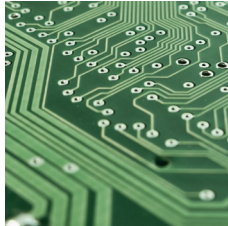


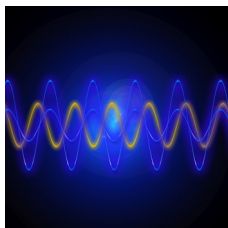
PRODUCT PORTFOLIO CONTACT PROBES



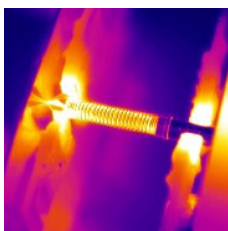
CONTACT PROBES FOR
PCB TEST



CONTACT PROBES FOR
WIRE HARNESS TEST



COAXIAL PROBES
FINE PITCH PROBES



HIGH CURRENT PROBES
BATTERY CONTACTS



ABOUT FEINMETALL



Practical Contact Probe Solutions

We are your partner for the secure contacting of electric and electronic devices for testing PCBs or wire harnesses, for wafer tests in the semiconductor industry or in products that demand low wear, releasable and reliable electrical contacts. As an independent mid-size company with about 500 employees worldwide, we do everything to make our customers successful.



Competence and Innovation In-house

Since many years FEINMETALL represents a high level of innovation. Especially the development and manufacturing of spring contact probes, special contact solutions and wafer probe cards in one company are a wide basis for our competence in precision technology and micro-mechanics. This combination is unique at the market and represents "German Technology" at its best.



Quality

Quality thinking controls all process steps at FEINMETALL. From product development and construction up to serial manufacturing and delivery - all operation steps are perfectly aligned. This leads to a maximum reliability of our products.



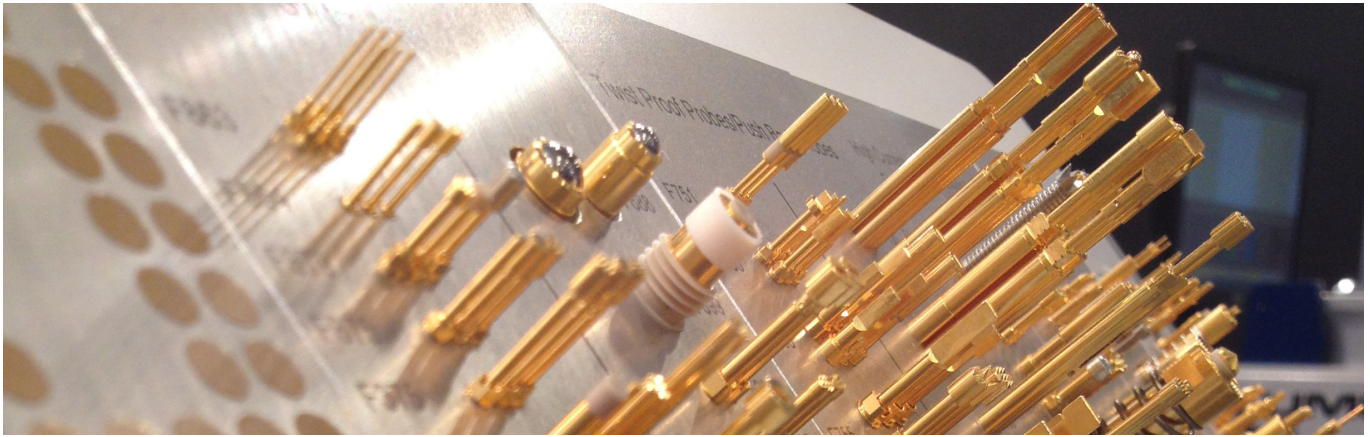
NEW Application Specific Contact Probe Catalogs

FEINMETALL offers a wide range of contact probes for the electric, electronic and automotive industry as well as for applications in medical technology, in telecommunications, in semiconductor test and in battery cell manufacturing.

The four new application specific catalogs show the best practice solutions for your needs.



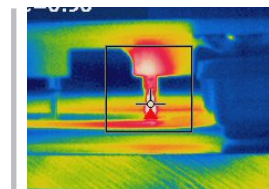
FEINMETALL CONTACT PROBES



Why Contact Probes?

Spring contact probes are used for a reliable low-wear contacting of electric and electronic devices. Typical applications are PCB test, wire harness and connector test or the use as charging and battery contacts of cordless electronic devices. Contact probes are available in a large variety of tip styles, dimensions and spring forces, some even with additional integrated functions.

