CONTACT PROBES

FOR HIGH CURRENTS
RADIO FREQUENCY AND KELVIN MEASUREMENT



FEINMETALL
Contact Technologies

Version 1

CONTENTS

Contact probes for high currents, Kelvin and radio frequency measurements
Based on long-term experience and a strong customer focus we have consistently set high standards in developing innovative and practical contacting solutions.

High current probes
The application range for high current probes is very large. These probes are used in test fixtures, wire harness test modules or in special test setups e.g in the field of charging and discharging processes in battery production.

Kelvin probes
Coaxially designed Kelvin probes are used for measuring very low resistances with the 4-wire measurement (Kelvin method), especially at limited space.

Radio frequency probes
Coaxially designed radio frequency probes are used for contacting many standard RF connectors such as Fakra, HSD, SMA, SMB and SMC connectors as well as SMD switch connectors or for direct contacting on a PCB.

Contact probes for other applications are shown in the corresponding further catalogs and on our homepage.

Competence

FEINMETALL is your partner for the reliable contacting of electronic components. The wide range of applications for spring contact probes includes board tests with fine centers up to wire harness and connector tests with individual and intelligent solutions.

Broad Competence In-house
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.

Innovative Capacity
For many years FEINMETALL represents a high level of innovation. Many patent-registered solutions have been milestones in the world of test engineering.

International Customer Service
We are acting in the international high-tech industry and our processes are aligned accordingly. With seven subsidiaries worldwide and a strong network of well trained partners we are always connected to the markets and to our customers, wherever they are. Local stocks and special customs certificates provide a high delivery performance.

Quality

Quality controls all process steps at FEINMETALL. From product development and construction up to manufacturing and delivery all operation steps are perfectly aligned.

FEINMETALL is certified according to DIN ISO 9001. Additionally a wide range of measures like e.g. risk analysis by FMEA during the whole product development process ensure a maximum of technical as well as delivery reliability.

Qualitätsmanagement
Umweltmanagement
Energiemanagement
ISO 9001
ISO 14001
ISO 50001
www.dekra-siegel.de
DEKRA
zertifiziert

Environment and Health Protection
FEINMETALL is committed to the goals of the up-to-date legislation regarding environment as well as health protection and to conformance to all necessary measures. The current statements regarding the various European environment and health regulations are available on our homepage.

Traceability of Contact Probes
FEINMETALL contact probes with sufficient diameters are marked by laser. This enables the traceability of each single contact probe and the correlation to the exact production lot. Additionally the laser marking guarantees the use of "the original".

Customer Focus
Our engineers and technicians work closely together with our customers and have a deep knowledge of the practical applications. Our know-how is your advantage!

Contents

Note:
This catalog contains contact probes for high currents as well as for Kelvin and radio frequency measurements.
The whole contact probe portfolio and corresponding step-files for the integration in your CAD-system can be downloaded from our homepage at **www.feinmetall.com**.

Overview of Tip Styles for High Current and Coaxial Probes

01	02	03	04	05	06
Conical 90°	Conical 90° stepped	Conical 60°	Conical 60° stepped	Concave stepped	Serrated stepped

07	08	09	11	12	14
Hexagonal 90° stepped	Hexagonal 60° stepped	6-point crown 120° stepped	Spherical	Spherical stepped	4-point crown stepped (self cleaning

15	16	17	18	27	39
Triangular 45° stepped	Flat	Flat stepped	Conical 30°	Conical 120°	Conical flat 30°

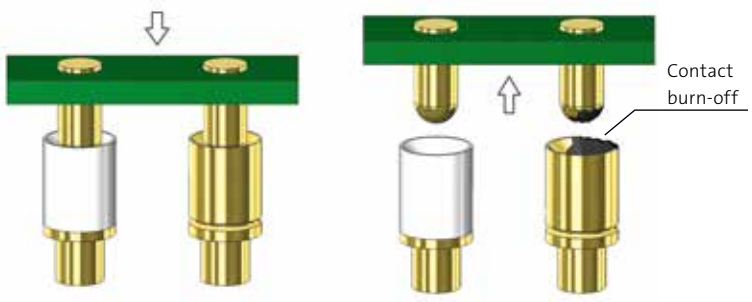
41	46	55
6-point crown stepped (self cleaning)	W-profile	Concave (self cleaning)

Special Versions

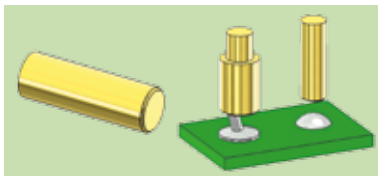
05 (IK)	05 (A)	12 (A)	12 (SP)	17 (A)
IK = Insulating cap	Concave stepped	Spherical stepped	SP = Step Probe	Flat stepped

Special Head Made of Silver Alloy

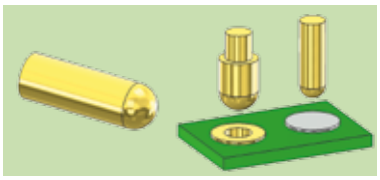
In high current applications ideally no voltage should apply and accordingly no current should flow during closing or releasing the contact. Otherwise, an electric spark may occur, which may damage the surface of the contact area.
To avoid or at least minimize such a contact burn-off, FEINMETALL offers tips made of a special silver alloy to minimize the contact burn-off, reducing the transition resistance and lead to a longer life time of the probes.



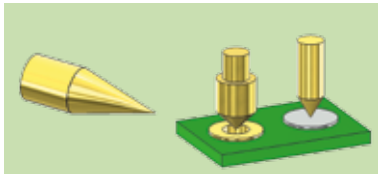
Typical Tip Styles and Applications



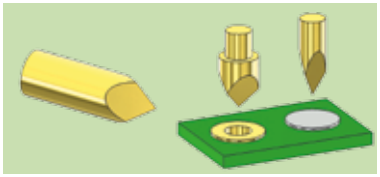
Flat
(16,17)
Suitable for solder pads and contact pins.



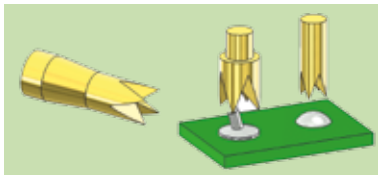
Spherical
(11,12)
For testing clean contact surfaces, does not leave marks or scratches.



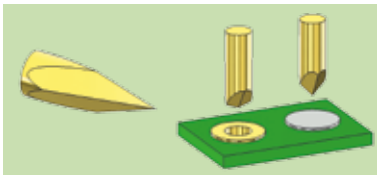
Conical
(01,02,03,10,18,32,34,35)
Universal tip style with different angles of 10°, 15°, 30°, 60°, 90° or 120° for contacting solder pads and vias.



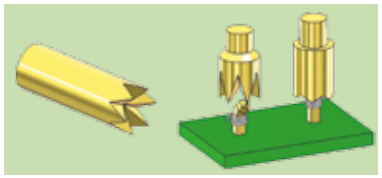
Triangular
(15,30,62)
For via holes and solder pads. The sharp edges penetrate flux residues and oxide layers.



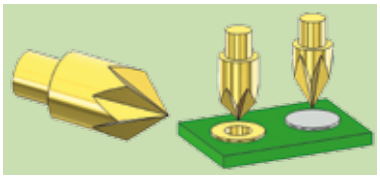
4-point crown
(14,20,21,28,29,37)
For pad surfaces and soldered pins. The sharp edges penetrate flux residues and oxide layers.



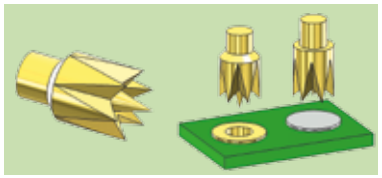
Square lance
(33,38,43)
For via holes and solder pads. The sharp edges penetrate flux residues and oxide layers.



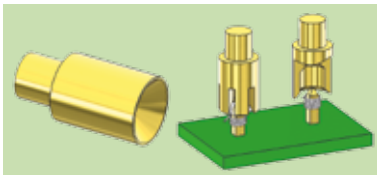
Crown
(09,35,40,41,42,60,63)
For wire wrap posts, even if the contacts are bent or twisted.



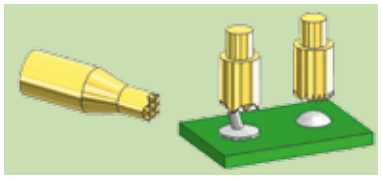
Hexagonal
(07,08)
For testing plated vias and pads. The sharp edges penetrate contamination and oxide layers.



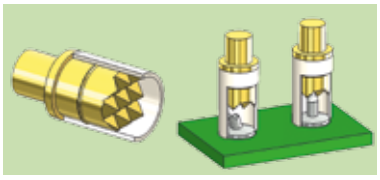
Crown with inner pin
(36,68)
Used for reliable contacting of plated or filled vias.



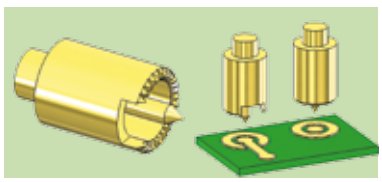
Concave
(05,50,55)
For a smooth contact of pins and wire wrap posts. The risk of contamination can be minimized by using a self cleaning version.



Serrated, W-profile
(06,46,64,66)
Universal tip style for contacting wires, pins and wire wrap posts, even suitable for bent contacts.



Insulation cap (IK)
(05,06,17,41)
For detecting the correct length and straightness of pins.



Coaxial design
Tip styles of coaxial probes are used for contacting standard connectors or for contacting PCB test points, SMD mini coax and switch connectors, see below.

Examples of PCB Layouts for Coaxial Contacting

Coax-closed

Coax-open

Coax-kidney-shaped

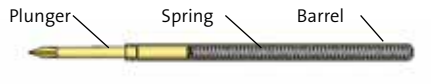
Coax G-S-G

Coax G-S-G

Coax G-G-S-G-G

Design of Spring Contact Probes

Spring contact probes are typically composed of a plunger, a barrel and a spring.



Plunger

FEINMETALL manufactures plungers with many different tip styles, suitable for a large variety of applications. Plungers are generally made from beryllium copper (BeCu) or steel. Optimized turning and plating processes are resulting in an outstanding straightness and exactness of the plunger surface, the base for a long lifetime. Aggressive tip styles are made by a special grinding process for ultra sharp edges.

Barrel

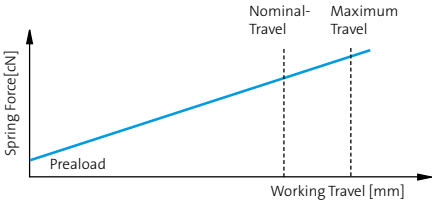
FEINMETALL barrels are usually made of nickel silver, bronze or brass. Nickel silver barrels are deep-drawn whereas barrels made of bronze are turned or deep-drawn and barrels of brass are turned. All barrels are usually silver or gold plated. A small hole in the bottom permits the barrels to be thoroughly cleaned during manufacturing and ensures continuous wetting in the plating process.

Spring

During the early years FEINMETALL developed long-life springs for the clock industry and subsequently made use of this knowledge in the manufacturing of spring contact probes. Compression springs are normally made of silver plated music wire or stainless steel, for some special applications also of non-magnetic beryllium copper. Springs made of music wire have a working temperature up to a Maximum of 80°C (176°F) while made of stainless steel or BeCu can be operated up to 200°C (392°F).

Spring Force

The selection of the spring force mainly depends on the application. On the one hand the spring force needs to ensure the quality of the electrical contact and the penetration of contaminations or oxide layers. On the other hand it should not lead to any damages on the contacting surface or on the board. It also needs to be taken into consideration that the penetration of the contacted surface highly depends on the chosen tip style. In test fixtures (especially vacuum fixtures) the sum of all spring forces has to be observed in order to close the fixture and to contact without problems. Due to manufacturing processes and material variances all spring forces have a tolerance of ±20%.



Spring Travel

The spring force increases proportional to the spring travel. This linear function is shown in the force-travel-diagram. During the assembly of the probe the spring is already compressed by a certain travel. The resulting spring force is called preload. The preload makes sure that there is a certain force right from the beginning of the contacting process. Also it makes sure that the plunger is completely pushed back after the contacting. The nominal spring force is the spring force at the recommended working travel. The recommended working travel should not be exceeded significantly, because otherwise the life time of the probe could be considerably reduced.

Electrical Specifications

In a contact probe the primary current flow typically leads through the plunger, the barrel and the receptacle.
A secondary current flow leads through the plunger, the spring and the barrel. The transition points cause certain transfer resistances that are influenced by the following factors:

- → Conductivity of the base material
- → Conductivity of the plating material
- → Condition of the surface of the probe
- → Size of the contact surface
- → Contact forces at the transition points

FEINMETALL is taking measures to guarantee a constant low contact resistance during the whole lifetime of the probes. The maximum continuous currents and the typical resistances of each specific probe are shown in the data sheets.

Important note for all products with electrically insulated functions
like switch probes, switch receptacles, combi receptacles, coaxial probes, insulation caps etc.: For safety reasons according to DIN VDE 0100, part 410, over electrically insulated parts only low-voltages of maximum 25 V (AC) or 60 V (DC) are allowed. These values are effective values including voltage pulses due to over-voltages etc.

	Basic Materials	Plating
Barrel	Nickel Silver (deep-drawn) Bronze (turned or deep-drawn) Brass (drilled) Nickel	Silver Gold
Plunger	Beryllium-Copper - BeCu (B) Steel (S) Synthetic Material (K) Palladium Alloy (P) Brass (M)	Chemical Nickel Gold FM-Longtime Gold Rhodium Progressive Coating Multiplex
Spring	Music Wire (max. 80°C) Stainless Steel (max. 200°C) BeCu (non-magnetic, max. 200°C)	Silver Gold
Receptacle	Nickel Silver Bronze Brass	Gold

Materials

The optimum performance of spring contact probes significantly depends on the selection and combination of materials and platings. Developing, testing and qualifying materials for the various applications is an important aspect of our research and development efforts.

Basic Materials

For choosing the optimum basic material for barrel, plunger, spring and receptacle of spring contact probes different aspects need to be considered. Besides the technical applicability also machining and economical factors are relevant for this decision.

Beryllium-Copper
combines outstanding mechanical properties with a high electrical conductivity. It is used for plungers or contact elements in a great variety of products, especially in the field of standard- and high current probes. Also springs can be made of BeCu.

Steel
is significantly harder than BeCu and is used for plungers with aggressive tip styles or the requirement of extremely long durability.

Palladium Alloy
is used as basic material for plungers. Because of the high hardness it is very robust, an additional plating is not necessary.

Nickel Silver
is very resistant to corrosion and is well suitable for machining. Barrels and receptacles made of nickel silver can also be deep drawn economically.

Bronze
is characterized by a combination of good wear resistance, cold formability and high electrical conductivity. It is used for barrels and receptacles.

Brass
is an extremely high quality material with a high electrical conductivity, a good wear resistance and the suitability for different ways of machining.
It is used for barrels, receptacles and for special shapes.

Nickel
Barrels in very small diameters can be manufactured by electro-forming. In this case nickel is separated and combined with precious metal. This results in pipes with very thin pipe wall of nickel, that can already be gold plated on the inner surface. These barrels are highly precise, however, the thickness of the pipe wall cannot be varied within one part.

Plating Materials

Typically the surfaces of all elements of contact probes are galvanically plated in order to protect the basic material against corrosion. At the assembled contact probe the plating also reduces friction and thereby leads to low abrasion and low contact resistances.

FEINMETALL plating materials are basically galvanic nickel, chemical nickel, gold, hard gold, longtime gold, rhodium, silver or progressive coating. To achieve the maximum performance the ideal selection and combination of coating materials, coating thicknesses, coating alloys as well as various boundary processes have to be made.

Galvanic Nickel
has a good chemical durability and a hardness of 300 to 500 HV. It has a good ductility and adheres well to the base material. Nickel also prevents the base material from migrating into the precious metal surface and contaminating it and leads to a high temperature stability and life time.

Chemical Nickel
has a very good chemical durability and is not brittle. It has a hardness of 400 to 600 HV. Chemical nickel is most appropriate for aggressive tip styles, because it has a good contouring capability and wear resistance.

Rhodium
is extremely resistant to wear and abrasion. Due to its hardness of 800 to 900 HV it is plated on plungers which are used in very rough applications.

Silver
is used as a bearing surface and as corrosion protection for barrels and springs. The hardness of the silver layer is 80 to 100 HV only, but it adheres very well to the base material even at small diameters. Silver improves the electrical conductivity.

Gold
guarantees the best chemical durability with a hardness of 150 to 200 HV.
Gold considerably improves the electrical conductivity. Standard gold is mainly used for plungers made of beryllium-copper or brass.

Hard Gold
is the hardest galvanic gold layer with up to 400 HV. Hard gold differs from the other gold types by its slightly lighter color.

FM Longtime Gold
is a special gold plating layer system for steel plungers developed by FEINMETALL. The combination of steel and FM-Longtime gold results in a high performance and a long lifetime, even at heavy load applications.

Progressive Coating
is a special coating for contacting lead-free soldering pads and other contaminated or oxidized surfaces. This coating is characterized by a high hardness of 550 to 600 HV and a very low contamination of the tips, which leads to a long lifetime of the probes.

Multiplex
is a multi-layer coating system with a very high corrosion resistance. It has been developed for gold plating of steel plungers, that are used in conditions with high humidity.

Different Types of Spring Contact Probes

Spring Contact Probes are available for various applications. Below you find a brief overview of the most important types.

ICT/FCT Probes for Test Fixtures
Test fixtures for in-circuit test (ICT) and functional test (FCT) are mainly equipped with standard probes for the centers 50 mil, 75 mil and 100 mil.

Fine Pitch Probes
Contact probes for centers smaller than 1,27 mm / 50 mil are fine pitch probes. In these centers a direct soldering or the use of receptacles is not possible. Therefore most fine pitch probes are designed as double plunger probes to be mounted into sandwich blocks.

Battery Contacts
Battery contacts are compact probes, often with a limited travel. They are well suitable as charging contact, but they can also be integrated in end user products whenever low-wear electrical contacts are required.

Interface Probes
Interface probes are used for transmitting the signals from the test fixture into the test system. Contact probes for this application are specifically standardized for each test system.

Threaded Probes
Contact probes with thread are mainly used in modules for testing connectors and wire harnesses. The advantage is that even under difficult conditions the probes do not move out of the receptacle and a secure seat is guaranteed.

High Current Probes
For high current applications spring contact probes need to be designed with a very small probe resistance. High current probes are available in different versions and designs.

Switch Probes
Special probes with integrated switch element are mainly used for presence tests. Switch probes close or open an electric circuit after a defined travel of the plunger (switch travel). For non-conductive contacting, switch probes are available with various insulated tips.

Switch Probes with Ball Head
For side contacts with laterally moved test items, FEINMETALL has developed a special switch probe series with a rolling ball as contact element. These probes are less sensitive to lateral forces and have a remarkably higher durability compared to standard probes with only round tip styles.

Pneumatic Switch Probes
For selective contacting of test points or for areas that are difficult to access, it can be helpful to use pneumatic contact probes, operated by compressed air.

Push Back Probes
During push back tests of connectors the tight seat of the connector elements is verified. For this application contact probes with very high spring forces are used.

Kelvin Probes
Very low resistances of components are measured by the 4-wire measurement (Kelvin-method). For this application contacts for the current source and the voltmeter need to be implemented very close to the component. These connections can be realized by special coaxial probes (Kelvin probes), using the outer conductor for the constant current and the inner conductor for measuring the voltage. Therefore measuring errors caused by the connection wires are eliminated.

Radio Frequency Probes
In many applications, like e.g. testing antenna connectors, radio frequency signals need to be transmitted. To carry these signals, special coaxial contact probes are used. RF-probes have an inner conductor for the transmission of the signal and an outer conductor for the electromagnetic shielding.

Receptacles for Spring Contact Probes

For simple replacement spring contact probes are typically mounted into receptacles. The probes are either plugged-in or screwed into receptacles, depending on the type of contact probe.
Receptacles are available with different types of electrical connections.

Mounting

Receptacles with collar on top have a fixed projection height and guarantee the tightest seat with very low tolerances. Receptacles with press ring can be used in two ways. Either the press ring is used as dead stop or it is inserted into the mounting plate, which results in a variable projection height.
For receptacle insertion into the mounting plate, a special insertion tool is necessary.

Connection of Receptacles

Almost all receptacles are available with solder or crimp connection. Wire wrap connections are frequently used for test fixture manufacturing, because they can be wired automatically. Some receptacles (especially those with very small diameters) are available with pre-assembled wires. Additionally, to connect coaxial probes, special connecting elements can be used

Types of Receptacles

At ICT/FCT test fixtures mainly plug-in probes are used. However, in some applications, particularly at modules for wire harness and connector tests, threaded probes are used, which are screwed into the receptacles. Threaded probes guarantee a secure seat because they do not move out of the receptacle even under difficult conditions. Knurled receptacles ensure a firm seat of the receptacle in the drill hole. For switch probes and coaxial probes, FEINMETALL has developed special receptacles called "combi-receptacles", which enable a solder free exchange of these probes. Further receptacles with integrated switch function are available, that are frequently used in combination with twist proof probes.

Drilling Recommendations

Mounting the receptacle into the mounting plate demands special precision. Various parameters like rotating speed, feed, helical groove length, material and plate thickness are influencing the drilling results.
The drilling recommendations in the technical specifications of the probes are guideline values only as a basis for your own drilling trials.
Therefore it is very important to make drilling tests in order to ensure that the receptacles have a proper seat in the mounting plate.

Spacers

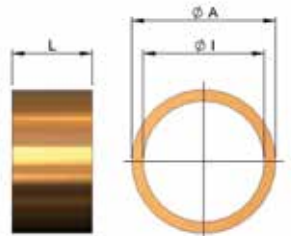
For height adjustment and balancing of tolerances.

