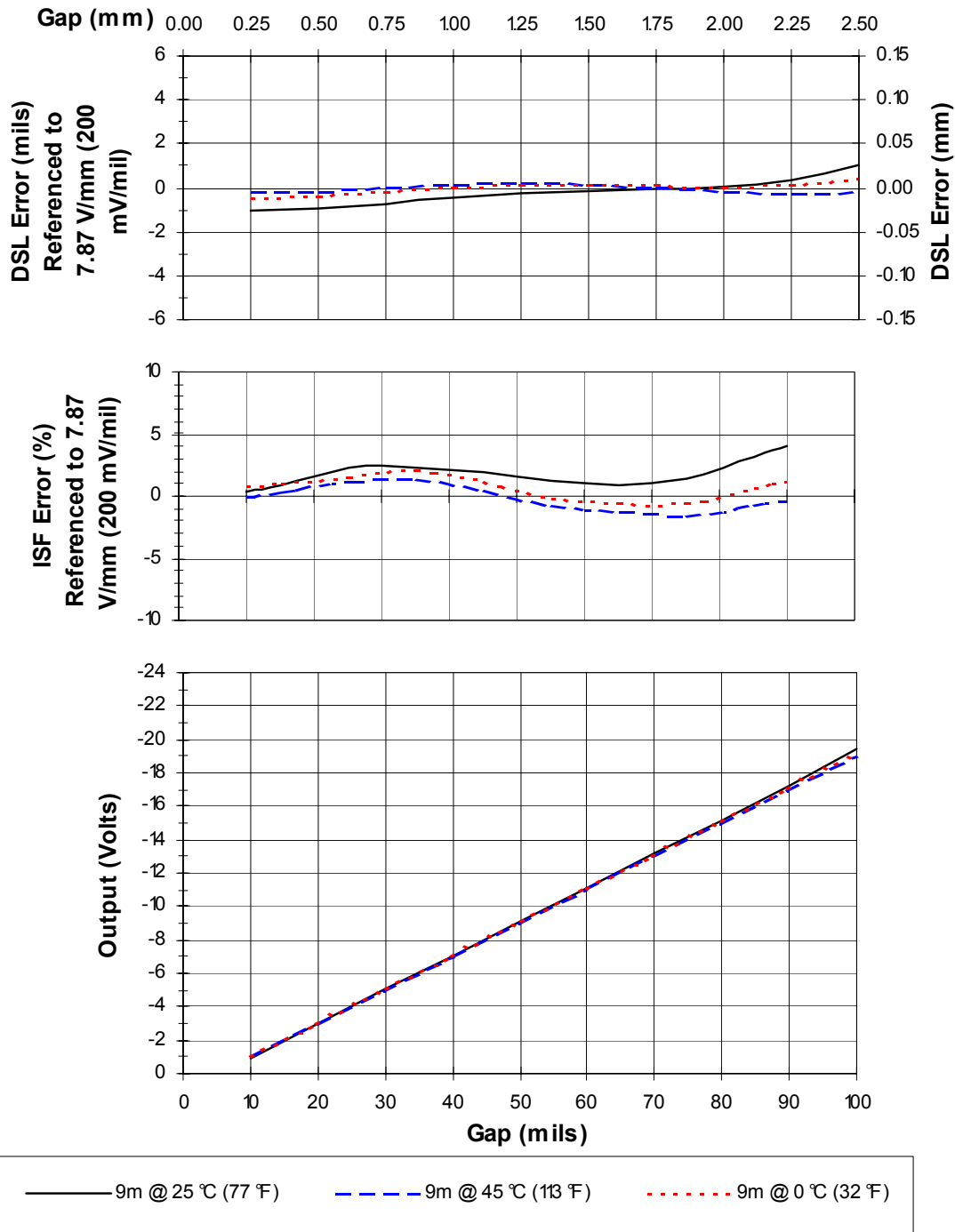


Figure 6-2: Typical 3300 XL 8mm 9m System over API 670 Testing Range

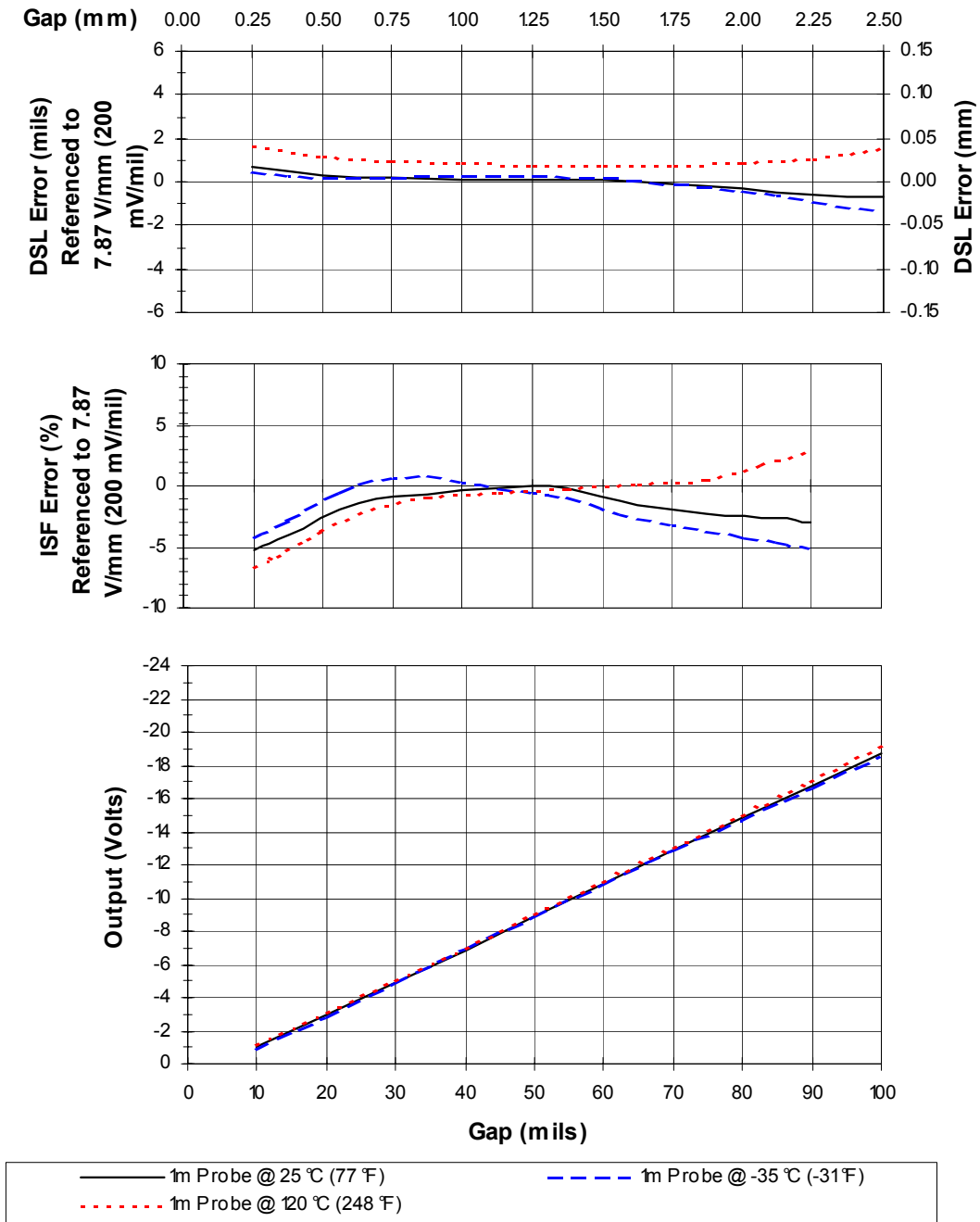


Figure 6-3: Typical 3300 XL 8mm Probe over API 670 Operating Range