With Know-how from the Idea to the Final Contact Probe



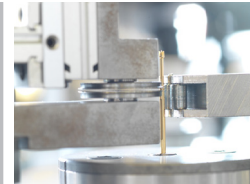
Research and development

New material and technology studies and examination of new ideas



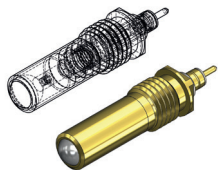
Prototype manufacturing

Quick manufacturing of first prototype



Volume production

Manufacturing of larger quantities by automated mounting



Construction

Design of new contact probes in CAD



Test and approval of the prototype

Customer testing of the prototype, initial sample test report, final approval



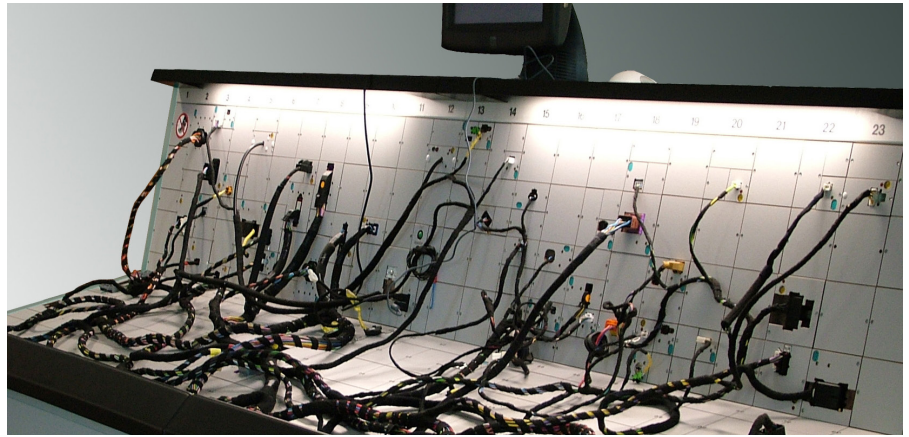
Delivery from stock

Comprehensive stock concept for global delivery

Customer project

New product ideas are often generated because of our close cooperation with customers

CONTACT PROBES FOR WIRE HARNESS AND CONNECTOR TEST



Practical Contacting Solutions for Wire Harness Test

As market leader, FEINMETALL offers a wide range of special contact probes and accessories for the design of test modules. With innovative and cost-effective solutions, we satisfy the demands of this market and build up a driving force for the wire harness testing technology.



Threaded Probes

- Secure seat of the probes even when exposed to vibrations
- Great variety of centers, lengths and tip styles
- For continuity test of wire harnesses
- Simple mounting of probes by appropriate tools



Step Probes

- For position test of contacts within connector cavities
- Specific dimensions for individual connectors
- More than 300 versions available
- Innovative tools for mounting probes in a limited space



Probes for Position Test

- Switch probes for presence test of components or connector elements
- Function as opener or closer
- Optional with rolling ball as contact element
- Switch probes with two switch points (off-on-off)
- Exact position measurement with position sensor systems

