

This Miniature Kelvin Contact allows unique test setups and flexible placement on custom circuit boards, which make it desirable for many electronic test applications.

Background

Many electrical tests require low resistance "Kelvin" (dual contact or 4-wire) connections to the electrical point of interest, which allows for correction or elimination of the resistance inherent in the measurement system itself. Typically the commercial contacts used to interface with pin type applications involve large "alligator clips" or other awkward contacts with large wire bundles (four wires per pin tested), which frequently damage the very pins being tested. For testing groups of pins (headers and pin arrays), such Kelvin contacts are just not feasible.

Description

This Miniature Kelvin Contact uses two metal contacts and a central insulator, to make the 4 wire connection to a single pin, and provides that connection directly to a circuit board. This Kelvin Contact Assembly transitions from no contact force (zero insertion force) to a balanced inward contact force on the pin, and travels with the pin, throughout the contact engagement. Removing the force on the pin reverses the movement of the contact and allows the entire pin/contact assembly to retract away from the circuit board, opening the contacts and releasing the pin.

Each contact assembly is mounted directly to a common circuit board, which eliminates separate wiring, and allows pins and contacts to be placed in any desired location, providing flexible interface with product connections and unrestricted pin spacing. As products and test contacts continue to shrink, providing a flexible, repeatable and reliable test interface solution will become increasingly important.

Advantages

Several styles of Kelvin contacts have been developed to provide testing connections to pin contacts.

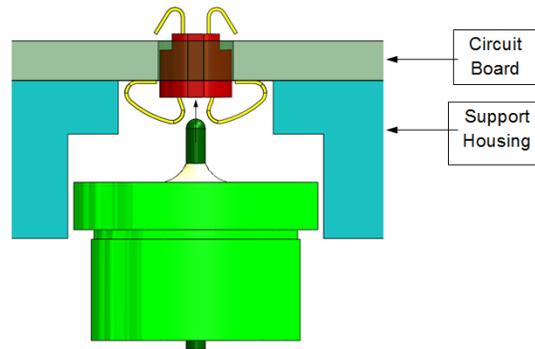
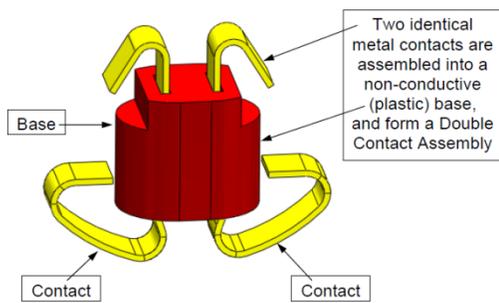
Alligator style Kelvin contacts are simple to use, but cause bent pins and damage to pin plating and base metal. Physical connection to product pins is different with each test. Usually only a few pins can be tested at once.

Fixed Kelvin contacts wipe on both sides of product pins, damaging the full length of the pin with each mating. Contacts and wire bundles are typically large and awkward. Usually only a few pins can be tested at once.

Zero insertion force (ZIF) type connectors minimize pin damage, but apply side loading and are limited to a single pin pattern and spacing. Product pins and spacing must conform to the ZIF connector spacing.

This Miniature Kelvin Contact provides several desirable improvements over these existing technologies, including:

- Reliable and repeatable test connections
- Minimized physical damage to the part or pins being tested
- Minimized bending damage (side loading) of product pins
- Direct interface to circuit board
- Elimination of wire bundles
- True single axis zero-insertion-force (ZIF) connections
- Small physical package
- Flexible positioning to accommodate testing of virtually any pin pattern and spacing



Applications

In the electronics industry many products require electrical tests which include "Kelvin" (dual contact or 4-wire) connections to multiple pins, in order to provide reliable low resistance measurements. The applications and requirements are well known in the industry. Never-ending redesigns and product miniaturization requires continual modifications to pin configurations and test hardware.

This Miniature Kelvin Contact allows unique test setups, and flexible placement on custom circuit boards, which make it desirable for many electronic test applications, including:

- Component and product test systems within the electronics and computer industry
- Reliability testing applications within the aerospace industry

Intellectual Property Status

This technology is protected under US Patent # 9,373,908 and US Patent Application # 13/736,696, filed 01/08/2013.

Keyword List

Kelvin, 4 wire, Zero Insertion Force, Low Resistance, Electrical Test

Contact

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Honeywell

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