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Part Number 82595-01
Revision B, 1994

TK85 Proximity Package
Manual

BENTLY
Nevada

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INTRODUCTION

PURPOSE

The TK85 Proximity Package allows two independent channels of temporary displacement measurement using eddy current probes. The package includes a TK85 Dual Temporary Proximitor, two eddy current probes, extension cables, and probe mounting brackets. Existing or temporarily mounted eddy current probes on the machine case are used to measure relative displacement or relative shaft vibration. A probe viewing either a notch or projection on a shaft offers a Keyphasor reference for vibration phase measurements.

FEATURES

- Portable (low weight, small size)
- Battery powered
- Probes, extension cables, and mounting brackets included.
- Low cost
- Two Proximitors in one unit

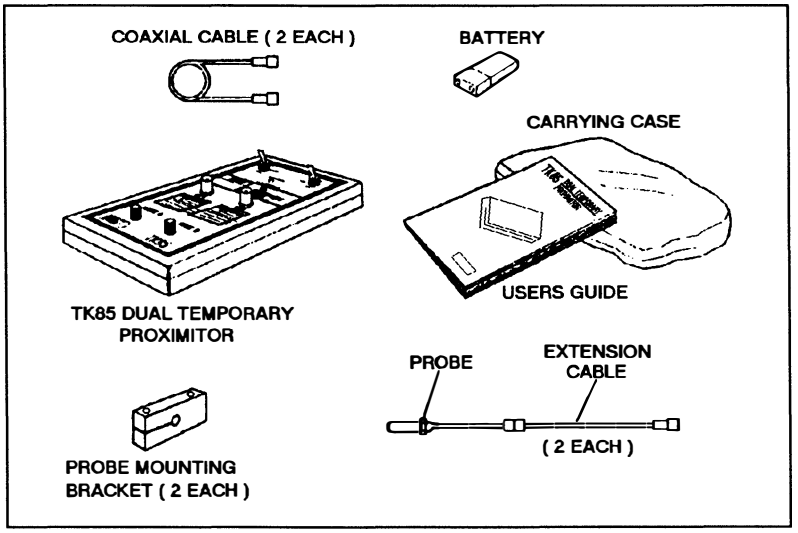


Figure 1
TK85 Proximity Package

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OPERATION

WARNING

Contact with rotating machinery causes severe injury.
Be careful; keep safe distance.

The TK85 Dual Temporary Proximitor may be connected to permanent or temporarily mounted eddy current probes. Required connections are shown in Figure 2.

SHAFT SURFACE CONSIDERATIONS

The observed surface must be free of all irregularities (i.e. scratches, rust, corrosion, out-of-roundness, chain marks, etc.). Irregularities cause a change in probe gap which is seen as a displacement change and results in transducer error.

Consideration must be given to shaft material. The Proximitor response is similar for most common shaft steel alloys, however, some materials have surface areas which present varying values of resistivity. This introduces a noise signal on the Proximitor output. The proximity system is designed to operate with 1000/4000 series carbon steel and most magnetic steels commonly used in rotating machinery. An AISI 4140 steel target is used for calibration.

Some shaft surface treatments (chrome plating, metallizing, etc.) are thin enough to allow the eddy currents to penetrate to the parent shaft material. The probe then observes two different materials as well as the rough interface of the materials. This also results in transducer noise.

USING PERMANENTLY MOUNTED PROBES

A probe with a 5 or 8 millimeter tip is required to be used with the TK85. The probe cable length must be 5 metres. This is made from a combination of a 0.5 metre probe and 4.5 metre extension cable or a 1 metre probe and a 4 metre extension cable. The proximity package is supplied with 1 metre probes and 4 metre extension cables.

