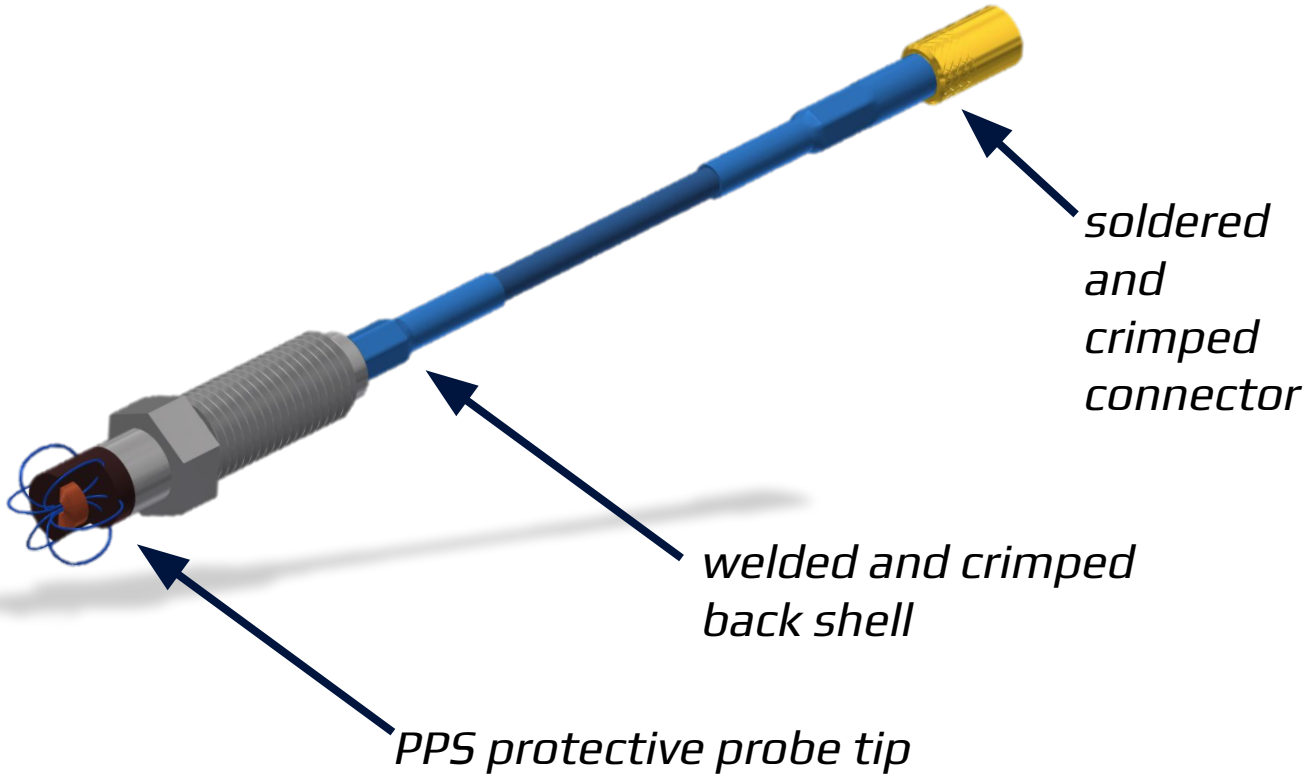
PROXIMITY PROBES EXPLAINED

CONNECTION TECHNOLOGY CENTER, INC. (CTC)

WHAT IS A COMPLETE PROXIMITY PROBE SYSTEM?

A complete Proximity Probe System consists of a **Probe**, an **Extension Cable**, and a **Driver**.

- The probe is a SS 316L shell which contains the sensing element (tip).
- The tip protects a finely-wound wire coil.
- The driver powers the probe which delivers power to the probe's coil.
- The driver powers the coil with an AC signal at approximately 1 MHz.
- This excitation produces a magnetic field radiating from the tip of the probe.
- The signal is then processed by the system driver.