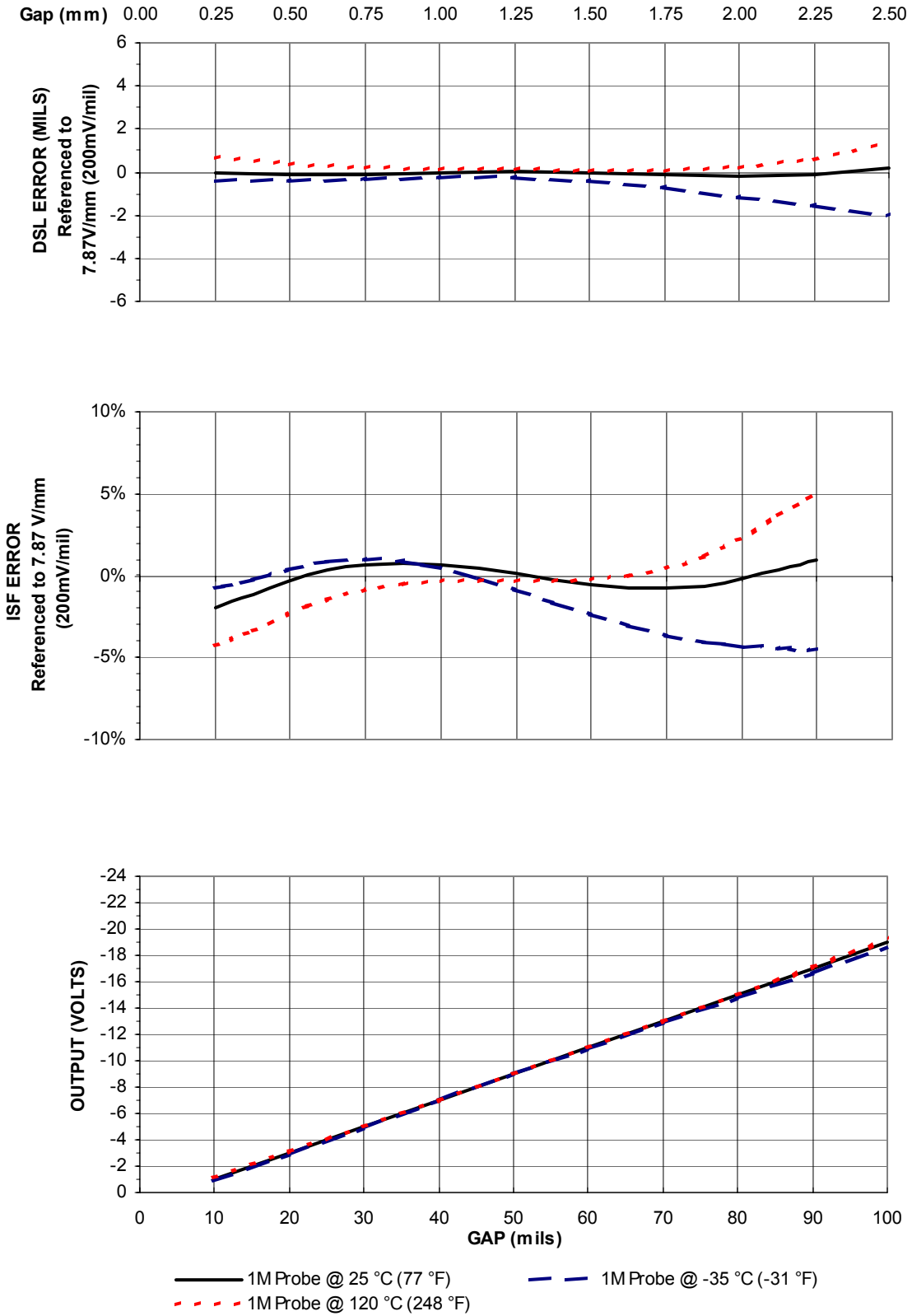


Figure 6-4: Typical 3300 5mm Probe over API 670 Operating Range

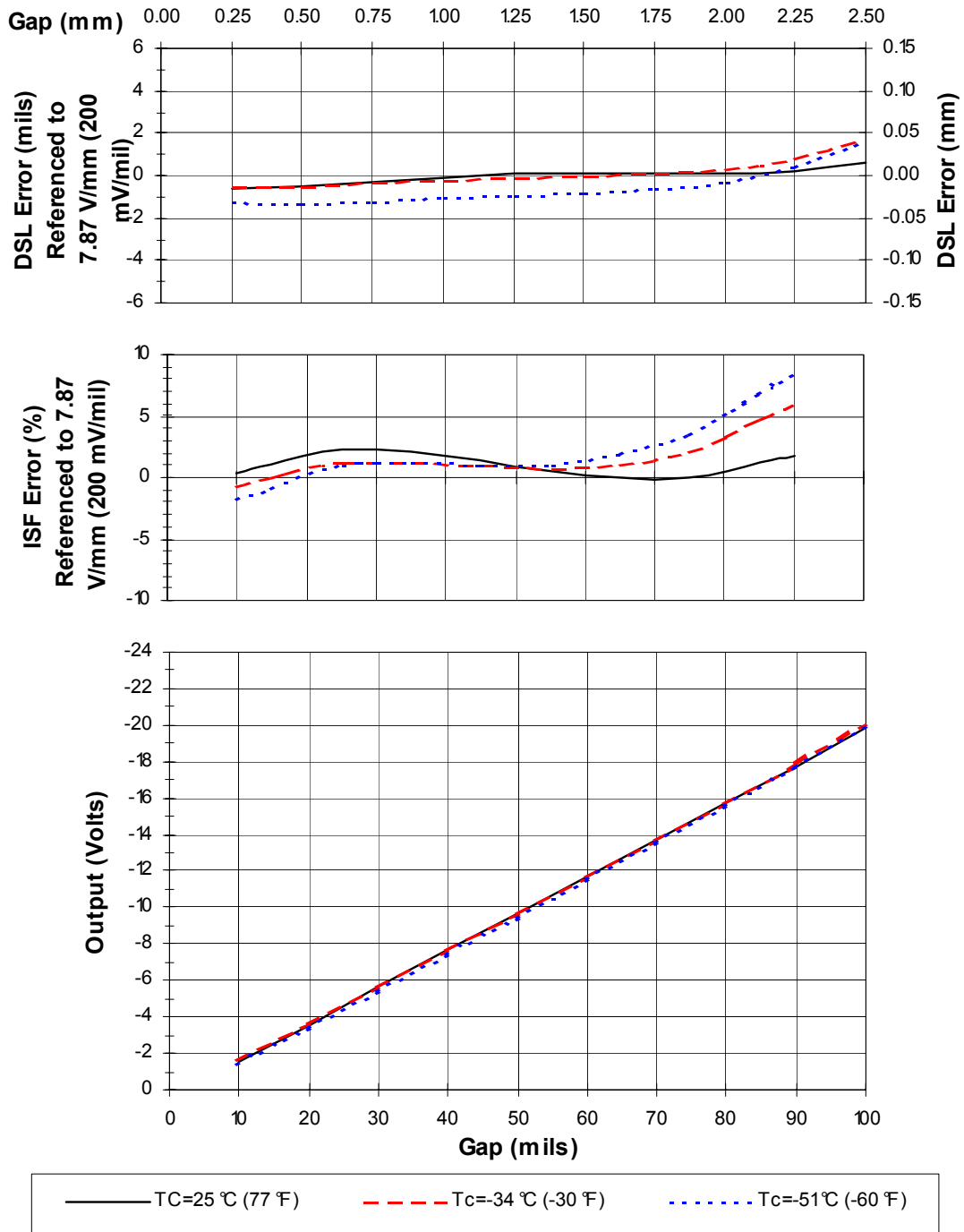


Figure 6-5: Typical 3300 XL 8mm 5m Proximitior Sensor with 4m Extension Cable @ Tc (Probe is at 25 °C)

