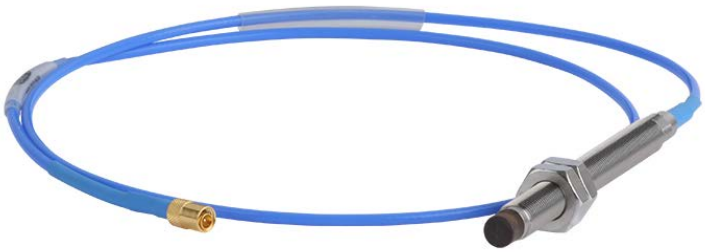
PROTECTION & RELIABILITY
OPTIMIZATION INSTRUMENTS
A CTC COMPANY

PRODUCT MANUAL

DX3301 / DD100170, DD100190, DD100191 Series



8mm Proximity Probe Drivers – Loop Powered 4-20 mA

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CONTENTS

C O N T E N T S

FIGURES

SECTION 1: OVERVIEW

Introduction

This document contains information on the operation, installation and maintenance of the DX3301 / DD100170, DD100190, DD100191 proximity probe series products.

Description

The DX3301 / DD100170, DD100190, DD100191 series proximity probe products utilize an eddy current, powered by the 4-20 mA loop power of a PLC, DCS or SCADA system. The 170 series 4-20mA loop is directly proportional to the “gap” distance between the probe and measured surface. The 190 & 191 series 4-20mA loop is directly proportional to the full scale selection. The assembly consists of a proximity probe, extension cable and driver. The driver is a 4 wire device with connections for loop power, common, and signal output.

Proximity Driver Specifications

PRO Model: DD100170 / DD100190 / DD100191 Series
Bently™ Compatible Model: DX330170 / DX190 / DX191 Series

Environmental

Temperature Range: -31°F(-35°C) to 185°F(85°C)
Humidity Range: 0-95% Relative, Non-condensing

Electrical*

Note: All specifications acquired through use of a AISI 4140 Steel target, 1.0" in Diameter.

Linear Range (4-20mA Loop)

Calibrated Linear Range: 10 to 90 mils (0.25 mm to 2.30 mm)
Nominal Output: 4-20 mA (±10%)
Nominal Sensitivity: 0.2 mA/mil (7.87 mA/mm)
Note: Sensitivity for DD100170 Series drivers only. DD100190 & DD100191 Series dependent on selectable full scale range.

Linear Range (Voltage Output)

Calibrated Linear Range: 10 to 90 mils (0.25 mm to 2.30 mm)
Nominal Output: -1 to -17 VDC
Nominal Sensitivity: 200 mV/mil (7.87 V/mm)
Resolution: 0.039 mils (1 micron)

Incremental Scale Factor (ISF)

Note: When measured over calibrated linear range in increments of 10 mils

32°F(0°C) to 113°F(45°C)
5 Meter System 200mV/mil (7.87V/mm) ± 5%
9 Meter System 200mV/mil (7.87V/mm) ± 6.5%

-31°F(-35°C) to 185°F(85°C)
5 Meter System 200mV/mil (7.87V/mm) ± 10%
9 Meter System 200mV/mil (7.87V/mm) ± 18%

Deviation from best fit Straight Line (DSL)

Note: When measured over calibrated linear range in increments of 10 mils

32°F(0°C) to 113°F(45°C)
5 Meter System ± 1.0 mil
9 Meter System ± 1.5 mil

-31°F(-35°C) to 185°F(85°C)
5 Meter System ± 3.0 mil
9 Meter System ± 6.0 mil

Operating Loop Power:

Input Voltage Range: 17.5 to 30 VDC
Power Consumption: 0.81W Max
Note: The Driver is protected against reversed polarity.

Isolation:

Case Isolation:	Isolated from all connections
Electrical Isolation:	Terminal block and BNC voltage outputs are isolated and buffered

***If using a CTC Bentley Compatible driver with a Bentley Nevada probe, tolerances are extended to ±10%**

Physical

Materials:

Case:	Anodized/Powder Coated Aluminum
Panel/Din Mount Hardware	Anodized/Powder Coated Aluminum
Gasket:	Neoprene
Prox Connector:	12-32 Threaded Gold plated Brass with Teflon Insulators
BNC Connector:	Polyester Housing, Gold plated center contact, Polymethylpentene dielectric, Zinc or Nickel plated shell
Terminal Block:	Polyamide

Weight:

Driver:	0.24 kg Max

Mounting:

DIN rail:	35mm Standard DIN rail
Panel:	2.0” x 2.0” Panel mount hole pattern **Note: Mounting Screws not included**

