3300 XL 8 mm Proximity Transducer System

Datasheet

Cordant™

141194 Rev. AN



Description

The 3300 XL 8 mm Proximity Transducer System consists of:

- One 3300 XL 8 mm probe,
- One 3300 XL extension cable[1], and
- One 3300 XL Proximitor Sensor[2].

The system provides an output voltage that is directly proportional to the distance between the probe tip and the observed conductive surface and can measure both static (position) and dynamic (vibration) values. The system's primary applications are vibration and position measurements on fluid-film bearing machines, as well as Keyphasor reference and speed measurements[3].

The 3300 XL 8 mm system delivers the most advanced performance in our eddy current proximity transducer systems. The standard 3300 XL 8 mm 5-meter system also fully complies with the American Petroleum Institute's (API) 670 Standard for mechanical configuration, linear range, accuracy, and temperature stability. All 3300 XL 8 mm proximity transducer systems provide this level of performance and support complete interchangeability of probes, extension cables, and Proximitor sensors, eliminating the need to match or bench calibrate individual components.

Each 3300 XL 8 mm Transducer System component is backward compatible and interchangeable[4] with other non-XL 3300 series 5 mm and 8 mm transducer system components[5]. This compatibility includes the 3300 5 mm probe, for applications in which an 8 mm probe is too large for the available mounting space[6,7].

Baker Hughes

Specifications

Unless otherwise noted, the following specifications are for a 3300 XL 8 mm Proximitor Sensor, extension cable and 8 mm probe between +18°C and +27°C (+64°F to +80°F) at a maximum altitude of 2000 meters, 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 apply to systems that consist solely of 3300 XL 8 mm components. The system accuracy and interchangeability specifications do not apply to transducer systems that are calibrated to any target other than our AISI 4140 steel target.

Electrical

Proximitor Sensor Input	Accepts one non-contacting 3300-series 5 mm, 3300 XL 8 mm Proximity Probe and Extension Cable.
Power	Requires -17.5 Vdc to -26 Vdc when installed with non-incendive circuit connected per installation drawing 140979 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

Nominal Probe DC Resistance	
Resistance (R_{PROBE}) from Center Conductor to Outer Conductor	
Probe Length (m)	**R_{PROBE}(Ω)**
0.5	7.45 ± 0.50
1.0	7.59 ± 0.50
1.5	7.73 ± 0.50
2.0	7.88 ± 0.50
3.0	8.17 ± 0.50
5.0	8.73 ± 0.50
9.0	9.87 ± 0.50

Nominal Extension Cable DC Resistance	
Resistance (R_{CORE}) from Center Conductor to Center Conductor	
Length of Extension Cable (m)	**RCORE (Ω)**
3.0	0.66 ± 0.10
3.5	0.77 ± 0.12
4.0	0.88 ± 0.13
4.5	0.99 ± 0.15
6.0	1.32 ± 0.21
7.0	1.54 ± 0.23
7.5	1.65 ± 0.25
8.0	1.76 ± 0.26
8.5	1.87 ± 0.28

Resistance (R_{JACKET}) from Outer Conductor to Outer Conductor	
Length of Extension Cable (m)	**R_{JACKET} (Ω)**
3.0	0.20 ± 0.04
3.5	0.23 ± 0.05
4.0	0.26 ± 0.05
4.5	0.30 ± 0.06
6.0	0.39 ± 0.08
7.0	0.46 ± 0.09
7.5	0.49 ± 0.10
8.0	0.53 ± 0.11
8.5	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 3 conductor shielded triad cable and tinned field wiring. Maximum length of 305 meters (1,000 feet) between the 3300 XL Proximitor Sensor and the monitor. See the frequency response graphs, Figures 10 and 12, for signal rolloff 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 for Radial Vibration	-9 Vdc [approximately 1.27 mm (50 mils)]
Incremental Scale Factor (ISF)	
Standard 5 or 1 meter System	7.87 V/mm (200 mV/mil) ± 5% including interchangeability error when measured in increments of 0.25 mm (10 mils) over the 80 mil linear range from 0°C to +45°C (+32°F to +113°F).
Standard 9 meter 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 80 mil linear range from 0°C to +45°C (+32°F to +113°F).
Extended Temperature Range (ETR) for 5 and 9 Meter Systems	7.87 V/mm (200 mV/mil) ± 6.5% including interchangeability error when measured in increments of 0.25 mm (10 mils) over the 80 mil linear range from 0°C to +45°C (+32°F to +113°F).
Deviation from best fit straight line (DSL)	
Standard 5 or 1 meter System	Less than ±0.025 mm (±1 mil) with components at 0°C to +45°C (+32°F to +113°F).
Standard 9 meter System	Less than ±0.038 mm (±1.5 mil) with components at 0°C to +45°C (+32°F to +113°F).
Extended Temperature Range 5 and 9 meter Systems	Less than ±0.038 mm (±1.5 mil) with components at 0°C to +45°C (+32°F to +113°F).

