



PROTECTION & RELIABILITY
OPTIMIZATION INSTRUMENTS

A CTC COMPANY

P R O D U C T M A N U A L

DX330870, DX890, DX891, DD100870, DD100890, DD100891 Series



25mm Proximity Probe Drivers – Loop Powered 4-20 mA

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SECTION 1: OVERVIEW

Introduction

This document contains information on the operation, installation and maintenance of the DX330870 / DX890 / DX891 / DD100870 / DD100890 / DD100891 proximity probe series products.

Description

The DX330870 / DX890 / DX891 / DD100870 / DD100890 / DD100891 series proximity probe products utilize an eddy current, powered by the 4-20 mA loop power of a PLC, DCS or SCADA system. The 870 series 4-20mA loop is directly proportional to the “gap” distance between the probe and measured surface. The 890 & 891 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.

SECTION 1: DRIVER DETAILS

Proximity Driver Specifications

PRO Model: DD100870 / DD100890 / DD100891 Series
Bently™ Compatible Model: DX330870 / DX890 / DX891 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 an AISI 4140 Steel target, 2.4" in Diameter.

Linear Range (4-20mA Loop)

Calibrated Linear Range: 25 to 525 mils (0.63 mm to 13.33 mm)
Nominal Output: 4-20 mA
Nominal Sensitivity: 0.02 mA/mil (0.787 mA/mm)

Note: Sensitivity for 870 Series drivers only. 890 & 891 Series dependent on selectable full scale range.

Linear Range (Voltage Output)

Calibrated Linear Range: 25 to 525 mils (6.35 mm to 13.33 mm)
Nominal Output: -1.5 to -11.5 VDC
Nominal Sensitivity: 20 mV/mil (0.787 V/mm)

Incremental Scale Factor (ISF)

Note: When measured over calibrated linear range in increments of 25 mils

32°F(0°C) to 113°F(45°C)

5 Meter System 20 mV/mil (0.787 V/mm) ±20%
9 Meter System 20 mV/mil (0.787 V/mm) ±20%

Deviation from best fit Straight Line (DSL)

Note: When measured over calibrated linear range in increments of 25 mils

32°F(0°C) to 113°F(45°C)

5 Meter System ± 12 mil
9 Meter System ± 12 mil

-31°F(-35°C) to 248°F(120°C)

5 Meter System ± 36 mil
9 Meter System ± 36 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

SECTION 1: DRIVER DETAILS

Frequency Response: 5 Hz to 2,700 Hz +0, -3dB

Maximum Loop Resistance: 1,000 Ω

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

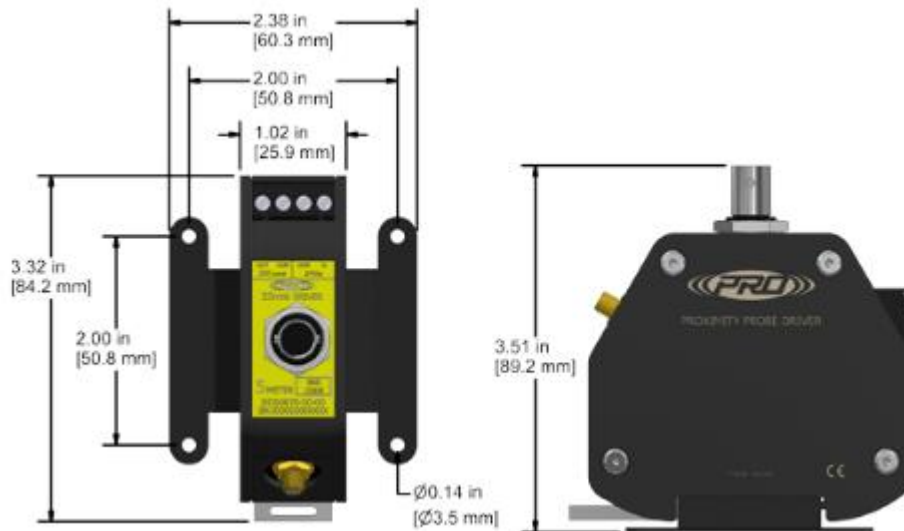


Figure 1 - 25mm Proximity Probe Driver

SECTION 2 : INSTALLATION

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 Protector are available per request.

