

Probe installation tips

by **Larry Covino**
 Design & Installation Services Manager
 Bently Nevada Corporation
 Buffalo, New York

Proper proximity probe installation is critical to effective machinery monitoring. Improper installation can lead to an inaccurate indication of machine condition. Here are a few things to consider when installing proximity probe systems:

- Ensure that the components of the transducer system are compatible and are suitable for the application and environment.
- Tag and document system components to assist with future identification and maintenance.
- To ensure system integrity, always electrically check components before and after installation.
- Develop and maintain a probe orientation plan. This will assist with future servicing and troubleshooting machine faults.

Probe target area preparation - The probe target area should have uniform conductivity and magnetic permeability and be free from residual magnetism and surface defects, such as scratches, dents, rust and corrosion.

Probe target area material - Bently Nevada's standard proximity probes are factory-calibrated to AISI E4140 steel. Identification of the shaft material is critical. If the material differs from the standard, Proximitor® recalibration may be necessary.

Probe target area clearance - Each proximity probe requires sufficient side clearance and shaft surface to provide an accurate signal. Insuffi-

cient clearance/target area will alter the scale factor and linear range. It is also important to provide adequate spacing between proximity probes to avoid signal interference known as cross-coupling. Figures 1 and 2 show the target area tolerances for 3300 Series 8mm proximity probe systems.

Benefits of external mounting

It is normal to mount probes through the machine case or bearing cover when the rotor-related vibration is not transmitted to the mounting area.

The advantages to mounting probes externally include ease of probe adjustment and removal without machine disassembly, and all connectors are external and easily accessible. Using external housing assemblies, such as the 31000 or 21000 (Figure 3) provides complete protection for probes and cables, reducing the risk of physical damage.

Special considerations - external mounting

Unsupported probe sleeve lengths should be no more than 12" (305mm) to

prevent the sleeve from resonating and causing false signals. In general, the recommendation is, make the probe sleeve as short as possible.

In order to install external housings, the machine case must be drilled and tapped. Care must be taken when machining to ensure that the probe tip will be normal to the shaft circumference. There also should be sufficient clearance external to the machine to allow for the easy installation of the probe and sleeve.

When is internal mounting appropriate?

In some machine configurations, the casings are very flexible and vibrate excessively. They can also grow as thermal expansion changes the position of the mounting location relative to the bearing. On some machines, it is physically impossible to mount the probe externally. In these instances, it is necessary to mount the probes internally. Additionally, if there is significant pressure under the casing, externally-mounted probes are not suitable. A high pressure cable seal should be used with an internally mounted probe. A typical installation is shown in Figure 4.

Special considerations - internal mounting

Great care must be taken when installing probes internally. Ideally the probes should be mounted in blocks bolted to the bearing retainer within 2 inches (50.8mm) of the shaft to avoid probe resonance and ease installation.▶

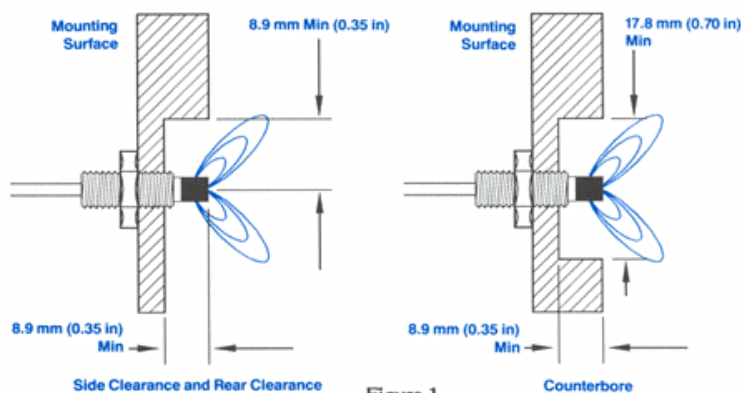


Figure 1
 Proper probe tip side clearance for 3300, 8 mm transducers

Probe brackets should be robust and rigid in design to avoid resonance or failure. Brackets should be positively secured using tie wire or tab-locking washers to avoid the possibility of the bracket or probe working loose.

Probe leads should be securely fastened inside the machine. Windage due to shaft rotation and/or oil spray can cause damage to cables if they are left to "flap in the breeze."