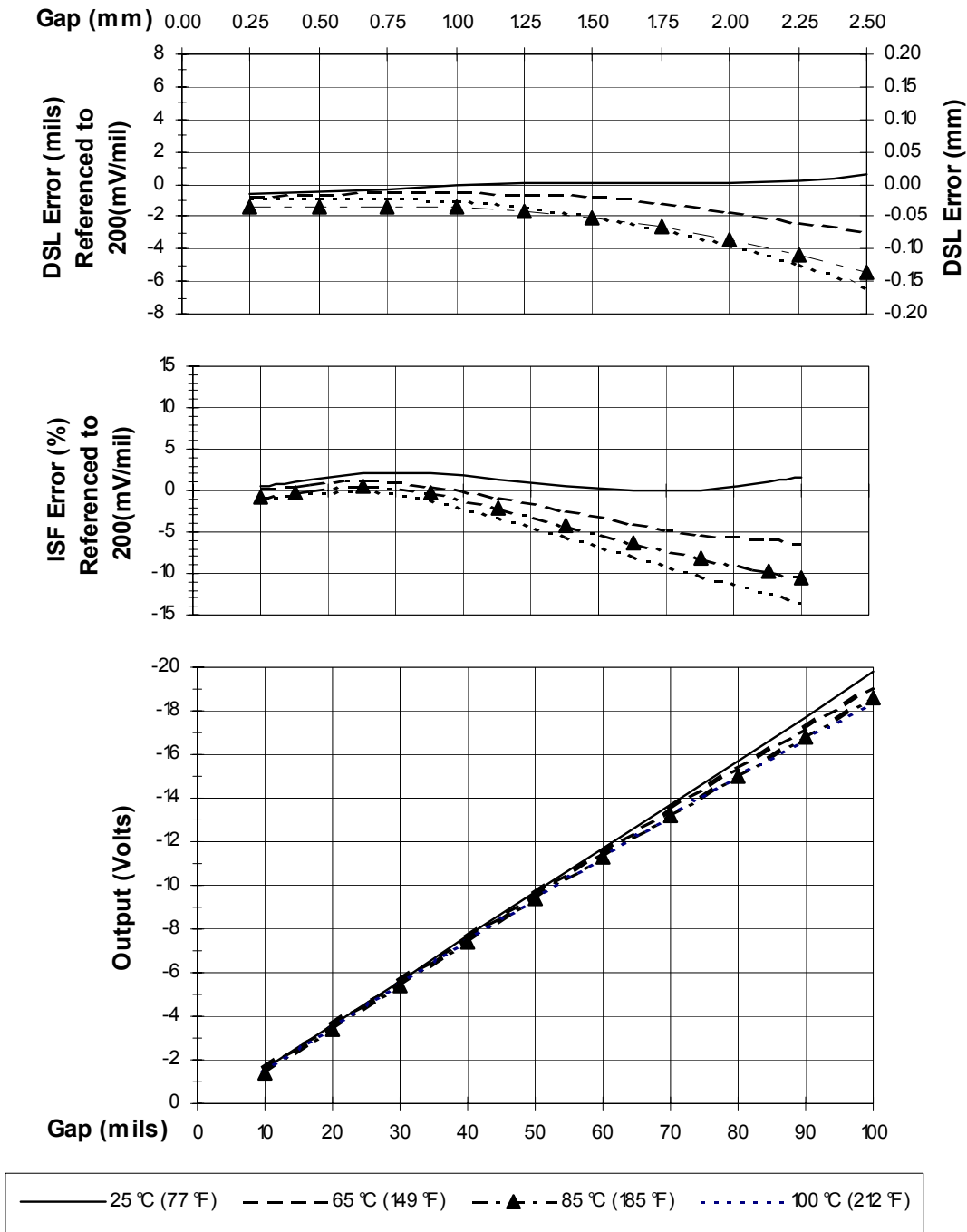


Figure 6-6: Typical 3300 XL 8mm 5m Proximitor Sensor with 4m Extension Cable @ Th (Probe is at 25°C)

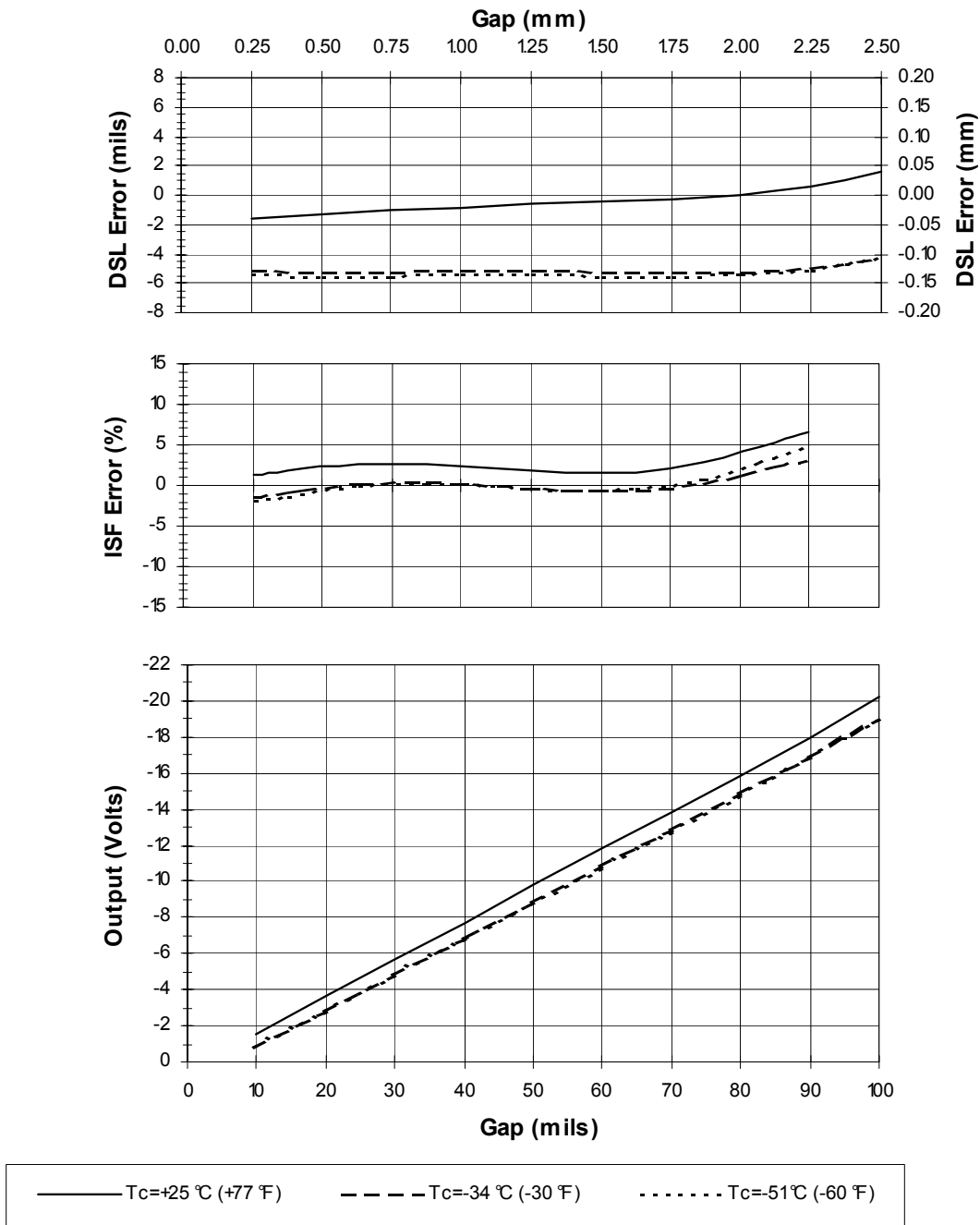


Figure 6-7: Typical 3300 XL 8mm 9m Proximity Sensor with 8m Extension Cable @ Tc (Probe is at 25 °C)