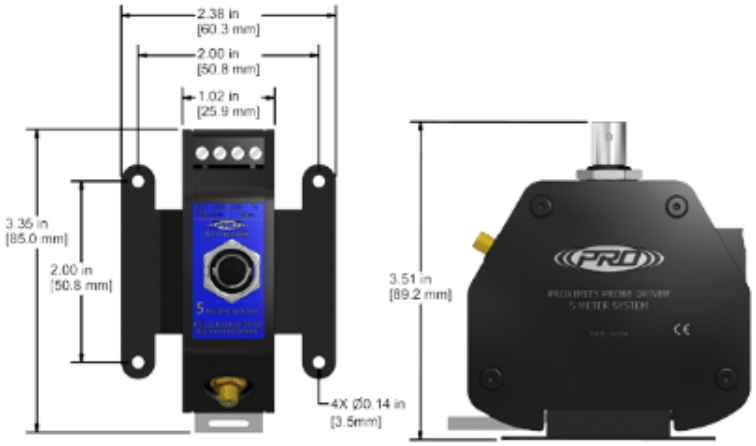

Figure 1 - 8mm Proximity Probe Driver

Installation Information

For most applications, it is recommended that the driver be mounted in a protective housing. More than one driver may share a single housing/enclosure to simplify installation. See PXE Series Enclosures. Drivers are typically DIN rail mounted in the enclosure. Connection to the probe is established when the integral cabling or a proximity probe or an extension cable are connected to the prox connector on the driver. Excess proximity probe cables should be coiled up inside the housing/enclosure. **Do not cut any cable in a probe system, doing so will affect system accuracy.**

Note: Only PRO DP series and DC series proximity products should be used for the PRO DD series 4-20 mA drivers. Only Bently™ Compatible DX series products should be used with each other. Bently™ 3300XL products can be used with the PRO DX series. Substitute cables from other sources should not be used. PRO products are not electrically compatible with other sources and will affect system accuracy.

All connector connections should be tight and secure. Snug the connector screw collar, applying 5 in-lbs (0.6 N-m) of torque.

Note: Do not overtighten the probe cable connection. Do not exceed a torque of 8 in-lbs (0.9 N-m). Too much torque can cause damage. Probe connectors must not touch any machine metal parts. Proper steps should be taken to isolate connectors from metal surfaces. Connector Protectors are available per request.

Electrical Connections

The driver has four terminal connections: -, +, COM and OUT. The 4-20mA loop power is connected to the + and - terminals.

The COM (signal common or signal ground) terminal is isolated from the driver case. COM is not directly connected to the probe cable connectors.

The OUT terminal is the output signal connection, and is a negative voltage output, with the voltage moving more negatively (higher in magnitude) as the gap between the probe and the machine shaft increases. COM is used for the output as well.