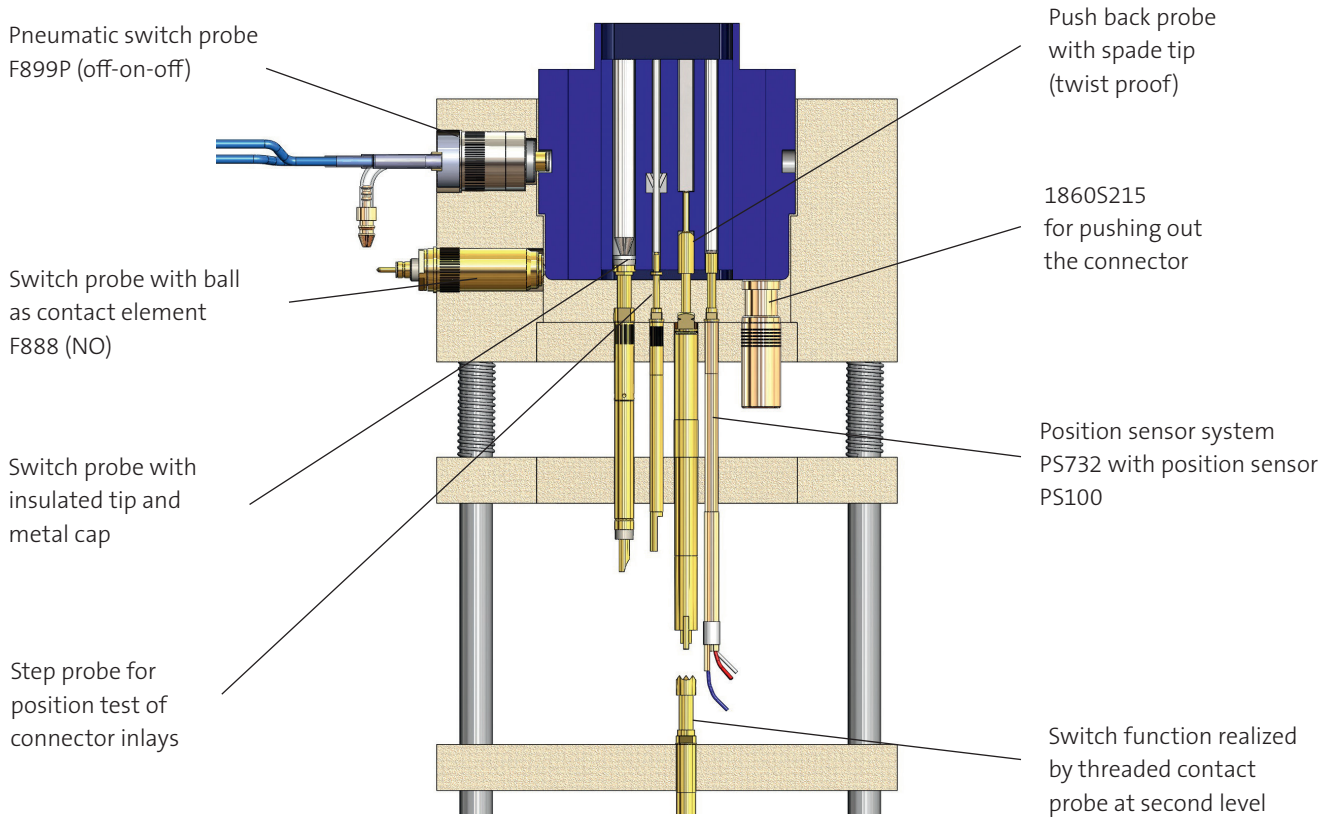


Push Back Probes

- High spring forces for push back test ("terminal push out")
- Twist proof spade tip styles
- Different switch concepts possible:
switch function in the probe, in the receptacle or by a second level

CONTACT PROBES FOR WIRE HARNESS AND CONNECTOR TEST

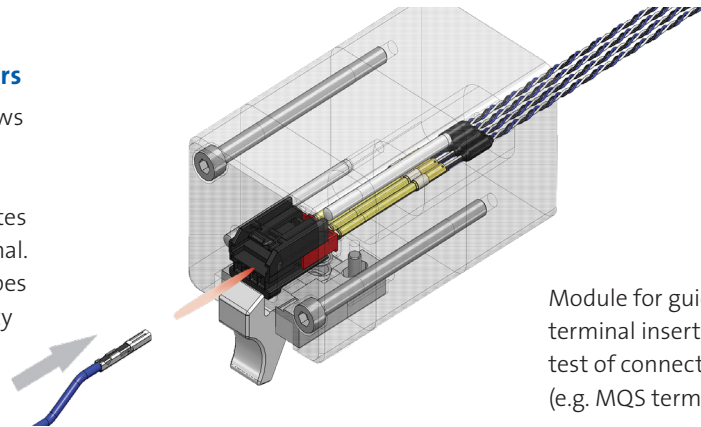
Principle Design of a Test Module for Connector Test



NEW Light Contact Probe for Guided Terminal Insertion of Wire Harness Connectors

The new LED contact probe from FEINMETALL allows a much easier construction of modules.

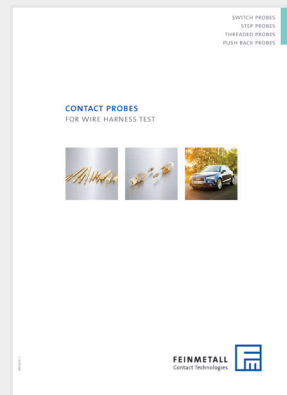
An integrated LED within the probe directly indicates the cavity that needs to be equipped with a terminal. After the terminal insertion the same contact probes can be used as electrical contacts for the continuity test.