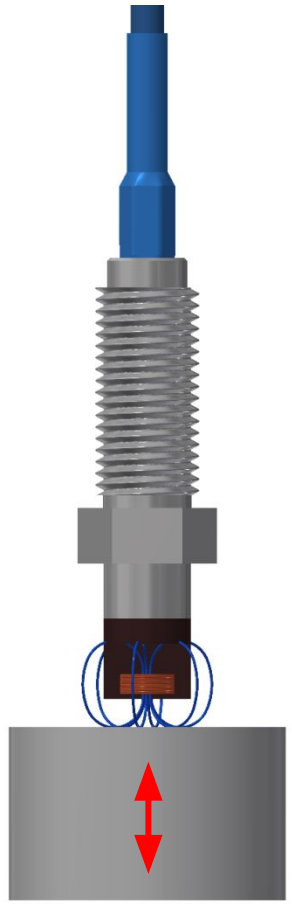


PROXIMITY PROBE FUNCTIONALITY

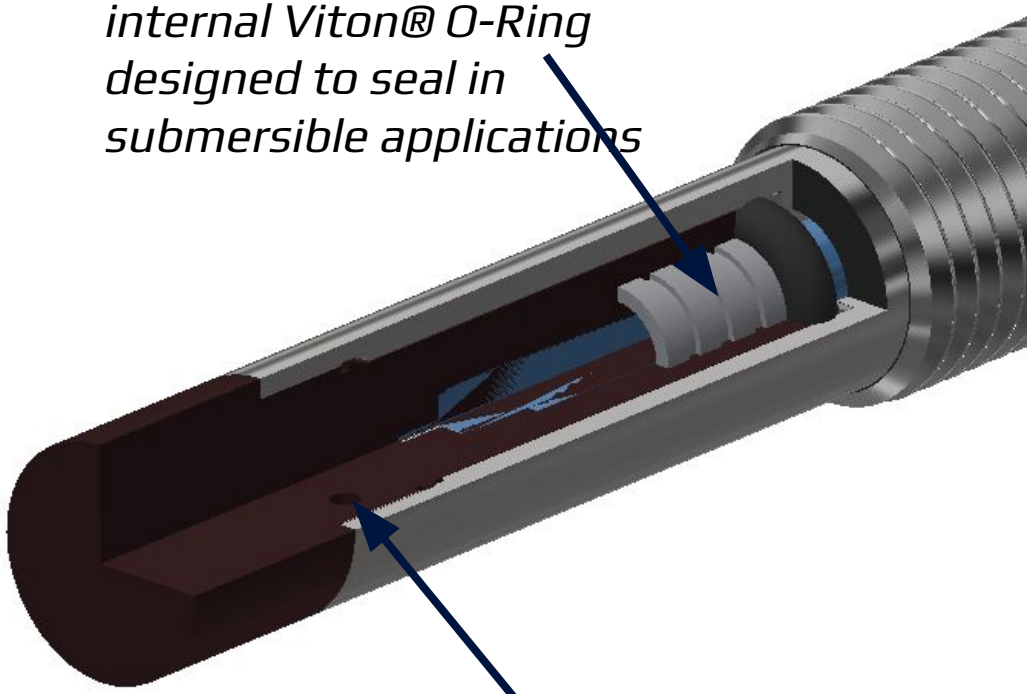
- As a conductive target (or typically a rotating shaft) moves by the surface of the probe, the magnetic field is absorbed by the material.

- Eddy currents are formed in the target material, dampening the probe's coil field.

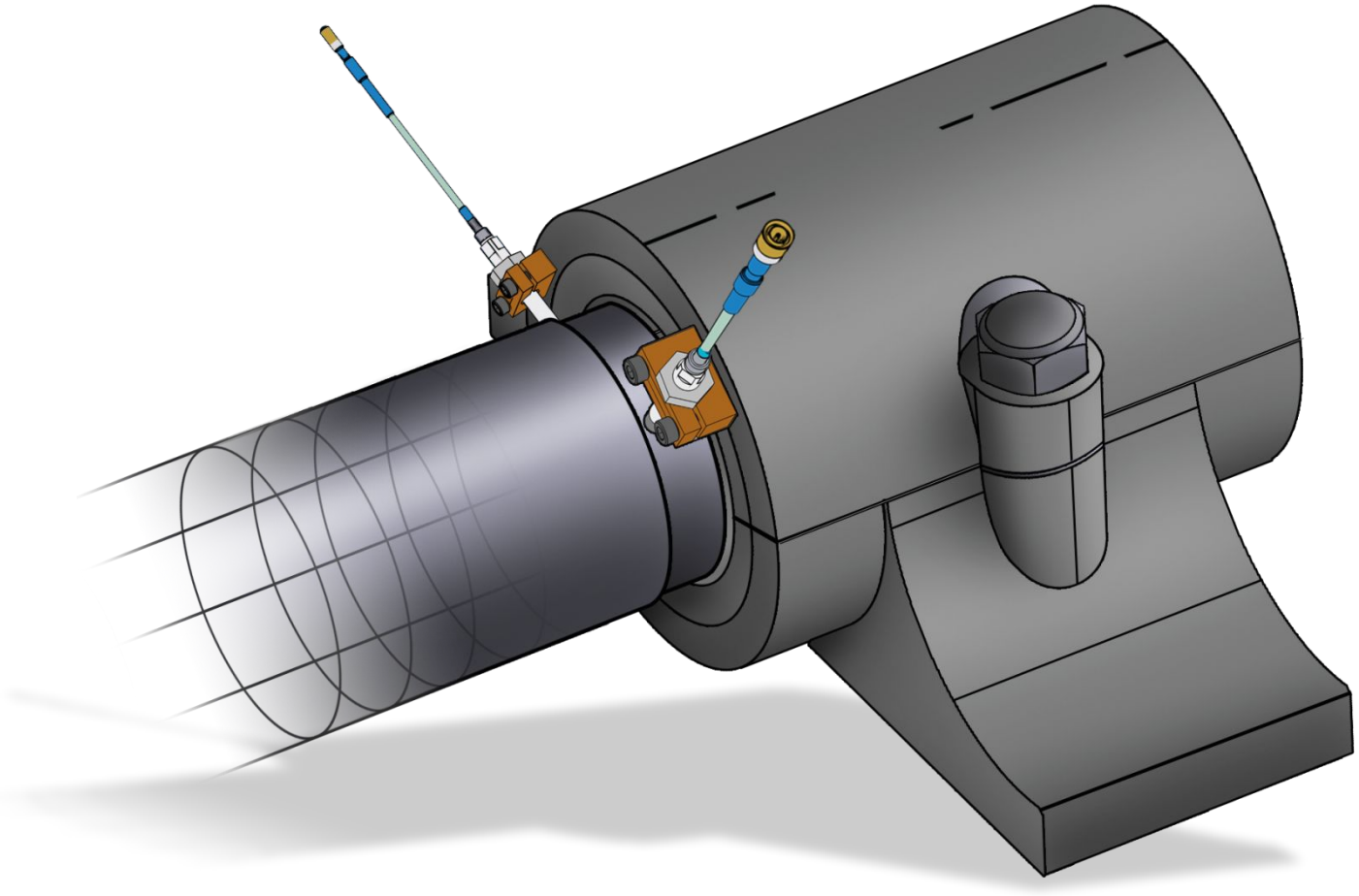
- As a result, the change in the gap of the DC voltage then converts that value to a 200 mV/mil AC signal.



