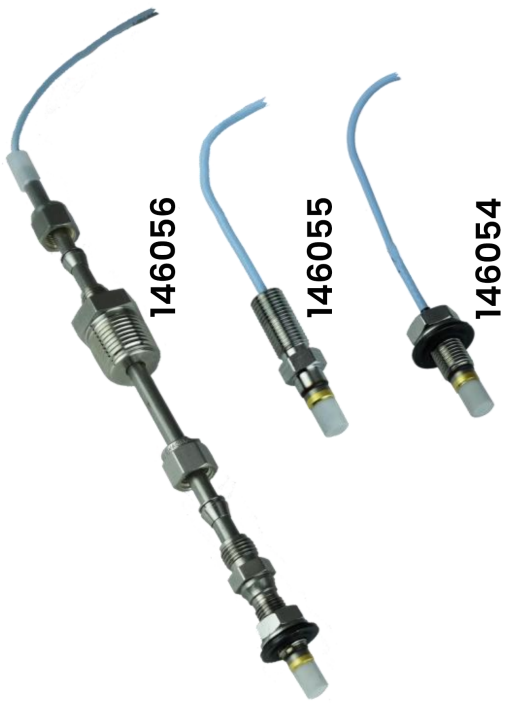
3300 Ceramic Capped Probe

Datasheet

Cordant™

172932 Rev. J



Description

The 3300 Ceramic Capped Probe is a state-of-the-art solution for monitoring machinery in aggressive chemical or high-pressure environments. The alumina cap and 304 stainless steel probe case provide robust protection and increased life for applications in anhydrous ammonia or other extreme pH environments. The ceramic capped probe is compatible with the 3300 Proximitor Sensor and extension cable.

Our Bently Nevada ceramic-capped probes are rated to 34 Bar (500 psi) pressure. Modifications are available for applications involving higher pressures.

The 146054, 146055, and 164517 probes were developed for applications that expose only the front of the probe case assembly to corrosive gases and liquids. These ceramic probe assemblies prevent corrosive gases and liquids from entering the front end of the probe case. We leak test the front-end ceramic to metal interface with helium to ensure a hermetic seal. These probes do not have a rear fitting or stainless steel tube, so that the rear of the probes are not sealed. You must not expose the rear of these probes to destructive environments such as water, NH_3, NH_4OH, hydrogen sulfide, etc.

The 146056 ceramic probe assembly has the rear fitting and stainless steel tubing to prevent corrosive gases and liquids from entering both the front and rear of the probe case. We leak test the front-end ceramic to metal interface with helium to ensure a hermetic seal. The fitting at the rear end of the probe is unsealed when it leaves the factory. You can disconnect the tubing and the fittings from the probe case and slide them out of the way while gapping and installing the probe. Once you have secured and correctly gapped the probe, you should tighten the fittings to completely seal the rear of the probe.

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Specifications

Unless otherwise noted, the following specifications are for a 3300 5 mm system including Proximitor Sensor, extension cable and probe between +18°C and +27°C (+64°F to +80°F), with a -24 Vdc power supply, a 10 kW load, and an AISI 4140 steel target. Performance characteristics apply to systems that consist solely of 3300 XL components. The system accuracy and interchangeability specifications do not apply when using a transducer system calibrated to any target other than our AISI 4140 steel target.

Electrical

Probe Nominal DC Resistance	
Probe Length	Resistance from the Center Conductor to the Outer Conductor (ohms)
0.5	7.45 ± 0.50
1.0	7.59 ± 0.50
2.0	7.88 ± 0.50
5.0	8.73 ± 0.70
9.0	9.87 ± 0.90

Linear Range	1.52 mm (60 mils). Linear range begins at approximately 0.25 mm (10 mils) from target and is from 0.25 to 1.78 mm (10 to 70 mils) (approximately −4 to −16 Vdc).
Recommended Gap Setting	1.0 mm (40 mils) The linear range of the ceramic-capped probes are shifted compared with standard 3300 XL probes. The probes are very robust but cannot withstand direct mechanical loads on the probe tip. Gap the probe electrically and avoid contact with the target surface. Configuring the monitor when using ceramic- capped probes requires extra care. Due to the shift in the curve from that of a standard 3300 XL probe, the probe tip may contact the shaft before the probe reaches lower OK limit. Your installation may require a monitor modification to accommodate this condition.
Incremental Scale Factor (ISF)	
Standard 5-metre or 9-metre system	7.87 V/mm (200 mV/mil) ±6.5% including interchangeability error when measured in increments of 0.25 mm (10 mils) over the 60 mil linear range from 0°C to +45°C (+32°F to +113°F).