Spacers H772DS/xx for 100mil Probes

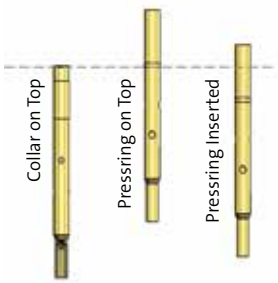
Order Code	Outer-Ø	Inner-Ø	Length
H772DS/10	2,20	1,70	1,00
H772DS/20	2,20	1,70	2,00
H772DS/30	2,20	1,70	3,00
H772DS/50	2,20	1,70	5,00

Spacers H773DS/xx for 138 mil Probes

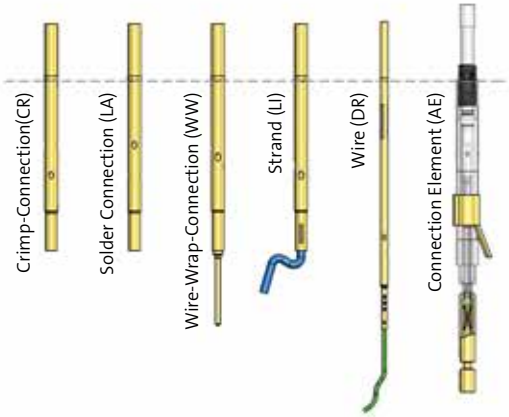
Order Code	Outer-Ø	Inner-Ø	Length
H773DS/01	3,20	2,70	0,10
H773DS/05	3,20	2,70	0,50
H773DS/10	3,20	2,70	1,00
H773DS/20	3,20	2,70	2,00
H773DS/30	3,20	2,70	3,00
H773DS/50	3,20	2,70	5,00



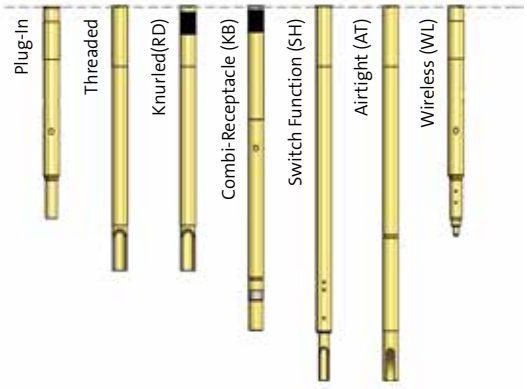
Mounting



Types of Connections



Types of Receptacles



HIGH CURRENT PROBES

Probes for high current applications								
Status	**Series**	**Current**	**Barrel- Ø**	**Total Length**	**mm**		**mil**	**Category**
	1860C001	50,0	11,00	8,90	12,00	/	472	High Current Probe
	1860C005	50,0	6,30	30,00	11,00	/	433	High Current Probe
	1860C006	100,0	10,70	9,75	12,00	/	472	High Current Probe
NEW	1860C009	80,0	11,0	36,4	12,00	/	472	High Current Probe
	F310 (plug-in)	10,0	1,00	26,00	1,90	/	75	High Current Probe
	F320 (plug-in)	12,0	1,35	32,00	2,54	/	100	High Current Probe
	F330 (plug-in)	14,0	2,00	40,00	3,00	/	118	High Current Probe
	F340 (plug-in)	16,0	2,40	50,00	4,00	/	157	High Current Probe
NEW	F713...C (plug-in)	25,0	2,65	15,00	3,50	/	138	High Current Probe
	F772...C (plug-in)	20,0	1,65	32,30	2,54	/	100	High Current Probe
	F773...C (plug-in)	25,0	2,65	27,30	3,50	/	138	High Current Probe
NEW	F566...C (plug-in)	35,0	3,18	36,10	4,50	/	177	High Current Probe
	F775...C (plug-in)	50,0	3,50	38,50	5,00	/	197	High Current Probe
	F732...C	20,0	1,65	35,70	2,54	/	100	High Current Probe
	F360...C	15,0	M2,5	4,90	3,50	/	138	High Current Probe
	F723...C	25,0	2,65	17,10	4,00	/	157	High Current Probe
	F733...C	25,0	2,65	28,30	4,00	/	157	High Current Probe
	F762...C	40,0	2,65	48,60	4,00	/	157	High Current Probe
NEW	F725...C	50,0	3,50	17,10	5,00	/	197	High Current Probe
	F735...C	50,0	3,50	43,10	5,00	/	197	High Current Probe
NEW	F348...C	100,0	5,80	52,10	7,60	/	300	High Current Probe

Coaxial probes for high current applications								
Status	**Series**	**Current**	**Barrel- Ø**	**Total Length**	**mm**		**mil**	**Category**
	1860C003	75,0	9,05	49,10	14,00	/	551	Coaxial High Current Probe
	1860C004	250,0	20,60	61,80	25,00	/	984	Coaxial High Current Probe
	1860C007	75,0	11,05	47,00	14,00	/	551	Coaxial High Current Probe
NEW	1860C008	300,0	20,60	61,30	25,00	/	984	Coaxial High Current Probe
NEW	F349...C	100,0	5,80	61,90	7,60	/	300	Coaxial High Current Probe

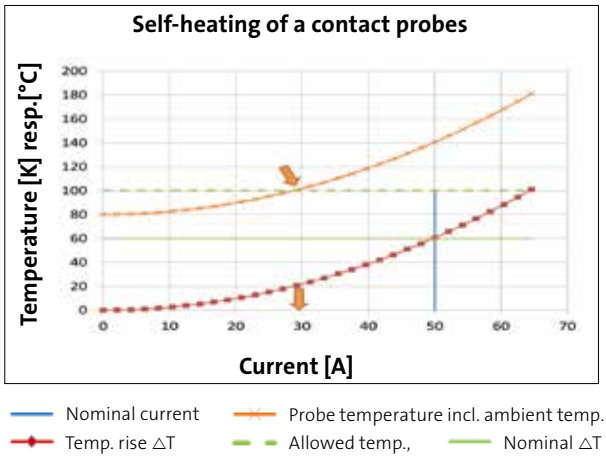
High Current Probes

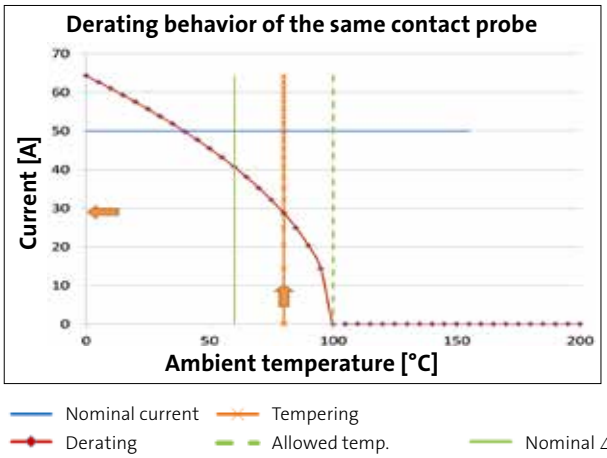
For high current applications spring contact probes need to be designed in a special way with very low internal resistances. Especially too high temperatures of the probes or of single components of the probes need to be avoided and the electrical contact to the DUT needs to be optimized. The application range for high current probes is very large. These probes are used in test fixtures, wire harness test modules or in special test setups like e.g. in the field of charging and discharging processes in battery production.

Requirements

Relevant for the temperature rise of a high current probe is power loss. This power loss needs to be as low as possible. This is why a high current probes needs a special design to minimize the internal and contact resistance of the probe. The internal resistance is directly depending on the design and the materials of the probe. FEINMETALL springs for high current probes are suitable for up to 200°C without any risk of damages or reduced life cycles. Independently from the probe design, the contact resistance can be minimized by using high contact forces or by choosing tips made of silver alloy.

The maximum current values in the specifications refer to a maximum continuous current (DC). It is mainly limited by the maximum allowed temperature rise of the contact probe. The maximum alternating current is defined as the root mean square of the current.





FEINMETALL standard high current test for creating the measurement curve and for defining the maximum current:

The self-heating caused by the power loss in a contact probe is measured in an own laboratory by increasing the current step by step and measuring the respective temperatures at the contact probe plating after reaching a stable state. As the ambient temperature may vary during the measurement, its value is also detected and subtracted from the measured temperature value. This results in the chart showing only the temperature rise ΔT in Kelvin versus the current, starting at zero.

On the basis of these measurement results the nominal current of a spring contact probe is defined by a certain degree of heating. This value (nominal ΔT) is not a fix value and varies depending on the probe series and functionality between 30 K and 70 K. In the example (diagram on the left) this value was 60 K, leading to a nominal current of 50 A.

At ideal operating conditions as in the laboratory (ambient temperature, heat dissipation by DUT and cables, sufficient thermal convection etc.), the contact probe can generally be used securely with the nominal current. It has to be considered, that in the application many factors differ from the ideal conditions (e.g. close-by current-carrying contact probes, contaminations, higher ambient temperatures). Especially the higher ambient temperature is visualized in the derating behavior (diagram on the right). A safety factor of minimum 20% is recommended.

Derating behavior and connection with self heating of a spring contact probe:

The derating describes the necessary reduction of the operating current at increasing temperatures of the contact probe and its ambiance. The derating curve shows the same behavior of the contact probe just in another diagram format. The analogies to the diagram on the left show this connection. The basis of a correct derating curve is the definition of a maximum allowed temperature of the contact probe. This value needs to be lower than the maximum temperature of the probe specifications (in most cases 200°C) and is often limited by application related factors such as fixture materials.

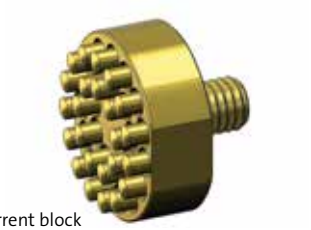
In the shown example the temperature limit is 100°C. That means at an ambient temperature of 100°C no further current flow is allowed, because this would lead to additional heating beyond the limit. At the nominal current of 50 A the self heating would result in 60°C and so an ambient temperature of 40°C would be allowed until the limit of 100°C is reached.

A different scenario is the assumption that the ambient temperature is e.g. 80°C. The heating curve is shifted of this value (diagram on the left). The intersection with the limit of 100°C results in an allowed current flow of only 30 A. The same current value can be identified in the diagram on the right as intersection of temperature and derating curve. So, the derating behavior is also determined by the self-heating diagrams shown in the catalog specifications.

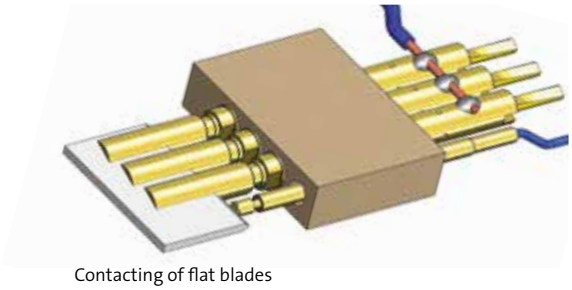
Overview

Types of High Current Probes

High current blocks
By integrated spring loaded contact elements this block allows contacting uneven or inclined surfaces with a very low contact resistance. The block should be mounted directly into conductive material to make use of the whole contact surface.


High current block

High current probes for contacting flat blade connectors
Due to the twist proof design the plunger can be moved to the test item well aligned. As soon as the plunger meets the blade and is pushed in, it makes a twist movement of up to 20°. Therefore it adapts to the surface and creates a line contact without causing any scratching or damaging of the DUT.


Contacting of flat blades

High current probes with bias ball design
are designed to optimize the electrical contact between plunger and barrel by an integrated ball between spring and inclined plunger. As soon as the plunger is compressed, the mechanical force leads to an optimal contact to the barrel.


Bias ball design

High current probes with split plunger design
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.


Split Plunger Design


Special tip with silver alloy

High current probes with continuous plunger
have the lowest internal resistance and therefore allow the highest currents. If the connection is made at the end of the plunger, this connection is moving synchronously with the plunger. Therefore such a connection wire needs to be flexible to avoid damages of the wire.


Continuous plunger

High current probes with coaxial design
For charging and discharging of accumulator and battery cells with simultaneous measuring of the voltage special coaxial high current probes have been developed.


Coaxial design

F310

High Current Probe 75 mil with Continuous Plunger

Centers (mm/mil)	1,90 / 75
Current	10,0 A
R typ	<25 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	40	90

Travel (mm)

Version	Nominal	Maximum
Standard	2,4	3,0
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Bronze, unplated
Spring	Stainless steel, unplated
Receptacle	Bronze, gold plated

Accessories

Insertion tool receptacle	FEWZ-075E0
Insertion tool probe	FDWZ-075

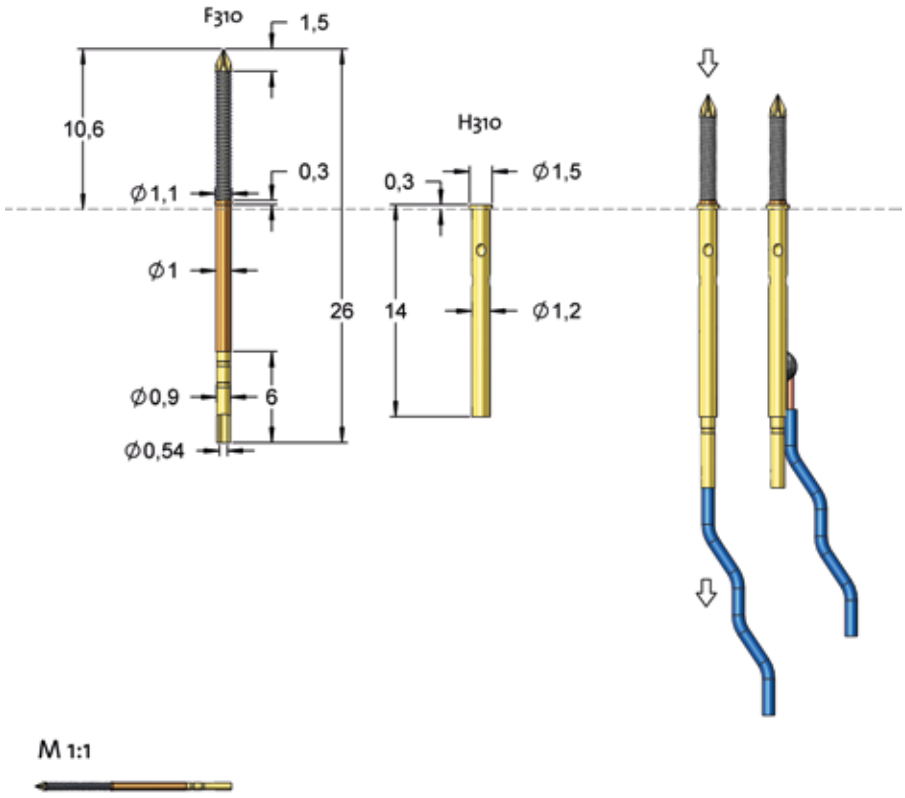
Drill Size (mm)

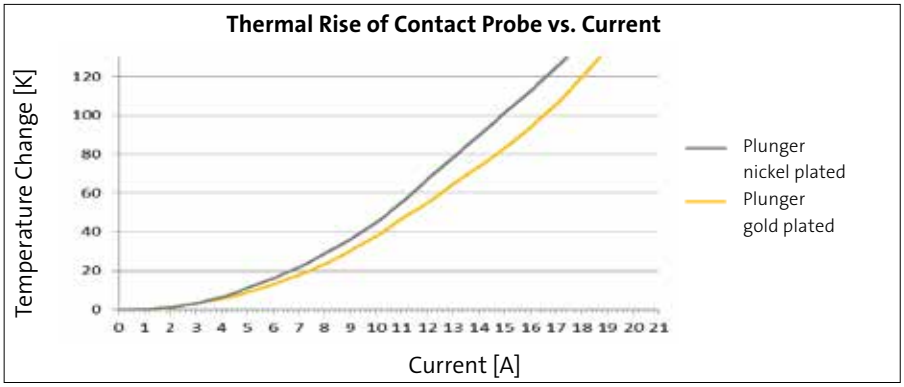
H310	1,19 - 1,20

Projection Height (mm)

H310 with F310	10,6

The continuous plunger guarantees a low internal resistance and allows applications with high currents. The connection of the plunger should be realized by a flexible wire with sufficient space for the movement. The wire can also be soldered directly to the receptacle. However, this leads to a lower electrical performance.





Series			Tip-Ø		Spring Force (cN)
F310	04	S	110	L	090
	Tip Style	Material		Plating	Version

Material:	S = Steel
Tip-Ø:	110 = 1,10 mm (e.g.)
Plating:	L = Longtime gold plated, N = Nickel plated
Receptacle:	Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	04	S	L	1,10	-
	05	S	N	1,10	-
	08	S	L	1,10	-
	09	S	L	1,10	-
	09	S	N	1,10	-
	14	S	L	1,10	-

F320

High Current Probe 100 mil with Continuous Plunger

Centers (mm/mil)	2,54 / 100
Current	12,0 A
R typ	<20 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	50	130

Travel (mm)

Version	Nominal	Maximum
Standard	3,2	4,0
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Bronze, unplated
Spring	Stainless steel, unplated
Receptacle	Bronze, gold plated

Accessories

Insertion tool receptacle	FEWZ-100E0
Insertion tool probe	FDWZ-100

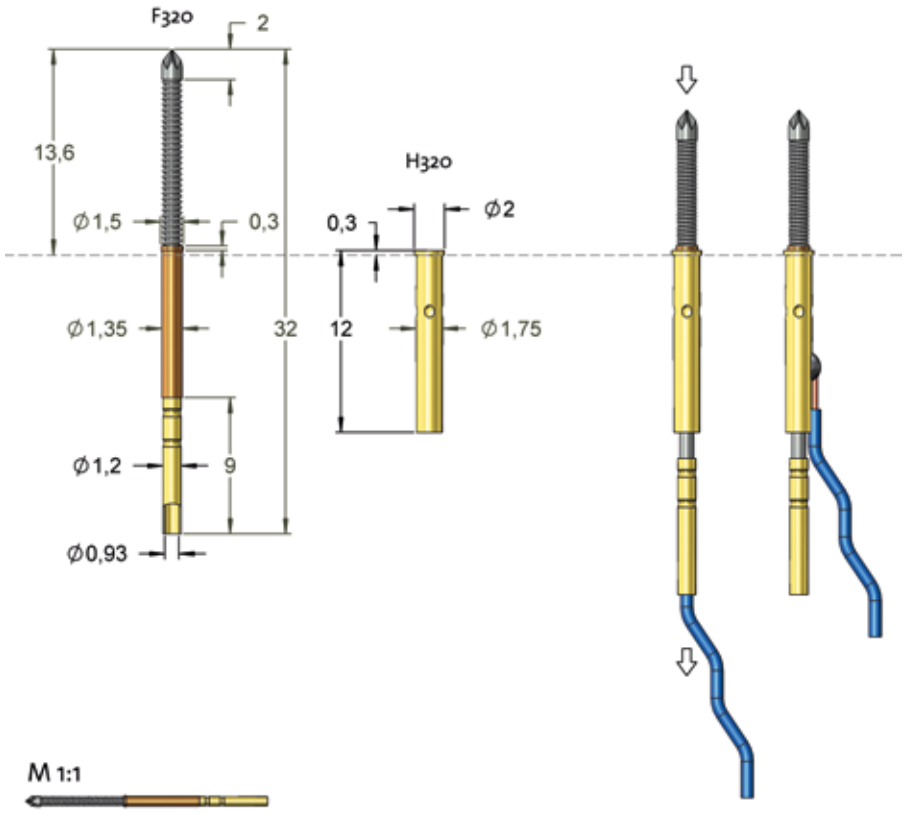
Drill Size (mm)

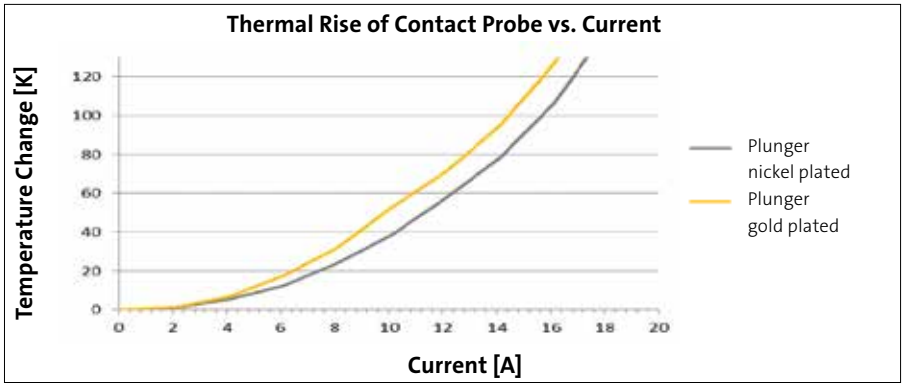
H320	1,74 - 1,75

Projection Height (mm)

H320 with F320	13,6

The continuous plunger guarantees a low internal resistance and allows applications with high currents. The connection of the plunger should be realized by a flexible wire with sufficient space for the movement. The wire can also be soldered directly to the receptacle. However, this leads to a lower electrical performance.





Series | Tip-Ø | Spring Force (cN)

F320 04 S 135 N 130

Tip Style | Material | Plating | Version

Material:	S = Steel
Tip-Ø:	135 = 1,35 mm (e.g.)
Plating:	L = Longtime gold plated, N = Nickel plated
Receptacle:	Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	04	S	N	1,35	-
	05	S	N	1,35	-
	07	S	N	1,35	-
	09	S	L	1,35	-
	09	S	N	1,35	-
	12	S	L	1,35	-
	14	S	L	1,35	-

F330

High Current Probe 118 mil with Continuous Plunger

Centers (mm/mil)	3,00 / 118
Current	14,0 A
R typ	<15 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	60	210
Standard	180	415

Travel (mm)

Version	Nominal	Maximum
Standard	5,6	7,0
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, unplated
Spring	Stainless steel, unplated
Receptacle	Bronze, gold plated

Accessories

Insertion tool receptacle	FEWZ-330E0
Insertion tool probe	FDWZ-100

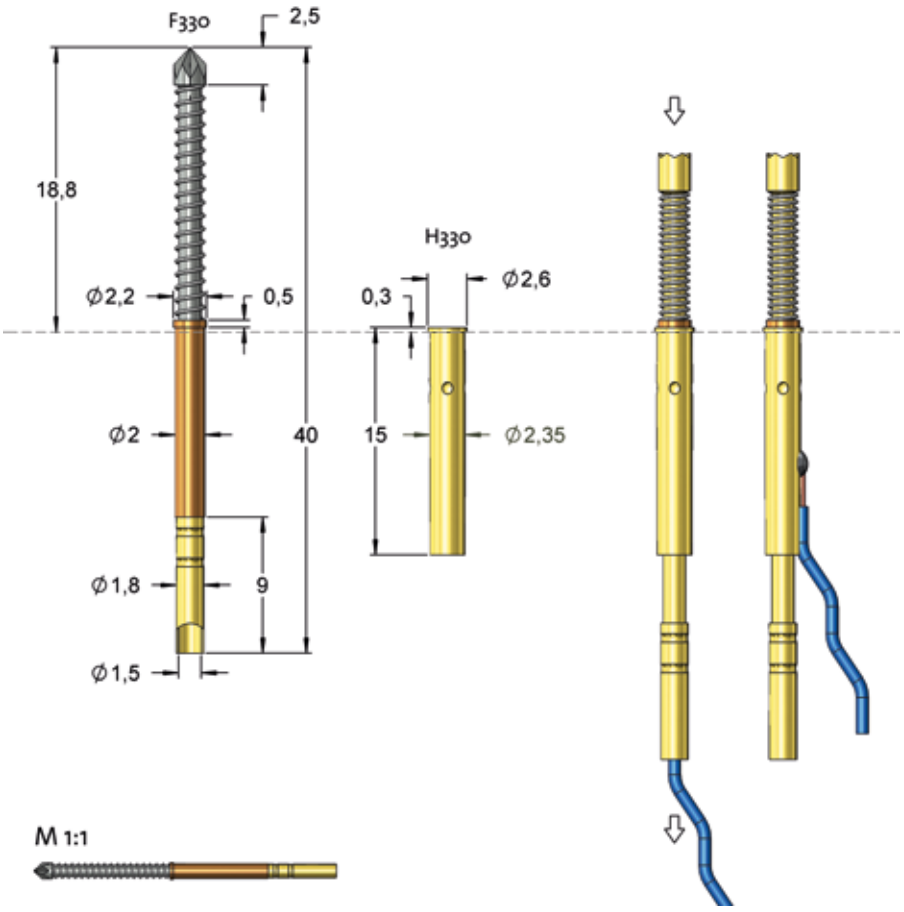
Drill Size (mm)

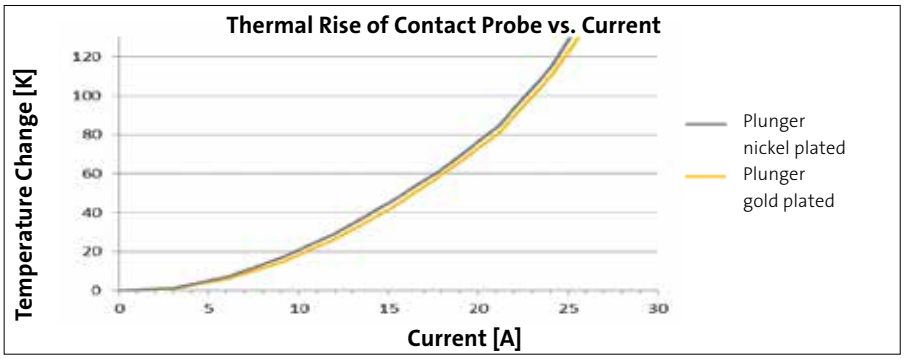
H330	2,33 - 2,34

Projection Height (mm)

H330 with F330	18,8

The continuous plunger guarantees a low internal resistance and allows applications with high currents. The connection of the plunger should be realized by a flexible wire with sufficient space for the movement. The wire can also be soldered directly to the receptacle. However, this leads to a lower electrical performance.