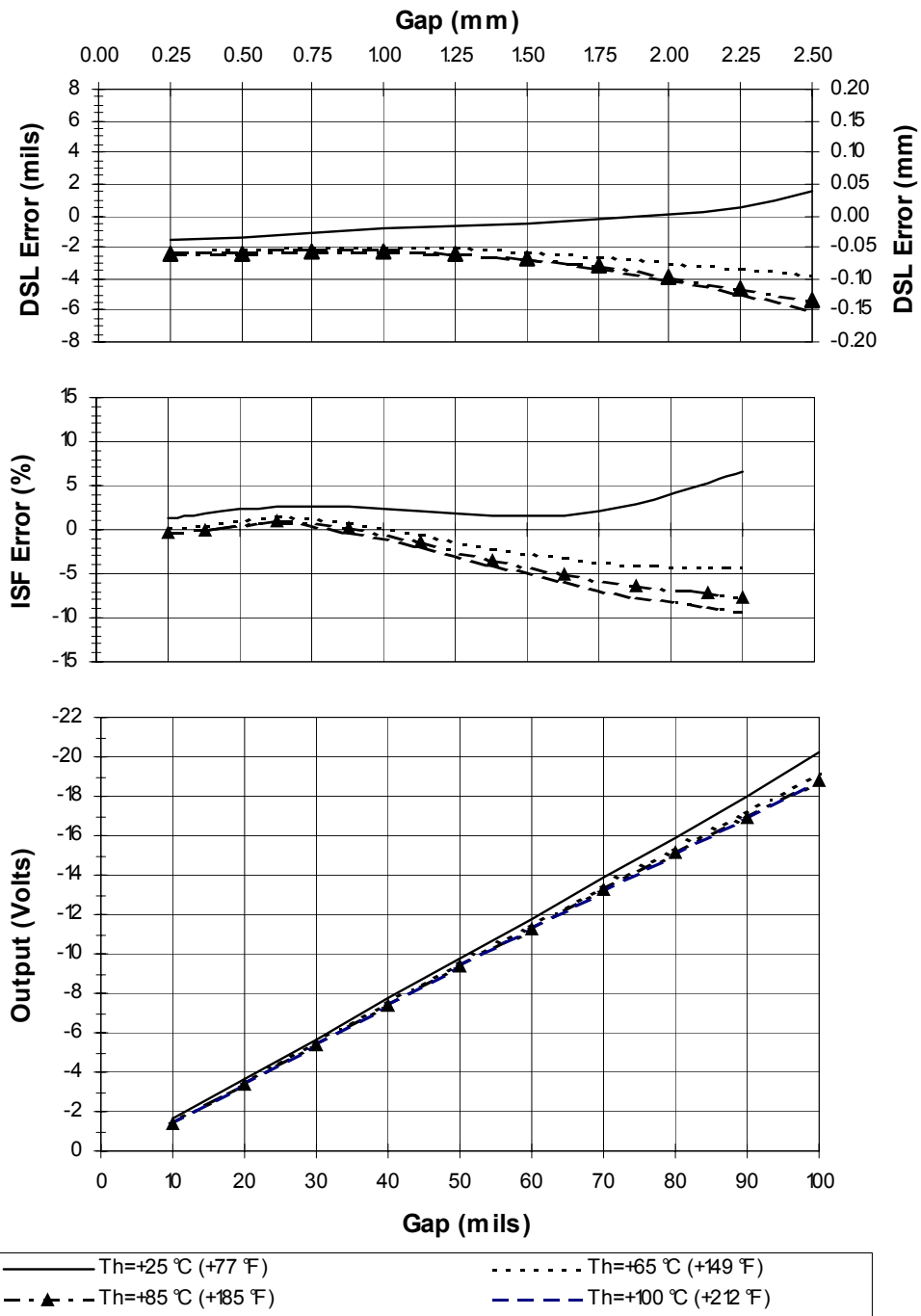


Figure 6-8: Typical 3300 XL 8mm 9m Proximitor Sensor with 8m Extension Cable @ Th (Probe is at 25 °C)

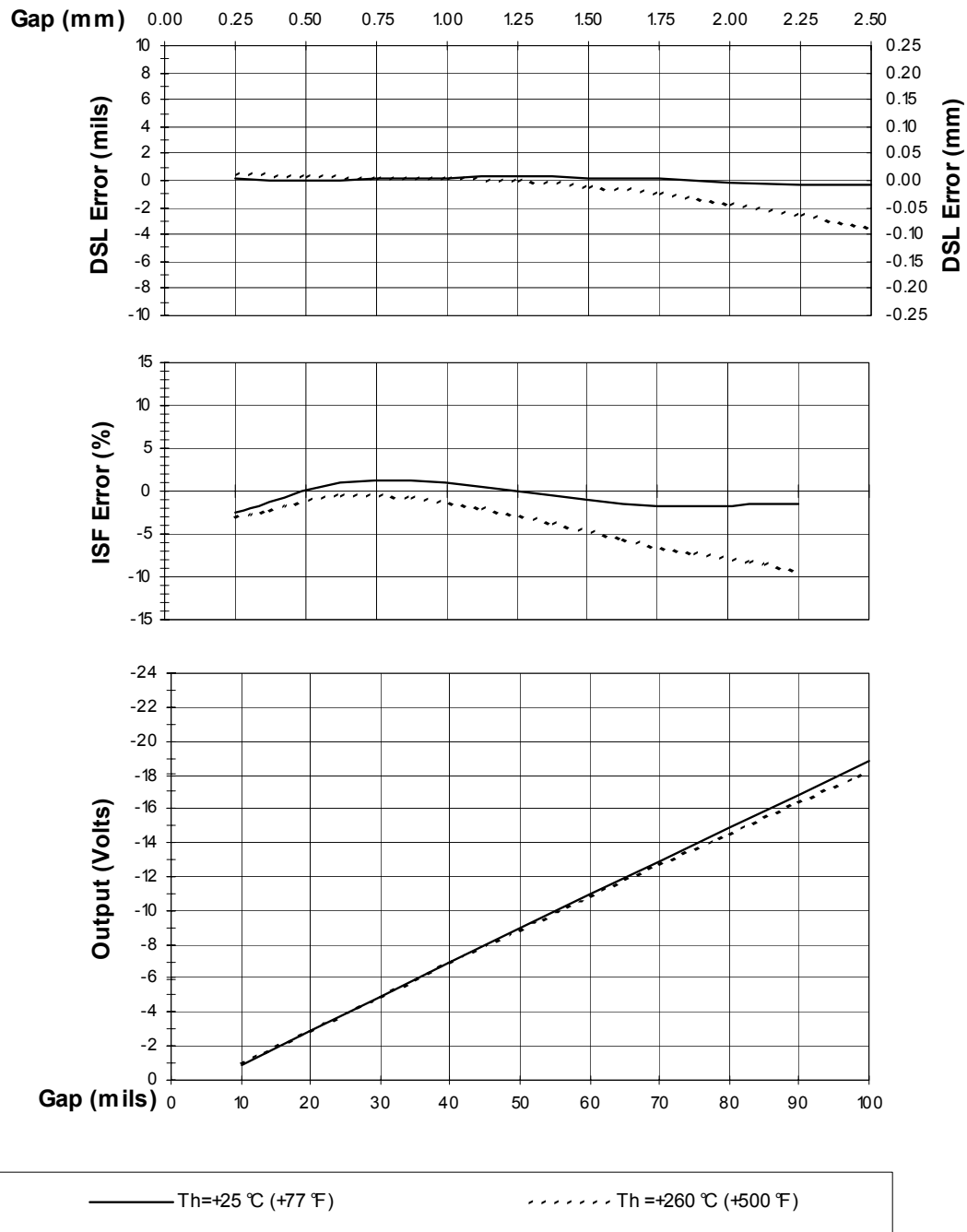


Figure 6-9: Typical 3300 XL Extended Temperature Range Probe and 4m Extended Temperature Range Extension Cable @ Th (Proximito Sensor and probe tip with 1 foot of cable are at +25 °C)