Mechanical

Probe Tip Material	Alumina ceramic (Al_2O_3)
Probe Case Material	AISI 304 stainless steel.
Probe Cable Specifications	
Standard cable	75 Ω coaxial, fluoroethylene propylene (FEP) insulated probe cable in the following total probe lengths: 0.5, 1, 2, 5, or 9 meters.

Thread Engagement Limits

Probe Case Thread	Maximum Length of Thread Engagement
3/8-24	0.563 in
M10x1	15 mm

Maximum thread engagement lengths are per the industry standard of 1.5 times the nominal thread diameter. A fit class matching that of the external probe thread is assumed for all internal threads. Applications with thread engagement lengths exceeding the values in the table above may exhibit binding during installation. Contact your Bently Nevada representative if you require probe thread engagement lengths exceeding the values above. Bently Nevada does not replace proximity probes under warranty due to excessive thread engagement lengths.

Connectors

The 3300 XL probe has 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. The connectors require no special tools for installation or removal. The connector can be ordered in a removable nut configuration, or as the standard ClickLoc connector on probe 146056.

You can also order 3300 XL Probes with connector protectors already installed or supplied separately for installation in the field (such as when you must run the cable through restrictive conduit). We recommend connector protectors for all installations to provide increased environmental protection.

Connector Material	Gold-plated brass or gold-plated beryllium copper.

Table 1: Connector Tightening Instructions

Connector Type	Tightening Instructions
2 3300 XL gold "click" type connectors	Finger tight
1 non-XL stainless steel connector and 1 3300 XL connector	Finger tight plus 1/8 turn using pliers
Maximum Torque	0.565 N•m (5 in•lbf)
Cable Minimum Bend Radius	25.4 mm (1.0 in)

Environmental Limits

Probe Temperature Range	
Operating and Storage Temperature	-51°C to +177°C (-60°F to +351°F)
Probe Pressure	Rated to seal 34 Bar (500 psi) nitrogen. Modifications are available for higher-pressure applications. Contact our custom design department if you require a test of the pressure seal for your application.

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. Bently Nevada does not be held responsible for any damages resulting from leaking proximity probes.

Compliance and Certifications

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

RoHS

European Community Directive:

RoHS Directive 2011/65/EU

China RoHS

Cables associated with the product(s) mentioned in this datasheet have an EFUP designation of 15 years, in accordance with SJ/T 11364-2024.

Maritime

2019 Rules for Conditions of Classification,

Part 1, 1-1-1/7.7, 1-1-A3, 1-1-A4

2019 Rules for Conditions of Classification,

Part 1, Offshore Units and Structures

1-1-4/9.7, 1-1-A2, 1-1-A3

Hazardous Area Approvals

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

For additional technical documentation, please log in to bntechsupport.com and access the Bently Nevada Media Library.

cNRTLus

3300 XL Proximitor Sensor

ia When installed with intrinsically safe zener barriers per drawing 141092 or when installed with galvanic isolators.	Class I, Zone 0: AEx/Ex ia IIC T4/T5 Ga; Class I, Groups A, B, C, and D, Class II, Groups E, F and G, Class III; T5 @ Ta= -55°C to + 40°C. T4 @ Ta= -55°C to + 80°C.
nA, ec When installed with non-incendive circuit connected per drawing 140979.	Class I, Zone 2: AEx/Ex nA IIC T4/T5 Gc; Class I, Division 2, Groups A, B, C, and D; Class I, Zone 2: AEx/Ex ec IIC T4/T5 Gc; Class I, Division 2, Groups A, B, C, and D; T5 @ Ta= -55°C to + 40°C T4 @ Ta= -55°C to + 80°C