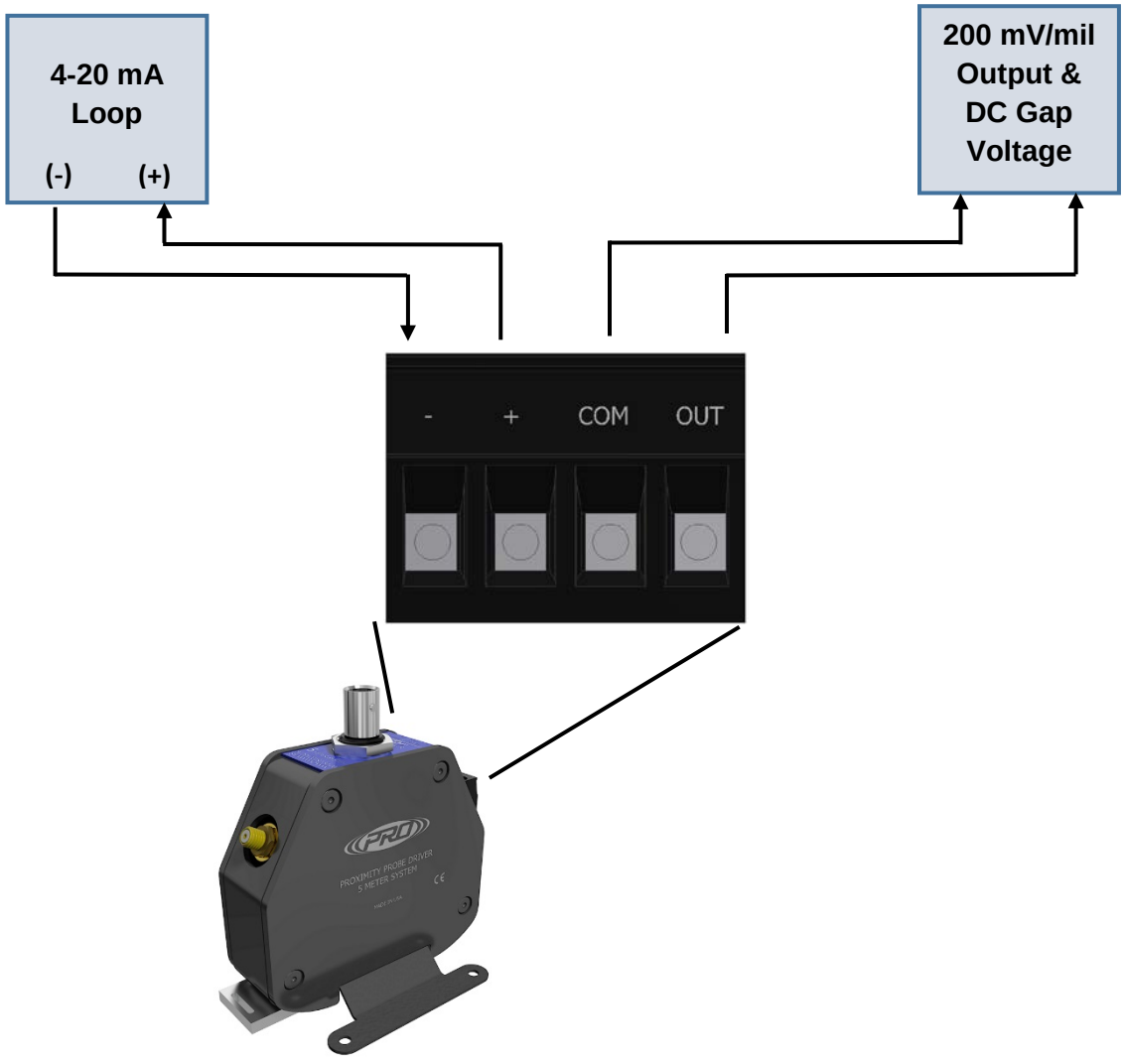

Figure 2 - Wire Connections

NOTE: Wiring Negative to COM Terminal Will Damage the Driver.

Target Surfaces

The target material directly affects the output from the system. Drivers are calibrated for SAE 4140 steel. If the target material differs from SAE 4140 steel, the output will become non linear

For vibration monitoring of rotating shafts, the observed surface must have a roughness not to exceed 32 micro inches (<1 microns) and must be concentric. If the surface is rough or has discontinuities or there is excessive mechanical run-out, false vibration readings will result. To insure measurement accuracy, the target area should be at the circumference of a shaft and perpendicular to the probe tip.

Linear range may be reduced if the target/shaft diameter < 3 inches.

NOTE: Shaft diameters should be uniform in target area, and free of keyways & oil slingers or mechanical damage.

Setup and Adjustment

When all connections to the driver have been made, and the probe is in place, apply power to the system. For applications where the only data of interest is vibration level, where measuring the gap is not important, the voltage at the OUT (signal output) terminal, relative to the COM (common) terminal should be -9.0 +/- 0.5 volts for a mid-range gap of 50 mils. Adjust the probe until this reading is obtained.

For applications where the actual gap needs to be measured, adjust the probe until a reading is obtained that reflects the desired initial gap setting.

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Operation

A PRO DP Probe Assembly operates in combination with a PRO DC extension cable and PRO DP Probe Driver. For the Bently™ DX compatible series, the probe assembly can be interchanged with the Bently™ 3300XL Series components. The driver outputs a signal that is proportional to the gap between the probe tip and the target. The average gap corresponds to the DC component of the output. Vibration is measured by monitoring the DC variation of the signal simulating an AC component. All drivers have the same 20 volt output span. The output sensitivity of the driver is 200 mV/mil for the most widely used 8 mm 3/8-24 probes. This is based upon the 20V span divided by the nominal 100 mil range.

The DD100170 / DX330170 Series drivers are scaled across the entire usable gap range:
10 mils = 4 mA
90 mils = 20 mA.

The DD100190 / DX190 Series radial drivers are scaled across a selectable full scale range. The output is automatically zeroed at any point in the probes range.
For example: If 0-5 mils pp full scale is selected.
0 mils pp = 4 mA
5 mils pp = 20mA
Recommended gap range of 15 – 85 mils.

The DD100191 / DX191 Series axial drivers are scaled across a selectable full scale range. The zero point is at the half scale set point, 50 mils. This is not field adjustable.
For example: If 25-0-25 mils pp full scale is selected.
-25 mils = 4 mA
0 mils = 12 mA
25 mils = 20mA
With a probe gapped at 50 mils or -9 VDC.
25 mils = 4mA
50 mils = 12 mA
75 mils = 20 mA

Troubleshooting Chart

Problem	Recommended Action
-0.5 to -0.6 VDC Signal Output	Check Probe Cable / Ext Cable Connection
No Signal Output	Check Power Supply

Note: For specific problem resolution, please call an Applications Engineer at 1-585-924-5900.

Maintenance

Once the proximity probe assembly have been installed, minimal maintenance will be required. Basic visual checks to ensure integrity and proper function should be made periodically.

General

There are no customer replaceable parts. The proximity probe assembly has been designed for trouble-free service under normal operating conditions.

Warranty

PRO will repair or replace any of our products under warranty so long as the product was not subjected to misuse, neglect, natural disasters, improper installation or modification which caused the defect.

Contact Information

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