Contact Probes for Wire Harness Test

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CONTACT PROBES FOR PCB TEST



Contact Solutions for Testing PCBs

Contact probes for PCB testing are very much standardized. They are commodities and need to be replaced on a regular basis. However, also in these applications we are facing a lot of special challenges and requirements that need very special solutions.

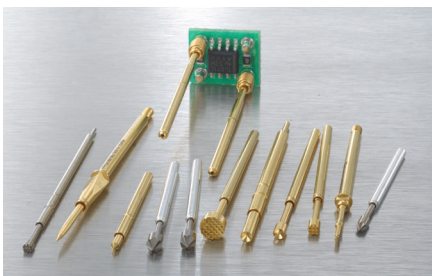
Special Challenges and Solutions

- Compensation of different heights of the DUT (device under test) by contact probes of different lengths and travels
- Implementation of dual stage fixtures by well combinable standard and long travel probes
- Contacting of lead free soldered boards by special probe series "Progressive Series"
- Penetration of OSP coatings on PCBs by using contact probes with special characteristics
- Contacting of standard interfaces with a great variety of test connectors
- Presence and position tests by using contact probes with integrated switch function



Contact Probes for ICT / FCT (In-Circuit & Functional Test)

- For standard centers 50 mil, 75 mil and 100 mil
- For fine pitches of e.g. 30 mil and 40 mil
- Great variety of tip styles, spring forces and further centers
- Insulation caps for verification of sufficient pin lengths



Interface Probes

- Tester specific standardized probes and pins
- For test systems ATG, Genrad, Luther&Mälzer, Digitaltest, Teradyne, Scorpion etc.
- Probes with sensor plates for TestJet or FrameScan

