

FLUKE®

80PK-6A

Type K Exposed Junction Probe

Instruction Sheet

WARNING

TO AVOID ELECTRICAL SHOCK, DO NOT USE THIS PROBE WHEN VOLTAGES EXCEEDING 24V AC RMS OR 60V DC ARE PRESENT. THE PROBE TIP IS ELECTRICALLY CONNECTED TO THE OUTPUT TERMINALS.

INTRODUCTION

The 80PK-6A Type K Exposed Junction Probe is essentially a bead probe with a handle that can be used as a surface probe. The stainless steel sheath allows the bead to measure temperatures higher than bead probes with flexible leads. The handle also allows you to apply more focused surface pressure without having your hand in close proximity to the source. The 40-inch (1-meter) cable is terminated with a Type K miniature thermocouple connector with 0.792-mm (.312-in) pin spacing. The 80PK-6A can be used with any temperature-measuring instrument that is designed to accept Type K thermocouples and has miniature connector input.

SPECIFICATIONS

Type: K: Standard Grade Ni-Cr vs Ni-Al (Chromel vs Alumel)

Measurement Range: -40°C to 816°C (-40°F to 1500°F)

Accuracy: (With respect to ANSI MC96.1 Standard Limits of Error):

NOTE

All error calculations should be done in °C, then scaled to °F.

RANGE	ACCURACY (% of reading)
-40°C to 275°C (-40°F to 527°F)	±2.2°C
275°C to 816°C (527°F to 1500°F)	±0.75% (°C)

November 1987 Rev.1, 4/02

© 1987-2002, Fluke Corporation, All rights reserved. Printed in U.S.A.

All product names are trademarks of their respective companies

Output: @ 25°C (77°F) =1.00 mV (reference junction @ 0°C)

Seebeck Coefficient: 25°C (77°F) = 40.50 $\mu\text{V} / ^\circ\text{C}$

Measurement Time (Time Constant): 3.0 seconds for air moving at 3.33 meters / second (10.9 feet / second) at sea level pressure (5 time constants = 1 complete step change, i.e., 15 seconds)

Maximum Voltage: 24V ac rms or 60V dc

Maximum Temperature of Tip: 816°C (1500°F)

Sheath

Material: 304 Stainless Steel

Dimensions

Diameter: 4.8 mm (.19 in)

Length: 20.32 cm (8 in)

Bead (sensor) Sheath

Material: Inconel 600

Dimensions

Diameter: 1.0 mm (.04 in)

Length: 6.35 mm (.25 in)

Grounding: Junction Welded to Sheath.

Cable

Length: 40 inches (1 meter)

Insulation

Material: PVC

Maximum Temperature: 105°C (220°F)

Jacket Color: Gray

Conductors

Type: K

Size: AWG #24 stranded (7 strands of #32)

Handle

Material: Gray Hytrel

Maximum Temperature: 125°C (257°F)

Connector

Type: Mini-thermocouple connector with .792 mm (.0312 in) pin spacing

Material: Yellow Hytrel

Maximum Temperature: 1.25°C (257°F)

Overall Probe Length: 31.9 cm (12.55 in) from tip to end of cable strain relief.

Protection: Class 3. Relates solely to insulation and grounding properties defined in IEC 348.

MEASUREMENT CONSIDERATIONS

Instrument Compatibility

The 80PK-6A is compatible with any temperature-measuring instrument that's accepts Type K thermocouples, has a miniature thermocouple connector, and has cold reference junction compensation. Accuracy of the temperature-measuring instrument must be considered along with the 80PK-6A accuracy specification to determine the overall accuracy of the combination.

Temperature Limitations

The tip area (thermocouple-sheath) of the 80PK-6A has a continuous temperature rating of 816°C (1500°F). However, the opposite end of the sheath nearest the handle should not be subjected to temperatures greater than 125°C (257°F). This is the maximum temperature limitation of the handle.

Media Limitations

The stainless steel sheath should not be exposed to halides or sulfides. Even though the sheath to junction transition is sealed, it is not recommended to immerse the probe in liquid or saturated vapor. The 80PK-6A should not be used in reducing atmospheres or in a vacuum. Excess mounting force can deform or crush the bead. With the probe perpendicular to the measurement surface, do not apply more than 12.25 new tons (2.75 pounds-force). Use proportionally less force as the angle to the measurement surface becomes more acute.

OPERATION

Use the 80PK-6A as follows:

1. Using the miniature (0.312 inch spacing) thermocouple, connect the 80PK-6A to a compatible Type K temperature-measuring instrument.
2. Turn on the measuring instrument, and select the appropriate range and scale.
3. Check the read out on the measuring instrument. With no heat or cold source applied to the bead, the measuring instrument should display the ambient (room) temperature. If the instrument does not read out properly, refer to the TROUBLESHOOTING paragraphs that follow.

MINIMIZING THERMAL SHUNTING

The 80PK-6A Exposed Junction Probe should be inserted at least 6.35 cm (2.5 in) into the environment to be measured to minimize the shunting effect of the sheath.

MEASURING TECHNIQUE

Here are some suggestions for improving the accuracy of your temperature measurements:

1. Make sure there is a good connection between the probe and the surface you are measuring by doing any of the following:
 - a. Increase the mounting pressure
 - b. Use an interface agent (such as silicone grease) between the thermocouple probe and the surface you are measuring.
 - c. Use a thermal epoxy to attach the thermocouple.
2. When measuring higher than ambient temperatures, adjust the connection between the probe and the surface until you get the highest temperature reading. To ensure a good connection, see the suggestions above.
3. When measuring lower than ambient temperatures, adjust the connection between the probe and the

surface until you obtain the lowest temperature reading. To ensure a good connection, see the suggestions above.