3300 XL Probe

ia When installed with intrinsically safe zener barriers per drawing 141092 or when installed with galvanic isolators.	Class I, Zone 0: AEx/Ex ia IIC T5...T1 Ga; Class 1, Groups A, B. C, and D, Class II, Groups E, F, and G, Class III; (see Temperature Schedule table to follow)
nA, ec When installed with non-incendive circuit connected per drawing 140979.	Class I, Zone 2: AEx/Ex nA IIC T5...T1 Gc; Class 1, Division 2, Groups A, B, C, D; Class 1, Zone 2: AEx/Ex ec IIC T5...T1 Gc; Class I, Division 2, Groups A, B, C, and D; (see Temperature Schedule table to follow)

ATEX/IECEx

3300 XL Proximitor Sensor

ia	II 1 G Ex ia IIC T4/T5 Ga Ex ia IIIC T90C/T105C Dc For EPL Dc: T105C @ Ta = -55°C to 100°C T90C @ Ta = -55°C to +85°C Ui= -28V, Uo= -28V Ii= 140mA, Io= 140mA Pi= 0.91W, Po= 0.742W Ci- 47nF, Co= 1.5nF Li= 1460µH, Lo= 610µH
nA,ec	II 3 G Ex nA IIC T4/T5 Gc Ex ec IIC T4/T5 Gc Ui= -28V, Ii= 140 mA T5 @ Ta= -55˚ C to + 40˚C T4 @ Ta= -55 ˚C to + 80˚C

3300 XL Probe

Probe entity parameters are met when used with BN extension cables and connected to BN Prox.

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ia	II 1 G Ex ia IIC T5...T1 Ga, (see Temperature Schedule table to follow) Ex ia IIIC T90°C ... T280°C Dc For EPL Dc: Ui= -28V, Ci = 1.5 nF Ii = 140 mA, Li =610 µH Pi = 0.91 W
nA,ec	II 3 G Ex nA IIC T5...T1 Gc, Ex ec IIC T5...T1 Gc, (see Temperature Schedule table to follow) Ui= -28V, Ii= 140 mA

Temperature Schedule

Temperature Classification	Ambient Temperature (Probe Only)
For EPL Ga and Gc	
T1	-55°C to +232°C
T2	-55°C to +177°C
T3	-55°C to +120°C
T4	-55°C to +80°C
T5	-55°C to +40°C
For EPL Dc	
T280°C @ Ta	-55°C to +232°C
T225°C @ Ta	-55°C to +177°C
T170°C @ Ta	-55C to +120°C
T130°C @ Ta	-55°C to +80°C
T105°C @ Ta	-55°C to +100°C
T90°C @ Ta	-55°C to +40°C

Hazardous Area Conditions of Safe Use

cNRTLus:

ia

Install per Bently Nevada drawing 141092.

nA, ec

Install per Bently Nevada drawing 140979.

ATEX/IECEx:

ia

Install per Bently Nevada drawing 141092.

nA, ec

The Proximitor must be installed so as to provide the terminals with a degree of protection of at least IP54.

Ordering Information

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

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3300 Ceramic Capped Proximity Probes

146054 3300 Ceramic Capped Probe, 3/8-24 UNF thread, without armor

146054 with Modification 164523 3300 Ceramic Capped Probe, 3/8-24 UNF thread, with armor

Part Number-AA-BB-CC-DD	
A:	**Overall Case Length Option**
	Order in increments of 0.1 in Threaded length configurations: Maximum case length: 4.0 in Minimum case length: 0.8 in
Example	**2 4** = 2.4 in
B: Total Length Option	
0 5	0.5 meter (1.6 feet)
1 0	1.0 meter (3.3 feet)
2 0	2.0 meters (6.6 feet)
5 0	5.0 meters (16.4 feet)[1]
9 0	9.0 meters (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
D: Agency Approval Option	
0 0	Not required
0 5	CSA, ATEX, IECEx

3300 Ceramic Capped Proximity Probes, Metric

164517, 3300 Ceramic Capped Probe, M10 x 1 thread, without armor

164517 with Modification 172330, 3300 Ceramic Capped Probe, M10 x 1 thread, with armor

Part Number-AA-BB-CC-DD	
A:	**Overall Case Length Option**
	Order in increments of 1 mm. Metric thread configurations: Maximum length: 100 mm Minimum length: 20 mm
Example	**0 6 0** = 60 mm
B: Total Length Option	
0 5	0.5 meter (1.6 feet)
1 0	1.0 meter (3.3 feet)
2 0	2.0 meters (6.6 feet)
5 0	5.0 meters (16.4 feet) [1]
9 0	9.0 meters (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
D:	**Agency Approval Option**
0 0	Not required
0 5	Multiple Approvals