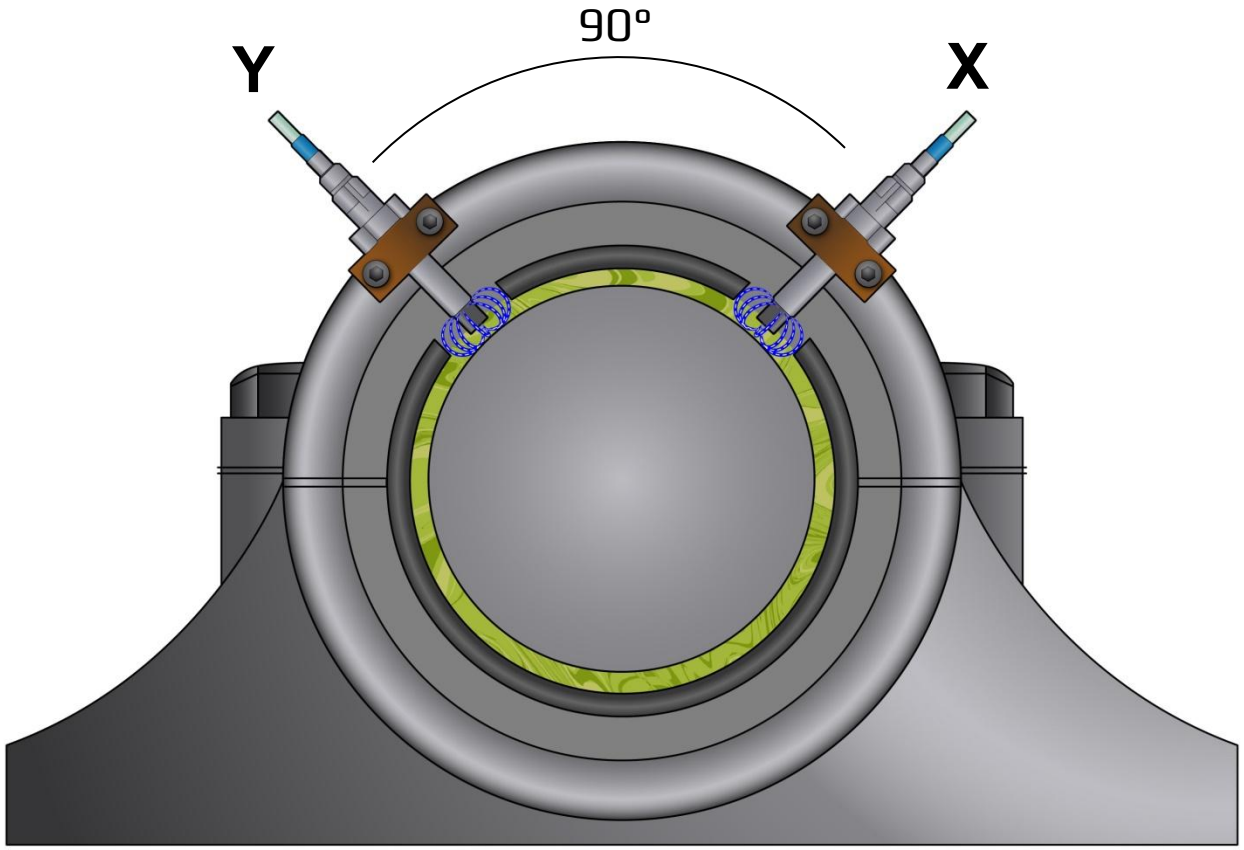
PROXIMITY PROBE STRUCTURE



PROXIMITY PROBE FUNCTIONALITY



PROXIMITY PROBE ORIENTATION

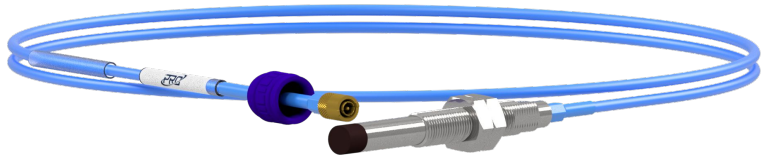


PROXIMITY PROBE SYSTEMS

- **8 mm**, **11 mm**, and **25 mm** systems – total length of either 5 or 9 meters. Length is measured from the probe tip to the driver.

- **FFv systems** – total length of either 5 or 7 meters. Length is measured from the probe tip to the driver.

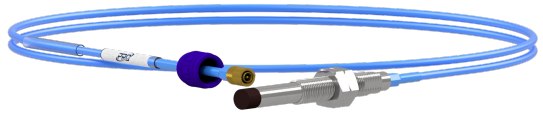
- Drivers are available in **Din Rail o** **Mount** options.