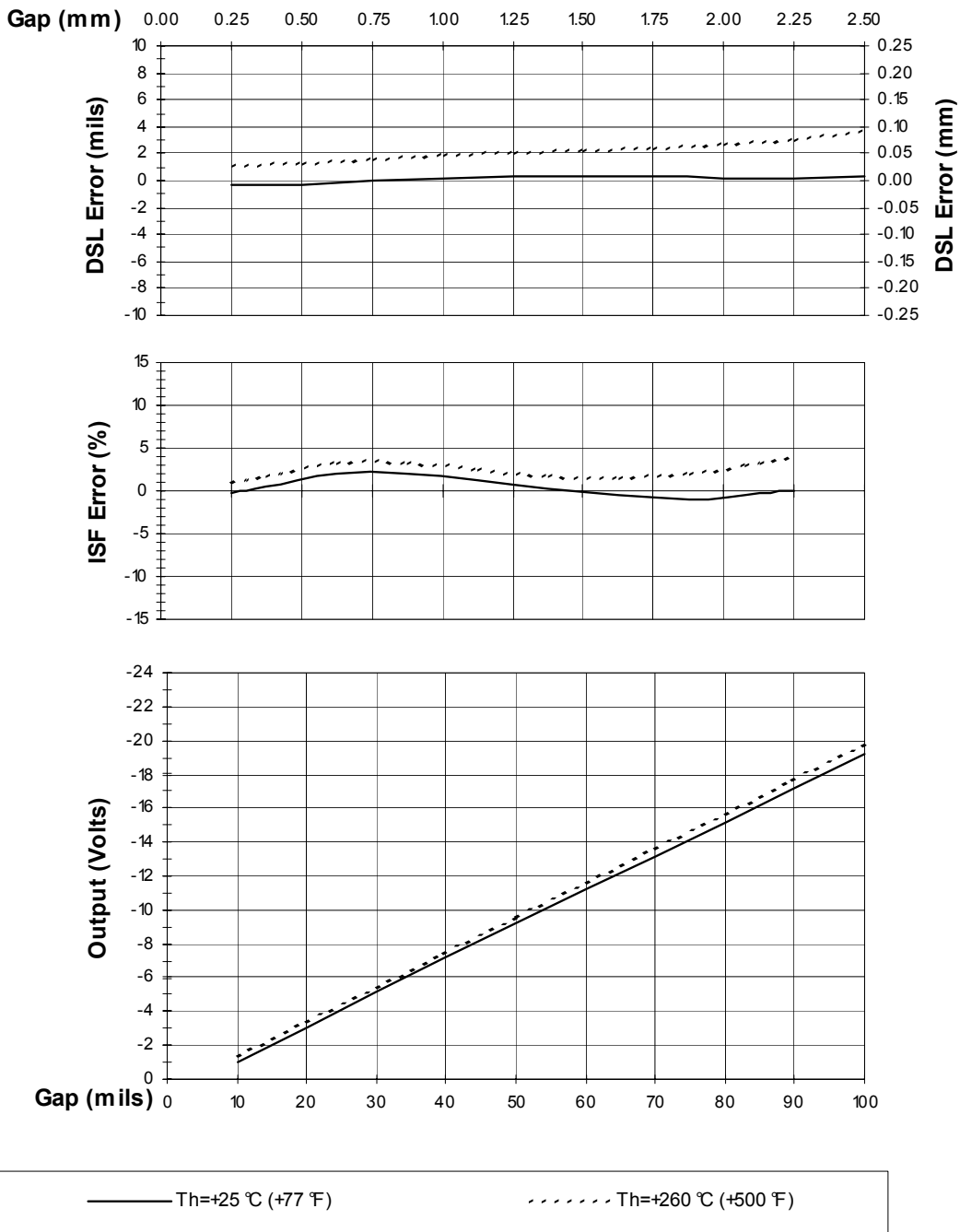


Figure 6-10: Typical 3300 XL Extended Temperature Range Probe and 8m Extended Temperature Range Extension Cable @ Th (Proximitor Sensor and probe tip with 1 foot of cable are at +25 °C)

Frequency Response to Different Field Wiring Lengths without Barriers (5 m System)

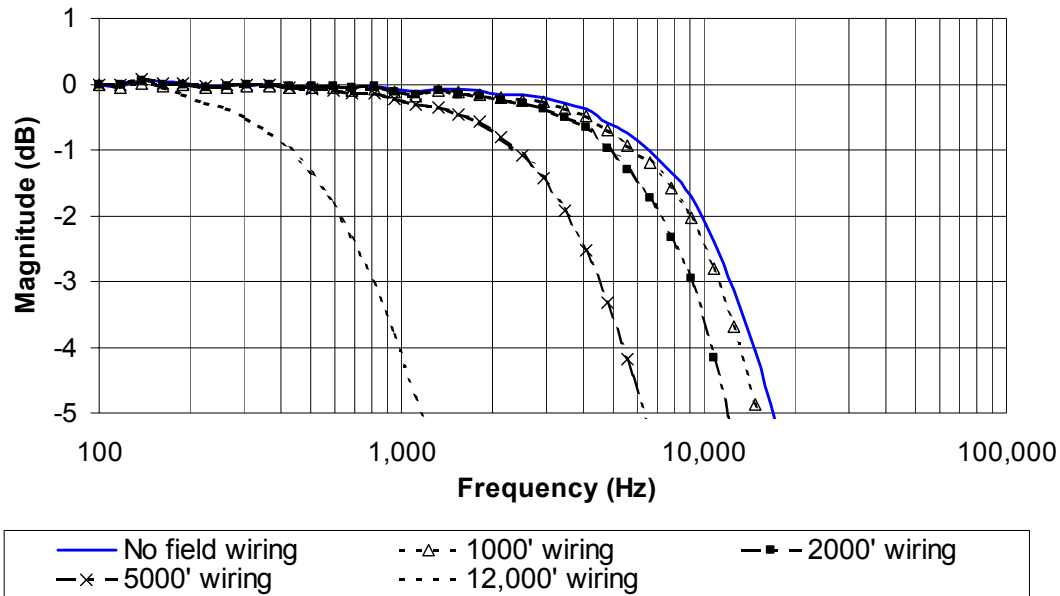


Figure 6-11: Frequency Response, typical 3300 XL 8mm 5m or 1m System with varying lengths of field wiring attached, no barriers

Phase Response with Different Field Wiring Lengths, No Barriers (5 m System)

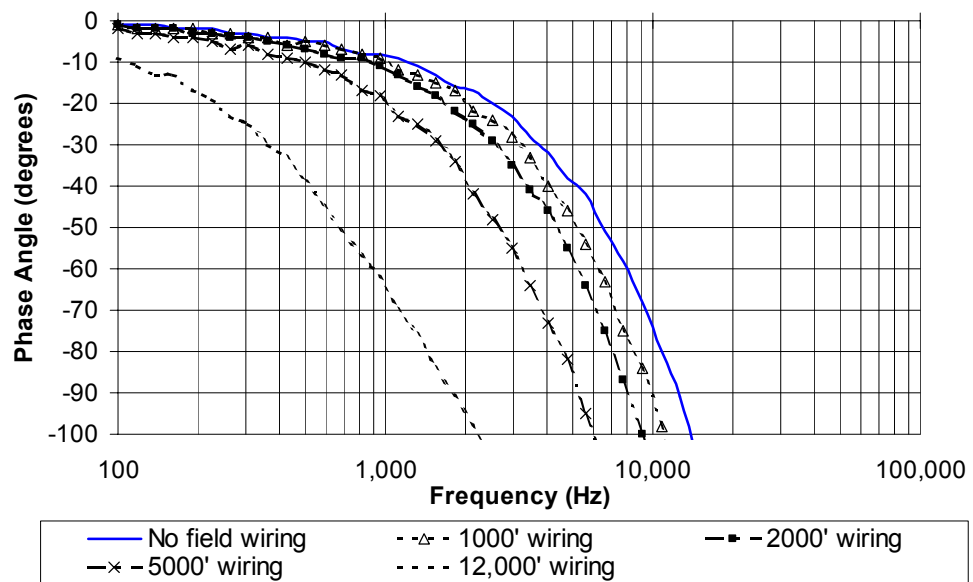


Figure 6-12: Phase Response, typical 3300 XL 8mm 5m or 1m System with varying lengths of field wiring attached, no barriers

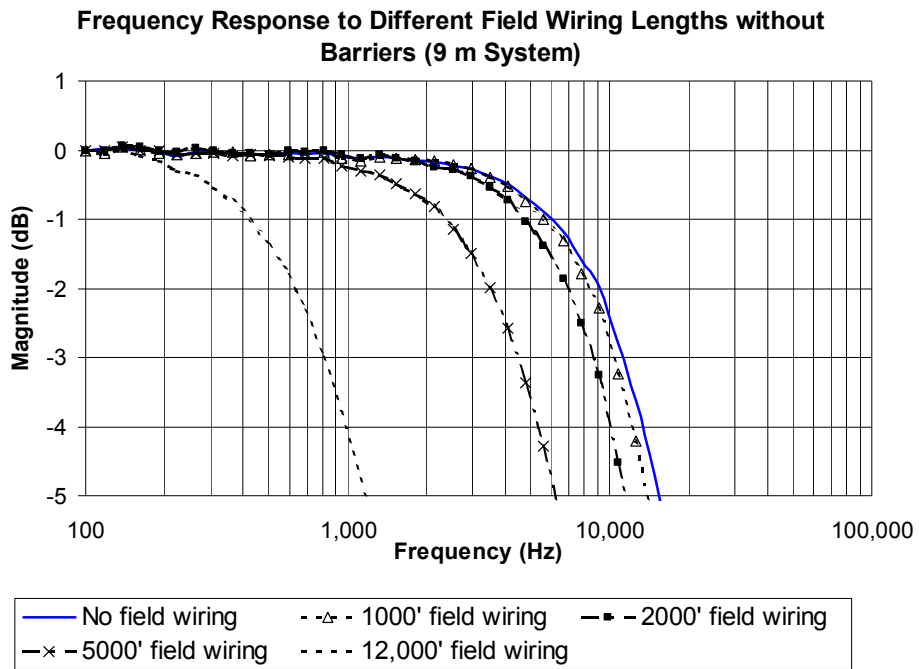


Figure 6-13 Frequency Response, typical 3300 XL 8mm 9m System with varying lengths of field wiring attached, no barriers