Series			Tip-Ø		Spring Force (cN)
F330	05	S	210	L	210
	Tip Style	Material		Plating	Version

Material: S = Steel
Tip-Ø: 210 = 2,10 mm (e.g.)
Plating: L = Longtime gold plated, N = Nickel plated
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	S	L	2,10	-
	05	S	N	2,10	-
	07	S	L	2,10	-
	07	S	N	2,10	-
	08	S	N	2,10	-
	09	S	L	2,10	-
	14	S	L	2,10	-

F340

High Current Probe 157 mil with Continuous Plunger

Centers (mm/mil)	4,00 / 157
Current	16,0 A
R typ	<10 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	80	260
Standard	150	400
Standard	300	540

Travel (mm)

Version	Nominal	Maximum
Standard	6,4	8,0
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, unplated
Spring	Stainless steel, unplated
Receptacle	Bronze, gold plated

Accessories

Insertion tool receptacle	FEWZ-340E0
Insertion tool probe	FDWZ-100

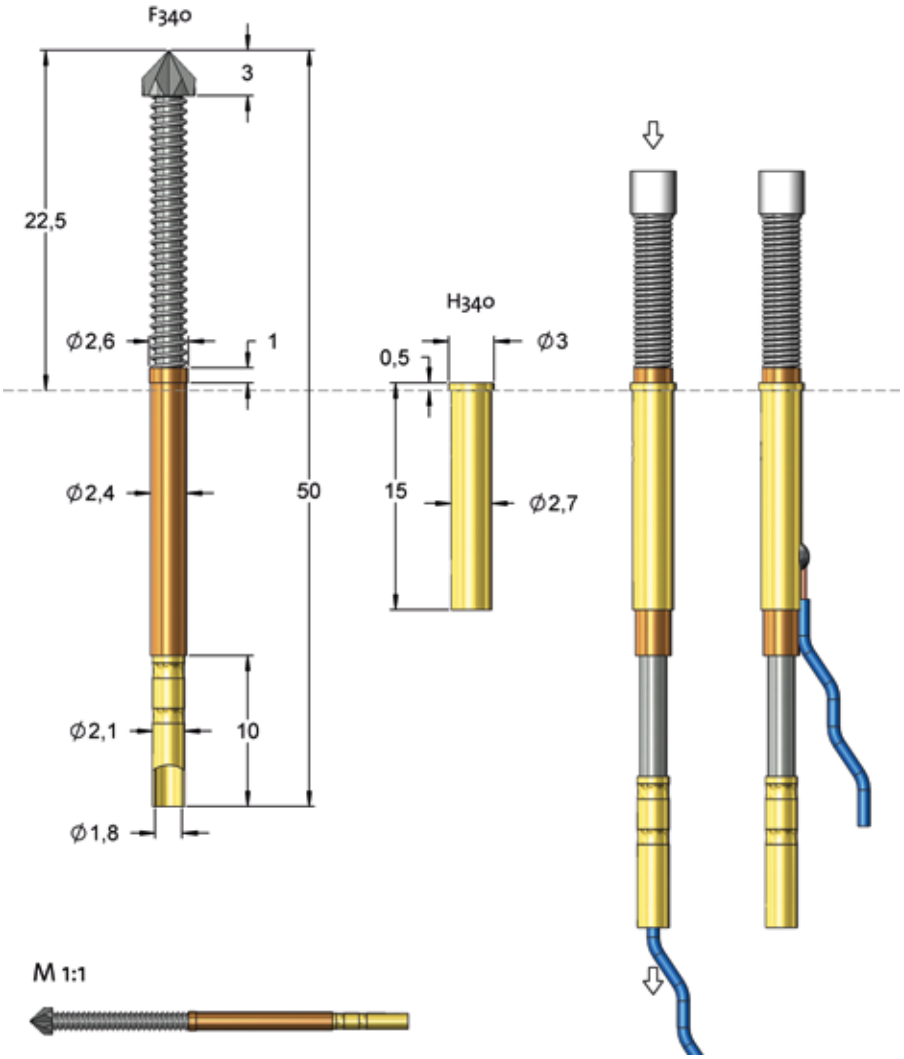
Drill Size (mm)

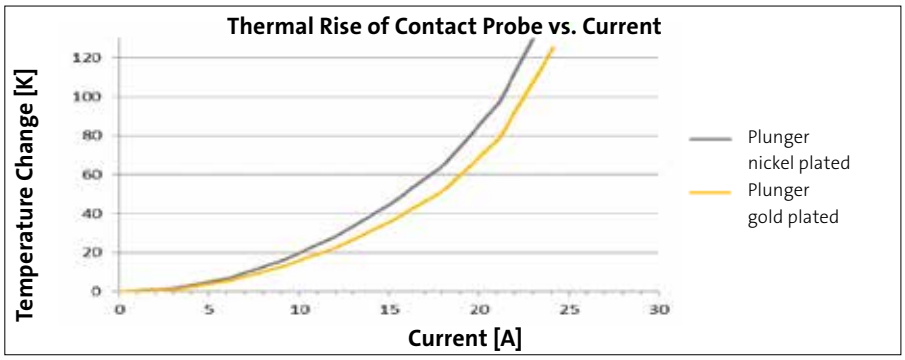
H340	2,68 - 2,69

Projection Height (mm)

H340 with F340	22,5

The continuous plunger guarantees a low internal resistance and allows applications with high currents. The connection of the plunger should be realized by a flexible wire with sufficient space for the movement. The wire can also be soldered directly to the receptacle. However, this leads to a lower electrical performance.





Series			Tip-Ø		Spring Force (cN)
F340	04	S	350	N	260
	Tip Style	Material		Plating	Version

Material: S = Steel, A = AgNi (Silver alloy)
Tip-Ø: 350 = 3,50 mm (e.g.)
Plating: L = Longtime gold plated, N = Nickel plated, U = Unplated
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	04	S	N	3,50	-
	05	A	U	3,00	-
	05	S	L	3,50	-
	05	S	N	3,50	-
	07	S	L	3,50	-
	09	S	L	3,50	-
	17	A	U	3,00	-

F772C

High Current Probe 100 mil Plug-in

Centers (mm/mil)	2,54 / 100
Current	20,0 A
R typ	<10 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	50	150
C	50	300

Travel (mm)

Version	Nominal	Maximum
C	4,0	5,0
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

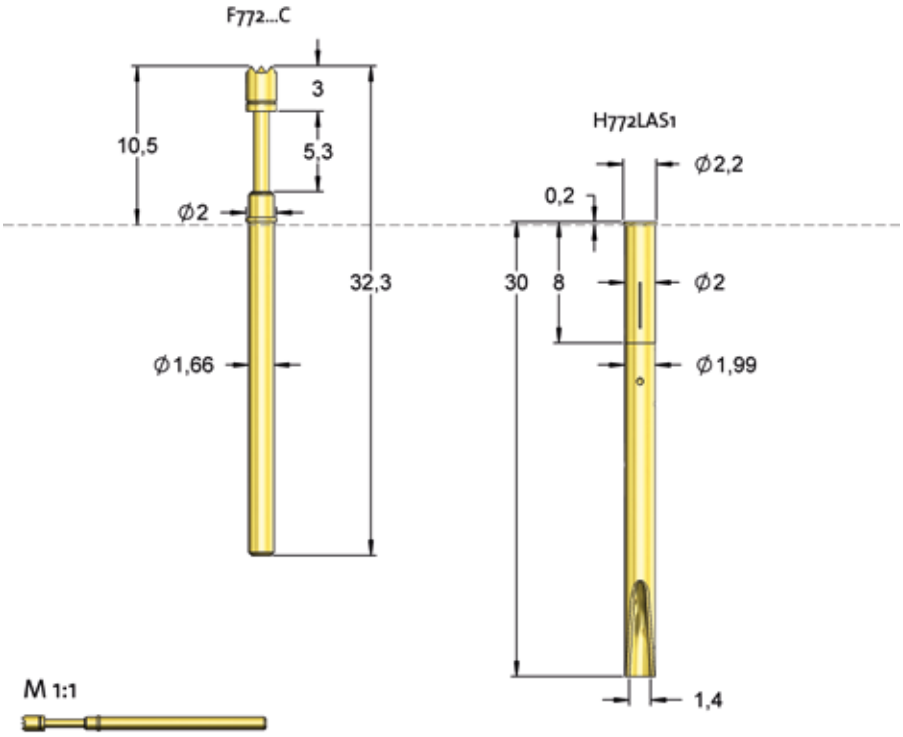
Insertion tool receptacle	FEWZ-772E0
Insertion tool probe	FDWZ-100

Drill Size (mm)

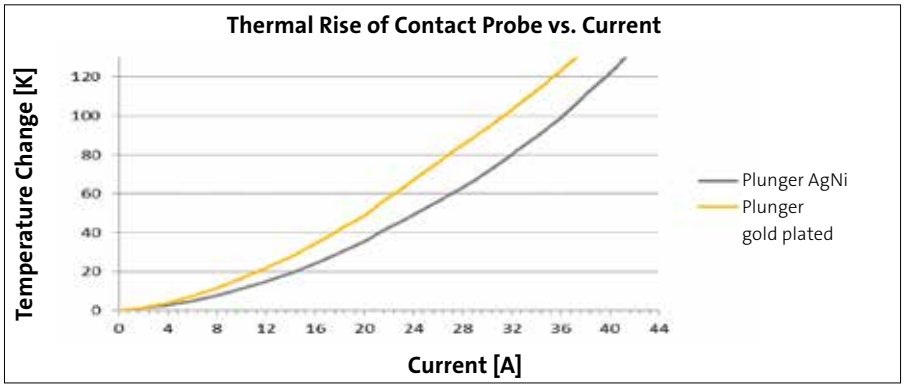
H772LAS1	1,99 - 2,00

Projection Height (mm)

H772LAS1 with F772...C	10,5



This probe is suitable for applications in burn-in / run-in tests and for functional tests with higher currents.



Series | Tip-Ø | Spring Force (cN)

F772 06 B 200 G 300 C

Tip Style | Material | Plating | Version

Material: B = BeCu, A = AgNi (Silver alloy)
Tip-Ø: 200 = 2,00 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: C = High Current Version
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	A	U	2,00	C
	05	B	G	2,00	C
	06	B	G	2,00	C
	07	B	G	2,00	C
	11	B	G	1,00	C
	14	B	G	2,00	C
	16	B	G	1,00	C
	46	B	G	2,00	C
	55	B	G	2,00	C

F713C

NEW

High Current Probe 138 mil Short Version, Plug-in

Centers (mm/mil)	3,50 / 138
Current	25,0 A
R typ	<8 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	60	150

Travel (mm)

Version	Nominal	Maximum
C	2,8	3,5
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

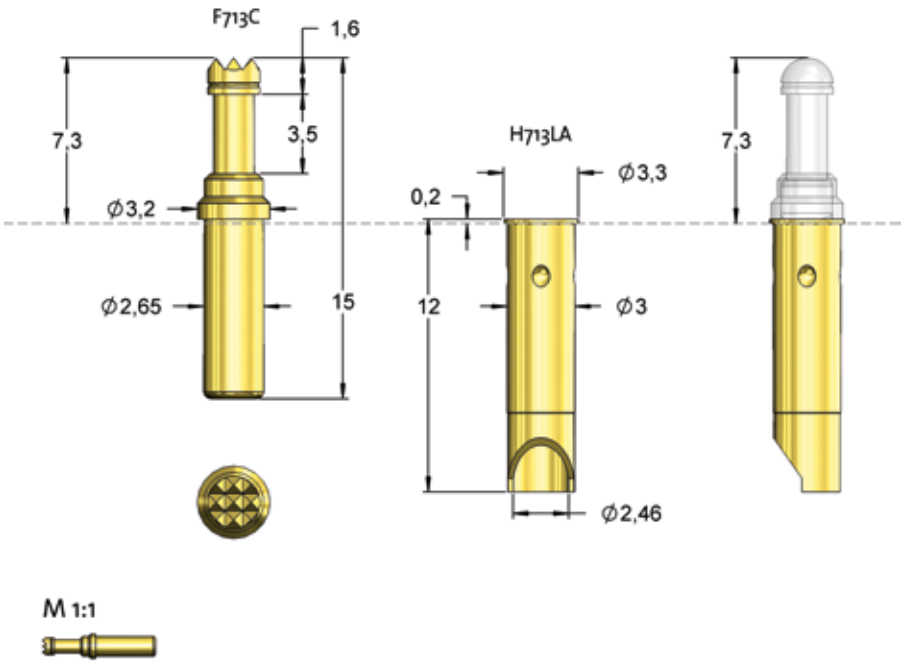
Insertion tool receptacle	FEWZ-774E0
Insertion tool probe	FDWZ-100

Drill Size (mm)

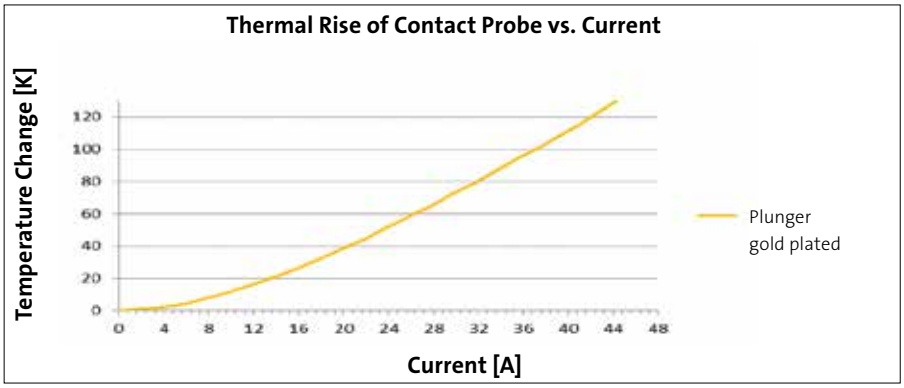
H713LA	2,98 - 2,99

Projection Height (mm)

H713LA with F713...C	7,3



For high current applications at limited space.



Series			Tip-Ø		Spring Force (cN)	
F713	06	B	230	G	150	C
	Tip Style	Material		Plating		Version

Material: B = BeCu
Tip-Ø: 230 = 2,30 mm (e.g.)
Plating: G = Gold plated
Version: C = High Current Version
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	2,30	C
	12	B	G	2,30	C
	14	B	G	2,30	C

F773C

High Current Probe 138 mil Robust Version, Plug-in

Centers (mm/mil)	3,50 / 138
Current	25,0 A
R typ	<8 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	60	150
C	60	300
C	170	600

Travel (mm)

Version	Nominal	Maximum
C	4,0	5,0
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

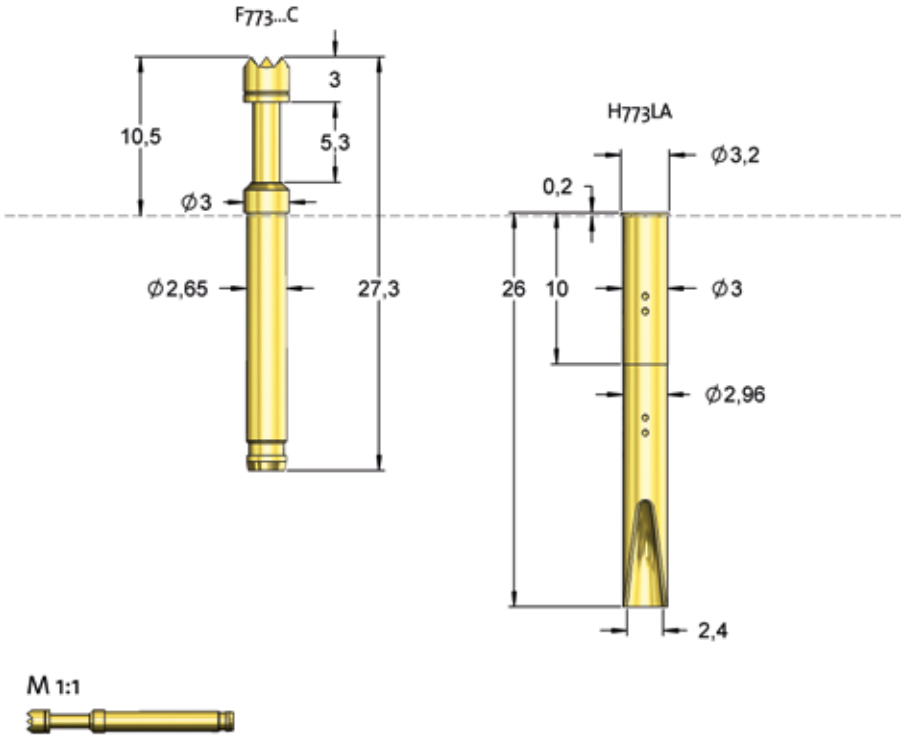
Insertion tool receptacle	FEWZ-774E0
Insertion tool probe	FDWZ-100

Drill Size (mm)

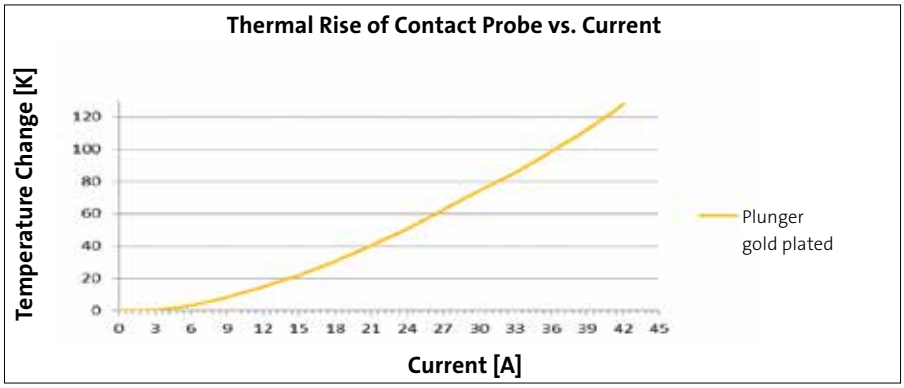
H773LA	2,98 - 2,99

Projection Height (mm)

H773LA with F773...C	10,5



This probe is suitable for applications in burn-in / run-in tests and for functional tests with higher currents



* Center differing from standard.

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	A	U	3,00	C
	06	B	G	2,30	C
	06	B	G	3,00	C
	06	B	G	4,00 *	C
	07	B	G	3,00	C
	11	B	G	1,40	C
	11	B	G	1,80	C
	12	B	G	2,30	C
	12	B	G	3,00	C
	14	B	G	2,30	C
	17	B	G	4,00 *	C
	55	B	G	3,00	C

Series			Tip-Ø		Spring Force (cN)	
F773	06	B	230	G	300	C
	Tip Style	Material		Plating		Version

Material: B = BeCu, A = AgNi (Silver alloy)
Tip-Ø: 230 = 2,30 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: C = High Current Version
Receptacle: Order Code according drawing

F566C

NEW

High Current Probe 177 mil Robust Version, Plug-in

Centers (mm/mil)	4,50 / 177
Current	35,0 A
R typ	<15 mOhm
Temperature	-20°C...+150°C

Spring Force (cN ±20%)

Version	Preload	Nominal
C	300	500
E12C	300	500

Travel (mm)

Version	Nominal	Maximum
C	4,3	6,4
E12C	4,3	6,4
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Bronze, gold plated
Spring	Stainless steel, unplated
Receptacle	Nickel silver, gold plated

Accessories

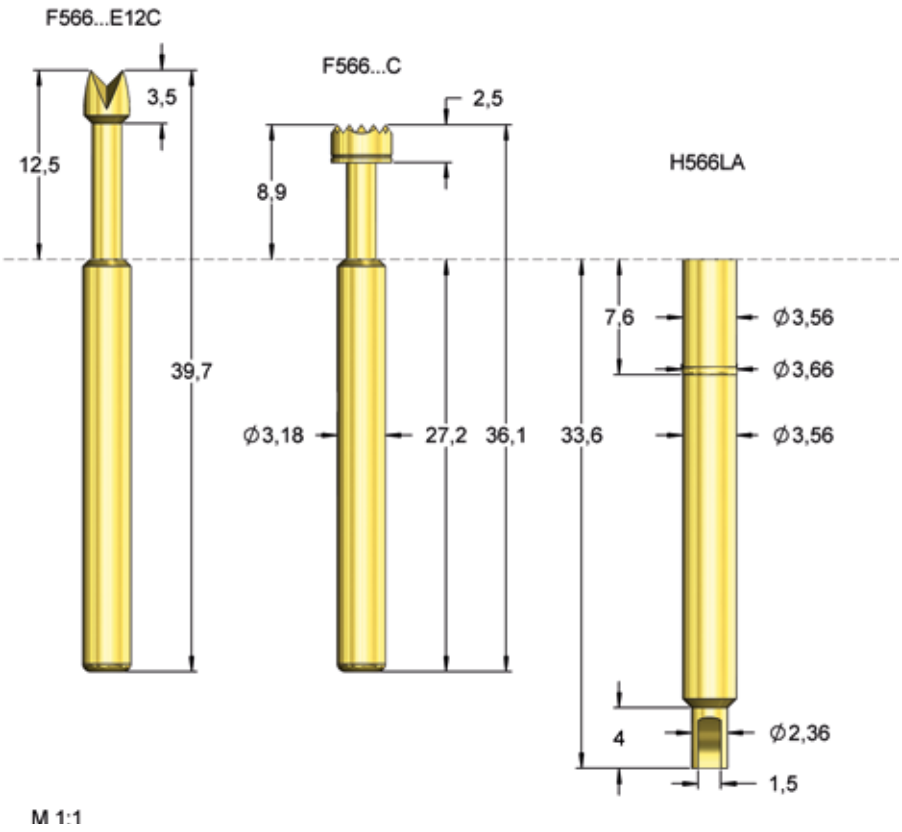
Insertion tool receptacle	FEWZ-774E0
Insertion tool probe	FDWZ-100

Drill Size (mm)

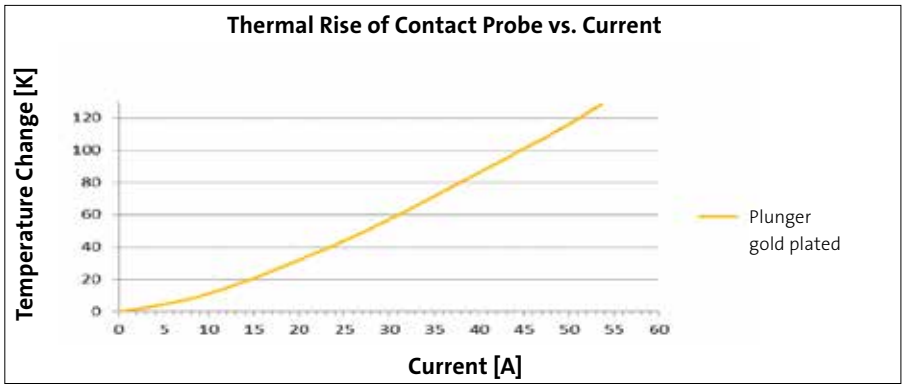
Press ring as stop	3,54 - 3,55
Press ring inserted	3,58 - 3,63

Projection Height (mm)

H566LA with F566...C	8,9 - 16,5
H566LA with F566...E12C	12,5 - 20,2



This probe is suitable for applications in burn-in / run-in tests and for functional tests with higher currents



Series			Tip-Ø		Spring Force (cN)	
F566	06	B	400	G	500	C
	Tip Style	Material		Plating		Version

Material: B = BeCu
Tip-Ø: 400 = 4,0 mm (e.g.)
Plating: G = Gold plated
Version: C = High Current Version, E12 = Projection Height 12,5mm
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	4,00	C
	12	B	G	4,00	C
	14	B	G	3,00	C
	14	B	G	3,00	E12C

F775C

High Current Probe 197 mil Robust Version, Plug-in

Centers (mm/mil)	5,00 / 197
Current	50,0 A
R typ	<5 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	150	300
C	150	500
C	500	1000

Travel (mm)

Version	Nominal	Maximum
C	4,4	5,5
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

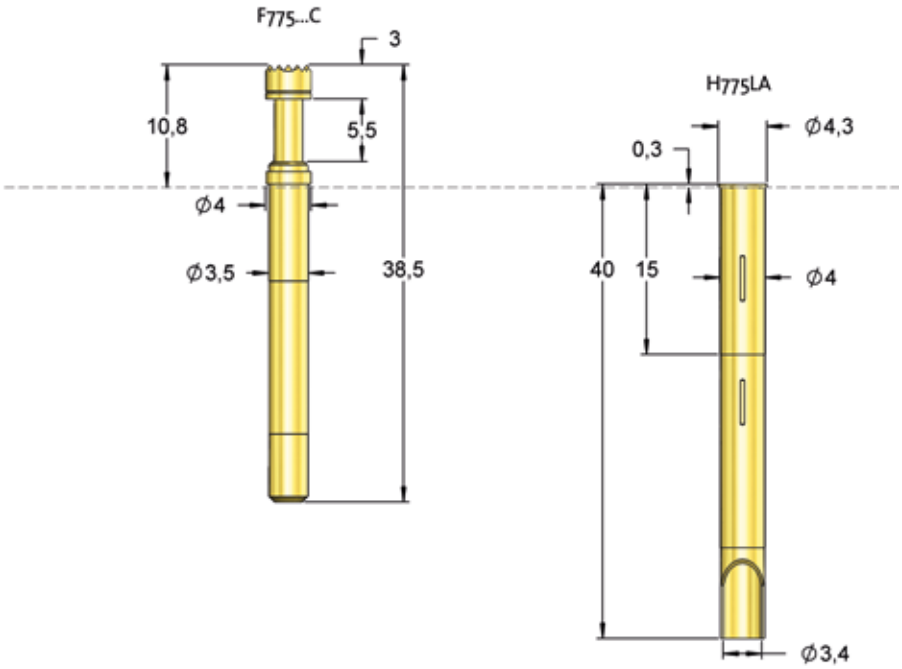
Insertion tool receptacle	FEWZ-735E0

Drill Size (mm)