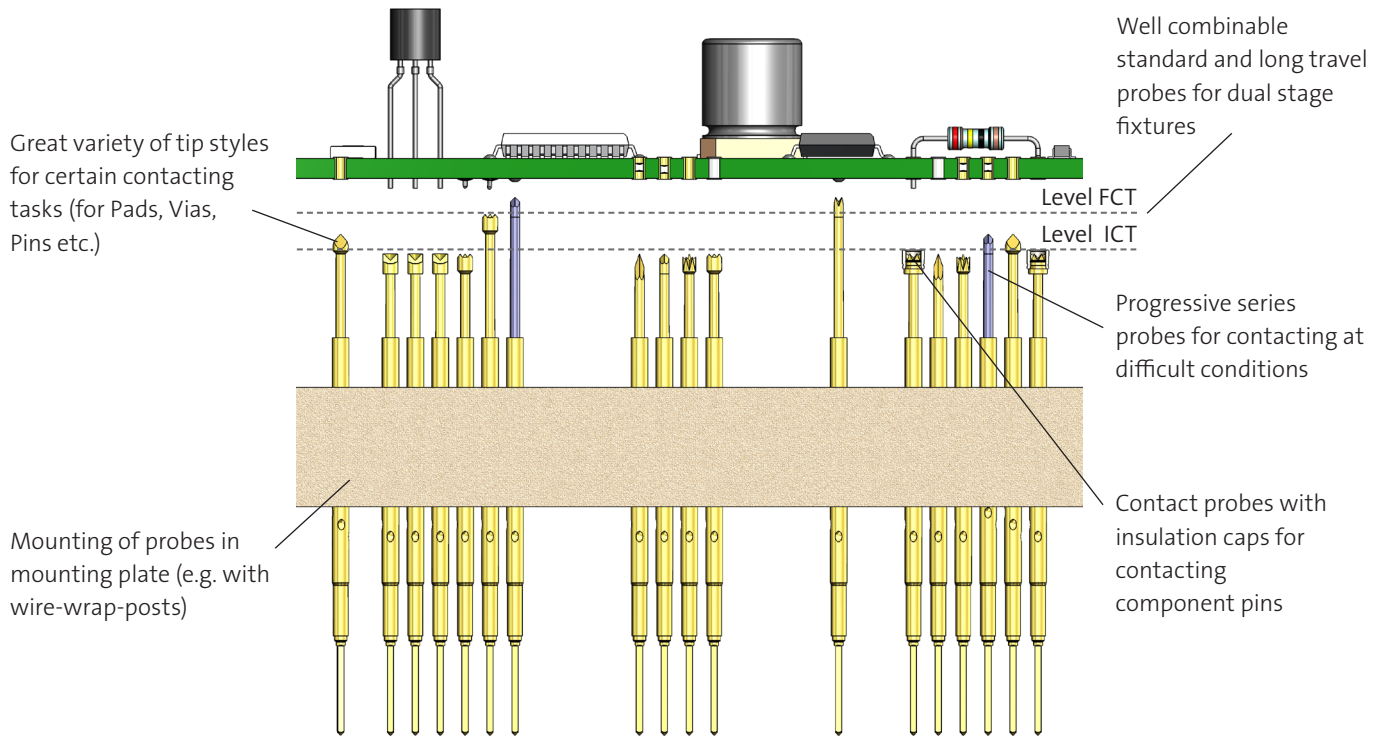


Accessories for Test Fixtures

- Pre-assembled interface blocks
- Test connectors with appropriate floating holder for contacting USB, HDMI or RJ interfaces
- Board markers

CONTACT PROBES FOR PCB TEST

Contacting of PCBs with Typical Spring Contact Probes (Dual Stage Fixture)



Progressive Series

Contacting lead-free soldered pads or strongly contaminated or oxidized boards is a challenging task, because contaminations are difficult to penetrate and they tend to stick on the probe tips. Both leads to a reduced electrical connection to the test item. For these challenges, a special contact probe series with the following advantages has been developed:

1. Functional coating

„Progressive Coating“ for a reduction of contaminations of the probe tips and for a 3-fold higher hardness.

2. Aggressiveness of contact tips

For a reliable penetration of contamination or oxide layers, different sharp tip styles are available.

3. Higher preload

Optimization of the force-travel diagram to reach a higher force at the beginning of the contacting process and still the same force at nominal travel.



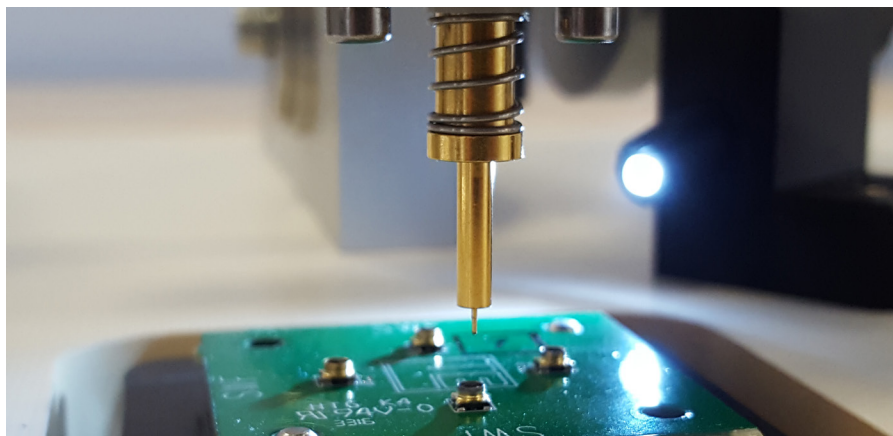
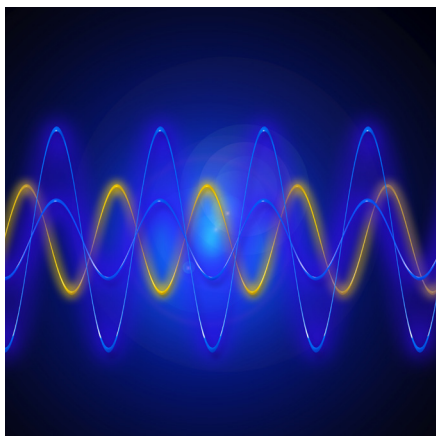
Contact Probes for PCB Testing

You will find detailed information about these contact solutions in the corresponding application specific catalog. Additionally to the appropriate products it also contains a high amount of background information, overviews and application examples.

The whole product portfolio as well as corresponding step files for implementation in your CAD system are available on our homepage www.feinmetall.com



COAXIAL PROBES, RF PROBES AND FINE PITCH PROBES



Contact Probes for Kelvin and Radio Frequency Measurement

High frequencies are application areas with a strong growth. This leads to a high level of specific and complex challenges. Solutions for these requirements demand long-term experience, optimal customer cooperation and a strong focus on research and development.

