

Precision measurements require accurate, reliable connections all the way to the device under test. PPM manufactures precision instrumentation that measure with **Parts Per Million** accuracy. If the physical measurement test lead or probe compromises transmission of the measurement signal to the instrument, the resultant testing will produce erroneous and unreliable results.

Resistance measurement accuracies can be significantly affected by test lead resistance. For example, 18-gauge test leads have a resistance of .006 ohms per foot per lead, or .012 ohms per foot per lead pair. Further, the temperature coefficient of copper wire is .393% per °C. When measuring resistances in the milliohm or micro ohm range, errors will be significant if not compensated. Simple two-lead measuring devices attempt to offset lead resistance by “shorting” the leads together and forcing the measurement to zero. This is a cumbersome method and does not account for wire resistance or temperature coefficient of the test lead, nor any connection (contact) resistance associated with the device under test.

Kelvin test leads use four wires to make the resistance measurement. In low resistance measurements, the recommended method is to force current through two wires while measuring the resultant voltage with the other two. Since the voltmeter draws insignificant amounts of current, potential errors created by any resistance or change in resistance in either the current force or in the voltmeter test leads are negligible. PPM’s instruments compute the resultant resistance by dividing voltage and current, thus achieving precision resistance measurements.



PPM’s model KTL-100 Kelvin Test Lead Set shown left are used for low resistance measurements. RG58 C/U test leads are 8 feet long each and are terminated with dual banana plugs to mate with the instrument. The device under test (DUT) end is made of gold plated brass.

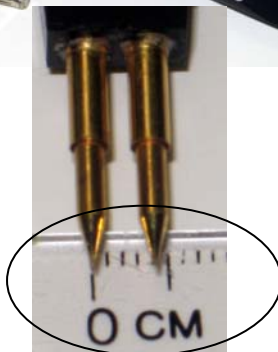
PPM’s model HTP-100 “Pistol Grip” probes shown right are made for tough duty applications where metal components and surfaces need to be tested for “bonding”. These probes are molded with impact resistant polycarbonate material. Pins are hardened stainless steel and rotate when pressed onto the DUT . Wires are 8.5 feet long each and are terminated in color coded spade lugs. For “Intrinsically Safe” applications, they are coated with an anti static material. Order HTP-101 for intrinsically safe applications.



Shown here are PPM's Kelvin probes for use in precision resistance measurements in tighter spaces than those where the Pistol Grip probes are used. The cables are color coded for ease of connection to the instrument and the probe tips are marked indicating the voltage sense pins. This ensures an operator error free measurement. Two versions are offered. The SSP-10 shown below feature hardened stainless steel pins for heavy duty uses.

**Example applications for PPM Kelvin test leads Include:**

- ❖ Switch and contact breaker resistance
- ❖ Bus and cable joints
- ❖ Aircraft frame bonds
- ❖ Integrity of weldments
- ❖ Transformer and winding resistance
- ❖ Rail and pipe bonds
- ❖ Wire resistance
- ❖ Antenna and lightning conductor bonds
- ❖ Power lineman bucket truck bond tests
- ❖ Aircraft fuel tank bonds where intrinsic safety is required



0.156 in. ~0.4 cm



0.400 in. ~1 cm

KTL-100	7 Ft. Each Alligator, gold plated	\$250.00 per pair
HTP-100	8 Ft. Each, Stainless Steel Hardened Spring Loaded Pins	\$800.00 per pair.
HTP-101	HTP-100 with Intrinsic Safety	\$850.00 per pair
SSP-10	Kelvin Probe with Stainless Steel spring loaded pins	\$499.00 per pair
BCP-10	Kelvin Probe with Beryllium Copper (BeCu) spring loaded pins	\$499 per pair with 4 pins
BGP-10 Pins	Select from next page	\$100.00 per bag of 10

KTL-100 Supplied with PPM R1L-B Series meters.  
HTP-100 Supplied with PPM R1L-E Series meters

\*PPM strives for continuous improvement. Please verify specifications with PPM prior to placing order.

**BCP-10 PROBES WITH INTERCHANGEABLE PINS**



Spherical Tips won't scratch surfaces

Choose PPM's BCP-10 series of probes for less rugged applications where versatility of probe tip style is needed. Choose from a variety of probe tips shown below.

Barrel: Nickel/silver, gold plated  
 Spring: Stainless steel, gold plated  
 Plunger: Full-hard beryllium copper, gold plated over nickel  
 Receptacle: Nickel/silver, gold plated, gold plated post