Performance over Extended Temperatures	
Standard 5 or 1 meter System	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 ±10% of 7.87 V/mm (200 mV/mil) and the DSL remains within ±0.076 mm (±3 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 ±10% of 7.87 V/mm (200 mV/mil) and the DSL remains within ±0.076 mm (±3 mils).
Standard 9 meter System	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 ±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 ±18% of 7.87 V/mm (200 mV/mil) and the DSL remains within ±0.152 mm (±6 mils).
Extended Temperature Range 5 and 9 meter Systems	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 ±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 meters (1000 feet) of field wiring.
Minimum Target Size	15.2 mm (0.6 in) diameter (flat target)
Shaft Diameter	
Minimum	50.8 mm (2 in)
Recommended Minimum	76.2 mm (3 in)

When gapped at the center of the linear range, the interaction between two separate transducer systems (cross-talk) will be less than 50 mV on shaft diameters of at least 50 mm (2 in) or greater. You should 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 to limit cross-talk to 50 mV or less. Radial vibration or position measurements on shaft diameters smaller than 76.2 mm (3 in) will generally change the scale factor.

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

Order in increments of 10 mm
Length configurations:
Maximum unthreaded length: 230 mm
Minimum unthreaded length: 0 mm
Example: **0 6** = 60 mm

B: Overall Case Length Option

Order in increments of 10 mm
Metric thread configurations:
Maximum case length: 250 mm
Minimum case length: 20 mm
Example: **0 6** = 60 mm

C: Total Length Option

05	0.5 meter (1.6 feet)
10	1.0 meter (3.3 feet)
15	1.5 meter (4.9 feet)
20	2.0 meters (6.6 feet)
50	5.0 meters (16.4 feet)
90	9.0 meters (29.5 feet)

5-meter probes are designed for use with the 5 meter Proximitor sensor only.

D: Connector and Cable-Type Option

01	Miniature coaxial ClickLoc connector with connector protector, standard cable
02	Miniature coaxial ClickLoc connector, standard cable
11	Miniature coaxial ClickLoc connector with connector protector, FluidLoc cable
12	Miniature coaxial ClickLoc connector, FluidLoc cable

E: Agency Approval Option

00	Not required
05	CSA, ATEX, IECEx Approvals

3300 XL 8 mm Reverse Mount Probes

330105-02-12-CC-DD-EE3/8-24 UNF threads(2)

330106-05-30-CC-DD-EE M10 x 1 threads(2)

Option Descriptions

C: Total Length Option

05	0.5 meter (1.6 feet)
10	1.0 meter (3.3 feet)
15	1.5 meter (4.9 feet)
20	2.0 meters (6.6 feet)
50	5.0 meters (16.4 feet)
90	9.0 meters (29.5 feet)

5-meter probes are designed for use with the 5 meter Proximitor sensor only.

D: Connector and Cable-Type Option

02	Miniature ClickLoc coaxial connector
12	Miniature ClickLoc coaxial connector , FluidLoc cable

The FluidLoc cable option –12 is 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 option for these probes.

E: Agency Approval Option

00	Not required
05	CSA, ATEX, IECEx Approvals

3300 XL 8 mm Proximity Probes, Smooth Case:

330140 3300 XL 8 mm Probe without armor(1)

330141 3300 XL 8 mm Probe with armor(1)

Part Number-AA-BB-CC-DD

A: Overall Case Length Option
Order in increments of 0.1 in. **Length configurations:** Maximum unthreaded length: 9.6 in. Minimum unthreaded length: 0.8 in. Example: **24** = 2.4 in.

B: Total Length Option	
05	0.5 meter (1.6 feet)
10	1.0 meter (3.3 feet)
15	1.5 meter (4.9 feet)
20	2.0 meters (6.6 feet)
50	5.0 meters (16.4 feet)
90	9.0 meters (29.5 feet)

5-meter probes are designed for use with the 5 meter Proximitor sensor only.

C: Connector and Cable-Type Option	
01	Miniature coaxial ClickLoc connector with connector protector, standard cable
02	Miniature coaxial ClickLoc connector, standard cable
11	Miniature coaxial ClickLoc connector with connector protector, FluidLoc cable
12	Miniature coaxial ClickLoc connector, FluidLoc cable

D: Agency Approval Option	
00	Not required
05	CSA, ATEX, IECEx Approvals

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

330191 3300 XL 8 mm ETR Probe, 3/8-24 UNF thread, without armor

330192 3300 XL 8 mm ETR Probe, 3/8-24 UNF thread, with armor

Part Number-AA-BB-CC-DD

A: Unthreaded Length Option
Unthreaded length must be at least 0.8 in. less than the case length.
Order in increments of 0.1 in. **Length configurations:** Maximum unthreaded length: 8.8 in. Minimum unthreaded length: 0.0 in. Example: **1 5** = 1.5 in.

B: Overall Case Length Option
Order in increments of 0.5 in. **Standard thread configurations:** Maximum case length: 9.6 in. Minimum case length: 0.8 in. Example: **2 5** = 2.5 in.

C: Total Length Option	
05	0.5 meter (1.6 feet)
10	1.0 meter (3.3 feet)
15	1.5 meter (4.9 feet)
20	2.0 meters (6.6 feet)
50	5.0 meters (16.4 feet)
90	9.0 meters (29.5 feet)

5-meter probes are designed for use with the 5 meter Proximitor sensor only.