Special Challenges for Manufacturing of Very Fine Structures (Fine Pitch Probes)

- New manufacturing methods like e.g. electro-forming allow very small diameters
- Plungers made of palladium-alloys for constant, low contact resistances and long life cycles
- Special automatic assembly machines with overpressure reduce contaminations of probes
- Packaging of fine pitch probes in fix packing units under clean room conditions to avoid contamination



Coaxial Kelvin Probes

- For 4-wire measurement according to the Kelvin method
- Suitable for applications with limited space
- Even for small centers down to 87 mil
- Application in measuring very low resistances



Coaxial Radio Frequency Probes

- Contacting of standard RF connectors
- For Fakra, HSD and mini coax connectors
- For SMA, SMB, SMC connectors
- For contacting of small SMD switch connectors
- For contacting directly on the PCB



Fine Pitch Probes

- For centers smaller than 50 mil
- Minimum center down to 0,3 mm / 12 mil
- Double plunger probe for mounting in mounting plates (test heads)
- Application in front-end and back-end test

COAXIAL PROBES, RF PROBES AND FINE PITCH PROBES

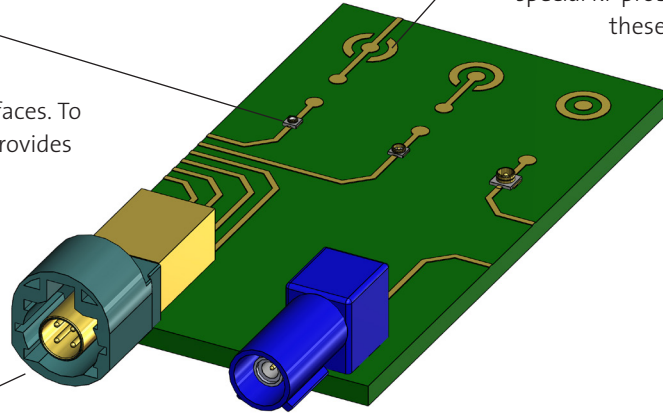
Radio Frequency Probes for Various Applications

SMD mini coax and SMD switch connectors

are used on PCBs as RF interfaces. To contact these FEINMETALL provides different types of RF probes (e.g. HF66).

PCB test points

For contacting RF contacts directly on the PCB, special RF probes are available. The probe design of these probes (e.g. HF05, HF60) is adapted to the typical requirements of the test points.

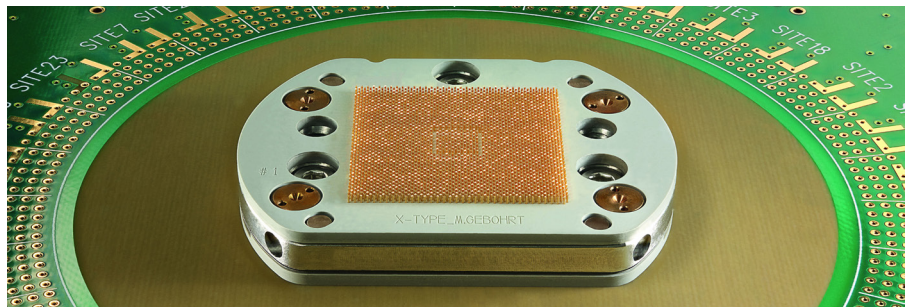
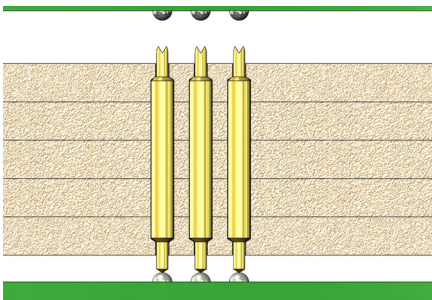


Connectors

In various telecommunications, consumer electronics and automotive applications different standard connectors like SMA, SMB, SMC, HSD are used. FEINMETALL offers different probe series for contacting these connectors (e.g. HF60, HF19, HF66).

Application Example: Fine Pitch Probes as Contact Elements in a Wafer Probe Card

In the new FEINMETALL FeinProbe®, instead of buckling beams very fine contact probes are used as contact elements. This includes many advantages for contacting semiconductor chips, because the contact probes are individually spring loaded and due to the special tip style they create an optimal electrical contact to the test item. In the example shown below, a total of 1000 contact probes with a diameter of only 0,3 mm are implemented.