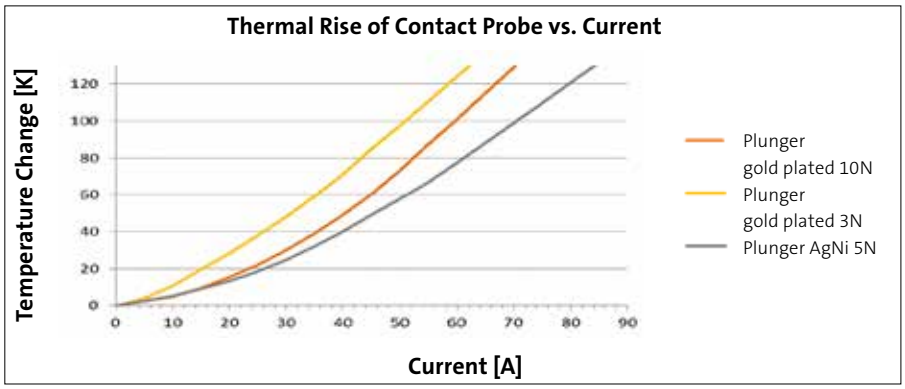
H775LA	3,98 - 3,99

Projection Height (mm)

H775LA with F775...C	10,8



This probe is suitable for applications in burn-in / run-in tests and for functional tests with higher currents



Series			Tip-Ø		Spring Force (cN)	
F775	05	B	400	G	300	C
	Tip Style	Material		Plating		Version

Material: B = BeCu, A = AgNi (Silver alloy)
Tip-Ø: 400= 4,00 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: C = High Current Version
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	04	B	G	3,00	C
	05	B	G	4,00	C
	06	B	G	4,00	C
	07	B	G	3,00	C
	12	A	U	4,00	C
	17	B	G	4,00	C
	55	B	G	4,00	C

F732C

High Current Probe 100 mil Threaded

Centers (mm/mil)	2,54 / 100
Current	20,0 A
R typ	<10 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	50	150
C	50	300

Travel (mm)

Version	Nominal	Maximum
C	4,0	5,0
Thread (M)		1,6
Wrench Size		1,7
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

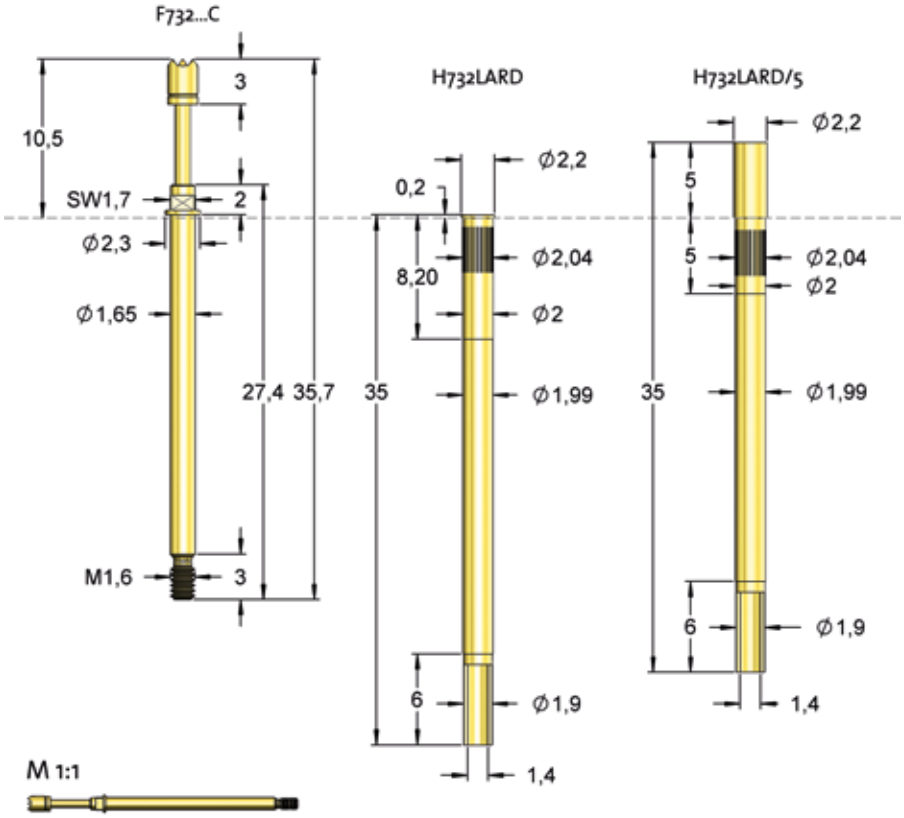
Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe	FWZ732 (T)

Drill Size (mm)

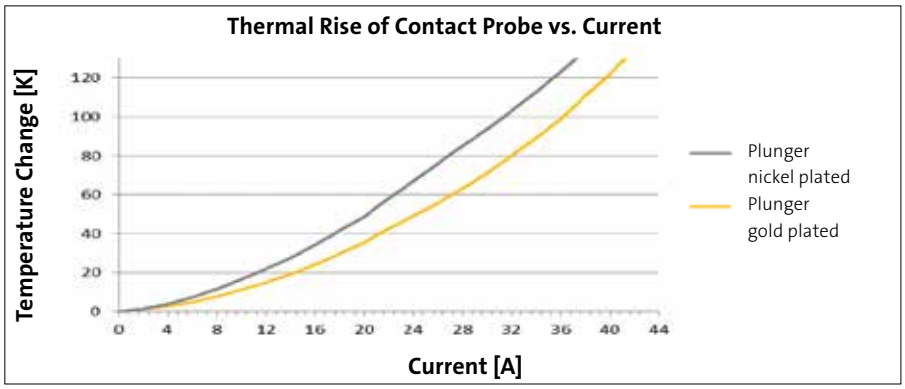
Receptacle without knurl	1,99 - 2,00
Receptacle with knurl	2,00 - 2,02

Projection Height (mm)

H732... with F732...C	10,5
H732.../5 with F732...C	15,3
H732.../10 with F732...C	20,3



This probe is suitable for applications in burn-in / run-in tests and for functional tests with higher currents



Tip Style	Number	Material	Plating	Ø in mm	Version
	05	A	U	2,00	C
	05	B	G	2,00	C
	06	B	G	1,80	C
	06	B	G	2,00	C
	07	B	G	1,75	C
	11	B	G	0,65	C
	11	B	G	0,80	C
	11	B	G	1,00	C
	16	B	G	1,00	C
	55	B	G	2,00	C

Series			Tip-Ø		Spring Force (cN)	
F732	06	B	200	G	300	C
	Tip Style	Material		Plating		Version

Material: B = BeCu, A = AgNi (Silver alloy)
Tip-Ø: 200 = 2,00 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: C = High Current Version
Receptacle: Order Code according drawing

F360C

High Current Probe 138 mil Threaded

Centers (mm/mil)	3,50 / 138
Current	15,0 A
R typ	<15 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	50	80

Travel (mm)

Version	Nominal	Maximum
C	0,8	1,2
Thread (M)		2,5
Wrench Size		2,2
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

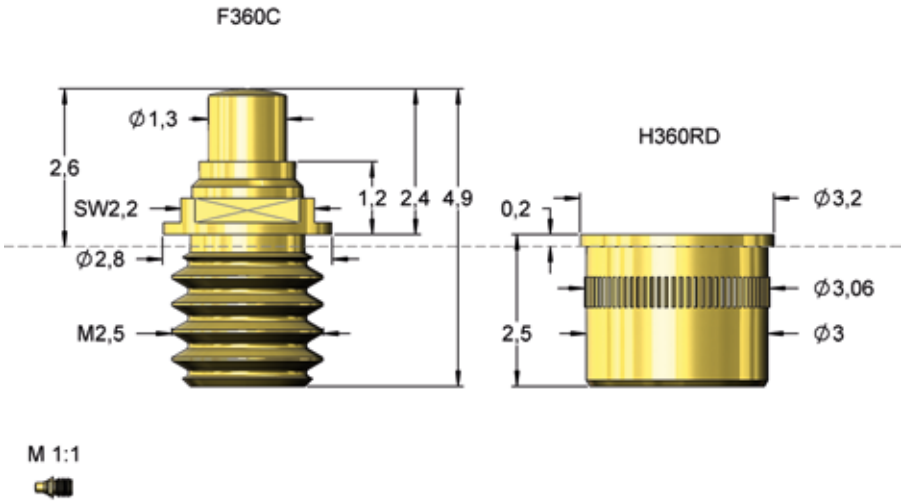
Screw-in tool probe	FWZVF3S2

Drill Size (mm)

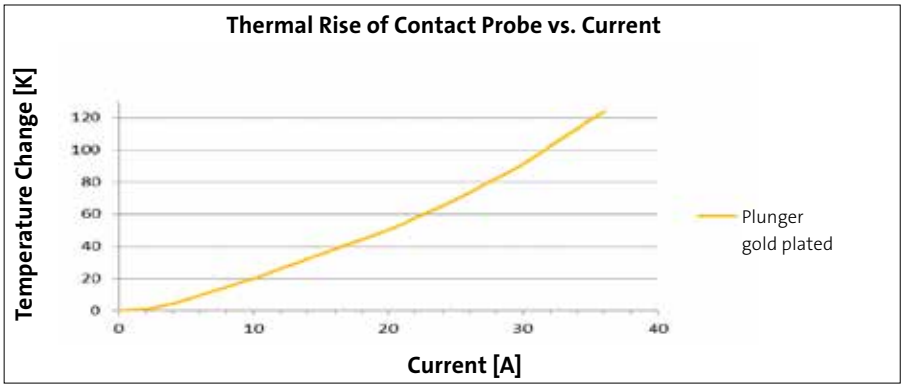
Receptacle with knurl	3,00 - 3,02

Projection Height (mm)

H360RD with F360...C	2,6



The high current construction ensures a low resistance despite the compact design of the probe. At larger contact surfaces several probes F360C an be mounted next to each other to realize higher currents (e.g. 1860C001).



Series			Tip-Ø		Spring Force (cN)	
F360	11	B	130	G	080	C
	Tip Style	Material		Plating		Version

Material: B = BeCu
Tip-Ø: 130 = 1,30 mm (e.g.)
Plating: G = Gold plated
Version: C = High Current Version
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	11	B	G	1,30	C

F723C

High Current Probe 157 mil Threaded

Centers (mm/mil)	4,00 / 157
Current	25,0 (18,0*) A
R typ	<8 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	40	80
C	70	150

Travel (mm)

Version	Nominal	Maximum
C	2,8	3,5
Thread (M)		2,0
Wrench Size		3,0
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

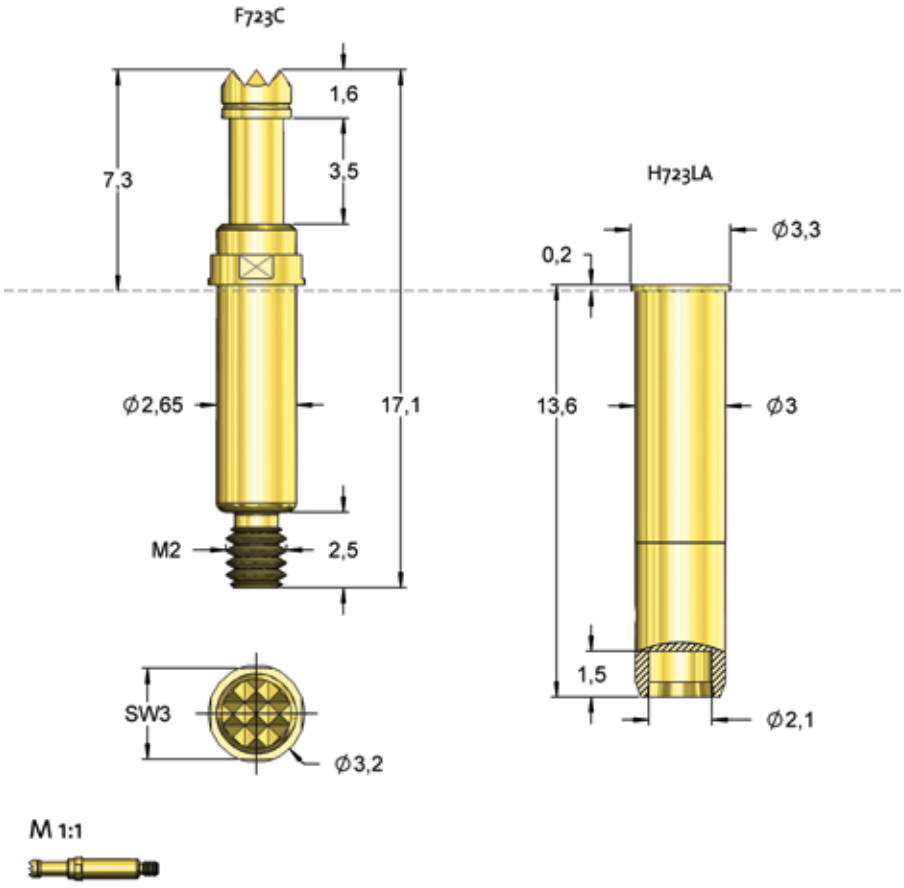
Insertion tool probe	FWZ733S1 FWZ733T1

Drill Size (mm)

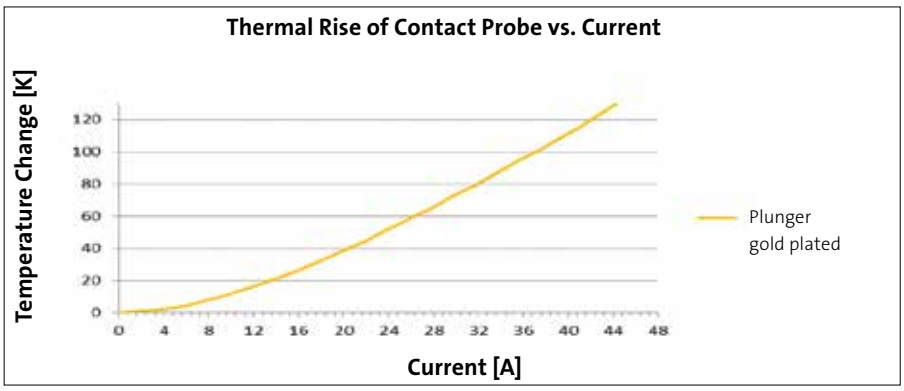
H723LA	2,98 - 2,99

Projection Height (mm)

H723LA with F723...C	7,3



For high current applications with limited available space.
*The 80 cN version only allows 18,0 A because of the low contact force.



Series			Tip-Ø		Spring Force (cN)	
F723	06	B	230	G	300	C
	Tip Style	Material		Plating		Version

Material: B = BeCu
Tip-Ø: 230 = 2,30 mm (e.g.)
Plating: G = Gold plated
Version: C = High Current Version
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	2,30	C
	12	B	G	2,30	C
	14	B	G	2,30	C

F762C

High Current Probe 157 mil for Contacting Flat Blade Connectors

Centers (mm/mil)	4,00 / 157
Current	40,0 A
R typ	<5 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	70	300

Travel (mm)

Version	Nominal	Maximum
C	4,0	5,0
Thread (M)		2,5
Wrench Size		2,6
Pointing Accuracy		±0,05 mm

Materials and Plating

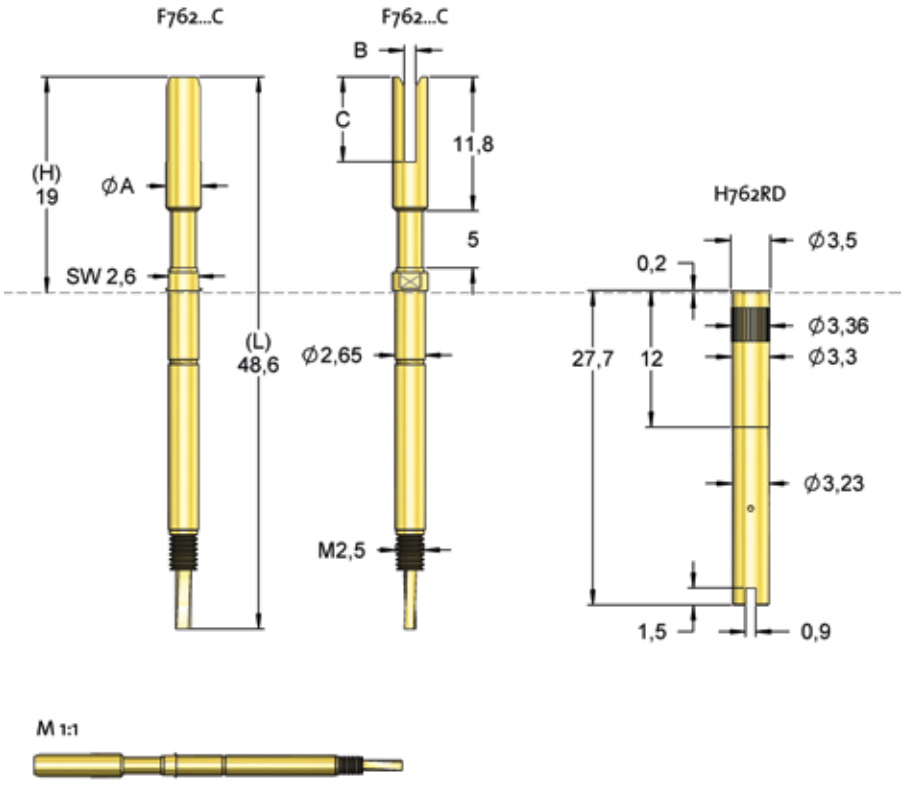
Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

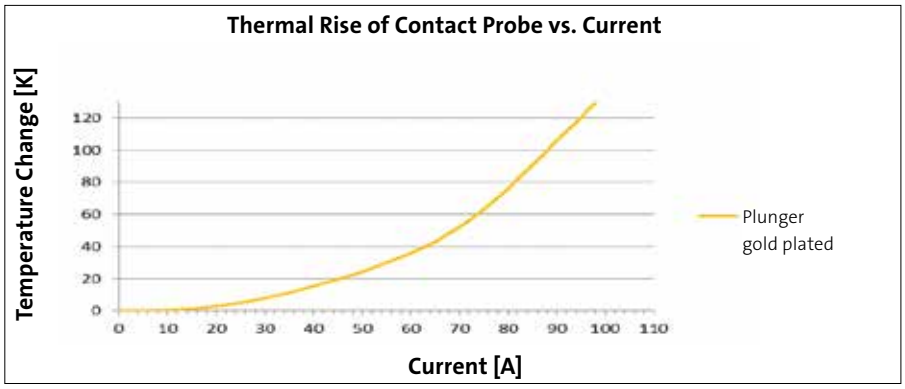
Alignment tool receptacle	FAWZ761
Screw-in tool probe	FWZ885S1 FWZ885T1

Drill Size (mm)

H762RD	3,30 - 3,35

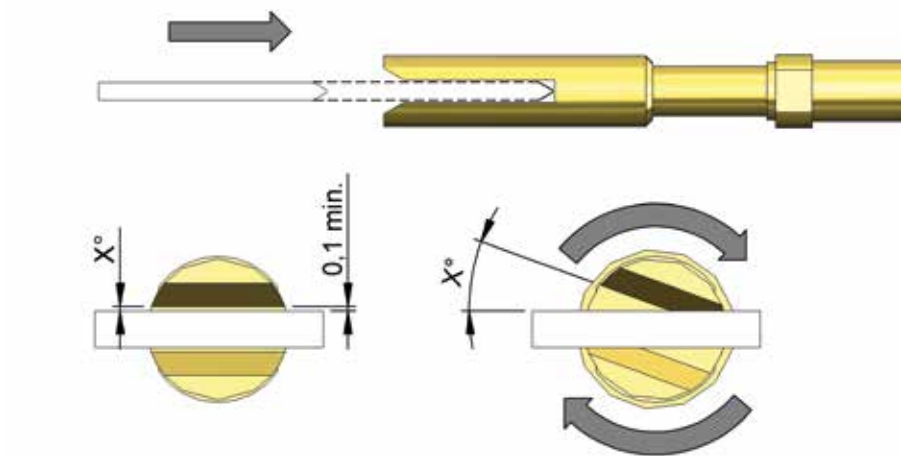


For connecting the probe a flexible wire with sufficient space for movement should be used.



Functional principle
Due to the twist proof design the plunger is always brought to the test item well aligned. Once the plunger is compressed by contacting the blade connector, it is twisted up to a maximum of 20°. This results in a good electrical contact without damaging or scratching the tested item.

Important:
The probe needs to be moved axially to the blade connector. A chamfer at the contact probe enables an optimum guiding.

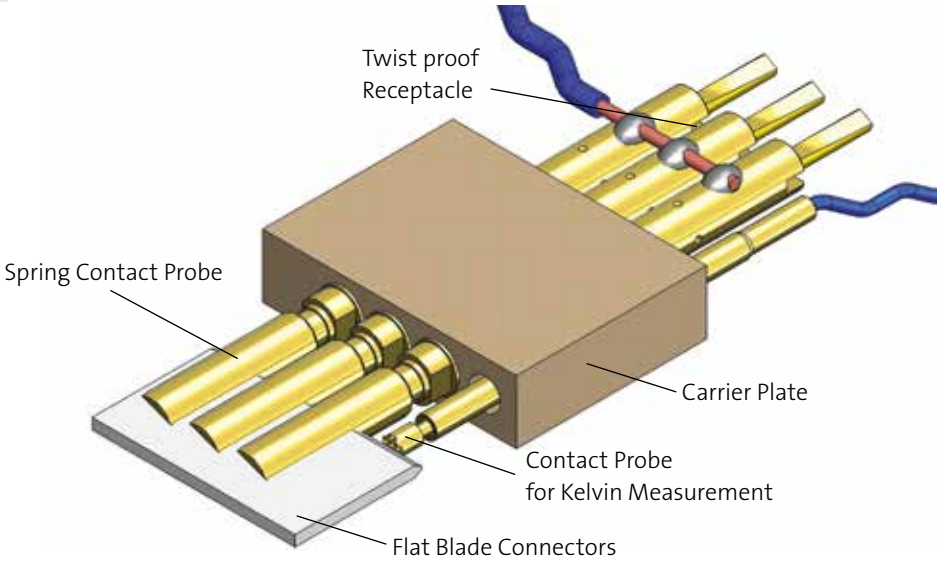


F762C

High Current Probe 157 mil for Contacting Flat Blade Connectors

Centers (mm/mil)	4,00 / 157
Current	40,0 A
R typ	<5 mOhm
Temperature	-40°C...+200°C (H)

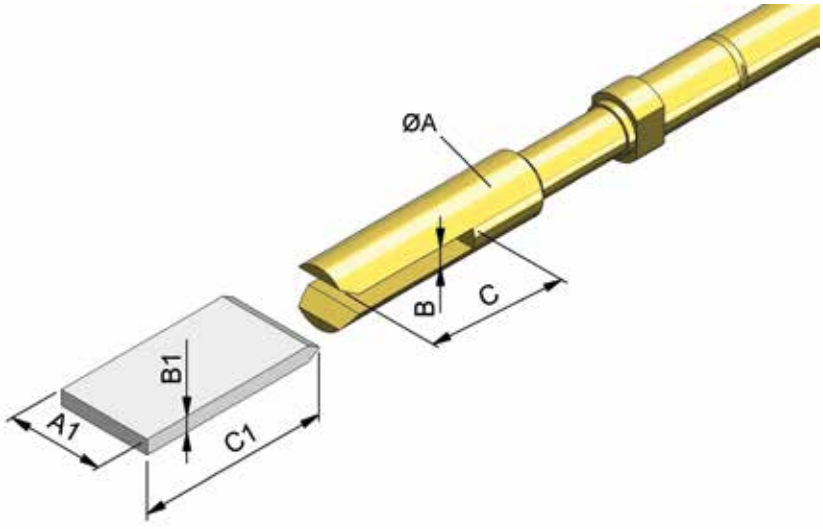
Application note
Higher currents can be realized by using several probes in parallel, e.g. 120 A in this example. In applications with Kelvin tests a normal spring contact probe can be used for the voltage (sense signal).