3300 Ceramic Capped Reverse Mount Probes

146055, 3/8-24 UNF threads[2]

146055-AA-BB-CC	
A: Total Length Option	
0 5	0.5 meter (1.6 feet)
1 0	1.0 meter (3.3 feet)
2 0	2.0 meters (6.6 feet)
5 0	5.0 meters (16.4 feet) [1]
9 0	9.0 meters (29.5 feet)
B: Connector Option	
0 2	Miniature ClickLoc coaxial connector, standard cable
C: Agency Approval Option	
0 0	Not required
0 5	Multiple Approvals

3300 Ceramic Capped Proximity Probes, Special Cable Protection:

146056, 3300 Ceramic Capped Probe, 3/8-24 thread with Stainless Steel tubing

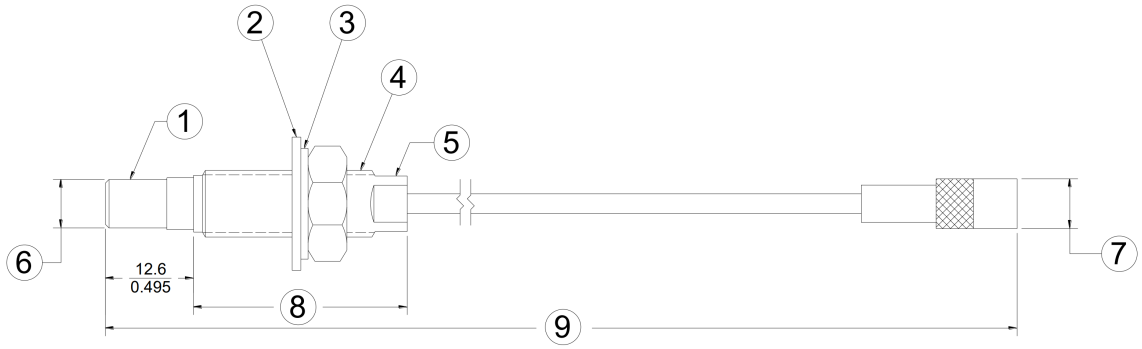
146056-AA-BB-CC-DD-EE	
A:	**Overall Case Length Option**
	Order in increments of 0.1 in Threaded length configurations: Maximum case length: 4.0 in Minimum case length: 0.8 in
Example	**2 5** = 2.5 in
B: Total Length Option	
0 5	0.5 meter (1.6 feet)
1 0	1.0 meter (3.3 feet)
2 0	2.0 meters (6.6 feet)
5 0	5.0 meters (16.4 feet)[1]
9 0	9.0 meters (29.5 feet)
C: NPT Exit Fitting	
0 1	1/4" NPT
0 2	1/2" NPT
D: Connector Option	
0 2	Miniature ClickLoc coaxial connector, standard cable
03	Removable nut ClickLoc coaxial connector, standard cable
E: Agency Approval Option	
0 0	Not required
0 5	Multiple Approvals

Accessories

40113-02	**Connector Protector Kit** Connector Protector Kit for probes and extension cables, including installation tools. You must order the 03800001 connector protector separately.
136536-01	Connector Protector Adapter Allows you to use connector protector installation tools manufactured prior to 1998 with 75 Ω ClickLoc connectors.
03839410	75 Ω Triaxial Male Connector Protector Male connector protectors are installed onto the extension cable and attach to the female connector protector on the probe, providing environmental protection of connectors.
03800001	75 Ω Coaxial Female Connector Protector Female connector protectors are installed onto the probe lead and attach to the male connector protector on the extension cable, providing environmental protection of connectors. Also placed on the extension cable to slide over the connection to the Proximitor sensor and protect it from the environment.
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.
Bently_ Manuals	Customer DVD containing all Bently Manuals, FWD, App Notes, and Install Guides in all available languages.