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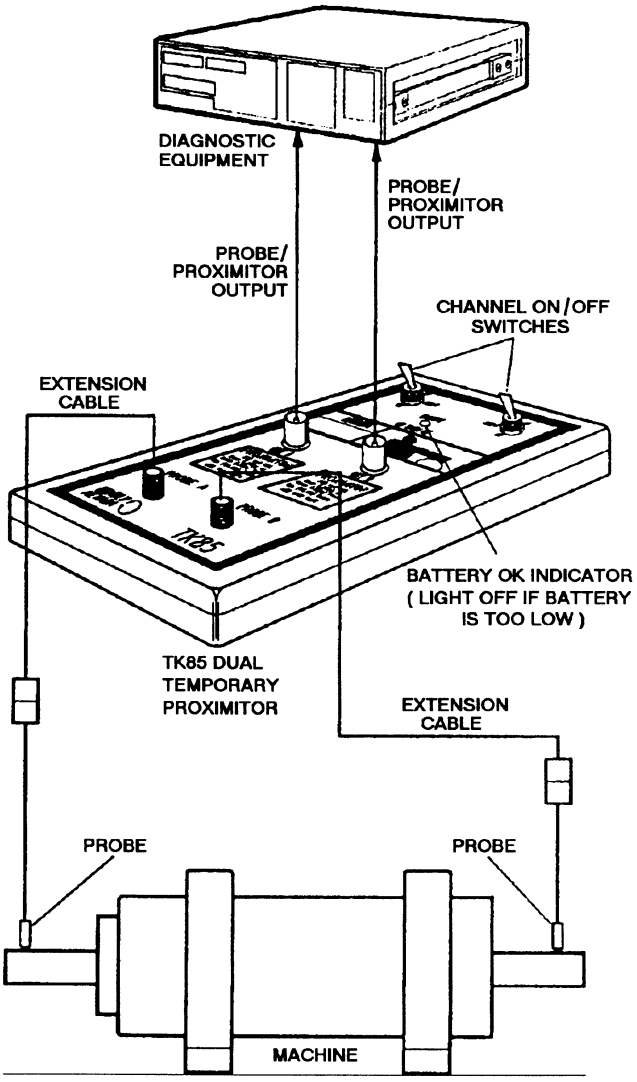


Figure 2
TK85 Controls and Connections

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TEMPORARY PROBE MOUNTING

When permanent probes are not available, temporary probe installations may be used. Accuracy can be maintained if the probes are rigidly mounted. A support for the probe or mounting bracket may need to be fabricated depending on the desired location for the probe.

The probe bracket supplied with the package (see Figure 1) may be used for probe mounting. A threaded hole is provided to hold the probe and allows adjustment of the tip relative to the observed surface. Two holes (0.218" diameter) are for attachment of the bracket using # 10 bolts. When the bolts are tightened, the slot in the bracket allows the threaded hole to compress, locking the probe in position.

A probe mount should offer side clearance to the probe tip of at least 0.2 inches (5 millimeters). Mounting the probe within 6 inches (150 millimeters) of the bearing will avoid vibration nodal points. Do not allow two probes to be within 1.6 inches (40 millimeters) of one another. This will prevent cross talk.

If the system is used to generate a phase reference, make sure the notch or projection is sufficient to create a large enough voltage pulse. The recommended size is at least 60 mils deep (or high), at least 300 mils wide and 400 mils long. The voltage pulse should then be greater than 5 volts.

CAUTION

To prevent damage to the probe tip, make sure it does not physically contact the observed surface of the rotating shaft.

CAUTION

Data errors may occur if weak batteries are used. Weak battery indications are BATTERY OK WHEN LIT indicator being dim, being off or flashing. Use fresh batteries and check indicator often.

PROBE GAP SETTING

1. Screw probe into mounting bracket and set the gap to approximately 50 mils using a plastic feeler gauge.
2. Connect the TK85 as shown in Figure 2.
3. With a voltmeter or instrument reading gap voltage, slowly turn the probe until the voltage reads about -9 Vdc. Tighten bracket bolt or jam nut (do not exceed 25 ft-lb) to secure probe.

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IN CASE OF DIFFICULTY

TEST AND VERIFICATION

Perform the following checks to be sure the TK85 is functioning properly.