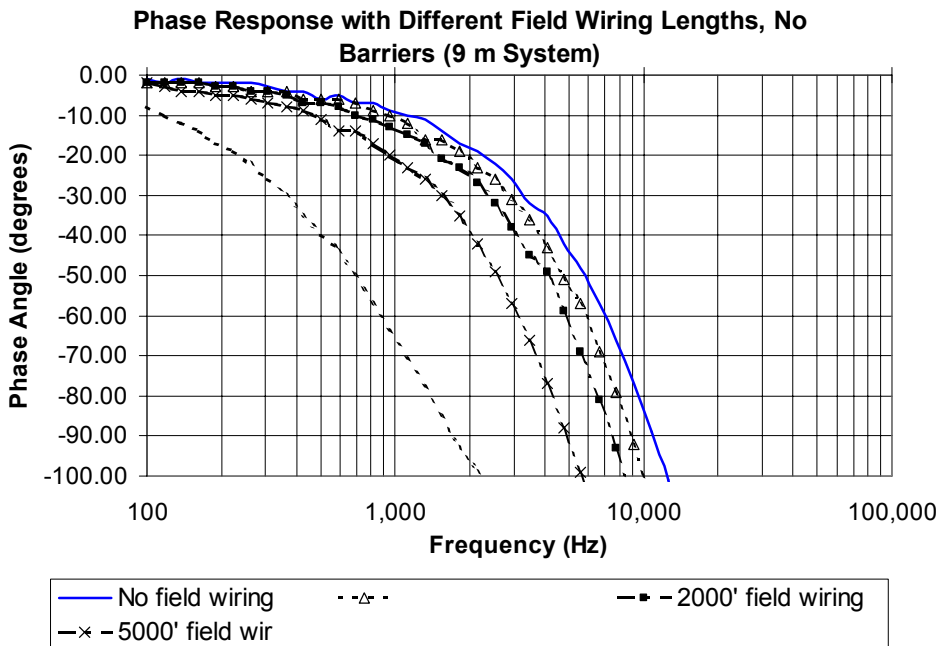
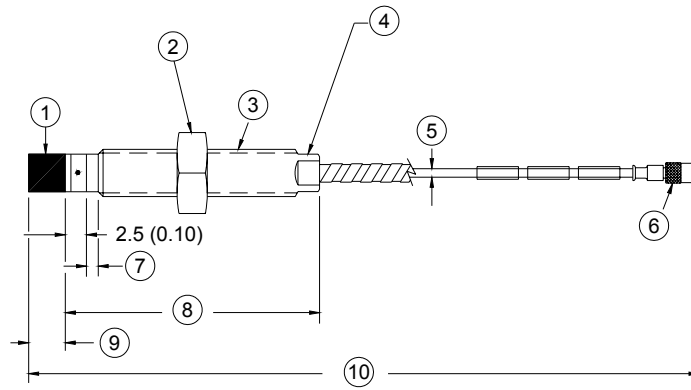


Figure 6-14: Phase Response, typical 3300 XL 8mm 9m System with varying lengths of field wiring attached, no barriers



1. 8.0 (0.31) diameter probe tip
2. 14.3 (9/16) for 3/8-24 threads²; 17.0 (0.67) for M10 threads²
3. Case thread
4. 8 (5/15) wrench flats, 4 each
5. 75Ω cable
 - 3.7 (0.15) maximum outside diameter
 - 3.9 (0.16) maximum diameter for FluidLoc cable
 - 7.6 (0.30) outside diameter for armor
 - 9.0 (0.35) maximum diameter for armor ferrule
6. Miniature male coaxial connector, 7.23 (0.285) maximum outside diameter "D"
7. Unthreaded length "A"
8. Case length "B"
9. 6.0 (0.236) maximum
10. Total length³ "C", +30%, -0%

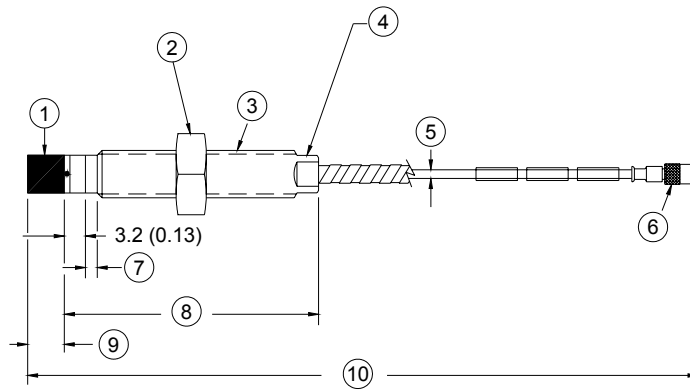
Figure 6-15: 3300 XL 8mm Proximity Probes, Standard Mount

330101 and 330191, 3/8-24 UNF-2A, without armor ⁷

330102 and 330192, 3/8-24 UNF-2A, with armor ⁶

330103 and 330193, M10X1 thread, without armor ⁷

330104 and 330194, M10X1 thread, with armor ⁶



1. 5.2 (0.21) diameter probe tip
2. 11.1 (7/16) for 3/8-24 threads²; 13.0 (0.51) for M10 threads²
3. Case thread
4. 5.6 (7.32) wrench flats for 1/4-28 threads, 7.0 (0.28) for M8 threads, 4 each
5. 75Ω cable
2.8 (0.11) maximum outside diameter
7.6 (0.30) outside diameter for armor
9.0 (0.35) maximum diameter for armor ferrule
6. Miniature male coaxial connector, 7.23 (0.285) maximum outside diameter "D"
7. Unthreaded length "A"
8. Case length "B"
9. 6.0 (0.236) maximum
10. Total length⁸ "C", +30%, -0%

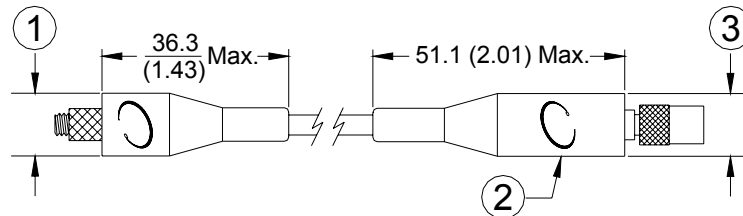
Figure 6-16: 3300 5mm Proximity Probes

330171, 1/4-28 UNF-2A, without armor ⁷

330172, 1/4-28 UNF-2A, with armor ⁶

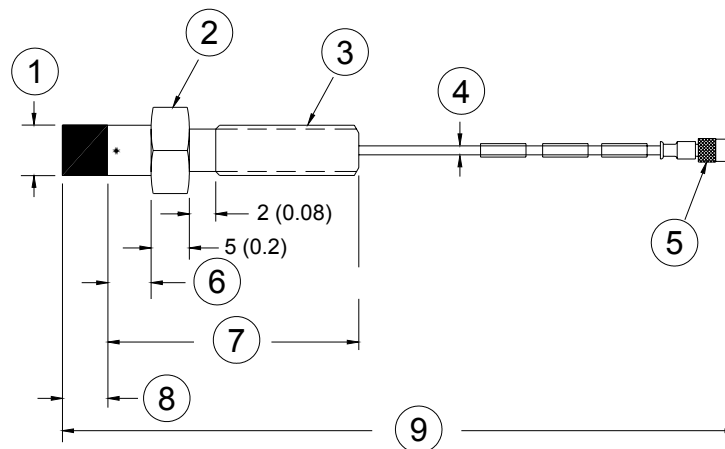
330173, M8X1 thread, without armor ⁷

330174, M8X1 thread, with armor ⁶



1. 12 (0.47) diameter maximum
2. Connector protector (fluorosilicone material)
3. 12 (0.47) diameter maximum