Series			Number		Spring Force (cN)	
F762	**89**	**B**	**0001**	**G**	**300**	**C**
	Tip Style	Material		Plating		Version

Material: B = BeCu
Number see table
Plating: G = Gold plated
Version: C = High Current Version
Receptacle: Order Code according drawing

At the Order Code of coaxial versions you will find a number instead of the coded tip-Ø. This number shows in the table the belonging spade diamensions.



Suitable for blades			Spring Contact Probe				
A1 [mm]	**B1 [mm]**	**C1 [mm]**	**Order Code**	**ØA [mm]**	**B [mm]**	**C [mm]**	**Screw-in Tool**
min. 3,2	0,5 - 0,8	min. 8,0	F76289B0001G300C	3,1	1,0	7,5	FWZ885S1; FWZ885T1
min. 3,2	1,0 - 1,3	min. 8,0	F76289B0002G300C	3,1	1,5	7,5	FWZ885S1; FWZ885T1
min. 3,2	1,0 - 1,3	min. 4,5	F76289B0003G300C	3,1	1,5	4,0	FWZ885S1; FWZ885T1
min. 4,2	1,5 - 1,8	min. 8,0	F76289B0004G300C	4,0	2,0	7,5	FWZ760S1; FWZ760T1
min. 3,2	0,5 - 0,8	min. 3,0	F76289B0005G300C	3,1	1,0	2,5	FWZ885S1; FWZ885T1
min. 3,2	0,5 - 0,8	min. 6,7	F76289B0006G300C	3,1	1,0	6,2	FWZ885S1; FWZ885T1
min. 3,2	0,3 - 0,6	min. 6,2	F76289B0007G300C	2,2	0,8	5,7	FWZ885S1; FWZ885T1

F733C

High Current Probe 157 mil
Robust Version, Threaded

Centers (mm/mil)	4,00 / 157
Current	25,0 A
R typ	<8 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	60	150
C	60	300
C	170	600

Travel (mm)

Version	Nominal	Maximum
C	4,0	5,0
Thread (M)		2,0
Wrench Size		3,0
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

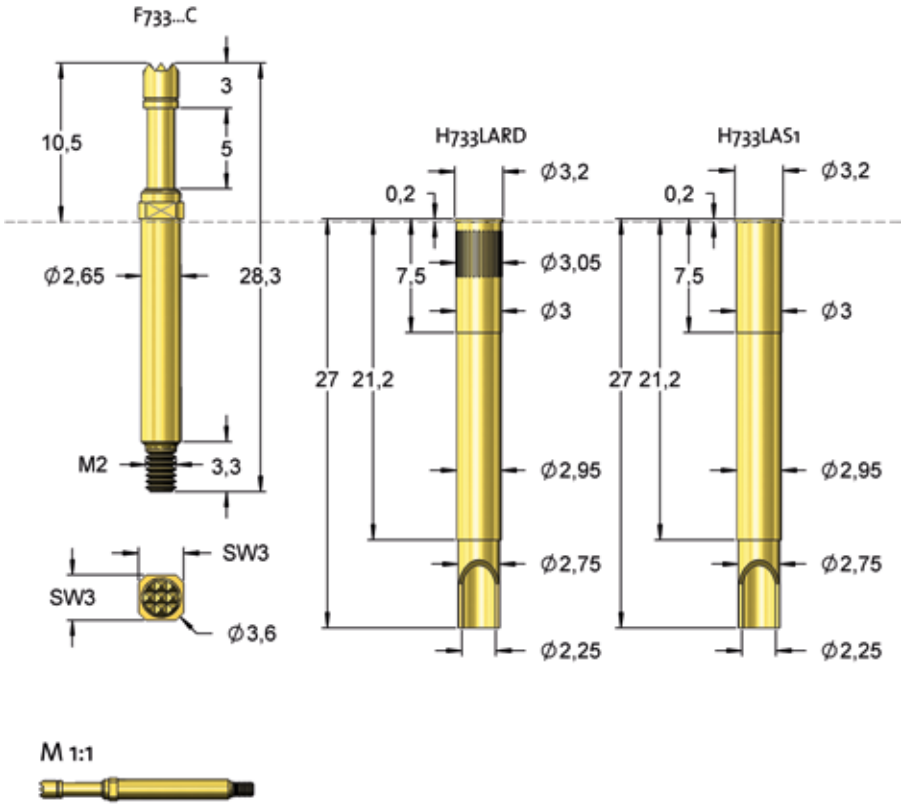
Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZ733 (T)

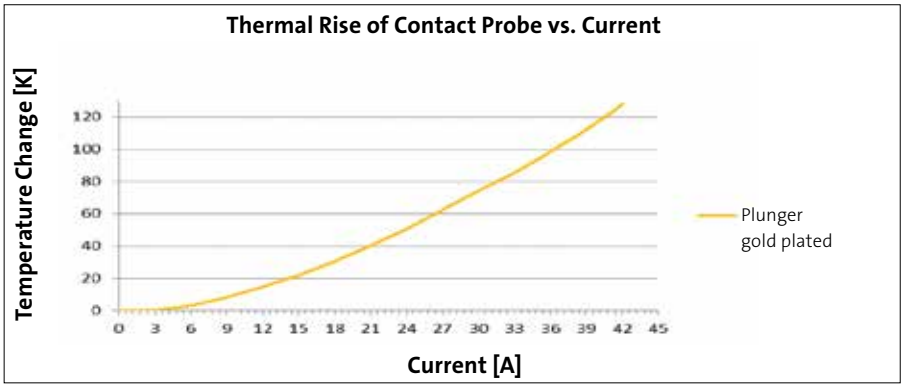
Drill Size (mm)

Receptacle without knurl	2,98 - 2,99
Receptacle with knurl	3,00 - 3,02

Projection Height (mm)

H733.... with F733C	10,5





Tip Style	Number	Material	Plating	Ø in mm	Version
	05	A	U	3,00	C
	06	B	G	1,80	C
	06	B	G	2,30	C
	06	B	G	3,00	C
	06	B	G	4,00	C
	07	B	G	3,00	C
	11	B	G	1,40	C
	11	B	G	1,80	C
	12	A	U	3,00	C
	12	B	G	2,30	C
	14	B	G	2,30	C
	16	B	G	1,00	C
	18	B	G	2,30	C

Series			Tip-Ø		Spring Force (cN)	
F733	06	B	230	G	300	C
	Tip Style	Material		Plating		Version

Material: B = BeCu, A = AgNi (Silver alloy)
Tip-Ø: 230 = 2,30 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: C = High Current Version
Receptacle: Order Code according drawing

F725C

NEW

High Current Probe 197 mil Robust Version, Threaded

Centers (mm/mil)	5,00 / 197
Current	50,0 A
R typ	<5 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	100	250

Travel (mm)

Version	Nominal	Maximum
C	2,0	2,5
Thread (M)		3,0
Wrench Size		3,5
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

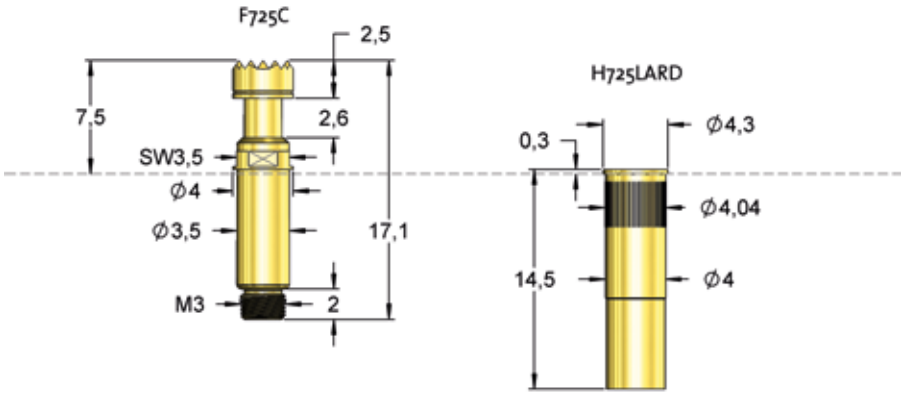
Insertion tool receptacle	FEWZ-735E0
Screw-in tool probe	FWZ735S1 FWZ735T1

Drill Size (mm)

H725...	3,98 - 3,99

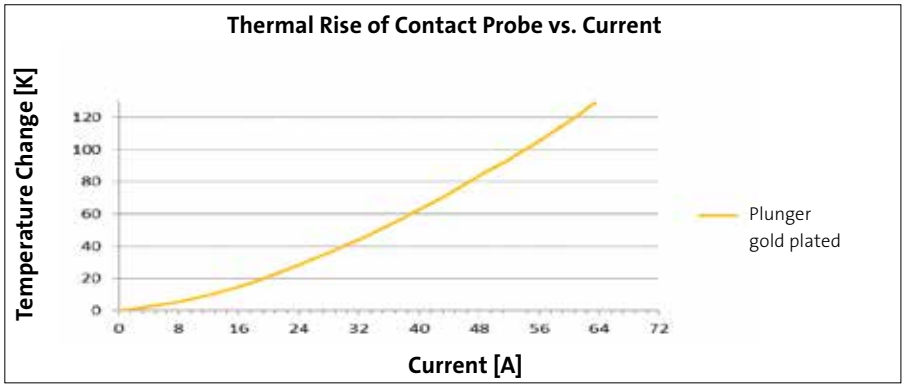
Projection Height (mm)

H725... with F725C	7,5



M 1:1

For high current applications with limited space.



Series			Tip-Ø		Spring Force (cN)	
F725	06	B	400	G	250	C
	Tip Style	Material		Plating		Version

Material: B = BeCu,
Tip-Ø: 400= 4,00 mm (e.g.)
Plating: G = Gold plated
Version: C = High Current Version
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	4,00	C
	12	B	G	4,00	C
	14	B	G	4,00	C

F735C

High Current Probe 197 mil
Robust Version, Threaded

Centers (mm/mil)	5,00 / 197
Current	50,0 A
R typ	<5 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	150	300
C	150	500

Travel (mm)

Version	Nominal	Maximum
C	4,4	5,5
Thread (M)		3,0
Wrench Size		3,5
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

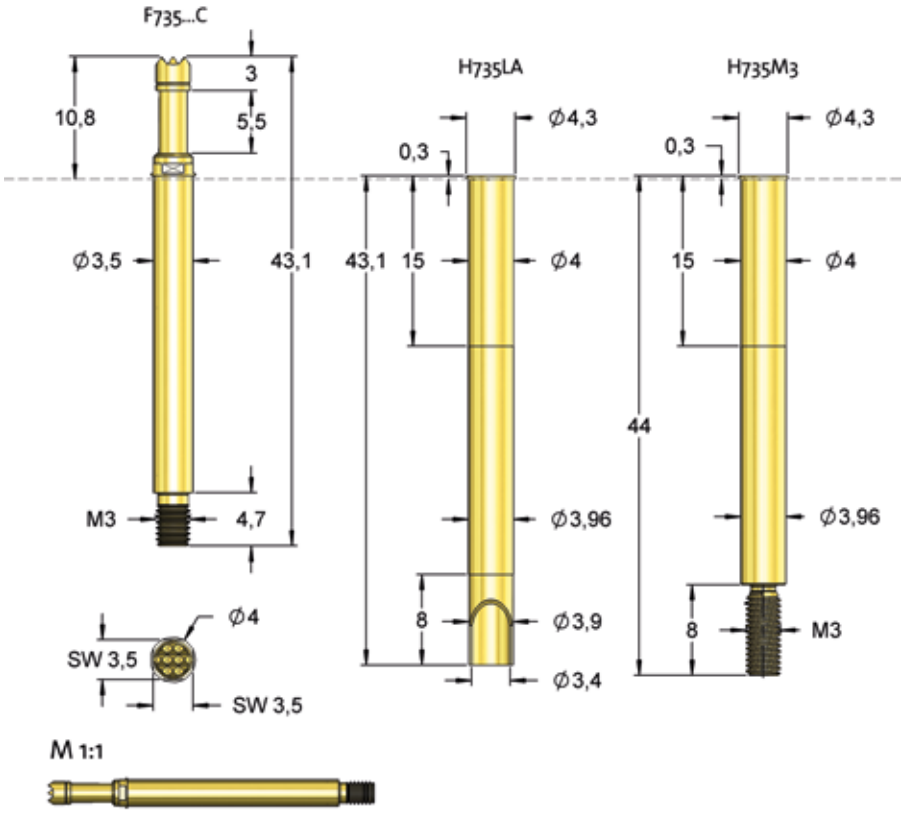
Insertion tool receptacle	FEWZ-735E0
Screw-in tool probe	FWZ735 (T)

Drill Size (mm)

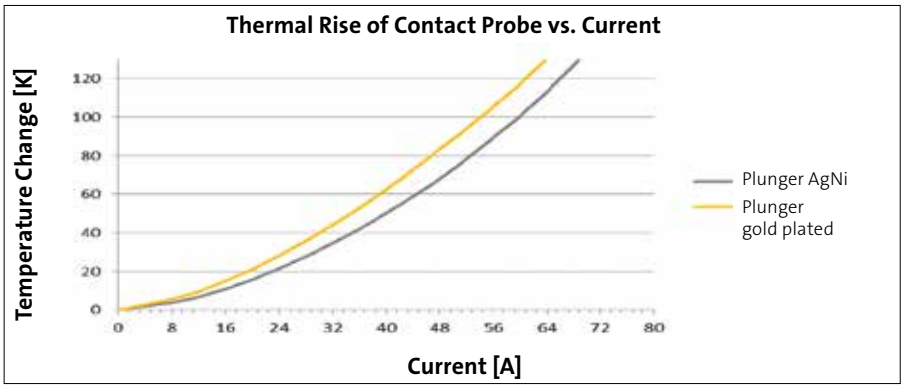
H735...	3,98 - 3,99

Projection Height (mm)

H735... with F735C	10,8



Robust designed high current probe. The M3 thread of H735M3 can be mounted with a counternut to a cable eye.



Series			Tip-Ø		Spring Force (cN)	
F735	06	B	400	G	300	C
	Tip Style	Material		Plating		Version

Material: B = BeCu, A = AgNi (Silver alloy)
Tip-Ø: 400= 4,00 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: C = High Current Version
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	3,00	C
	06	B	G	4,00	C
	07	B	G	3,00	C
	12	A	U	4,00	C
	12	B	G	4,00	C
	17	B	G	4,00	C
	55	B	G	4,00	C

F348C

NEW

High Current Probe 300 mil Robust Version, Threaded

Centers (mm/mil)	7,60 / 300
Current	100,0 A
R typ	<4 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	500	1400

Travel (mm)

Version	Nominal	Maximum
C	4,4	5,5
Thread (M)		5,0
Wrench Size		6,0
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Stainless steel, gold plated
Receptacle	Brass, silver plated

Accessories

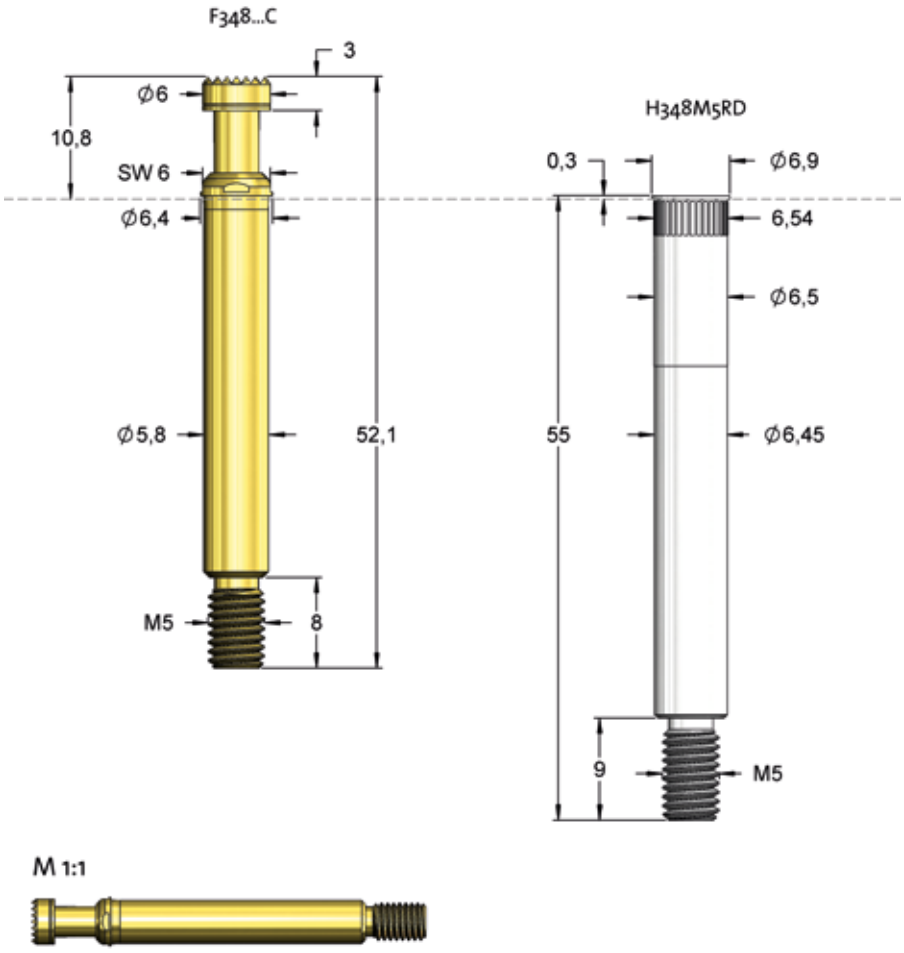
Insertion tool receptacle	FEWZ-348E0
Screw-in tool probe	FWZ348 (T)

Drill Size (mm)

H348M5RD	6,51 - 6,53

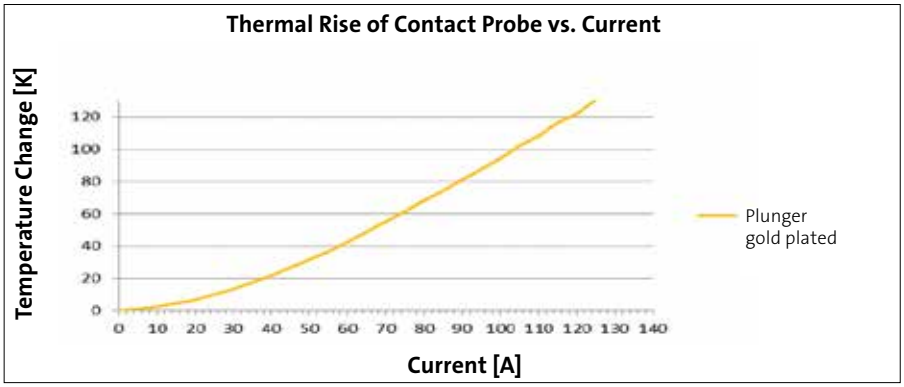
Projection Height (mm)

H348... with F348C	10,8



M 1:1

Fir testing smaller power components in centers of 300 mil. The M5 thread of H348M5RD can be mounted with a counternut to a cable eye. A coaxial version of this probe is also available (see F349C).



Series			Tip-Ø		Spring Force (N)	
F348	06	B	600	G	14	C
	Tip Style	Material		Plating		Version

Material: B = BeCu
Tip-Ø: 600= 6,00 mm (e.g.)
Plating: G = Gold plated
Version: C = High Current Version
Receptacle: Order Code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	6,00	C

1860C005

High Current Probe
Robust Version, Threaded

Centers (mm/mil)	11,0 / 433
Current	50,0 A
R typ	<6 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
C	200	530

Travel (mm)

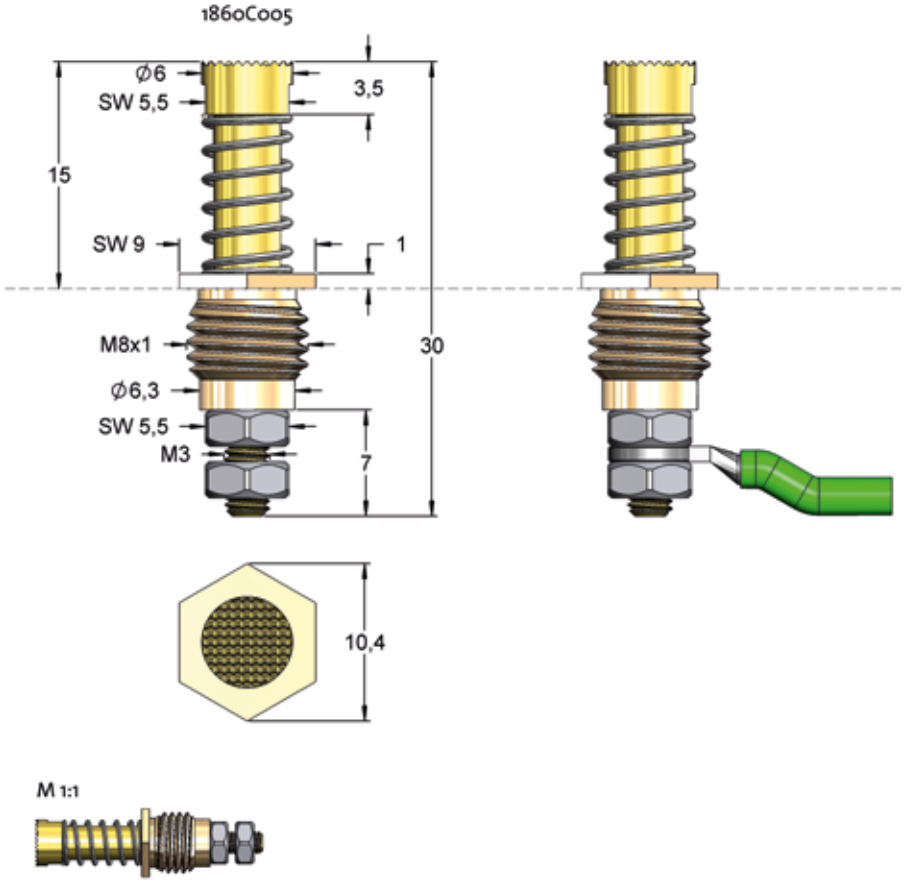
Version	Nominal	Maximum
C	5,0	7,0
Thread (M)		8x1 / 3,0
Wrench Size		9,0 / 5,5
Pointing Accuracy		±0,08 mm

Materials and Plating

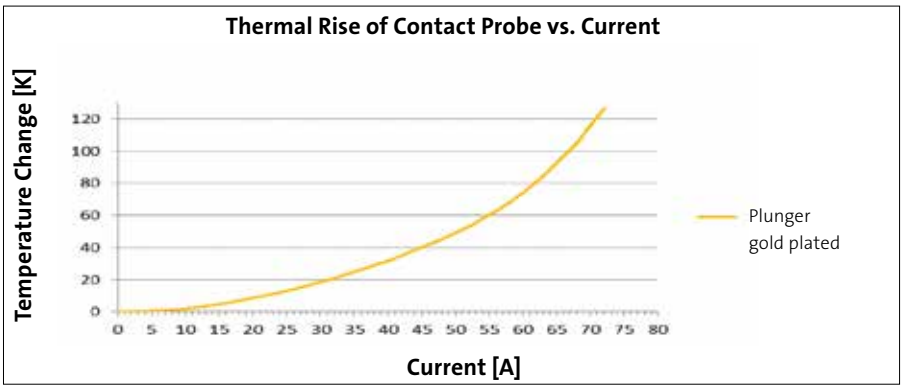
Plunger	BeCu, gold plated
Barrel	Brass, unplated
Spring	Stainless steel, unplated

Drill Size (mm)

Barrel with knurl	10,95 - 10,99



Robust high current probe with continuous plunger. The M3 thread can be mounted with a counternut to a cable eye.