SECTION 2 : INSTALLATION

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.

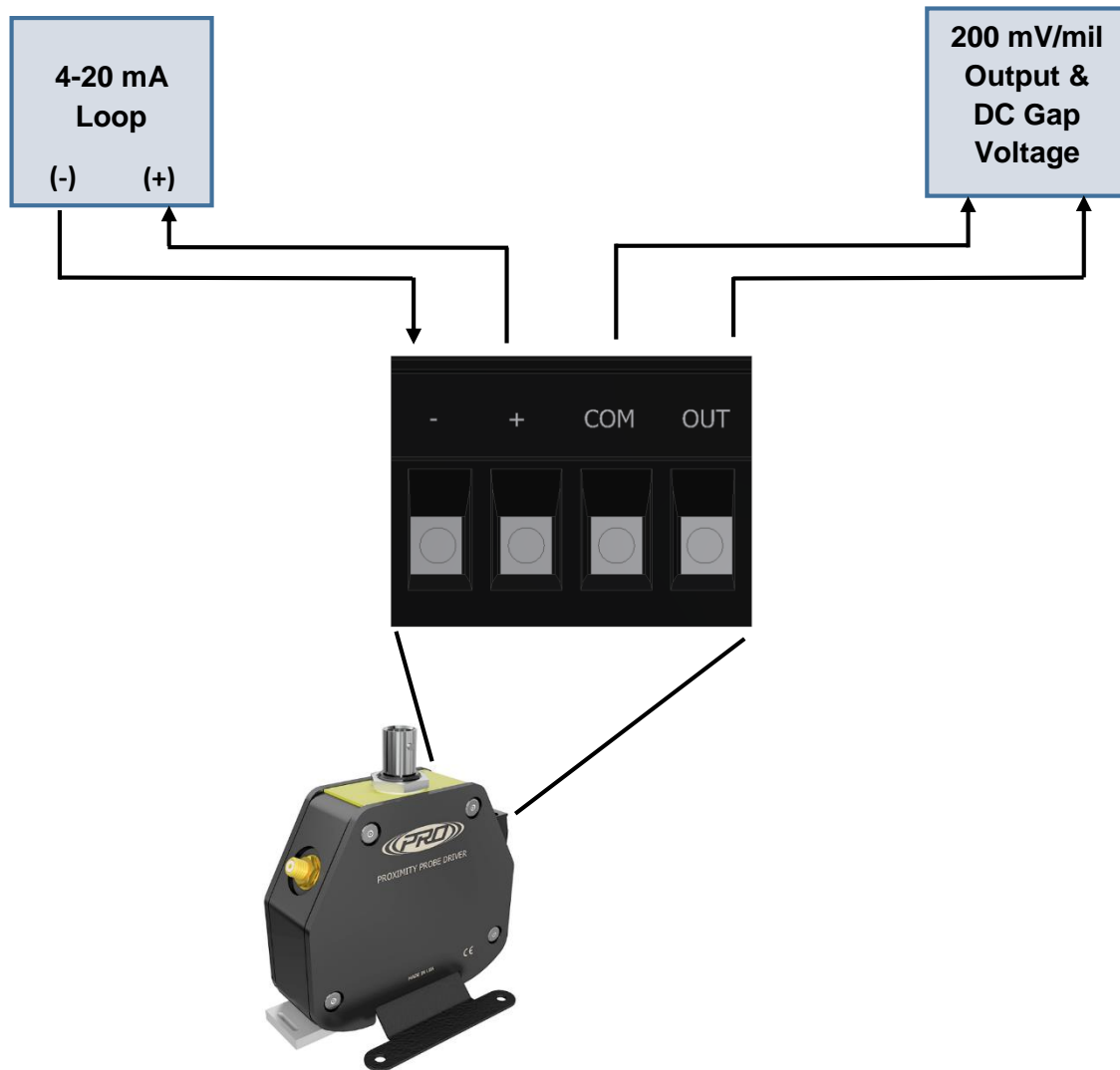


Figure 2 - Wire Connections

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

SECTION 2 : INSTALLATION

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

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

Setup and Adjustment

25mm proximity probes are typically used for measuring differential expansion on steam turbines. This is the measurement of the difference in the rotor expansion and casing expansion.