4. When measuring near ambient temperatures, make the reading when the multimeter when the multimeter read-out is most stable.

TROUBLESHOOTING

With no heat or cold applied to the probe, the measuring instrument should display the ambient temperature. If the measuring instrument does not read out properly, try the following:

1. Verify that the temperature-measuring instrument is designed to be used with Type K thermocouples. The temperature-measuring instrument should have a yellow input connector and / or be marked with a "K".
2. Check for an open circuit indicator on the measuring instrument. Some temperature measuring instruments have a built-in circuit to indicate if the connected probe is open. (All Fluke Temperature-measuring instruments have this feature.) Refer to the owner's manual accompanying the measuring instrument to see if this feature is available.

Short the two input pins of the measuring instrument with a piece of wire. If the instrument is functioning, it should indicate the ambient temperature.

3. If you suspect a broken connection, use an ordinary ohmmeter to read the continuity of the measuring instrument from pin to pin. The ohmmeter should read 20 ohms or less if there is continuity.

SCALE CONVERSIONS

Use the following equation to convert °C to °F:

$$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$$

Use the following equation to convert °F to °C:

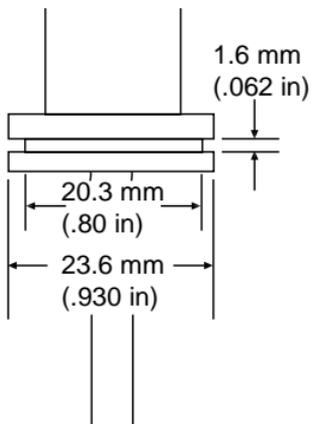
$$(^{\circ}\text{F} - 32) \times 0.5556 = ^{\circ}\text{C}$$

PROBE MOUNTING GROOVE

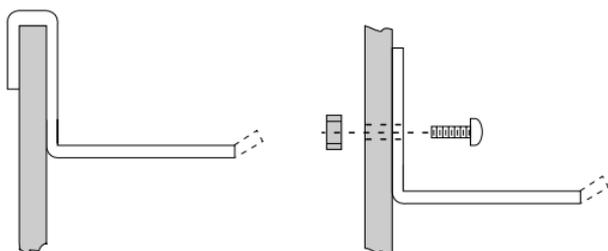
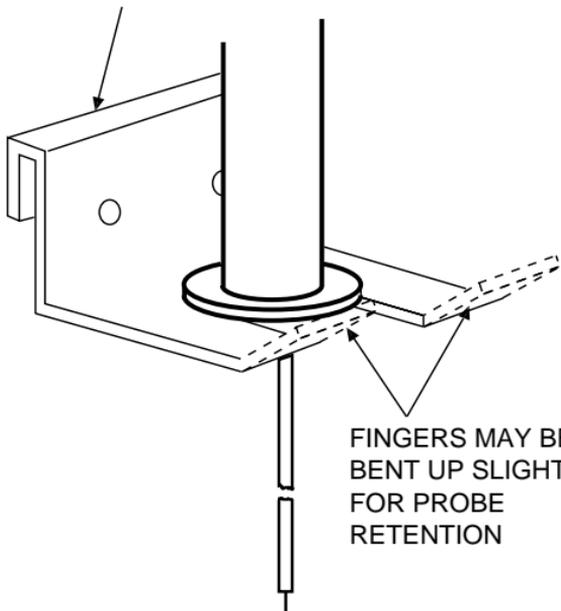
The probe finger guard contains a groove to simplify mounting the probe in a fixed position. The figure below shows nominal dimensions for the finger guard and groove, and suggests a temporary quick mounting method. However, any mounting method should be carefully designed to prevent damage to the probe or the measured medium.

CAUTION

The handle and plug of the probe are made of material that may deteriorate when exposed to some solvents on a long-term basis.



CLIP NOT INCLUDED WITH PROBE



ONE YEAR LIMITED WARRANTY

Fluke warrants your accessory to be free from defects in material and workmanship under normal use and service for 1 YEAR from date of purchase to the original purchaser. The warranty does not apply to batteries or fuses or when the accessory has been misused, altered, or damaged by accident or abnormal conditions of operation.

For warranty service, send the accessory with a description of the difficulty, postage prepaid, to a Fluke Service Center. Fluke assumes no risk for damage in transit. Fluke will, at our option, repair or replace the defective accessory free of charge. However, if we determine that the failure was caused by misuse, alteration, accident or an abnormal condition of operation, you will be billed for the repair. The repaired accessory will be returned, transportation prepaid.

FLUKE MAKES NO WARRANTY OTHER THAN THE LIMITED WARRANTY STATED ABOVE. ALL WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, ARE LIMITED TO A PERIOD OF 1 YEAR FROM THE DATE OF PURCHASE. FLUKE SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT, TORT, OR OTHERWISE.

NOTE (USA only)

Some states do not allow limitation of implied warranties, or the exclusion of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may have other rights, which vary from state to state.

For application or operation assistance, or information on Fluke products, call:

USA: 1-888-99-FLUKE (1-888-993-5853)

Canada: 1-800-36-FLUKE (1-800-363-5853)

Europe: +31 402-678-200

Japan: +81-3-3434-0181

Singapore: +65-738-5655

Anywhere in the world: +1-425-446-5500

Or, visit Fluke's Web site at www.fluke.com.

Address correspondence to:

Fluke Corporation

P.O. Box 9090

Everett, WA 98206-9090

USA

Fluke Europe B.V.

P.O. Box 1186

5602 BD Eindhoven,

The Netherlands