When routing the cable, ensure that the bend radius is never smaller than specified, as it could alter the cable's electrical characteristic and will damage the cable.

Cables should exit the machine below the horizontal split, but well above the oil level and, if possible, at a location that will allow the probe/extension cable connection to be external to the machine. External connections will facilitate calibration checks and trouble-shooting.

Cable exit holes should be sealed with appropriate glands to prevent leakage of oil and other contaminants to the proximity housing. Never use an armored probe or extension cable to exit through a machine casing, as oil will leak out between the cable and the armored sleeve.

It is important to protect the probe to extension cable connection from the ingress of contaminants and to maintain

isolation from electrical ground. Always use the recommended connector protectors or the heat shrink tubing supplied on the 3300 Series Systems. Never use electrician's tape, as oil and heat cause the

tape to deteriorate and melt.

When installing probes internally, it is often prudent to install redundant probes if it is difficult to replace probes once the machine is operating. ■

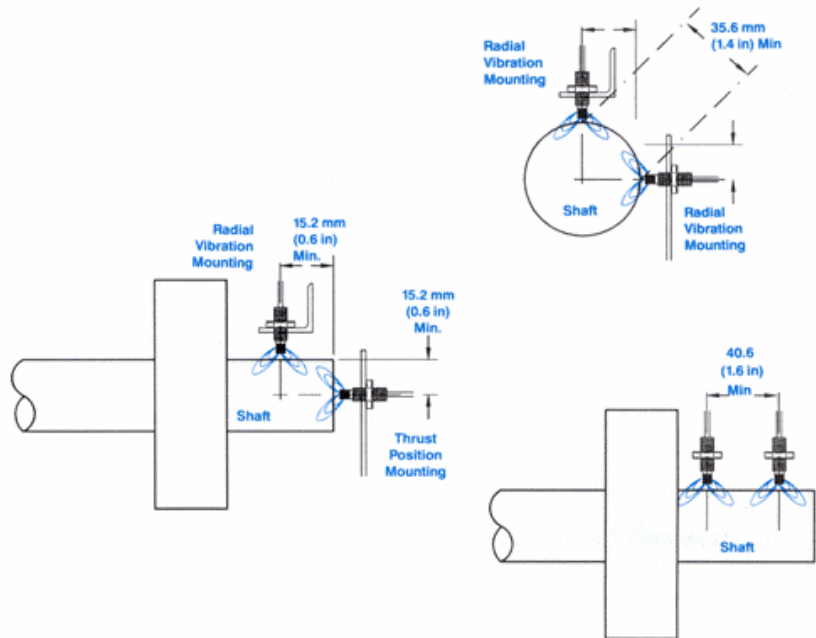


Figure 2
Minimum tip separation needed to prevent cross coupling on 3300, 8 mm transducer



Figure 3
External probe housing assembly

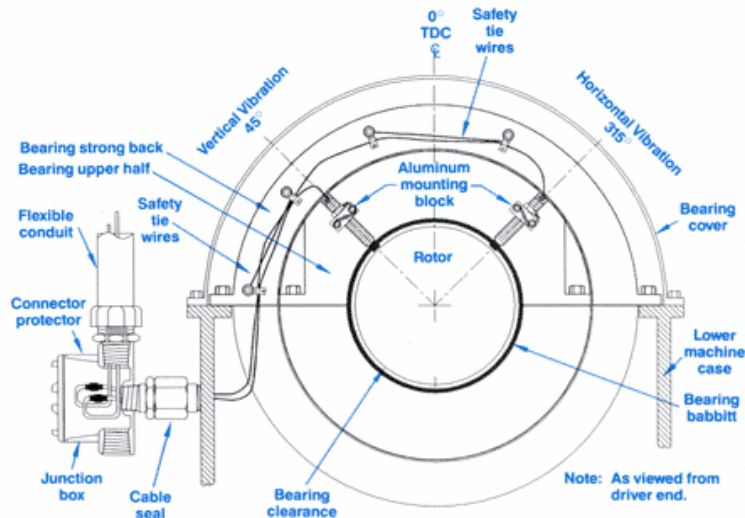


Figure 4
Typical internal probe installation