FLUKE®

Instruction Sheet

80PK-1

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-1 is a Type K Bead Thermocouple designed for general purpose temperature measuring applications. It has an extremely fast response time, due to the low thermal mass of the exposed tip. The 40-inch (1-meter) Teflon cable is terminated with a Type K miniature thermocouple connector with 0.312-inch (0.792-mm) pin spacing. The 80PK-1 can be used with any temperature measuring instrument that is designed to accept Type K thermocouples and that has a miniature connector input.

The 80PK-1 must be used in Teflon-compatible environments and is not suitable for liquid immersion. Above 260°C (500°F), Teflon will emit toxic fumes.

SPECIFICATIONS

Type: K Special Grade (Chromel vs Alumel)

Measurment Range: -40°C to 260°C (-40°F to 500°F) continuous

Accuracy (with respect to NBS tables for Special Grade): ±1.1°C (2.0°F) over the range of 0°C to 260°C (32°F to 500°F) Typically within 1.1°C (2.0°F) of NBS Tables over the range of -40°C to 0°C (-40°F to 32°F)

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Output: 25°C (77°F) = 1.00mV (reference junction at 0°C)
Seebeck Coefficient: 25°C (77°F) = 40.50 µV / °C
Measurement Time (Time Constant): 2 seconds (for air at room temperature and one atmosphere of pressure moving with a velocity of 65 ft / sec)
Maximum Voltage: 24V ac rms or 60V dc maximum for proper safe operation.
Maximum Temperature of Bead: 260°C (500°F
Cable:
- Length: 40 inches (1 meter)
- Insulation:
  - Material: Teflon
  - Maximum Temperature: 260°C (500°F)

Conductors:
- Type K
- Size: AWG #24 solid
- Length: 48 inches nominal

Polarity and Color Coding:
- Chromel: + yellow
- Alumel: - red
- Outer Jacket: black

Connector:
- Type: yellow mini-thermocouple connector with 0.312-inch pin spacing
- Material: Hytrel
- Maximum Temperature: 200°C (392°F)

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

MEASUREMENT CONSIDERATIONS

Instrument Compatibility

The 80PK-1 is designed to be compatible with any temperature measuring instrument that 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-1 accuracy specification in order to determine the overall accuracy of the combination.

Temperature Limitations

The 260°C continuos temperature rating of the 80PK-1 is primarily determined by the Teflon insulation. The bead alone may be momentarily subjected to higher temperatures without damage.

Media Limitations

Type K Chromel-Alumel thermocouple wires are compatible with clean oxidizing atmospheres.

OPERATION

Caution

Repeated sharp bending can break the 80PK-1 lead. To protect the lead, avoid sharp bends, especially near the connector.

Use the 80PK-1 as follows:

1. Connect the 80PK-1 to a compatible Type K temperature measuring instrument using the miniature (0.312-inch pin spacing) thermocouple connector.
2. Turn on the measuring instrument and select the appropriate range and scale.
3. Check the readout on the measuring instrument. With no heat or cold source applied to the bead, it should display the ambient (room) temperature. If the instrument does not readout properly, refer to the TROUBLESHOOTING section below.

MEASURING TECHNIQUE

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

1. Make sure that 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 obtain 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 get 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 readout is most stable.

TROUBLESHOOTING

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

1. Verify that the temperature measuring instrument is designed to be used with Type K thermocouples. It 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 instruments have this feature.) Refer to the measuring instrument’s owner’s manual to see if this feature is available.

   If you suspect a broken connection, use an ordinary ohmmeter to check its continuity from pin to pin. The ohmmeter should read 10 Ω or less if there is continuity.
3. 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.