Order Code	Tip Style	Number	Material	Plating	Ø in mm	Version	Screw-in Tool
1860C005		06	B	G	6,00	C	-

1860C001

High Current Test Head for Contacting Uneven Surfaces

Centers (mm/mil)	12,0 / 472
Current	50,0 A
R typ	<4 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

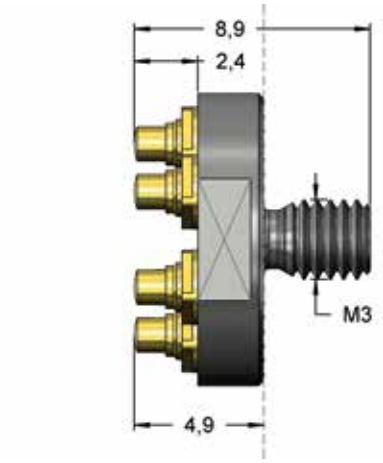
Version	Preload	Nominal
C	300	480

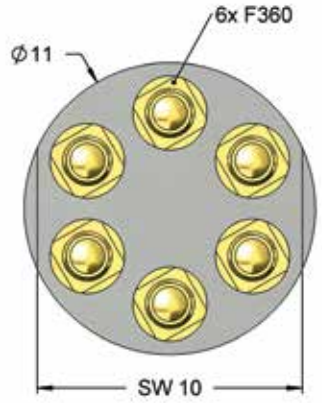
Travel (mm)

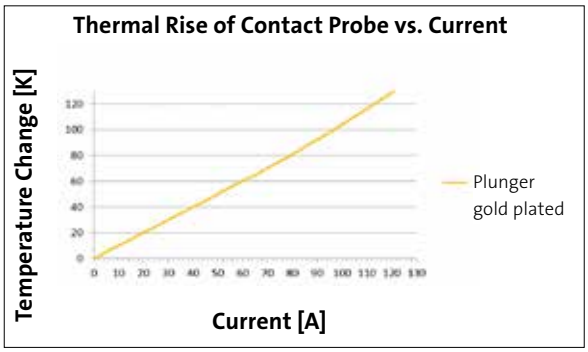
Version	Nominal	Maximum
C	1,0	1,2
Thread (M)		3,0
Wrench Size		10,0

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Copper, gold plated
Spring	Stainless steel, unplated







1860C006

High Current Test Head for Contacting Uneven Surfaces

Centers (mm/mil)	12,0 / 472
Current	100,0 A
R typ	<2 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

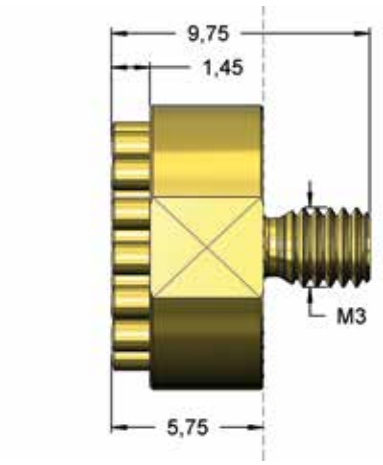
Version	Preload	Nominal
C	960	1920

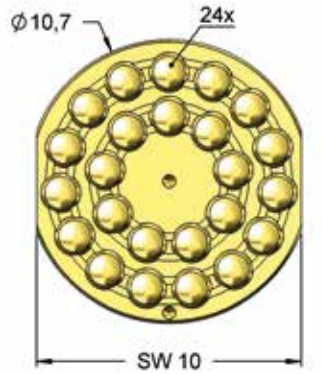
Travel (mm)

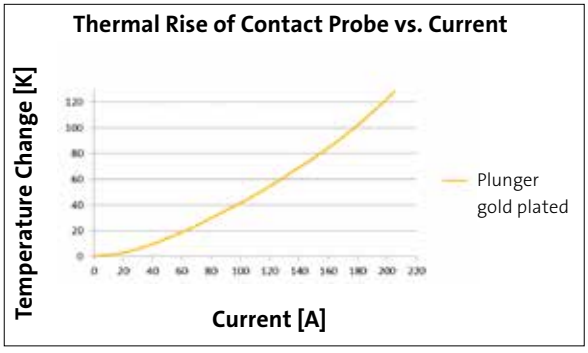
Version	Nominal	Maximum
C	0,9	1,2
Thread (M)		3,0
Wrench Size		10,0

Materials and Plating

Plunger	Brass, gold plated
Barrel	Copper, gold plated
Spring	Stainless steel, unplated







These contact blocks are screwed directly into conductive material. It is essential that not only the thread, but also the whole surface of the block has an electrical contact. The electrical connection can be realized also directly with the conductive material. The maximum current depends on the allowed temperature rise.

1860C009

NEW

High Current Test Head for Scratch Contacting

UTILITY MODEL

Centers (mm/mil)	12,0 / 472
Current	80,0 A
R typ	<3 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	3x 170	3x 600

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
Thread (M)		4,0
Wrench Size		3,0/10,0

Materials and Plating

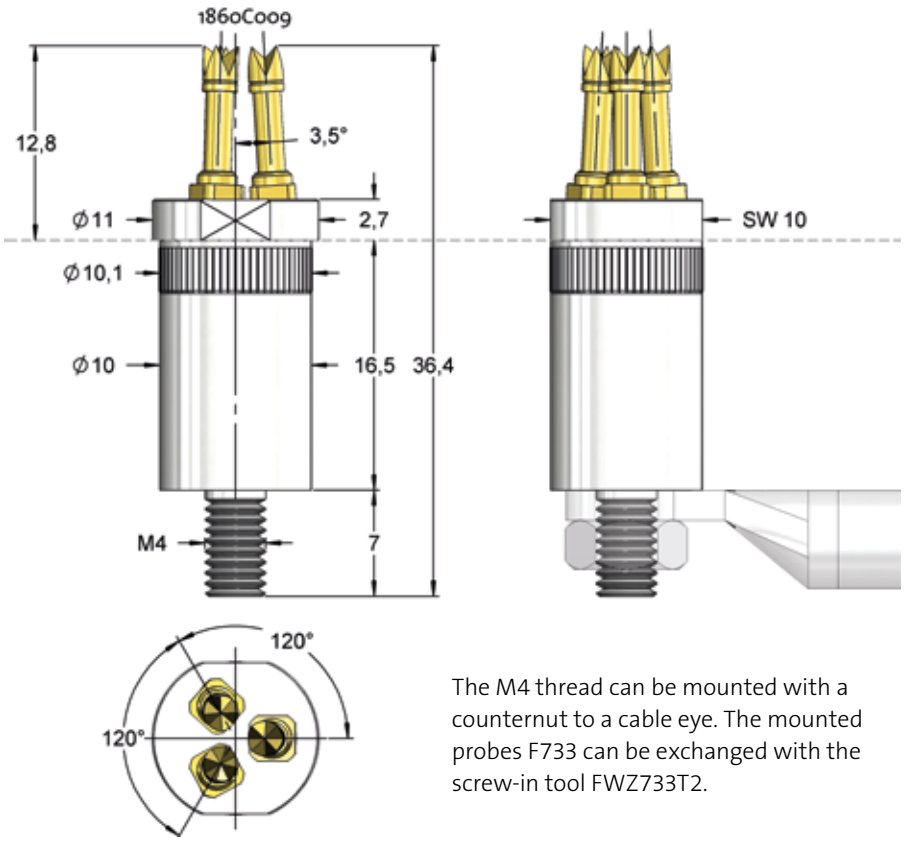
Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Stainless steel, gold plated
holder	Brass, silver plated

Accessories

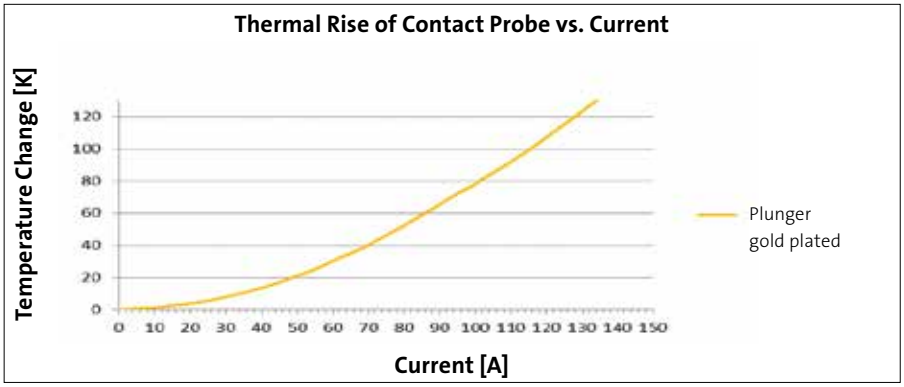
Insertion tool holder	FDWZ-860C009
Screw-in tool probe	FWZ733T2

Drill Size (mm)

Receptacle with knurl	10,00 - 10,02



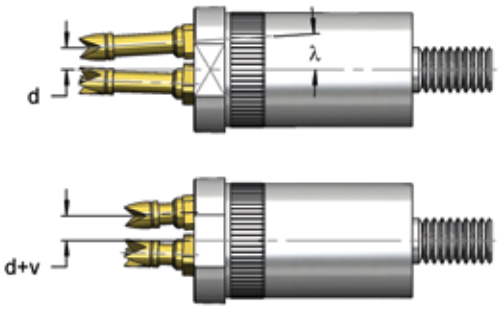
The M4 thread can be mounted with a counternut to a cable eye. The mounted probes F733 can be exchanged with the screw-in tool FWZ733T2.



Function:
The scratch contact 1860C009 is well suitable for reliable contacts at difficult conditions. It contacts not only axially, but also causes a lateral scratch movement because of the inclined contact probes. This lateral scratching improves the quality of the electrical contact compared to standard high current probes.

Advantage:
The advantage of this solutions is a more effective penetration of passivation layers or contaminations and a deeper penetration of the surface, even compensating unevenness. This creates an increased contact surface and contact force, leading to a higher ampacity of the contact. Especially the increased contact reliability of critical materials like aluminum or nickel is remarkable

Travel 0,0 mm:
The probe tips are contacting in a distance d from the central axis. During the travel the probe tips move outwards by the offset v.



Resulting radial offset:

Travel [mm]:	Offset v [mm]:
1,0	0,06
2,0	0,12
3,0	0,18
4,0	0,24
5,0	0,30

Order Code	Tip Style	Number	Material	Plating	Ø in mm	Version	Screw-in Tool
1860C009		14	B	G	2,30	C	FWZ733T2

Coaxial Probes for High Current Applications

Coaxially designed high current probes are used for the measurement of very low resistances according to the Kelvin-method (4-wire measurement). In this application the outer conductor is used for the constant current and the inner conductor is used for measuring the voltage drop (Kelvin probes). One important application field of these probes is charging and discharging of batteries and accumulator cells in large volume production.

F349C

NEW

High Current Probe
Coaxial Design

Centers (mm/mil)	7,60 / 300
Current (Circular)	100,0 A
Current (Internal)	4,0 A
R typ (circular/internal)	<4/20 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	1560
Internal Cont.	60	160
Circular Cont.	500	1400

Travel (mm)

	Nominal	Maximum
Internal Cont.	4,3	6,4
Circular Cont.	4,4	5,5
Thread (M)		5,0
Wrench Size		6,0
Pointing Accuracy		-

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Stainless steel, unplated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, silver plated

Accessories

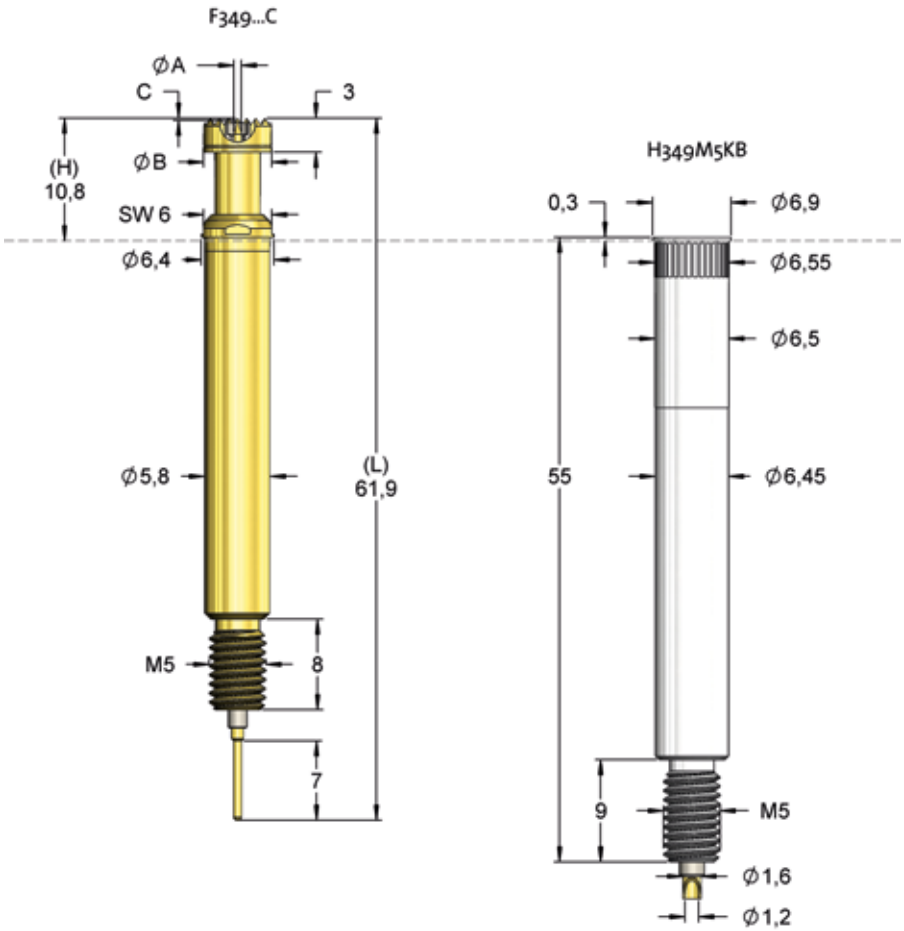
Insertion tool receptacle	FEWZ-348E0
Screw-in tool probe	FWZ348; FWZ348T

Drill Size (mm)

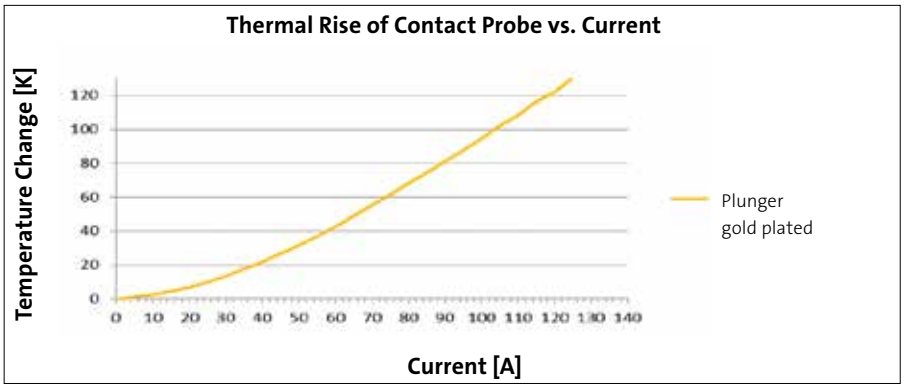
Receptacle with knurl	6,51 - 6,53

Projection Height (mm)

H349... with F349C	10,8



The new high current Kelvin probe F349C allows 4-wire measurements with currents up to 100 A even at smaller power components with centers down to 300 mil.
The robust design allows applications even at rough production conditions.
The F349C is mounted into the receptacle H349M5KB. The circular contact is connected by the M5 thread of the receptacle. It can be mounted with a counternut to a cable eye. The internal contact at the receptacle needs to be soldered.



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version	Screw-in Tool
F34918B0001G15C		18	0,64	6,00	-0,20	10,5	61,9	C	FWZ348 (T)

1860C003

High Current Probe
Coaxial Design

Centers (mm/mil)	14,0 / 551
Current (Circular)	75,0 A
Current (Internal)	5,0 A
R typ (circular/internal)	<3/20 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	1220
Internal Cont.	130	220
Circular Cont.	450	1000

Travel (mm)

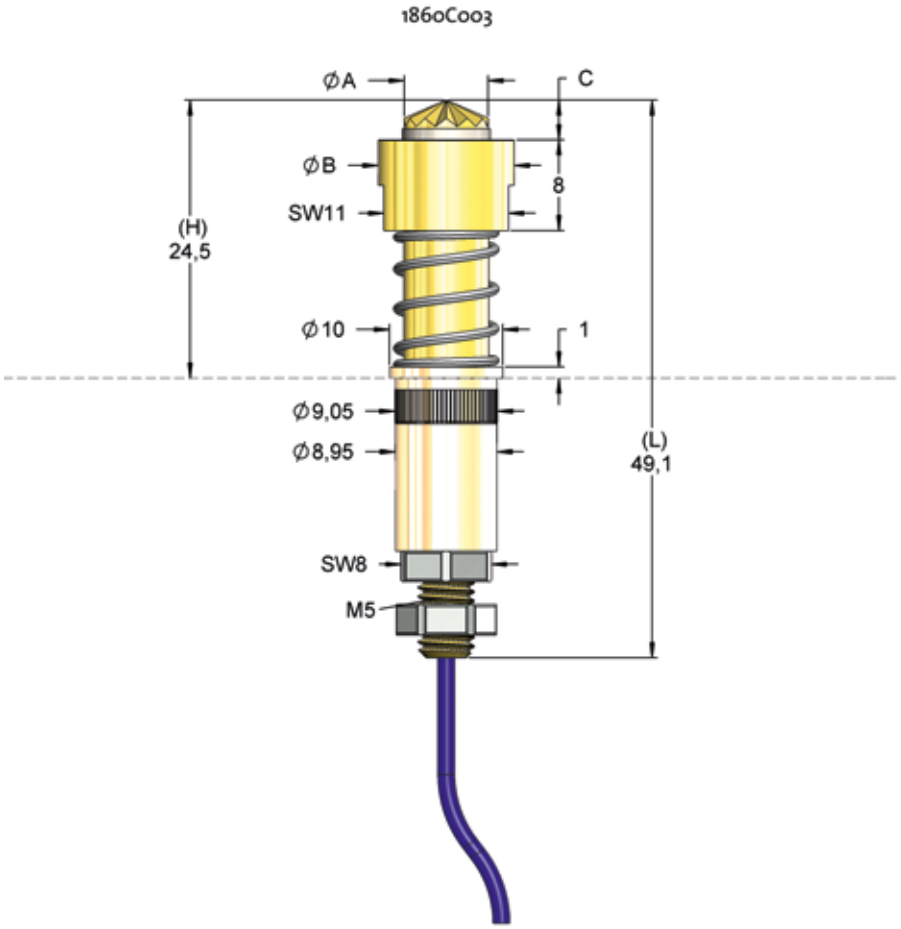
	Nominal	Maximum
Internal Cont.	1,5	2,8
Circular Cont.	4,0	5,6
Thread (M)		5,0
Wrench Size		11,0
Pointing Accuracy		-

Materials and Plating

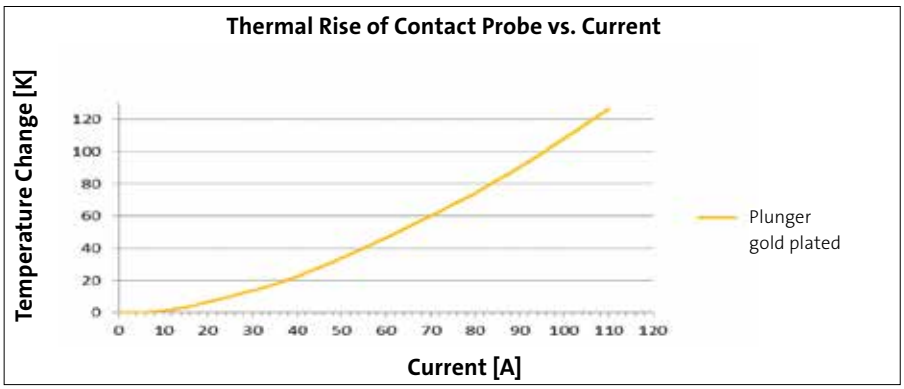
Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, unplated
Spring Internal Cont.	Stainless steel, unplated
Spring Circular Cont.	Stainless steel, unplated

Drill Size (mm)

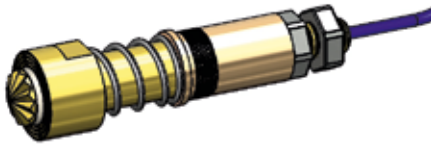
Barrel with knurl	8,97 - 9,03



The M5 thread can be mounted with a counternut to a cable eye.



M 1:1



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
1860C003		07	7,40	12,00	3,50	24,50	49,10	C

1860C007

High Current Probe
Coaxial Design

Centers (mm/mil)	14,0 / 551
Current (Circular)	75,0 A
Current (Internal)	5,0 A
R typ (circular/internal)	<3/20 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	3035
Internal Cont.	160	235
Circular Cont.	1900	2800

Travel (mm)

	Nominal	Maximum
Internal Cont.	1,5	3,0
Circular Cont.	5,0	8,0
Thread (M)		5,0
Wrench Size		11,0
Pointing Accuracy		< 2°

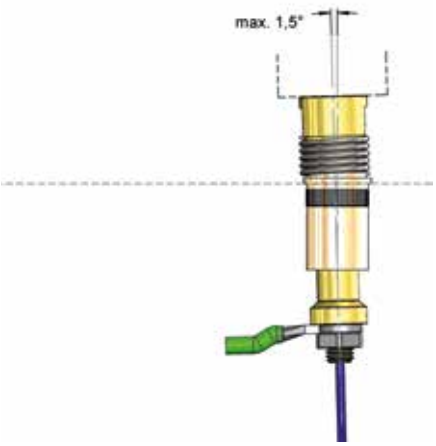
Materials and Plating

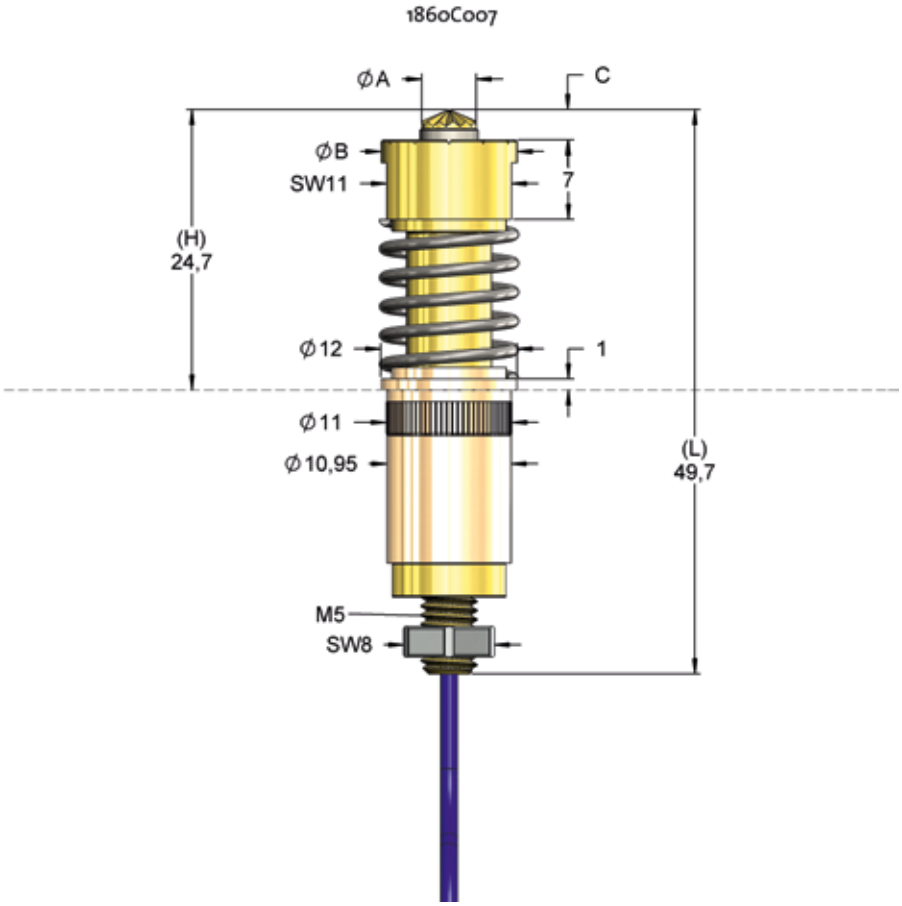
Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, unplated
Spring Internal Cont.	Stainless steel, unplated
Spring Circular Cont.	Stainless steel, unplated

Drill Size (mm)

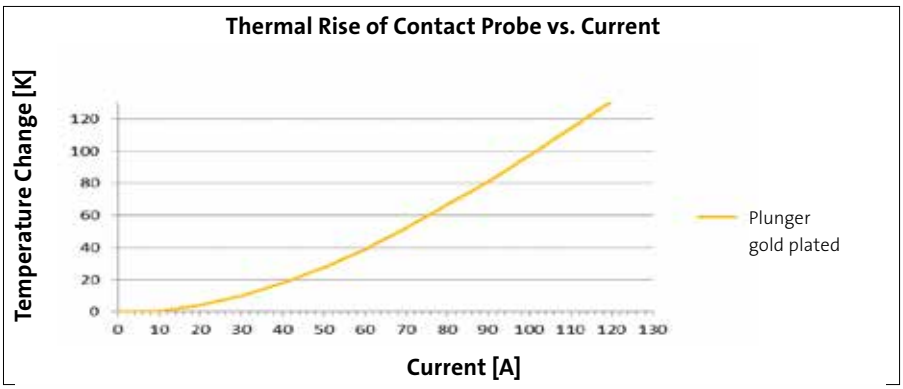
Barrel with knurl	10,95 - 10,99

Contacting an inclined surface





Der 1860C007 adapts to an up to 1,5 degree inclined surface.
The M5 thread can be mounted with a counternut to a cable eye.