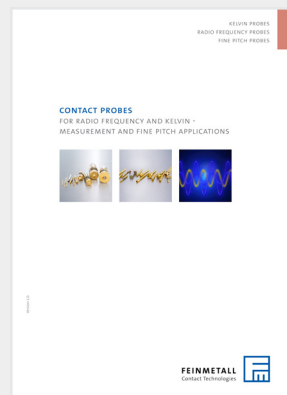


Double plunger probes mounted in the head of a FEINMETALL FeinProbe® wafer probe card.

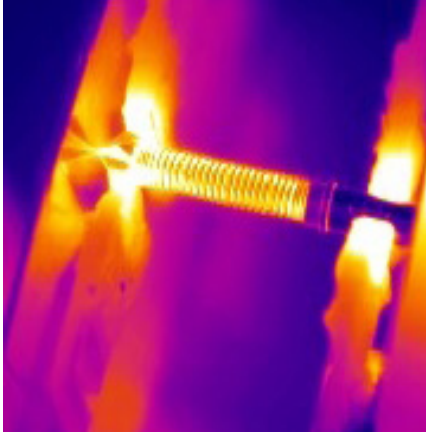
Contact Probes for RF- and Kelvin Measurement as well as for Fine Pitches

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HIGH CURRENT PROBES, SHORT TRAVEL PROBES AND BATTERY CONTACTS



Contact Probes for High Currents, Low Heights or for Direct Soldering

High currents are strongly growing fields of application for contact probes. This is always associated with very specific and complex challenges, which we meet through many years of experience and customer proximity on the one hand, and through intensive research and development work on the other. FEINMETALL offers solutions up to 600 A continuous current. Contacting electrical components in applications with very limited space is often a challenging task. For these applications we offer charging and battery contacts in very fine dimensions for installation in systems or devices.



High Current Probes

- Specific probe design with low ohmic resistance
- Optimized contact to the DUT
- Contacting of power-pins, high current interfaces etc.
- High current contacting of flat blade connectors
- Applications in burn-in test and functional test



Coaxial High Current Probes

- For 4-wire measurement according to the Kelvin method
- Suitable for high currents up to 300 A continuous current
- Floated mounting for adaption to the DUT
- Application in high volume production of batteries and accumulator cells



Battery Contacts

- As charging contact for direct soldering into or onto a PCB
- Use in non-test applications, e.g. charging stations for cordless devices
- For products with low-wear releasable electrical connections
- Currently shortest probe with a length of 2,7 mm



Short Travel Probes

- For applications at limited available space
- For contacting higher components
- Spring travel usually below 3 mm
- Use also in non-test applications, e.g. as interface between two devices (signal and power transmission)

HIGH CURRENT PROBES, SHORT TRAVEL PROBES AND BATTERY CONTACTS

High Current Probes with Split Plunger

are designed to optimize the contact between plunger and barrel as soon as they are pushed in. The result is an optimized current flow through the barrel, with a minimized current flow through the spring.

High Current Probes with Continuous Plunger

have the lowest internal resistance and therefore allow the highest currents.

High Current Probes for Specific Applications

have been developed for certain requirements, e.g. for high current contacting of flat blade connectors.

Coaxial High Current Probes

are suitable for 4-wire measurements with very high currents. They are frequently used for charging and discharging of batteries and accumulator cells.



Split plunger



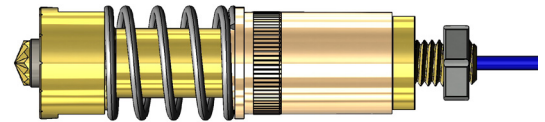
Special tip made of silver alloy



Continuous plunger



Special solution for contacting flat blade connectors



High current Kelvin probe

Design of Battery Contacts

Battery and charging contacts are compact and directly solderable contact probes. For the inner design, different versions are available, each version has advantages and disadvantages. A hollow plunger (drill-hole design) allows the design of very short contact probes. A standard plunger reaches the longest life cycles and the inclined plunger (bias design) reaches the highest and most stable currents.



Drill-hole design



Standard design



Bias design

Solderable Battery Contacts

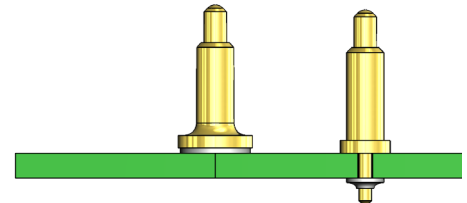
A special probe design facilitates a direct soldering. So, the probes can be directly soldered onto a PCB (SMT). Alternatively, contact probes with pin can be used that are plugged into a hole and then soldered from the bottom (THT). This makes sure that the probe cannot change its position during soldering.



