



*PROTECTION & RELIABILITY  
OPTIMIZATION INSTRUMENTS*

A CTC COMPANY

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

**DX990, DX991, DD100970, DD100190, DD100191 Series**



**FFv Proximity Probe Drivers – Loop Powered 4-20 mA**

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# SECTION 1: OVERVIEW

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## Introduction

This document contains information on the operation, installation and maintenance of the DX330970 / DX990 / DX991 / DD100970 / DD100990 / DD110991 proximity probe series products.

## Description

The DX330970 / DX990 / DX991 / DD100970 / DD100990 / DD110991 series proximity probe products utilize an eddy current, powered by the 4-20 mA loop power of a PLC, DCS or SCADA system. The 970 series 4-20mA loop is directly proportional to the “gap” distance between the probe and measured surface. The 990 & 991 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 4: DRIVER DETAILS

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## Proximity Driver Specifications

PRO Model: DD100970 / DD100990 / DD100991 Series  
Bently™ Compatible Model: DX330970 / DX990 / DX991 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, 1.2" in Diameter.

#### Linear Range (4-20mA Loop)

Calibrated Linear Range: 10 to 70 mils (0.25 mm to 1.78 mm)  
Nominal Output: 4-20 mA  
Nominal Sensitivity: 0.2 mA/mil (7.87 mA/mm)

Note: Sensitivity for DD100970 Series drivers only. DD100990 & DD100991 Series dependent on selectable full scale range.

#### Linear Range (Voltage Output)

Calibrated Linear Range: 10 to 70 mils (0.25 mm to 1.78 mm)  
Nominal Output: -1 to -13 VDC  
Nominal Sensitivity: 200 mV/mil (7.87 mV/mm)

#### 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) +12.5% / -20%  
7 Meter System 200mV/mil (7.87V/mm) +12.5% / -20%

#### 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 ± 2.3 mil  
7 Meter System ± 2.3 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