M 1:1

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
1860C007		07	4,80	12,00	2,70	24,70	49,70	C

1860C004

High Current Probe
Coaxial Design

Centers (mm/mil)	25,0 / 984
Current (Circular)	250,0 A
Current (Internal)	5,0 A
R typ (circular/internal)	<1/20 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	3150
Internal Cont.	130	300
Circular Cont.	1000	2850

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,8	3,5
Circular Cont.	5,6	7,0
Thread (M)		10,0
Wrench Size		19,0
Pointing Accuracy		< 2°

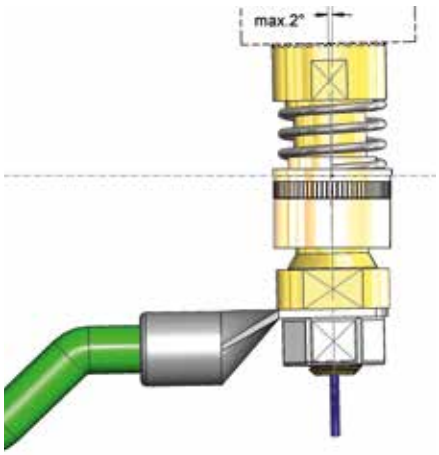
Materials and Plating

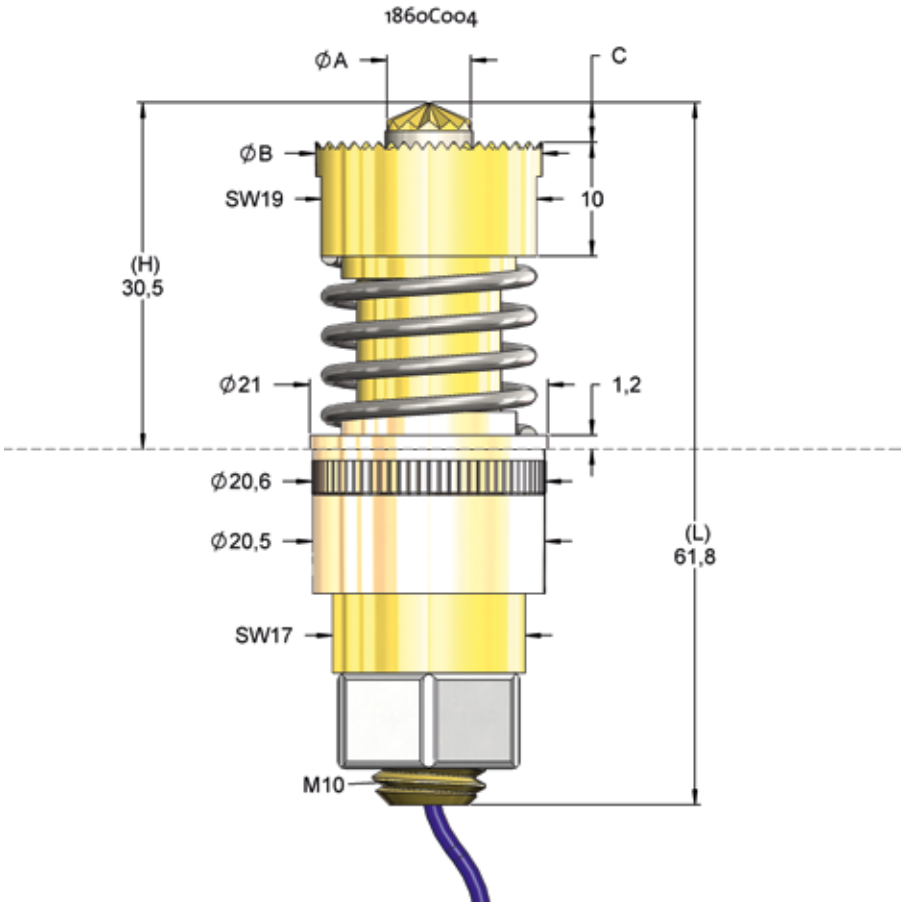
Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, unplated
Spring Internal Cont.	Stainless steel, unplated
Spring Circular Cont.	Stainless steel, unplated

Drill Size (mm)

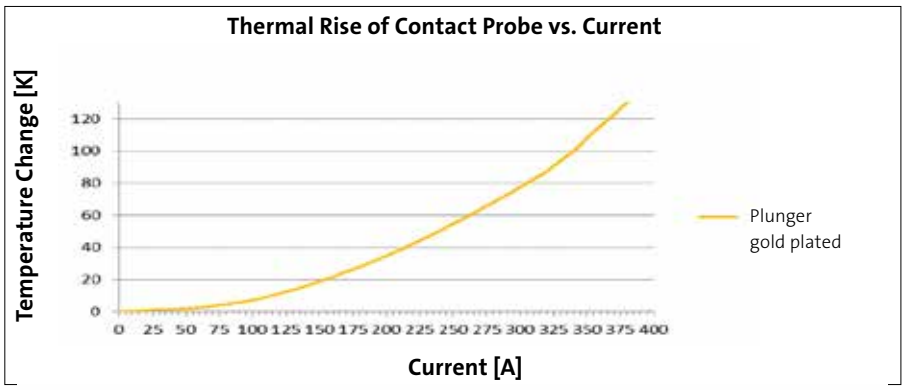
Barrel with knurl	20,55 - 20,60

Contacting an inclined surface





Der 1860C004 adapts to an up to 2 degree inclined surface.
The M5 thread can be mounted with a counternut to a cable eye.



M 1:1

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
1860C004		07	7,40	20,00	3,50	30,50	61,80	C

1860C008

NEW

High Current Probe up to 300 A with Coaxial Design and Temperature Sensor

UTILITY MODEL

Centers (mm/mil)	25,0 / 984
Current (Circular)	300,0 A
Current (Internal)	2,0 A
R typ (circular/internal)	<1/20 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	7350
Sensor	-	200
Internal Cont.	60	150
Circular Cont.	1000	7000

Travel (mm)

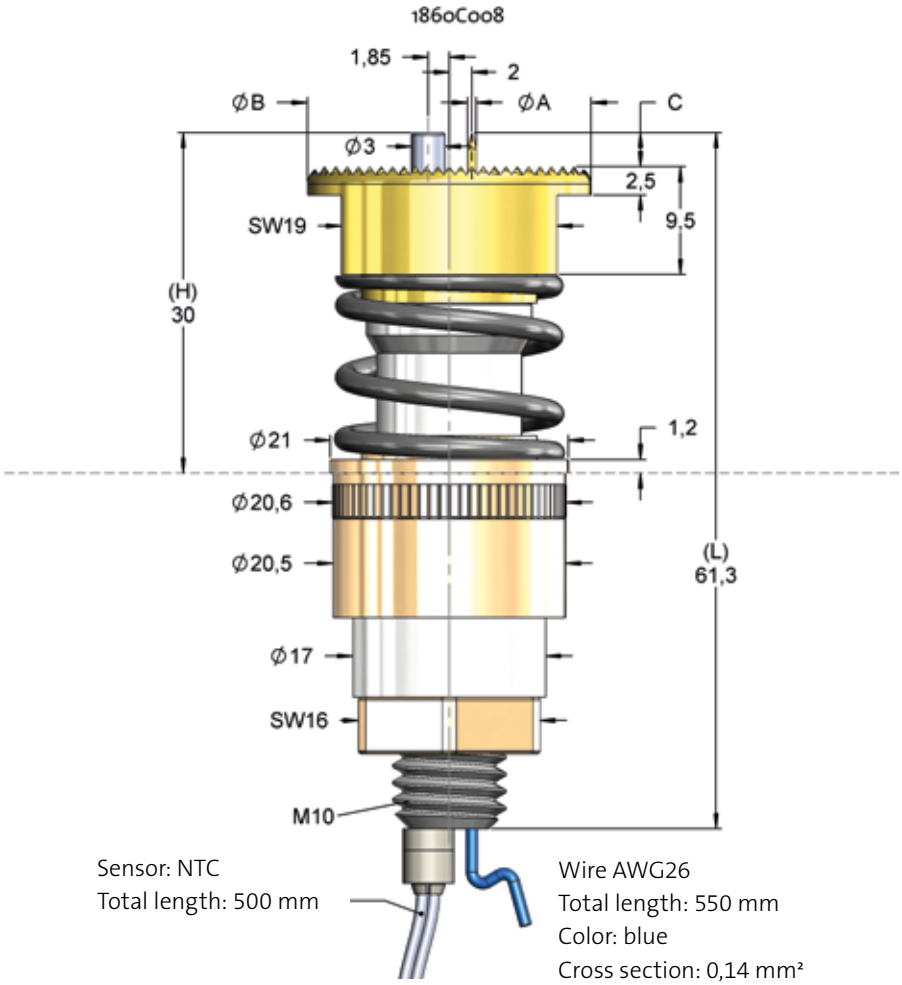
	Nominal	Maximum
Internal Cont.	4,0	5,0
Circular Cont.	5,6	7,0
Thread (M)		10,0
Wrench Size		19,0 / 16,0
Pointing Accuracy		< 2°

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, unplated
Spring Internal Cont.	Stainless steel, unplated
Spring Circular Cont.	Stainless steel, unplated

Drill Size (mm)

Barrel with knurl	20,55 - 20,60

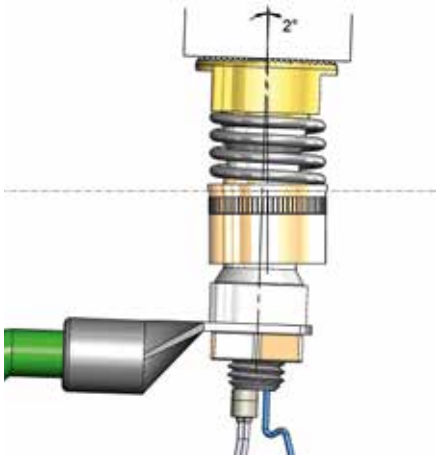


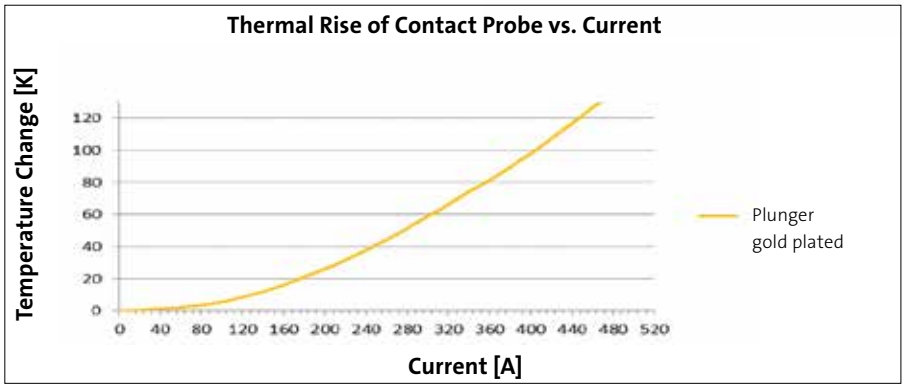
Der 1860C008 adapts to an up to 2 degree inclined surface.
The M5 thread can be mounted with a counternut to a cable eye.

Sensor specifications:
NTC Mini sensor TP-MI-2.0-NTC5
(alternatively thermocouple possible)
Switch type: 2-wire Teflon strand
Protection sleeve: 3x12 mm stainless steel
Protection class: IP68

M 1:1

Contacting an inclined surface





Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
1860C008		18	0,76	25,00	3,00	27,00	61,30	C

Coaxial Probes for 4-Wire Measurement (Kelvin Method)

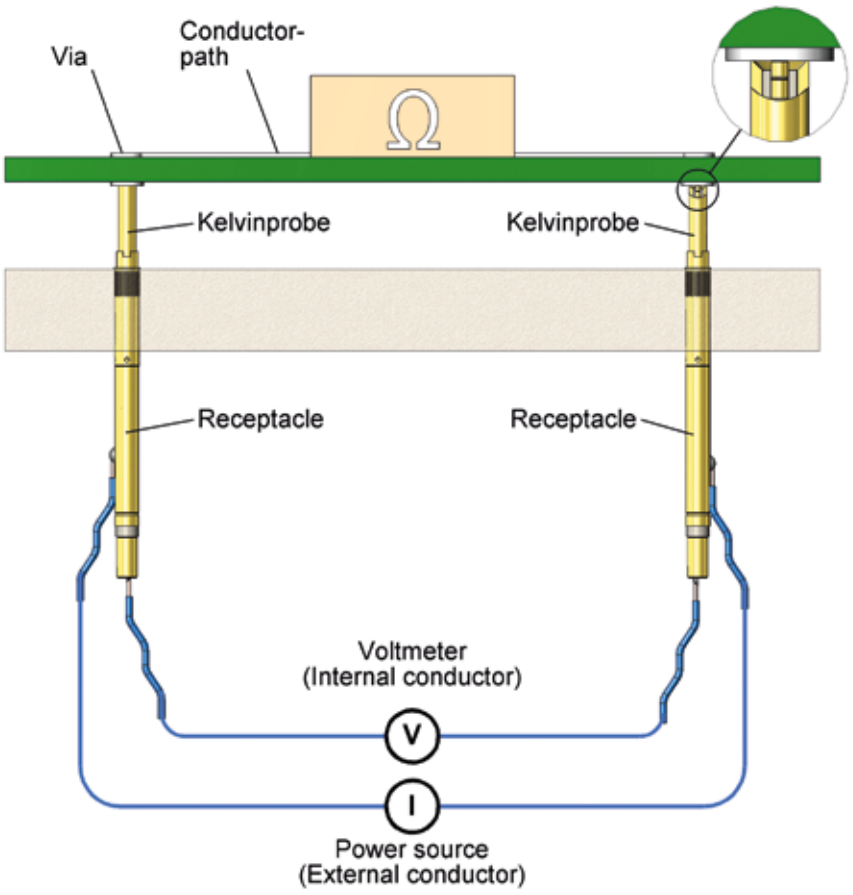
Coaxially designed contact probes can be used for the measurement of very low resistances according to the Kelvin-method (4-wire measurement), especially at limited space. In this application the outer conductor is used for the constant current and the inner conductor is used for measuring the voltage.

4-Wire Measurement (Kelvin Method)

A Kelvin probe is a coaxial contact probe with two electrically insulated measuring circuits. The typical 4-wire-method is based on a constant current, flowing through the test resistance and the measurement of the resulting voltage, which is directly proportional to the resistance value. According "I=constant" and because of the very high internal resistance of the voltmeter, the cable and contact resistances are not influencing the measuring result. This leads to high accuracy of this measuring method.

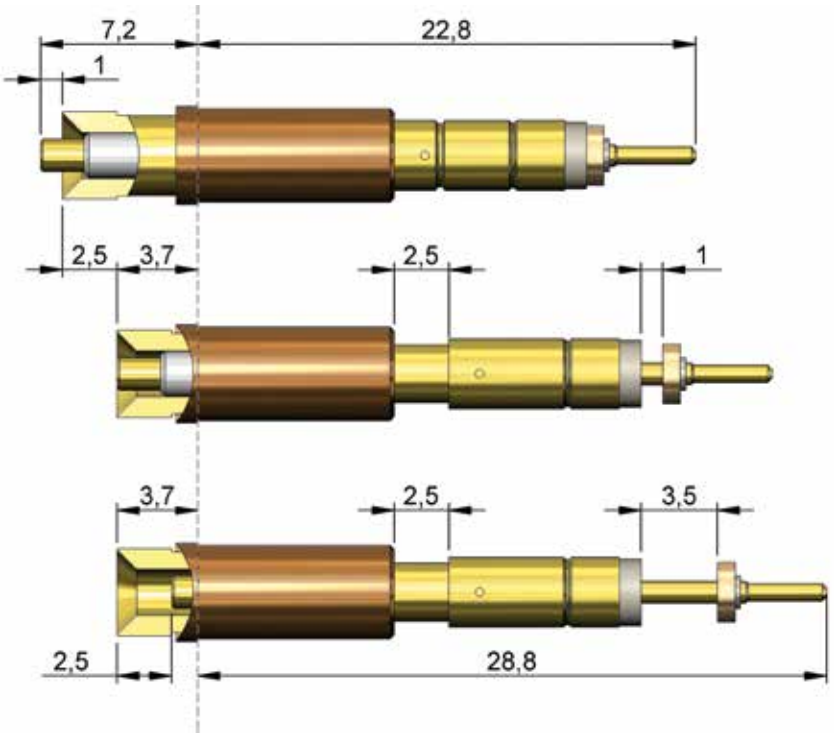
The contacting for current source and voltmeter is realized by two Kelvin probes, ideally located very close to the device under test. The constant current is usually carried by the outer conductor (force signal), while the voltage is detected by the inner conductor (sense signal).

The inner and outer conductors of FEINMETALL coaxial probes are independently spring loaded in order to balance mechanical tolerances and heights.



Application Note F822

Depending on the shape of the DUT the travel of inner contact and circular contact might be different. As soon as the circular contact is pushed in, the inner contact is carried along. This might lead to other travels and spring forces than the nominal values.



F805

Kelvin Probe 87 mil
Plug-in

Centers (mm/mil)	2,20 / 87
Current (Circular)	2,5 A
Current (Internal)	0,5 A
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	250
Internal Cont.	10	50
Circular Cont.	80	200

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	2,5
Circular Cont.	2,0	2,5

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Bronze, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Bronze, gold plated

Accessories

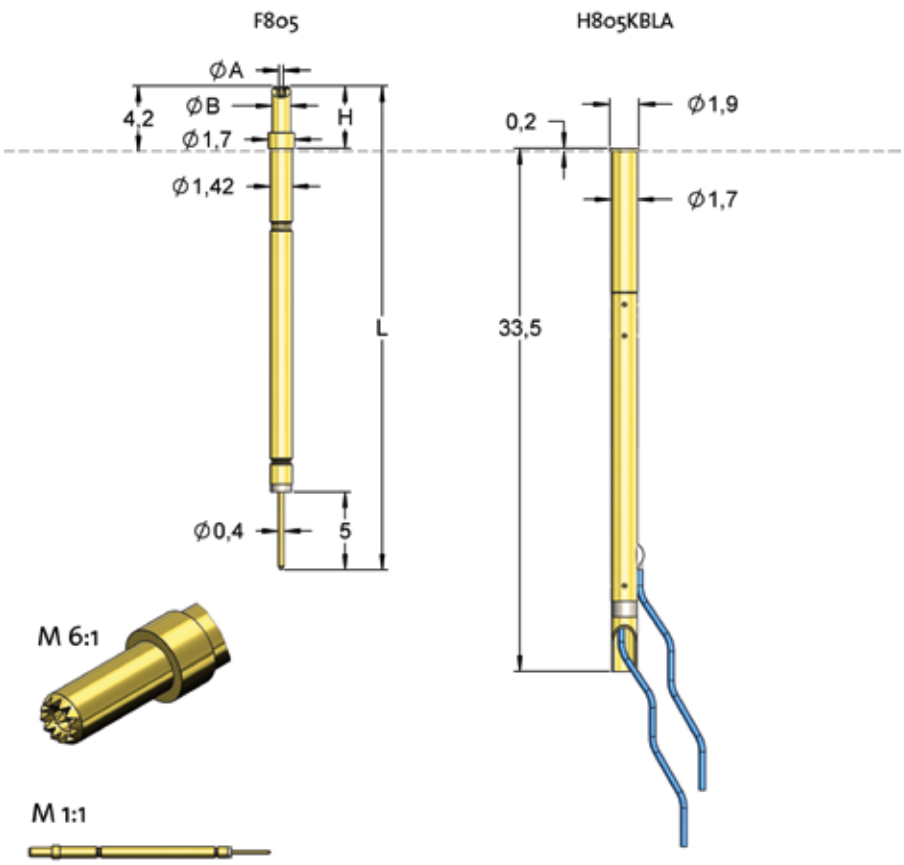
Insertion tool receptacle	FEWZ-100E0

Drill Size (mm)

H805KBLA	1,68 - 1,70

Projection Height (mm)

H805KBLA with F805	4,2



Currently the smallest Kelvin probe worldwide. This solution is outstanding on the market, as common Kelvin probes usually require centers of at least 100 mil / 2,54 mm.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
F80518B0001G250		18	0,27	1,20	0,00	4,00	31,00	-

F810

Kelvin Probe 100 mil Plug-in

Centers (mm/mil)	2,54 / 100
Current (Circular)	3,0 A
Current (Internal)	0,8 A
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total		170
Total		230
Internal Cont.	10	70
Internal Cont.	25	90
Circular Cont.	40	100
Circular Cont.	40	140

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,8	4,0
Circular Cont.	2,3	3,5

Materials and Plating

Internal Cont.	Steel, longtime gold plated
Circular Cont.	BeCu, gold plated
Barrel	Bronze, silver plated
Spring Internal Cont.	Music Wire, silver plated
Spring Circular Cont.	Music Wire, silver plated
Receptacle	Bronze, gold plated

Accessories

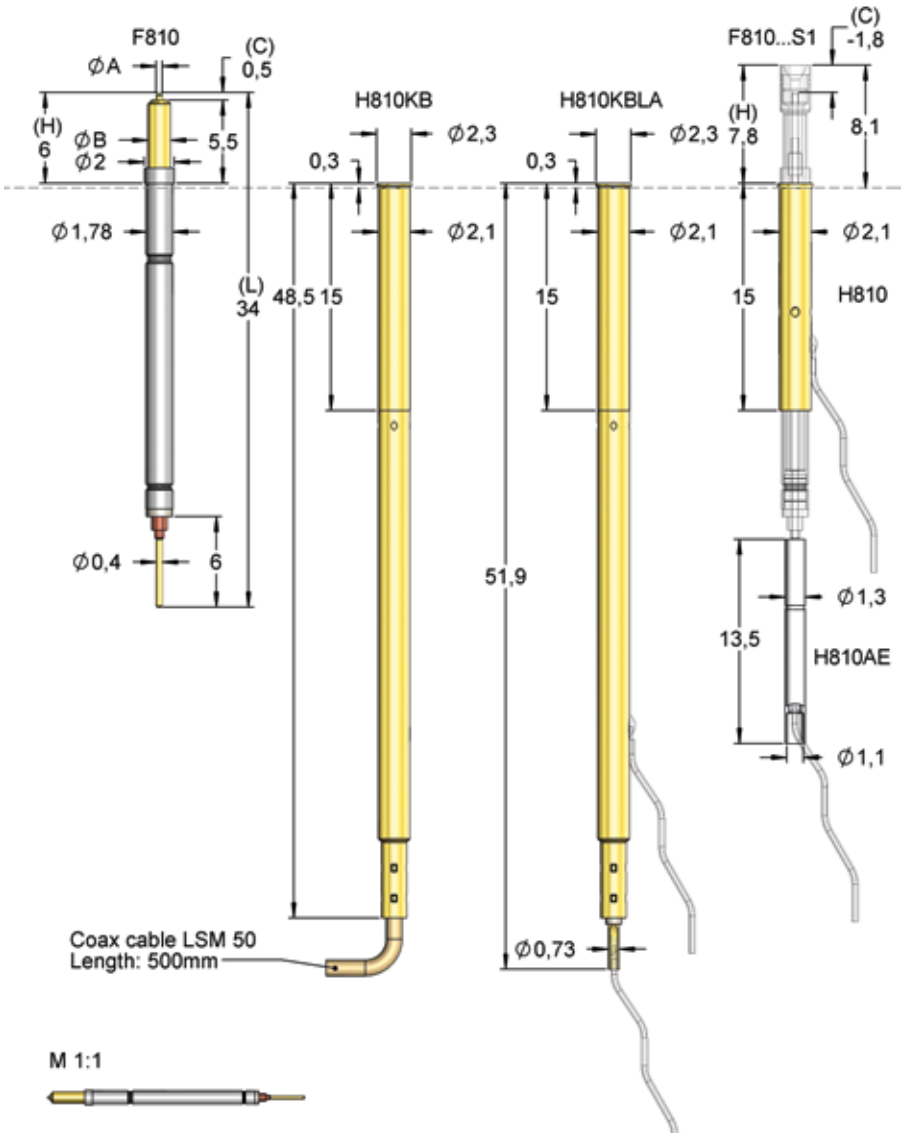
Insertion tool receptacle	FEWZ-772E0

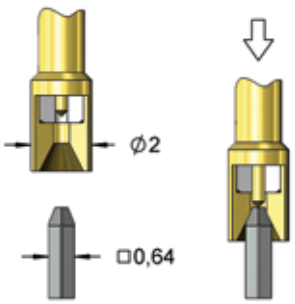
Drill Size (mm)