PRO LINE INSTRUMENTS

CTC's PRO Line offers a variety of proximity probes and accessories, including:

Standard Mount Proximity Probe



Reverse Mount Proximity Probe

Armor Jacketed Proximity Probe

Probes, Cables & Drivers

Probe Tips, Drivers & Reverse Mount Housing

(5 mm diameter)
FFv Probe Tip

8 mm Probe Tip

11 mm Probe Tip

25 mm Probe Tip

Panel Mount

DIN Rail Mount

Reverse Mount Housing

PROXIMITY PROBE APPLICATIONS

Proximity Probe Systems are commonly used in applications including:

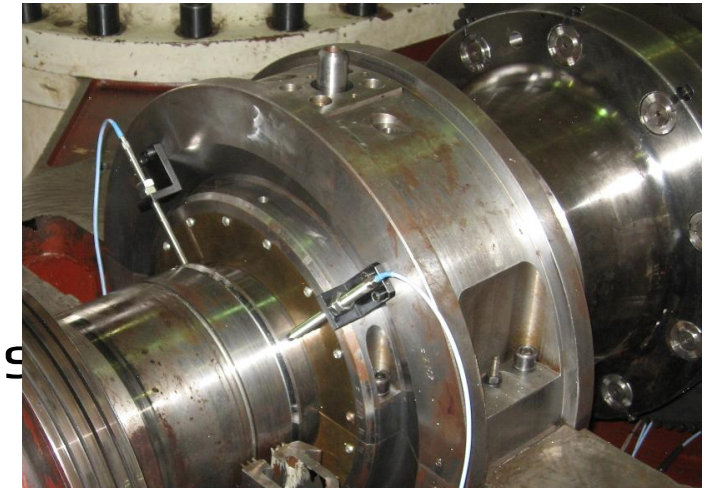
- ❑ Compressors
- ❑ Steam Turbines
- ❑ Pumps
- ❑ Fans
- ❑ Blowers
- ❑ Generators
- ❑ Gear Boxes

8 mm PROXIMITY PROBE SYSTEM

-200 mV/mil Output | **-7.87 V/mm Output** | **10-90 mils (0.25-2.30 mm) Total Range**

Common applications for 8 mm Proximity Probe Systems include:

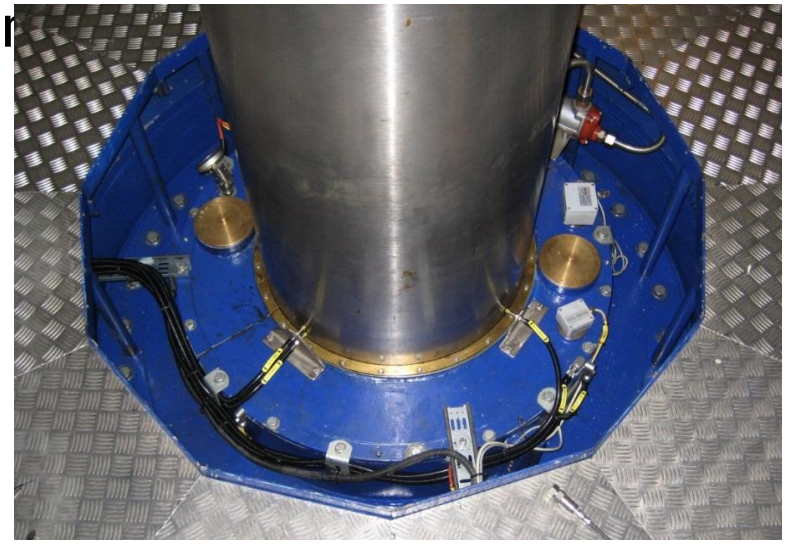
- ❑ Steam Turbines
- ❑ Boiler Feed Water Pumps
- ❑ Gear Boxes
- ❑ Motors
- ❑ Fans
- ❑ General Purpose



11 mm PROXIMITY PROBE SYSTEM

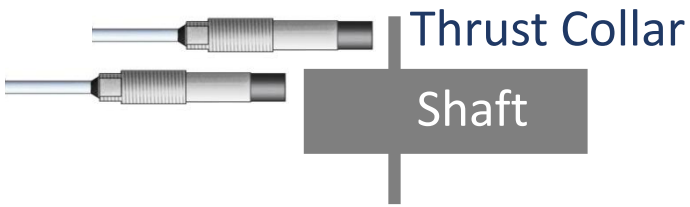
-100 mV/mil Output | -3.94 V/mm Output | 20-180 mils (0.5-4.5 mm) Total Range

Common applications for 11 mm Proximity Probe Systems include:

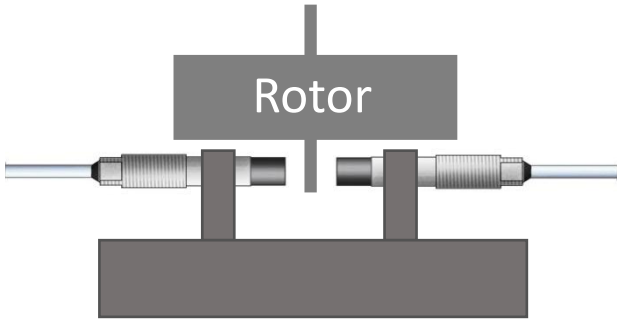


25 mm PROXIMITY PROBE SYSTEM

-20 mV/mil Output | -0.787 V/mm Output | 25-525 mils (0.63-13.33 mm) Total Range



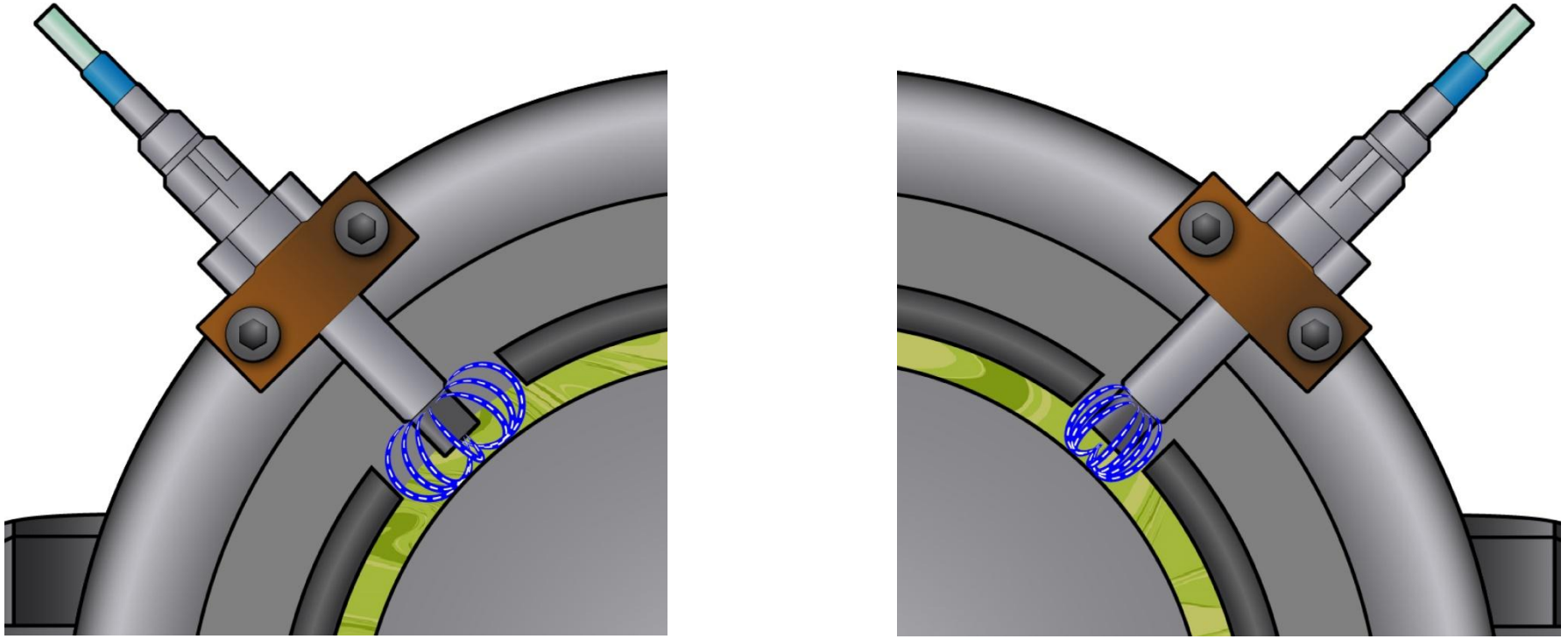
Axial Thrust
shaft axial position



Differential Expansion
axial thermal growth of rotor with respect to the case

FFv PROXIMITY PROBES FOR SHAFTS <50 mm IN DIAMETER

Side clearance around the probe tip should be at least **3x the diameter** of the tip.



HAZARDOUS RATINGS

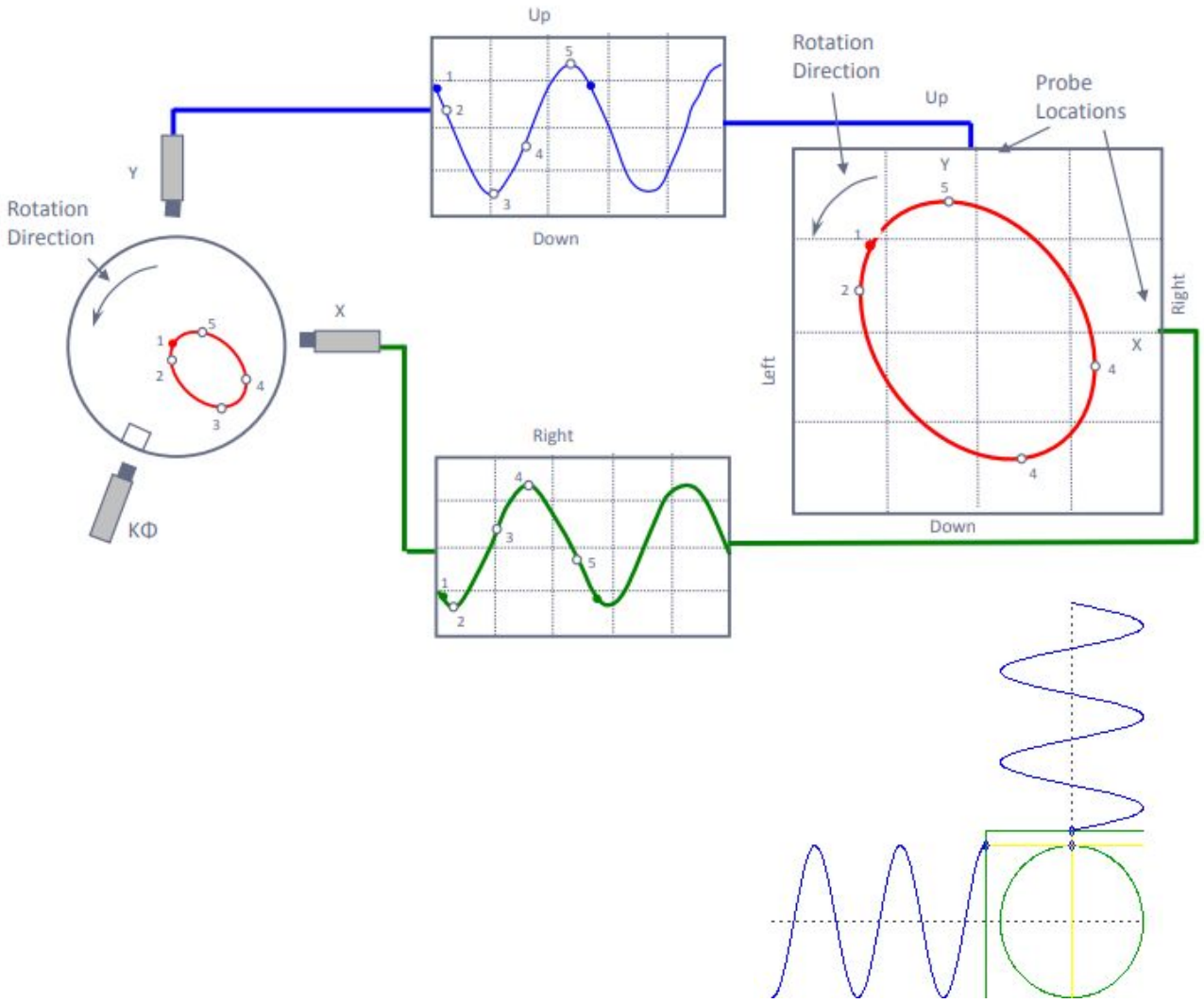
- ❑ North American, ATEX, and IECEx ratings
- ❑ Class 1, 2, and 3 and Divisions 1 and 2 in North America
- ❑ Zone 0, 1, 2 rated internationally