Figure 6-17: Installed Connector Protectors

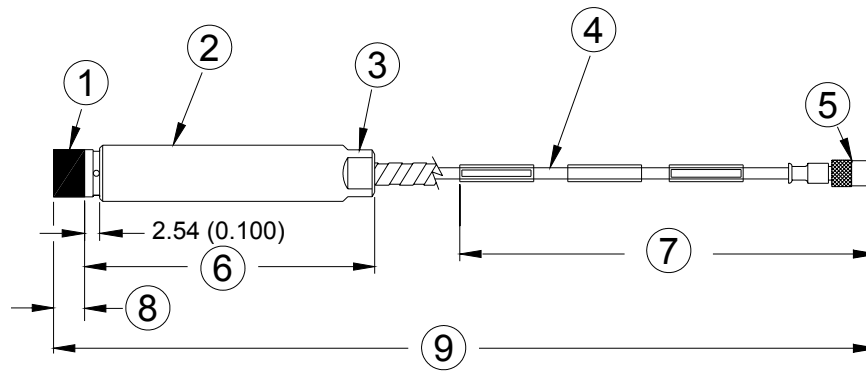


1. 8.0 (0.31) diameter probe tip
2. 7/16 or M10 hexagonal
3. Case thread
4. 75Ω cable, 3.7 (0.15) outside diameter
5. Miniature male coaxial connector, 7.23 (0.285) maximum outside diameter "D"
6. Unthreaded length "A"
7. Case length "B" 30 (1.2)
8. 6.0 (0.236) maximum
9. Total length³ "C", +30%, -0%

Figure 6-18: 3300 XL 8mm Proximity Probes, Reverse Mount ^{4,7}

330105 and 330195, 3/8-24 UNF-2A threads

330106 and 330196, M10X1 threads

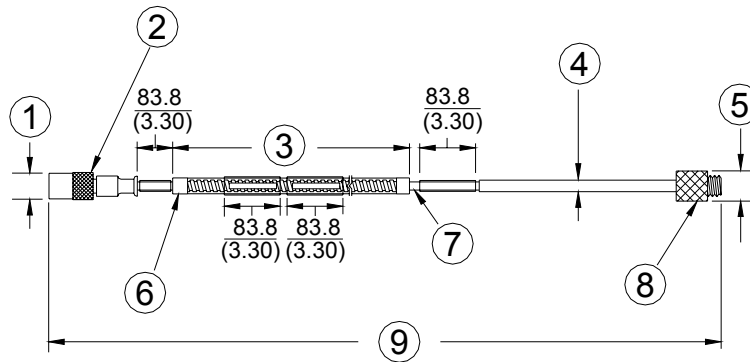


1. 8.0 (0.31) diameter probe tip
2. 9.6 (0.38) maximum diameter
3. 7.9 (0.31) wrench flats, 4 each
4. 75Ω cable, 3.68 (0.145) maximum diameter
5. 3.9 (0.16) maximum diameter for FluidLoc cable
6. 8.0 (0.315) outside diameter for armor
7. 9.0 (0.35) maximum diameter for armor ferrule
8. Miniature male coaxial connector, 7.23 (0.285) maximum outside diameter
9. Case length "A"
10. 349.25 (13.720) maximum
11. 6.0 (0.236) maximum
12. Cable length³

Figure 6-19: 3300 XL 8mm Proximity Probes, Smooth Case

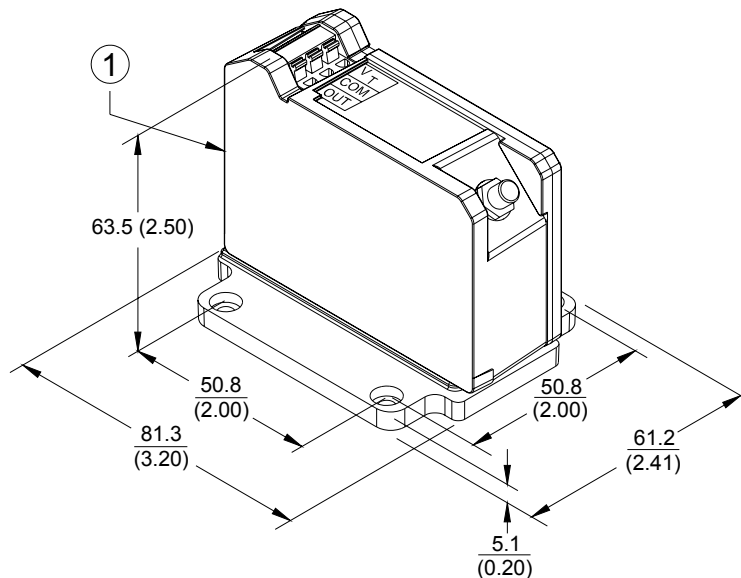
330140 and 330197, without armor ⁷

330141 and 330198, with armor ⁶



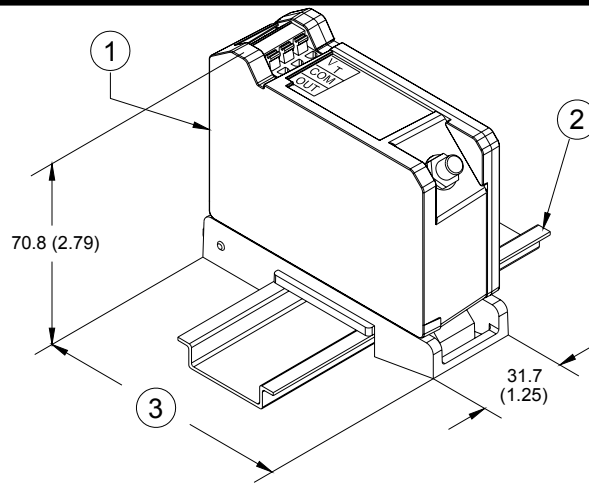
1. 7.2 (0.285) maximum diameter
2. Miniature male coaxial connector
3. FEP or PFA coated armor⁶, armor length 300 (11.8) less than cable length
4. 75Ω cable, 3.68 (0.145) maximum outside diameter
(0.16) maximum diameter for FluidLoc cable
(0.30) outside diameter for armor
(0.35) maximum diameter for armor ferrule
5. 7.2 (0.285) maximum diameter
6. Stainless steel ferrules, 8.4 (0.33) diameter
7. FEP or PFA insulated triaxial cable
8. Miniature female coaxial connector
9. Cable length +20%, -0%

Figure 6-20: 330130, 3300 XL Extension Cable (FEP armor and insulation) 330190, 3300 XL ETR Extension Cable (PFA armor and insulation)



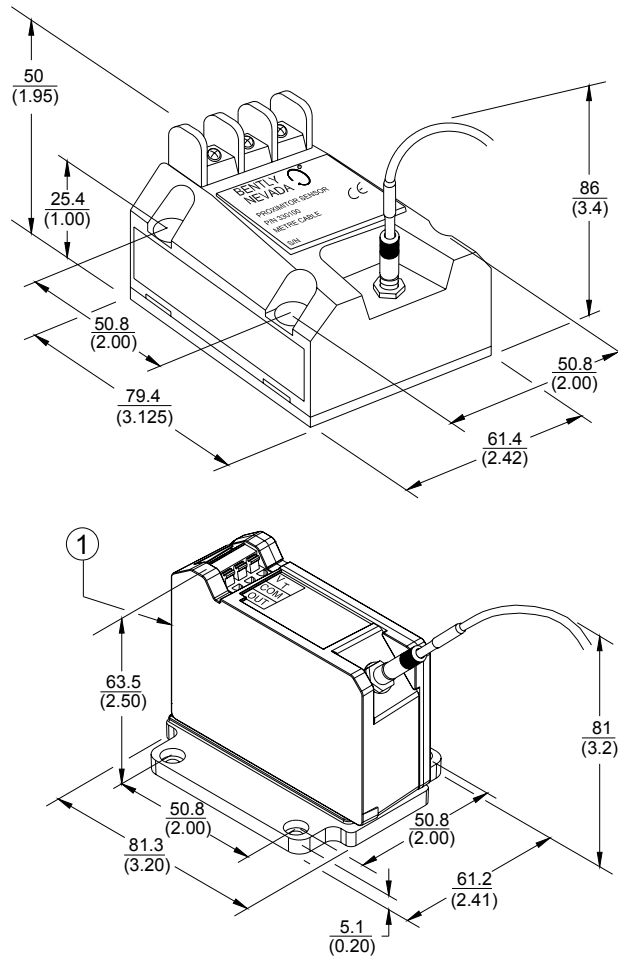
1. Mounting option "A", options -50 or -90