1. Set CHAN A switch to ON and CHAN B switch to OFF. BATTERY OK WHEN LIT indicator should be brightly lit and not flashing. If not, check battery connection and battery condition.
2. Repeat with CHAN B to ON and CHAN A to OFF and with both CHAN A and CHAN B to ON.
3. Without probes connected, read the voltage at OUT A and OUT B using a voltmeter or gap voltage instrument such as a TK83. The output should be at least -20 Vdc.
4. In turn, temporaily connect the center pin to the side of the probe connector using a small piece of wire. The respective OUT A or OUT B gap voltage should be less than -1 Vdc.
5. In turn, connect a probe and extension cable to the probe input connector. The respective OUT A or OUT B gap voltage should be greater than -20 Vdc and lower to less than -2 Vdc as the probe tip is brought closer to, and finally touches, a steel target.
6. Set CHAN A and CHAN B switch to OFF.

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PROBLEMS

Problem	Cause/Solution
BATTERY OK WHEN LIT off, dim or flashing	Battery low/ Replace battery Poor connection/ Check connector
Output from one channel but not the other	Disconnect the probe and extension cable from operating channel and connect to second channel. If there is an output from the second channel, then problem is in the probe or extension cable. A problem in the TK85 is indicated if there is no output from the second channel.
Problem in the TK85	Electronic problem/ Conduct the verification test. Damaged connector/ Examine probe connector closely
Problem in the probe	Damaged connector/ Examine probe connector closely Improper probe installation/ Make sure the probe is properly gapped and that adequate side clearances exist Open circuit in probe/ Measure the continuity from the center pin to the shell of the probe cable connector. The value should be less than 10 ohms.

For technical assistance or service,
call Bently Nevada Corporation
800-227-5514
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ORDERING INFORMATION

TK85 Proximity package	82609-01
Includes:	
TK85 Dual Temporary Proximitor	82653-01
BNC-BNC coaxial cable (6 feet)	02211505
Probe	21504-00-20-10-02
Extension cable	21747-040-00
Battery	01810700
Carrying case	04160101
Users guide	82595-01
Probe mounting bracket	3567-01

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SPECIFICATIONS

GENERAL SPECIFICATIONS

POWER REQUIREMENTS

9 Volt transistor battery, alkaline, 5.4 Volts to 10.0 Volts.

BATTERY LIFE

The figures given below are for minimum battery life starting with a fresh battery.

Channel A Only	Channel B Only	Both On
8 hours	8 hours	4 hours

LOW BATTERY CONTROL

If the battery voltage drops to between +4.8 and +5.4 Volts, the low battery control circuit shuts down the Proximitor power supply circuit.

OPERATING TEMPERATURE RANGE

0°C (+32°F) to +50°C (+122°F).
Note: Battery capacity is reduced below 0°C (+32°F).

STORAGE TEMPERATURE RANGE

–20°C (-4°F) to +70°C (+158°F).
Note: Battery shelf life is reduced when stored above +40°C (+104°F).

RELATIVE HUMIDITY

5 to 90 %, non-condensing, operating or stored.

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PROXIMITORS

The following specifications apply to each Proximitor in the assembly when calibrated with a 5 mm or 8 mm probe with 5 metres of cable viewing an AISI 4140 target.

RANGE
80 mils (2.00 mm). Begins at approximately 10 mils (0.25 mm) from probe face.

SCALE FACTOR
200 mV/mil ± 10% (7.87 V/mm)

LINEARITY
Less than 2.3 mils (0.06 mm) deviation from 200 mV/mil straight line.

OUTPUT RESISTANCE
50 ohms, nominal

SHORT CIRCUIT DURATION
Continuous

OUTPUT LOAD
Calibrated into a 10K ohm resistive load with up to 0.01 μf shunt capacitance.

FREQUENCY RESPONSE
+0% –5%, 0 to 600,000 rpm.

OUTPUT NOISE
Less than 10 mV peak-to-peak when terminated into a 0.01 μf capacitor load.

INDICATION OF FAULT CONDITIONS
The output will go to greater than –20 volts if an open fault occurs, or within 1 volt of common if a short fault occurs, in an extension cable or probe.

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