When all connections to the driver have been made, and the probe is in place, apply power to the system. Adjust the probe until the appropriate output is obtained.

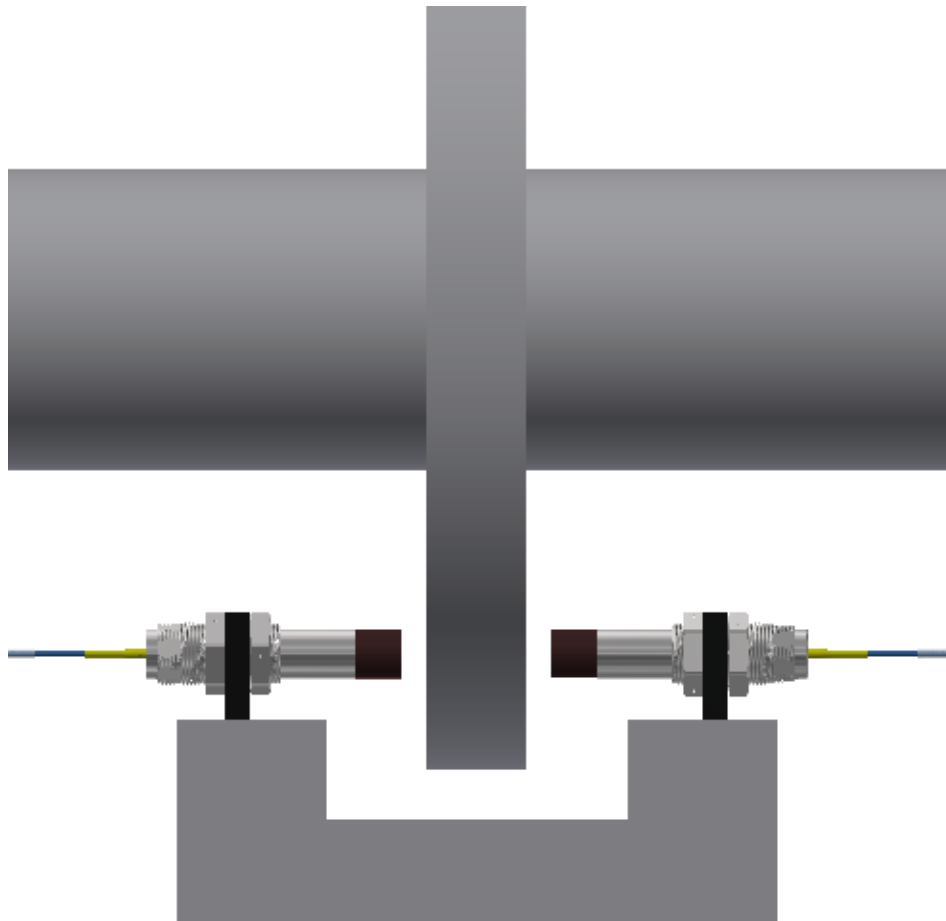


Figure 3 - Differential Expansion

SECTION 3 : OPERATION

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.

The DD100870 / DX330870 Series drivers are scaled across the entire usable gap range:

25 mils = 4 mA

525 mils = 20 mA.

The DD100890 / DX890 Series drivers are scaled across a selectable full scale range:

For example: If 0-50 mils pp full scale is selected.

0 mils pp = 4 mA

50 mils pp = 20mA

Recommended gap range of 75 – 475 mils.

The DD100891 / DX891 Series drivers are scaled across a selectable full scale range:

For example: If 200-0-200 mils pp full scale is selected.

-200 mils = 4 mA

0 mils = 12 mA

200 mils = 20mA

With a probe gapped at 275 mils or -6.5 VDC.

75 mils = 4mA

275 mils = 12 mA

475 mils = 20 mA

SECTION 4 : TROUBLESHOOTING

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.

SECTION 5 : MAINTENANCE

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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