Figure 6-21: Panel Mount 3300 XL Proximity Sensor



1. Mounting option "A", options -51 or -91
2. 35mm DIN rail (not included)
3. 89.4 (3.52) [Additional 3.05 (0.120) require to remove DIN rail

Figure 6-22: DIN Mount 3300 XL Proximity Sensor



1. Mounting option "A", options -50 or -90

Figure 6-23: Physical mounting characteristics showing interchangeability of 3300 and 3300 XL Proximity Sensors when 4-hole mounting option is used⁸

Notes:

- All dimensions on figures are in millimetres (inches) unless otherwise noted.
- Standard mount 8 mm probes supplied with 17 mm or 9/16 inch lock nut.
- Probes ordered with 5 or 9 metre integral cables have a length tolerance of +20%, -0%.
- Reverse mount probes not available with armor or connector protector options.
- Letters inside quotation marks on figures refer to probe ordering options.
- Stainless steel armor is supplied with FEP outer jacket for standard probes, PFA outer jacket for ETR probes.
- FEP jacket is standard non-armored portion of the cable for standard probes, PFA jacket on non-armored portion for ETR probes.
- Use M3.5 or #6 screws for panel-mount Proximito[®]r Sensors (screws provided when purchasing Bently Nevada housings).

7. Micrometer Specifications and Ordering Information

7.1 Mechanical

Target Buttons

AISI 4140 Alloy Steel, 30.5 mm (1.20 in) diameter flat target. Contact your local sales office for details on special target materials.

Casing Material

3300 XL Precision
Micrometer:

Fiberglass and Plastic.

3300 XL Shaft Micrometer

ABS Plastic.

Micrometer specifications:

Table 7-1: 3300 XL Precision Micrometer:

Part number	Resolution	Accuracy	Range
330185-01	0.000020 in	± 0.000015 in	0-1 in
330185-02	0.0005 mm	± 0.0004 mm	0-25 mm

Table 7-2: 3300 XL Shaft Micrometer

Part number	Resolution	Accuracy	Range
330186-01	0.001 in	±0.0001 in	0-1 in
300186-02	0.01 mm	±0.003 mm	0-25 mm

Size

3300 XL Precision
Micrometer (case
dimensions)

Height

226 mm (8.9 in)

Width

274 mm (10.8 in)

Length

356 mm (14.0 in)

**3300 XL Shaft Micrometer
(case dimensions)**

Height

152 mm (6.0 in)

Width

246 mm (9.7 in)

Length

356 mm (14.0 in)

Total System Mass

**3300 XL Precision
Micrometer:**

6.8 kg (15.0 lbm)

3300 XL Shaft Micrometer:

2.8 kg (6.2 lbm)

7.2 Ordering Information

7.2.1 3300 XL Precision Micrometer 330185-AXX

A: Scale Units

- 0 1** Micrometer in English units (0-1 in)
- 0 2** Micrometer in metric units (0-25 mm)

7.2.2 3300 XL Shaft Micrometer 330186- AXX

Option Descriptions

A: Scale Units

- 0 1** Micrometer in English units (0-1 in)
- 0 2** Micrometer in metric units (0-25 mm)

NOTE

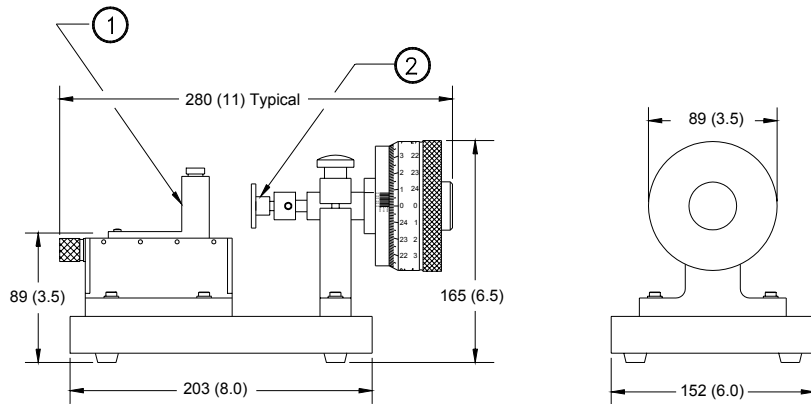
The 3300 shaft micrometer and precision micrometer come with probe mounting adapters for 1/4 inch, 3/8 inch, 1/2 inch, 5/8 inch, M8, M10, M14 and M16 probe thread sizes.

7.2.3 Accessories**Table 7-3: Accessory Part Numbers and Descriptions**

Part Number	Description
138751-01	3300 XL Precision Micrometer Instruction Sheet
140273-01	3300 XL Shaft Micrometer Instruction Sheet
27505-01	Target button: A replacement 4140 target button that comes standard with the 3300 XL shaft micrometer. There can be a variation of up to 5% in the average scale factor (ASF) between each target button.
136534-01	High Precision target button: A replacement 4140 target button that comes standard with the 3300 XL precision micrometer. There can be a variation of up to 0.6% in the Average Scale Factor (ASF) between each target button.
02200218	Shaft Micrometer Strap: A replacement strap for the 3300 XL Shaft Micrometer.
49478-01	Probe mounting adapter, suitable for M5 threads.
49478-02	Probe mounting adapter, 1/4 inch threads.
49478-03	Probe mounting adapter, M8 threads.
49478-04	Probe mounting adapter, M10 threads.
49478-05	Probe mounting adapter, 3/8 inch threads.
49478-06	Probe mounting adapter, M11 threads.
49478-07	Probe mounting adapter, 1/2 inch threads.
49478-08	Probe mounting adapter, M14 threads.
49478-09	Probe mounting adapter, 5/8 inch threads.
49478-10	Probe mounting adapter, M16 threads.

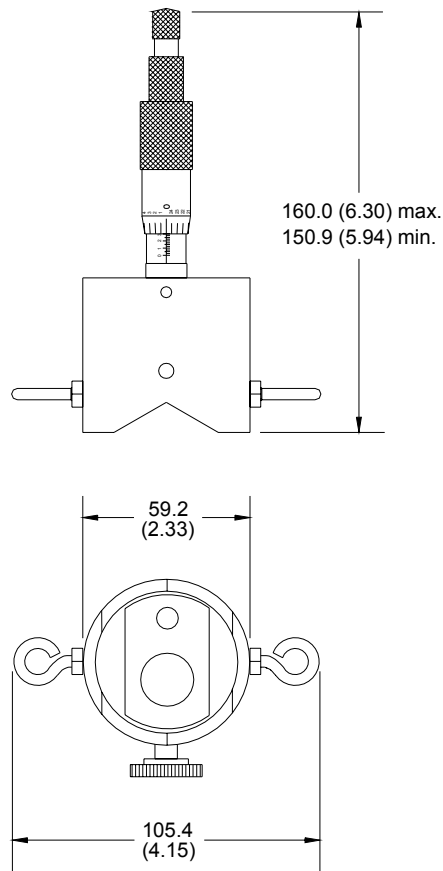
7.3 Dimensional Drawings

Note: Dimensions for figures are in millimetres (inches)



1. Collets to fit both metric and English 5mm, 8mm, and 14mm probes
2. Removable AISI 4140 target

Figure 7-1: 3300 XL Precision Micrometer



i.

Figure 7-2 - 3300 XL Shaft Micrometer