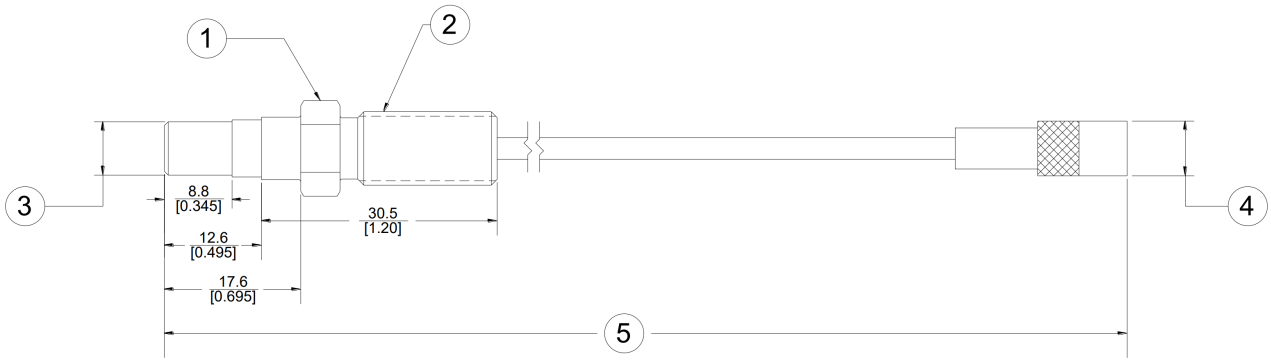
Graphs and Figures

Note: All dimensions shown in millimeters [inches] except as noted.



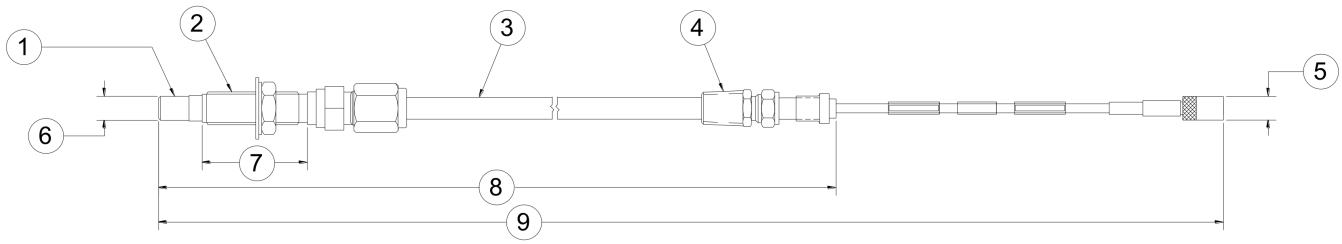
1. Ceramic capped tip
2. Pressure sealing washer
3. Flat washer
4. Probe threads, 3/8-24 UNF 2A
5. 5/16-in wrench flats
6. 7.0 mm [0.273 in] diameter
7. 7.2 mm [0.285 in] diameter
8. Case length, 102 mm [4.0 in] maximum length
9. Total length

Figure 1: Probe 146054, 3/8-24 Thread Forward Mount (Note 4-inch maximum case length)



1. 7/16-in Wrench flats
2. 3/8-24 UNF 2A Mounting threads
3. 7.0 mm [0.273 in] diameter
4. 7.2 mm [0.285 in] diameter
5. Total length

Figure 2: Probe 146055, 3/8-24 Thread Reverse Mount, Suitable For Use In 31000 or 21000 Housings.



1. Ceramic capped tip
2. 3/8-24 UNF 2A mounting threads
3. Stainless steel tubing, 6.3 mm (0.25 in) outside diameter
4. 1/4-in or 1/2-in NPT exit fitting
5. 7.2 mm (0,285 in) diameter
6. 6.9 mm (0.273 in) diameter
7. Case length
8. 9.50 ± 0.25 in for 0.5 m length probes, 20 ± 1 in for 1.0 m length probes, 60 ± 1.0 in for 2.0 m and longer length probes
9. Total length

Figure 3: Probe 146056, 3/8-24 Thread, Forward Mount With Stainless Steel Tubing Protecting Probe Cable.

Probes ordered with 5 m or 9 m integral cables have a length tolerance of +20%, -0%.

Reverse mount probes are not available with armor or connector protector options.

5 m probes are designed for use with the 5 m Proximitor Sensor only.

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

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