Contact probe with large soldering surface



Contact probe with pin



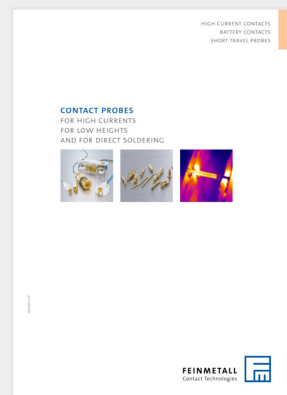
SMT Surface Mounted Device

THT Through Hole Technology

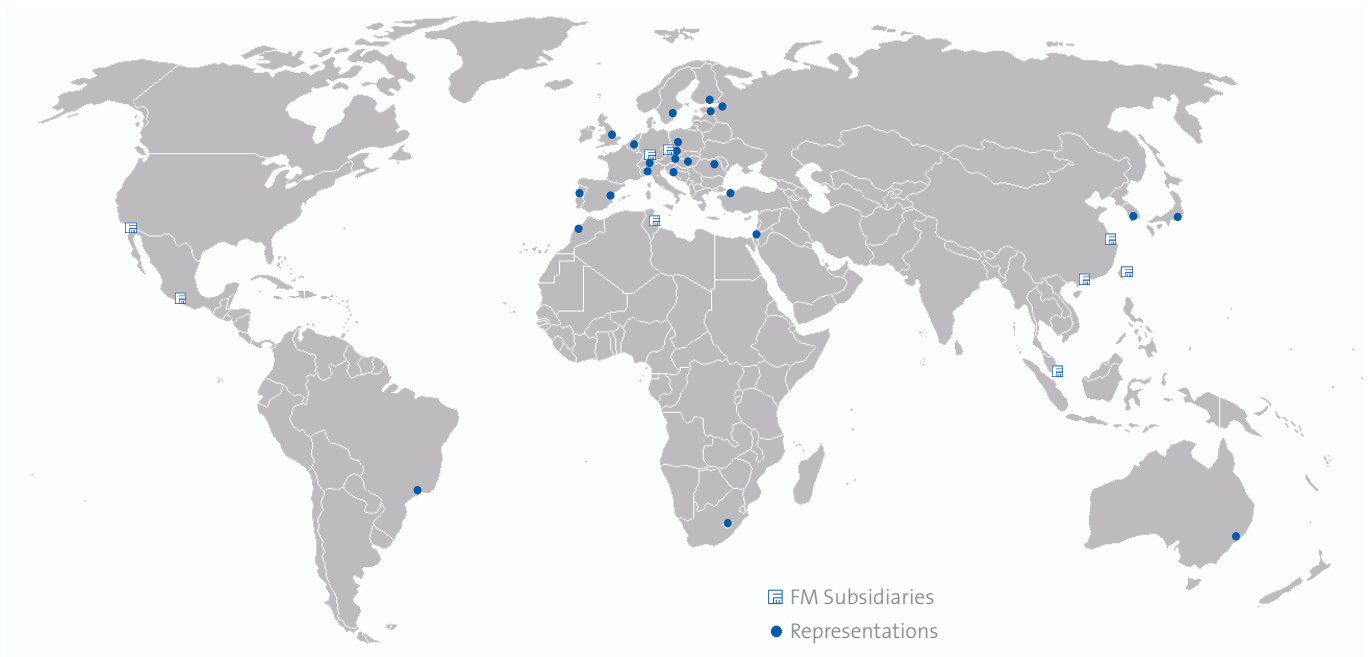
Contact Probes for High Currents, Low Heights and for Direct Soldering

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WORLDWIDE PRESENT FOR YOU



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Our sales offices are perfectly connected to the markets and work in close cooperation with our customers. Most important for us is a high quality - regarding our products as well as regarding our customer support.

Our strengths

- Native-speaking contacts in many countries enable ideal communication
- Application engineers take care of customer projects
- Active key account management provides customer specific know-how
- Teamwork of product managers and local sales engineers facilitate innovative and customized solutions
- Periodic technical trainings make sure that sales teams have a high level of competence
- Technical key customer trainings enhances know-how transfer to end users

These strengths have already resulted in many successful and innovative projects. FEINMETALL is rated as preferred supplier for many notable companies. Our strong customer support is your advantage.



FEINMETALL
Contact Technologies

www.feinmetall.com