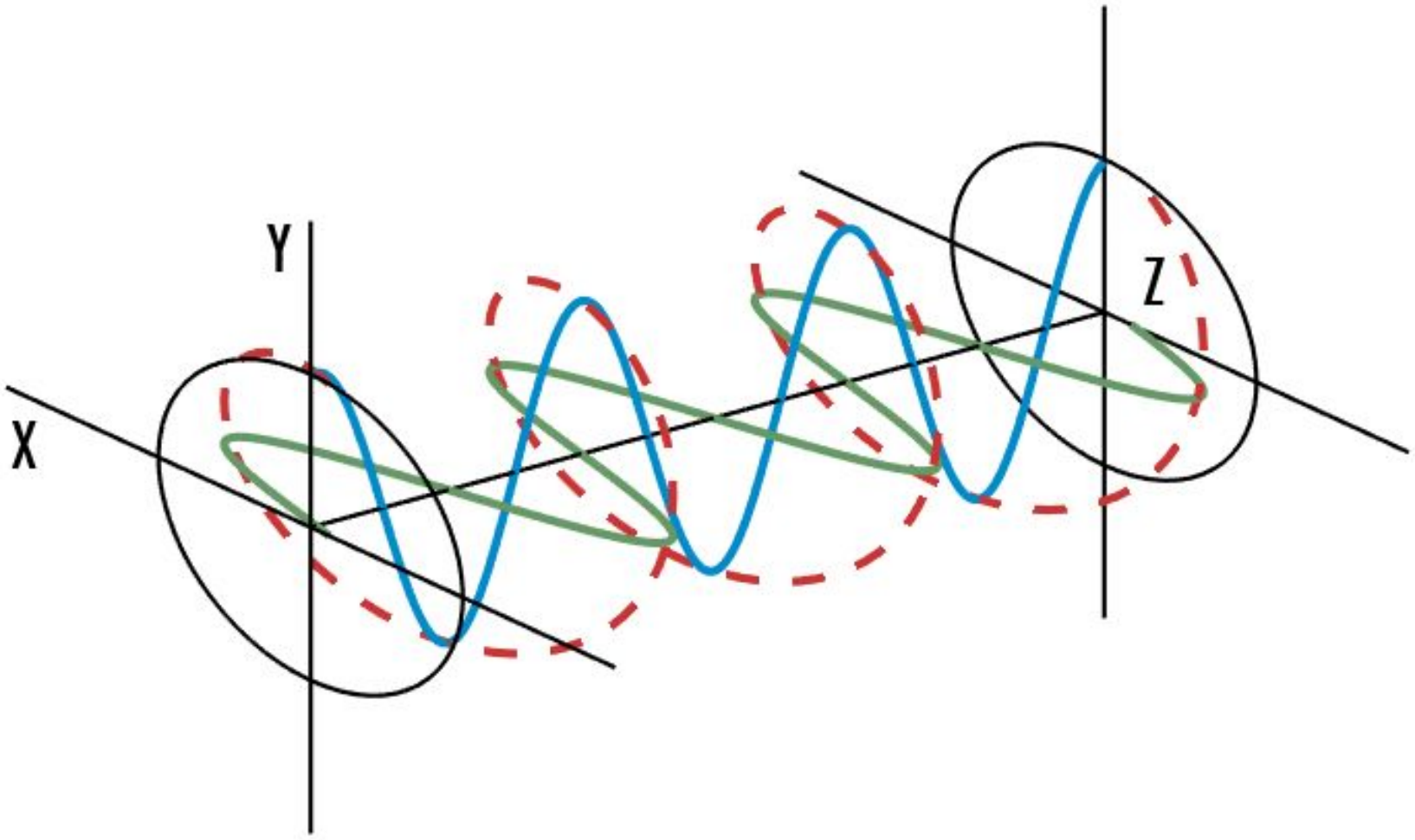
C US

IECEx

“80” SERIES VOLTAGE OUTPUT DRIVER

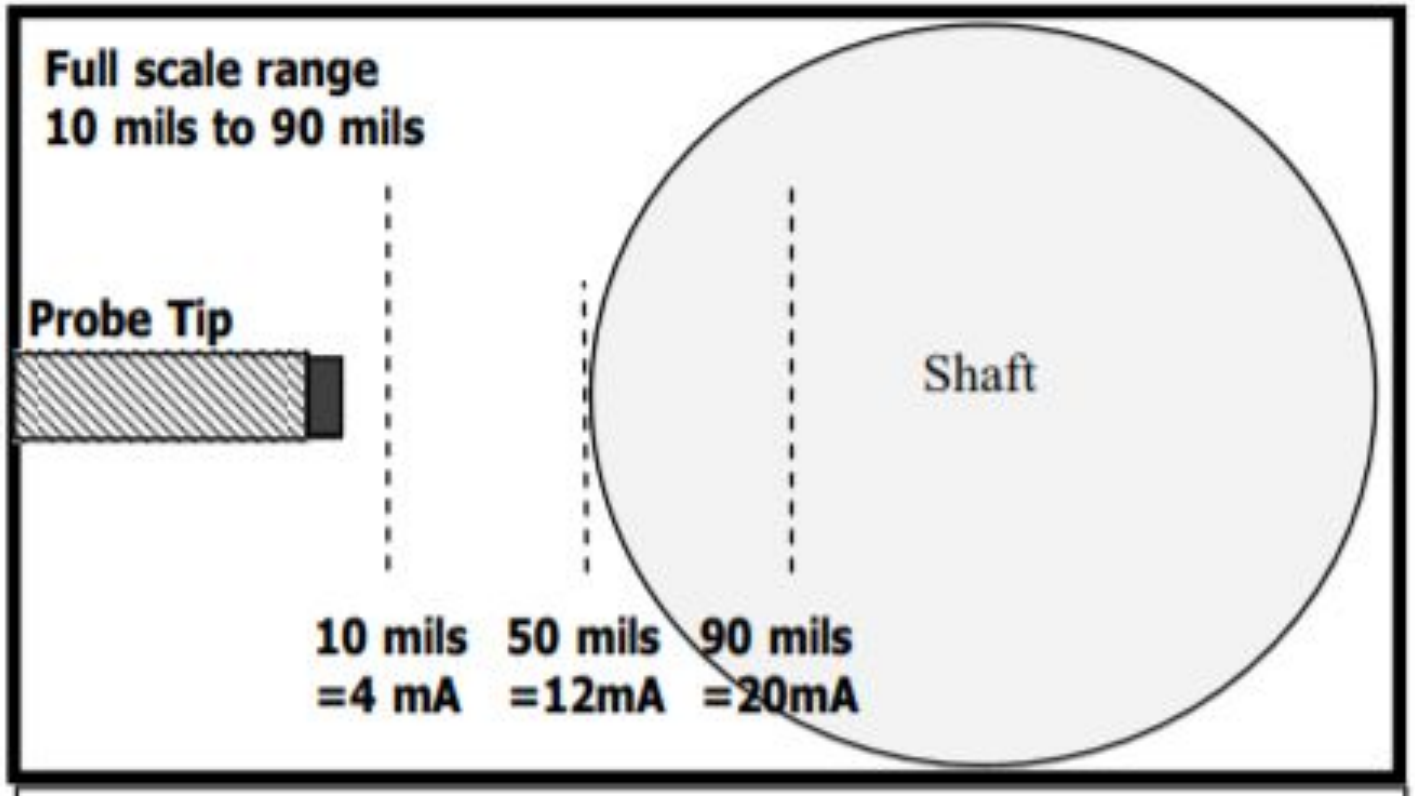
- The “80” Series has a -1 to -17 VDC Voltage Output that is directly proportional to the gap distance between the probe tip and the target material
- Most competitors offer this as their standard Proximity Probe Driver (Proximitor)
- The Voltage Output is also available on the BNC plug for all Driver types




Y
Z
X

“70” SERIES 4-20 mA OUTPUT DRIVER

- 4-20 mA output proportional to the **Dynamic Displacement** of the surface material.
- Linear range – 10-90 mils.
- Can be used for both radial and axial applications.



“90” SERIES 4-20 mA OUTPUT DRIVER FOR RADIAL APPLICATIONS

- “90” Series Drivers are used to measure **Radial Shaft Vibration**
- 4-20 mA Output is proportional to the overall peak to peak vibration in mils around the surface of the shaft
- The output can be proportional to either 0-4, 0-10, or 0-15 mils Peak to Peak (Pk-Pk)