Frequency Response: 5 Hz to 6,000 Hz +0, -3dB

#### Maximum Loop

Resistance: 1,000 Ω

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

# SECTION 4: DRIVER DETAILS

## 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**

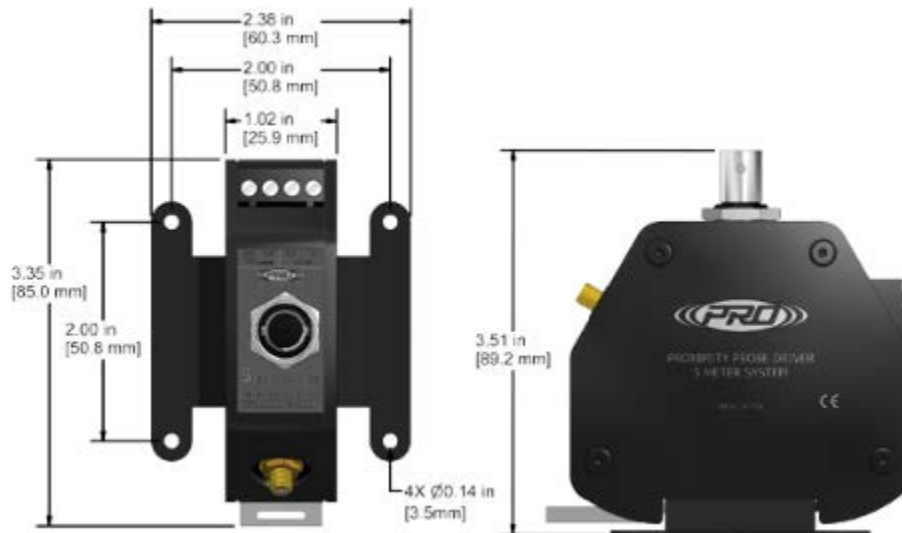


Figure 1 - FFv Proximity Probe Driver

# SECTION 5: 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.

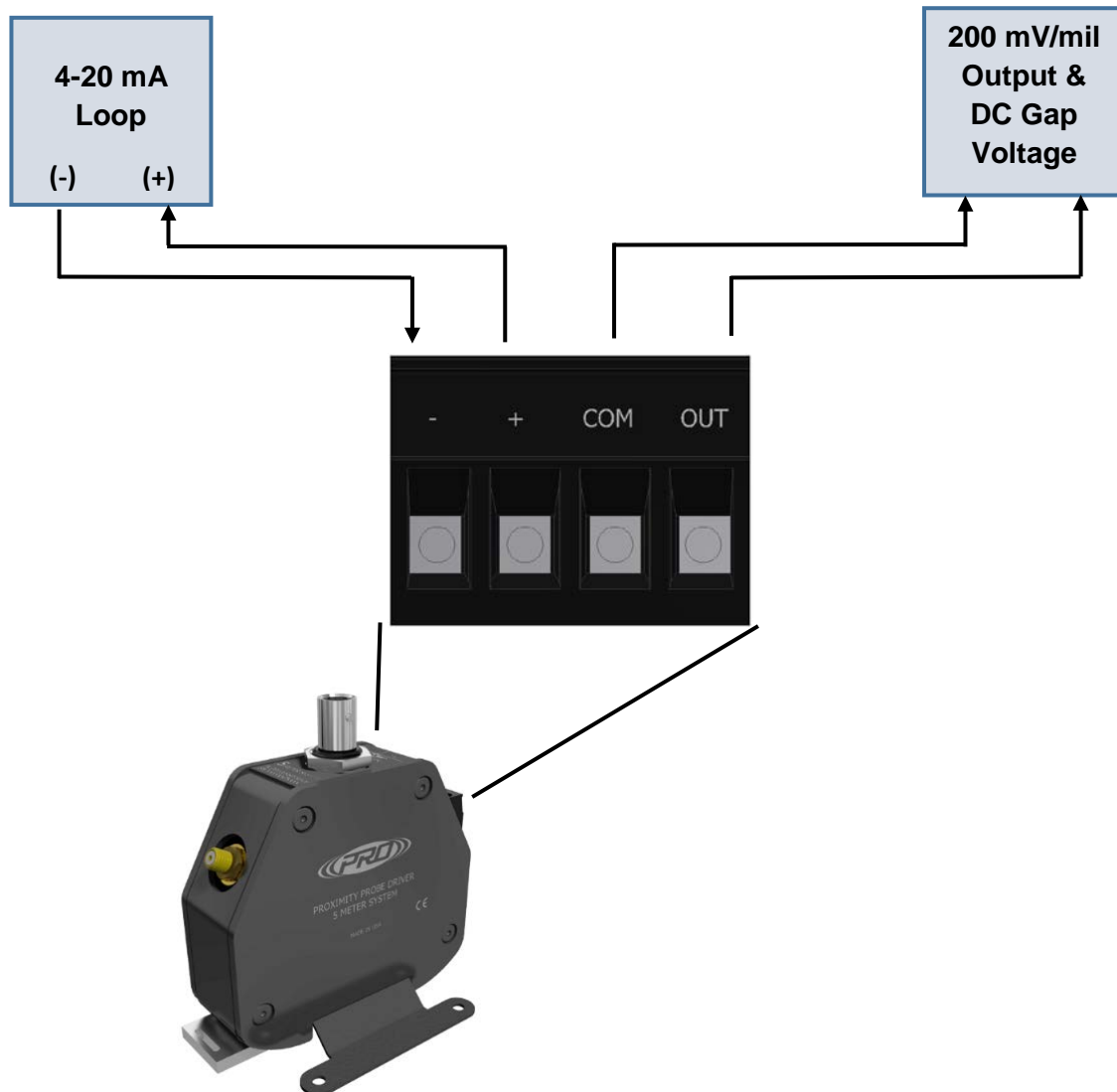


Figure 2 - 4-20mA Wiring

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



# **S E C T I O N   5 :   I N S T A L L A T I O N**

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## **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  $-7.0 \pm 0.5$  volts for a mid-range gap. 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.

# SECTION 6 : OPERATION

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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.

The DD100970 / DX330970 Series drivers are scaled across the entire usable gap range:

10 mils = 4 mA  
70 mils = 20 mA.

The DD100990 / DX990 Series drivers are scaled across a selectable full scale 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 – 65 mils.

The DD100991 / DX991 Series drivers are scaled across a selectable full scale range:  
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 -7 VDC.  
15 mils = 4mA  
40 mils = 12 mA  
65 mils = 20 mA

# SECTION 7: TROUBLESHOOTING

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## 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 8 : MAINTENANCE

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## 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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