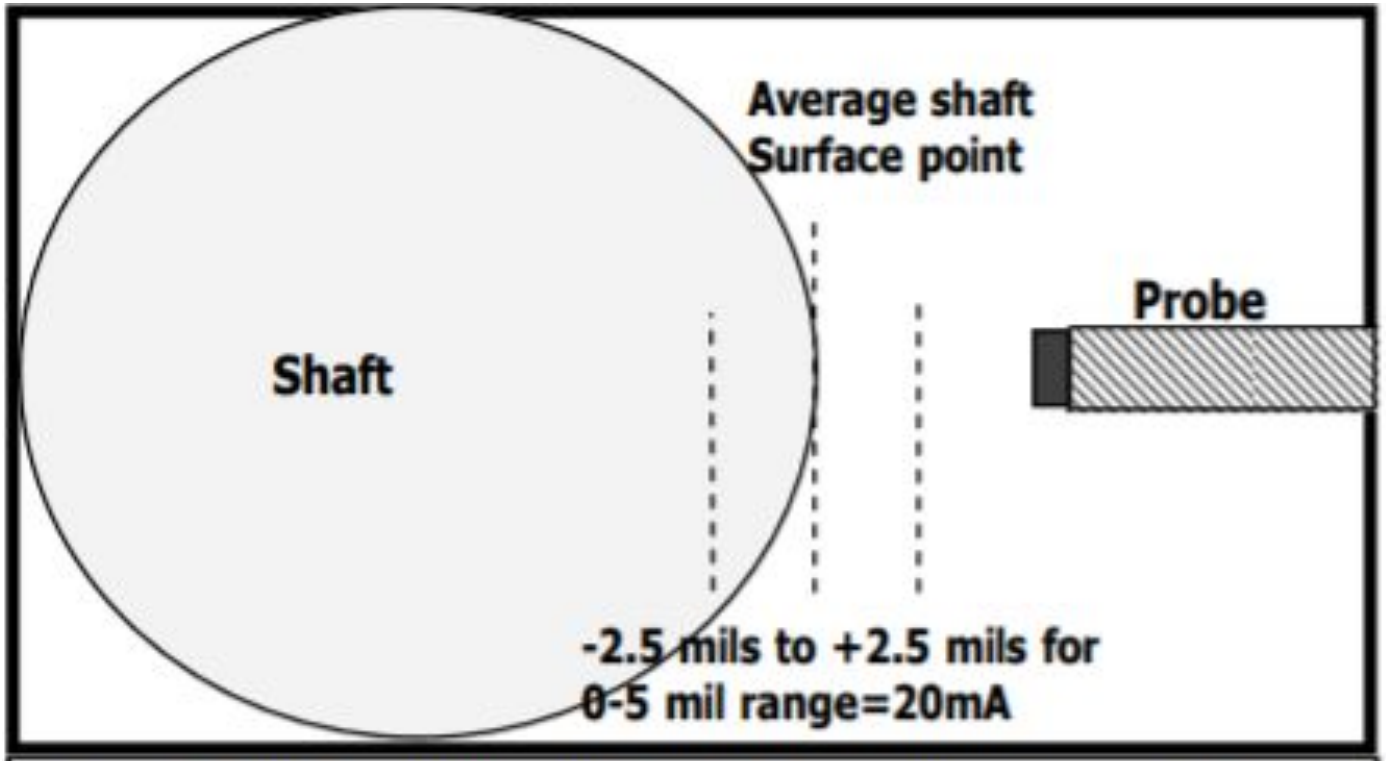


Figure 2– in radial applications the -90 series probe drivers select the average shaft surface distance and the 4-20 is proportional to the overall peak to peak vibration in mils around the average surface of the shaft.

“91” SERIES 4-20 mA RPM DRIVER

- “91” Series Drivers are used to measure **Axial Thrust** and **Differential Expansion**
- 4-20 mA Output is proportional to the DC Displacement between the probe and target material
- The Full Scale is proportional to the positive and negative motion around the midpoint of the overall gap

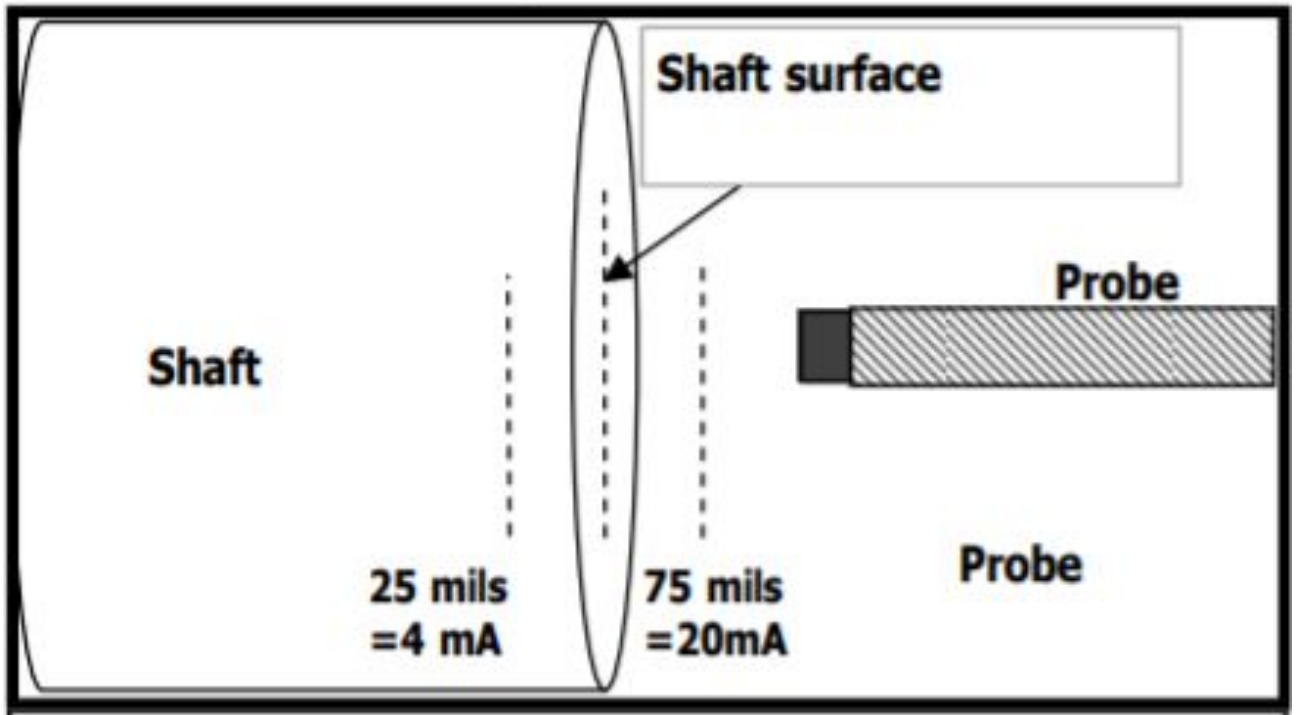


Figure 3– In the thrust position the –91 series probes auto range to the face of the shaft or thrust collar and the 4-20 is proportional to the positive or negative vibration away or toward the probe as shown.

“99” SERIES 4-20 mA RPM DRIVER

- “99” Series Drivers are used to measure the **Operating Speed** of a machine
- These drivers can be configured for use with a single trigger point to 99 trigger points
- Can be used on a shaft with keyways or directed at a gear