H810...	2,08 - 2,09

Projection Height (mm)

H810... with F810	H + 0,3





Special version for contacting wire wrap posts: Order code F81001S040L230S1

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
F81001S040L170		01	0,40	1,50	0,50	6,00	34,00	-
F81001S040L230S1		01	0,40	2,00	-1,20	7,80	35,80	S1
F81006B080G230S1		06	0,80	2,00	-1,20	7,80	35,80	S1
F81016S040L170		16	0,40	1,50	0,50	6,00	34,00	-
F81016S040L230S1		16	0,40	2,00	-1,80	7,80	35,80	S1

F835

Kelvin Probe 138 mil Threaded

Centers (mm/mil)	3,50 / 138
Current (Circular)	10,0 A
Current (Internal)	2,0 A
Frequency	2 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	180
Internal Cont.	30	70
Circular Cont.	50	110
Total	-	410
Internal Cont.	50	110
Circular Cont.	80	300

Travel (mm)

	Nominal	Maximum
Internal Cont.	4,0	5,0
Circular Cont.	4,0	5,0
Wrench Size		2,6
Thread		2,5

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, silver plated
Spring Circular Cont.	Music Wire, silver plated
Receptacle	Brass, gold plated

Accessories

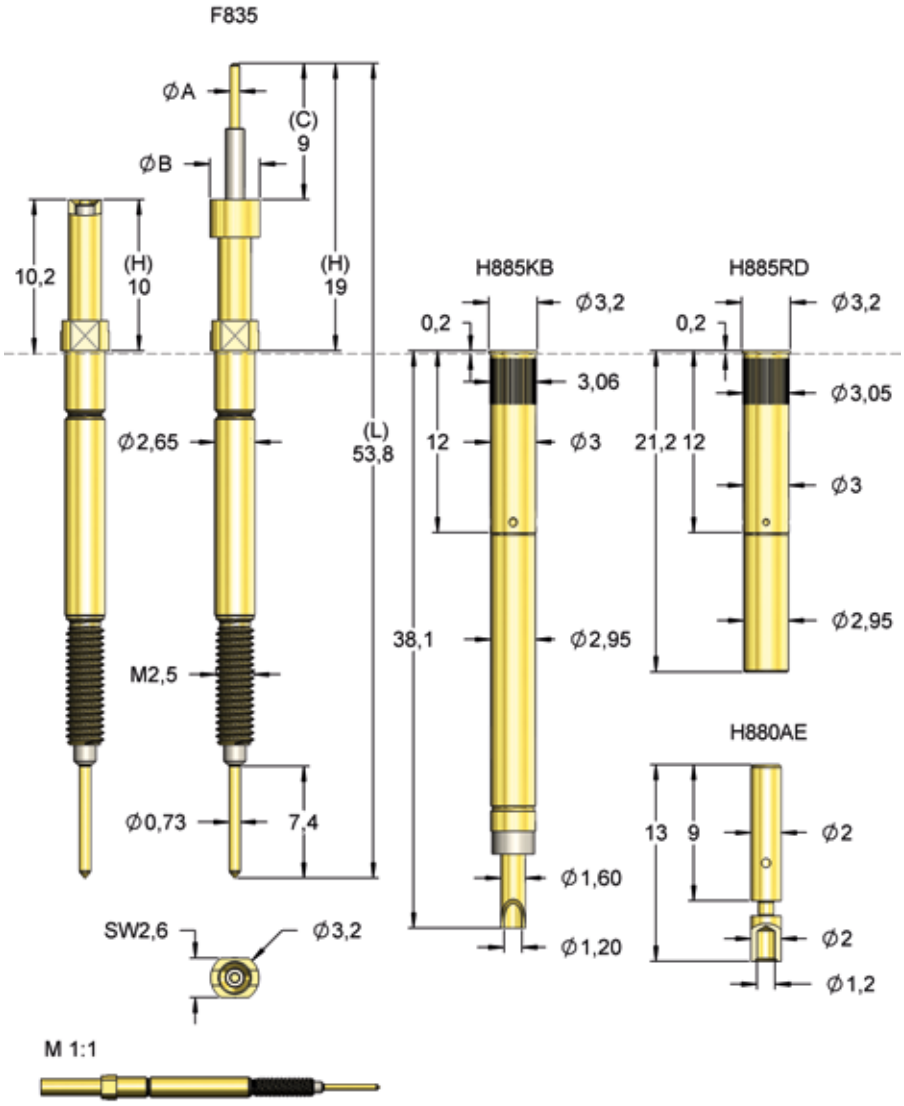
Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZ885; FWZ885T

Drill Size (mm)

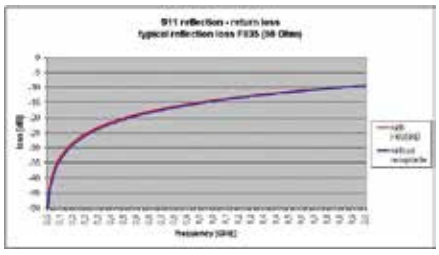
Receptacle without knurl	2,98 - 2,99
Receptacle with knurl	3,00 - 3,02

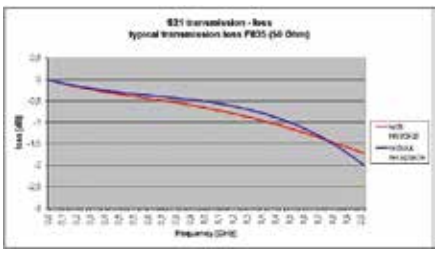
Herausraghöhe (mm)

H885... mit F835	H + 0,2



The version F83527B0002G410 is for Kelvin measurement at hybrid connector ECTA.





Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version	Screw-in Tool
F83509B0001G180		09	0,64	2,17	0,00	10,00	44,80	-	FWZ885; FWZ885T
F83516B0001G410		16	0,64	2,17	0,00	10,00	44,80	-	FWZ885; FWZ885T
F83527B0002G410		27	0,64	2,17	9,00	19,00	53,80	-	FWZ760S1; FWZ760T1

F822

Kelvin Probe 217 mil Plug-in

Centers (mm/mil)	5,50 /217
Current (Circular)	6,0 A
Current (Internal)	1,6 A
Frequency	1,2 GHz
Temperature	-40°C...+200°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	650
Internal Cont.	100	200
Circular Cont.	250	450

Travel (mm)

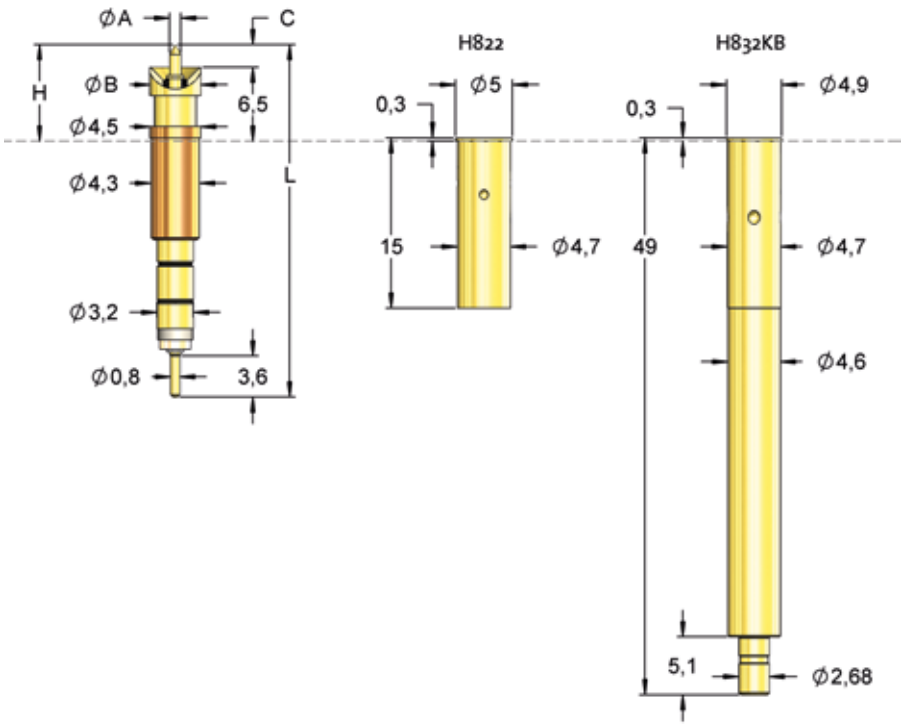
	Nominal	Maximum
Internal Cont.	3,0	3,5
Circular Cont.	2,0	2,6

Materials and Plating

Internal Cont.	Steel, longtime gold plated
Circular Cont.	BeCu, gold plated
Barrel	Bronze, unplated
Spring Internal Cont.	Stainless steel, unplated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0



Drill Size (mm)

Receptacle without knurl	4,68 - 4,69
Insulating receptacle	5,56 - 5,57

Projection Height (mm)

H8x2... with F822	H + 0,3

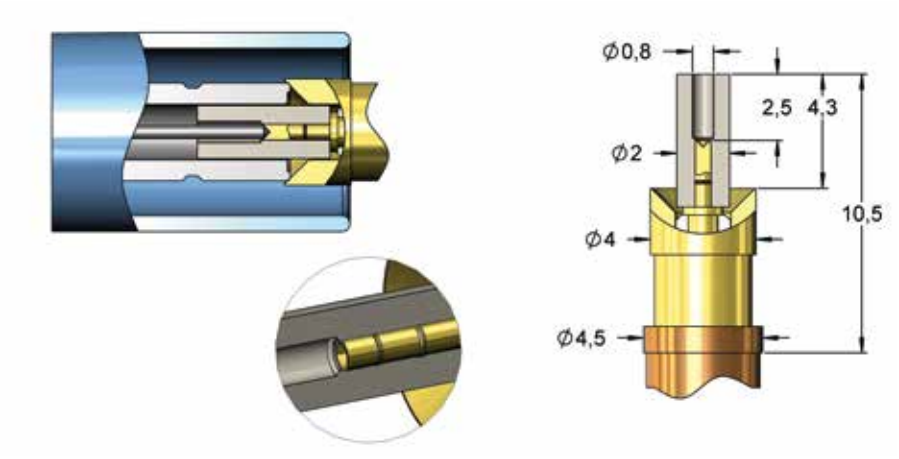
Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
F82202S0016L650		02	1,50	4,00	1,00	7,20	30,00	-
F82203S0011L650		03	0,50	4,00	2,00	8,20	31,00	-
F82203S0001L650		03	1,00	4,00	2,00	8,20	31,00	-
F82203S0014L650		03	1,00	4,00	3,50	9,70	32,50	-
F82203S0003L650		03	1,00	4,50	2,00	8,20	31,00	-
F82203S0015L650		03	1,00	4,50	3,50	9,70	32,50	-
F82205S0007L650IK25		05	0,60	4,00	-2,50	10,50	33,30	IK25
F82205S0001L650		05	1,00	4,00	2,00	8,20	31,00	-
F82205S0003L650		05	1,00	4,50	2,00	8,20	31,00	-
F82205S0005L650		05	1,50	4,00	4,50	10,70	33,50	-
F82209S0016L650		09	1,50	4,00	1,00	7,20	30,00	-
F82211S0012L650		11	0,64	4,50	3,50	9,70	32,50	-
F82217S0006L650		17	0,64	4,00	2,00	8,20	31,00	-
F82217S0016L650		17	1,50	4,00	1,00	7,20	30,00	-
F82239S0001L650		39	1,00	4,00	2,00	8,20	31,00	-
F82241S0009L650S2		41	1,50	5,00	0,70	10,70	33,50	S2
F82241S0008L650S1		41	1,50	5,70	-1,80	12,50	35,30	S1

F82x Special Versions

Fakra Connector Contacting

Position- and Straightness Test with Insulation Cap

This probe has a leading insulating cap at the inner contact for testing position and straightness of the connector pin. Bended pins or pins with wrong position do not enter the insulating cap and are not able to contact the inner probe plunger. Inner and outer conductor of the Kelvin probe are spring loaded. Receptacles and probe dimensions please see F822.

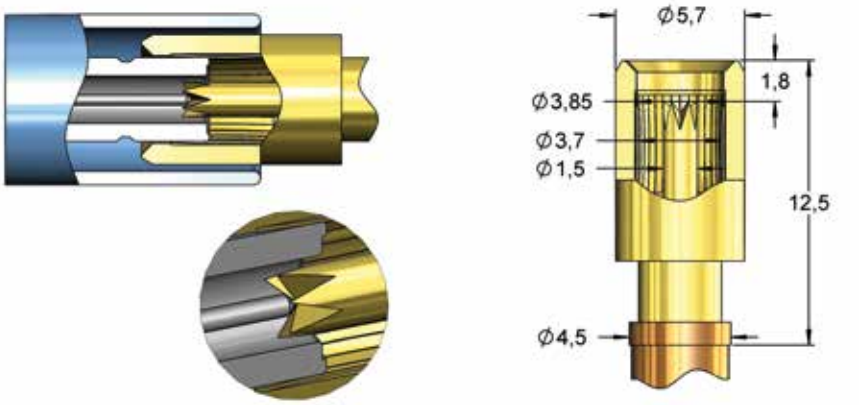


Order code: F82205S0007L650IK25

Fakra Connector Contacting

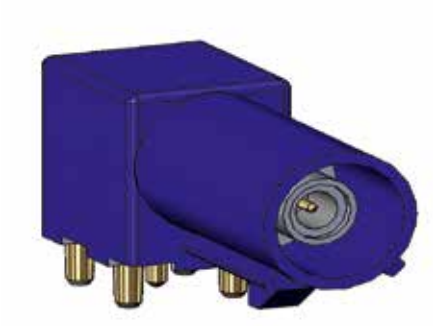
Lamella Socket for Optimal Ground Contacting

This probe is provided with a bezel at the inner and outer contact to center the connector. The connector ground contacting is securely made by a specific lamella socket, which tolerates deviations of position and angle. Inner and outer conductor of the Kelvin probe are spring loaded. Receptacles and probe dimensions please see F822.



Order code: F82241S0008L650S1

Fakra-Male



Accessories for Coaxial Probes F822 / F832

Mounting option 1

Order code: H822
Plug-in receptacle
for soldering
suitable for F822

Order code: H832
Threaded receptacle
for soldering
suitable for F832

Order code: H832RD
Threaded receptacle
with knurl for soldering
suitable for F832

Order code: H822AE
Connection element plug-in
for soldering
suitable for F822/F832

Mounting option 2

Order code: H832KB
Threaded coax combi receptacle
with SSMB Mini connector
suitable for F822/F832

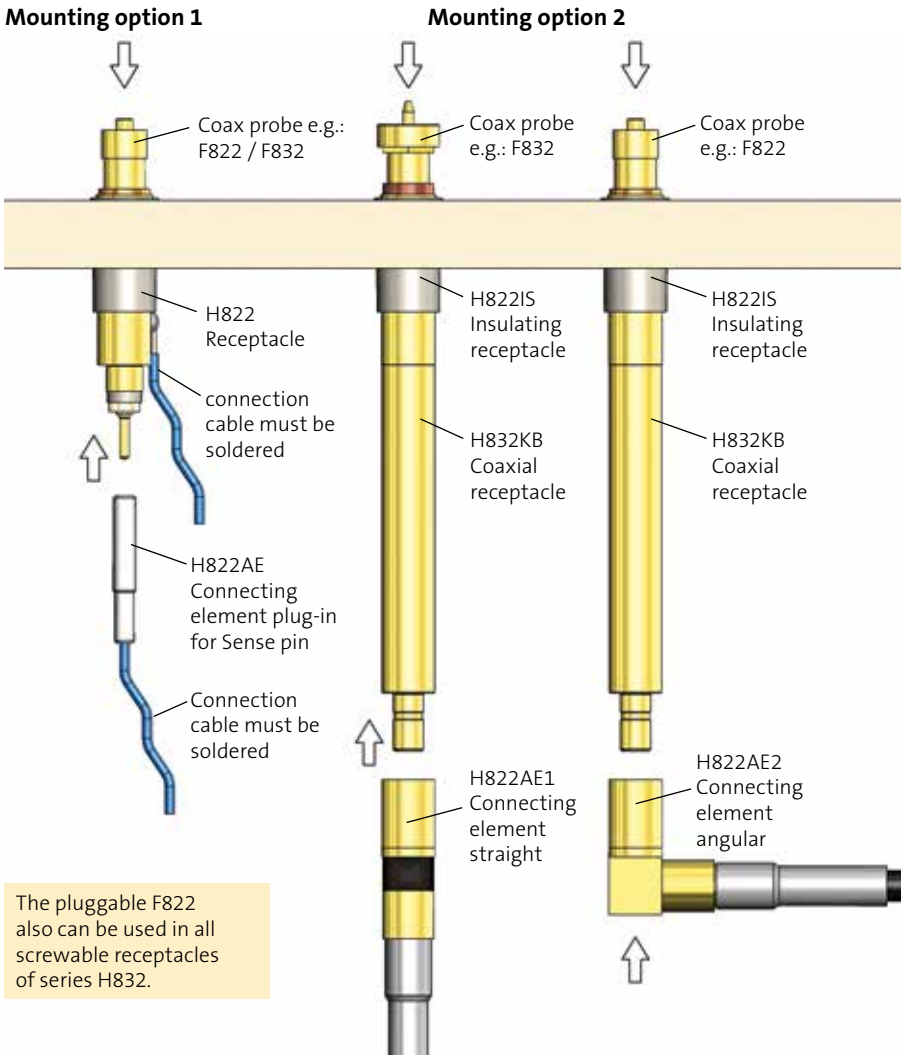
Order code: H822AE1
Connection element with pre-assembled
coaxial cable RG 174 and **straight**
SSMB Mini connector
Impedance: 50 Ohm
Standard length: **600 mm**

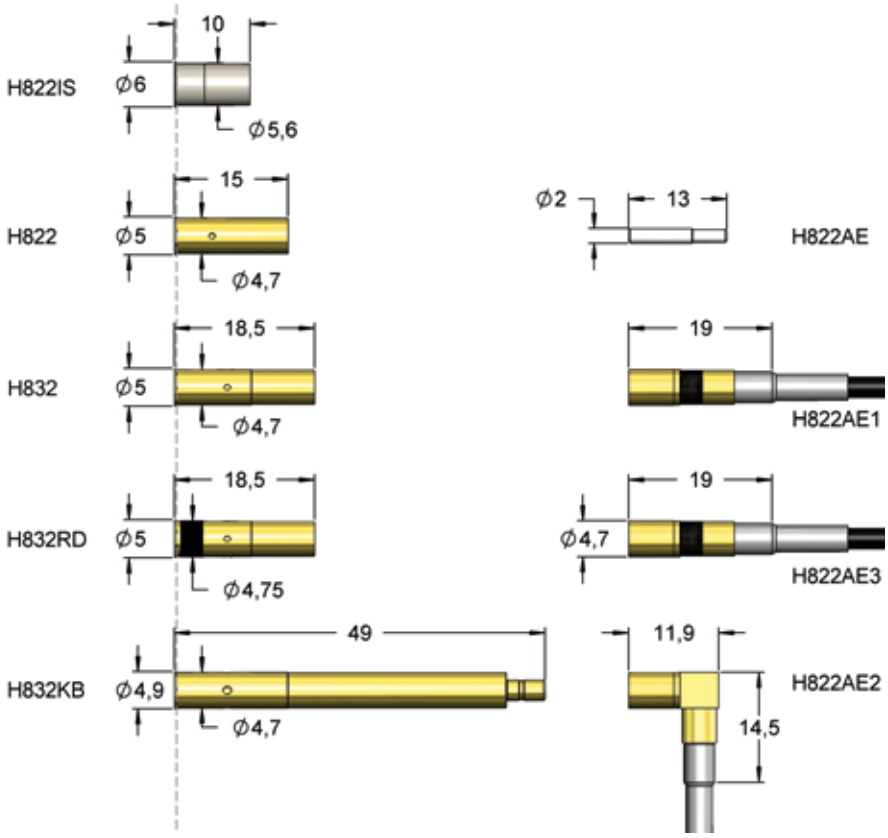
Order code: H822AE2
Connection element with pre-assembled
coaxial cable RG 174 and **angled**
SSMB Mini connector
Impedance: 50 Ohm
Standard length: **600 mm**

Order code: H822AE3
Connection element with pre-assembled
coaxial cable RG 174 and **straight**
SSMB Mini connector
Impedance: 50 Ohm
Standard length: **2000 mm**

Additional option

Order code: H822IS
Plug-in insulating receptacle for insulated
mounting into conductive material
suitable for H822...
for drill holes Ø 5,55 mm

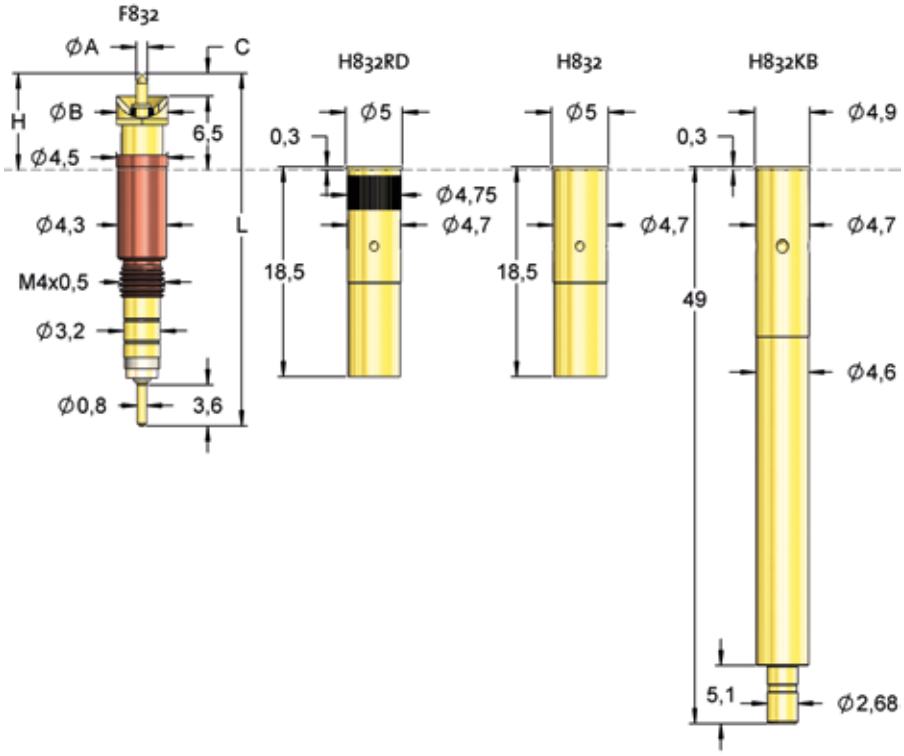




F832

Kelvin Probe 217 mil Threaded

Centers (mm/mil)	5,50 /217
Current (Circular)	6,0 A
Current (Internal)	1,6 A
Frequency	1,2 GHz
Temperature	-40°C...+200°C



Spring Force (cN ±20%)

	Preload	Nominal
Total	-	650
Internal Cont.	100	200
Circular Cont.	250	450

Travel (mm)

	Nominal	Maximum
Internal Cont.	3,0	3,5
Circular Cont.	2,0	2,5
Wrench Size		-
Thread		4,0x0,5

Materials and Plating

Internal Cont.	Steel, longtime gold plated
Circular Cont.	BeCu, gold plated
Barrel	BeCu, unplated
Spring Internal Cont.	Stainless steel, unplated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Screw-in tool probe	FWZ832 (T)

Drill Size (mm)

Receptacle without knurl	4,68 - 4,69
Receptacle with knurl	4,70 - 4,72
Insulating receptacle	5,56 - 5,57

Projection Height (mm)

H832... with F832	H + 0,3

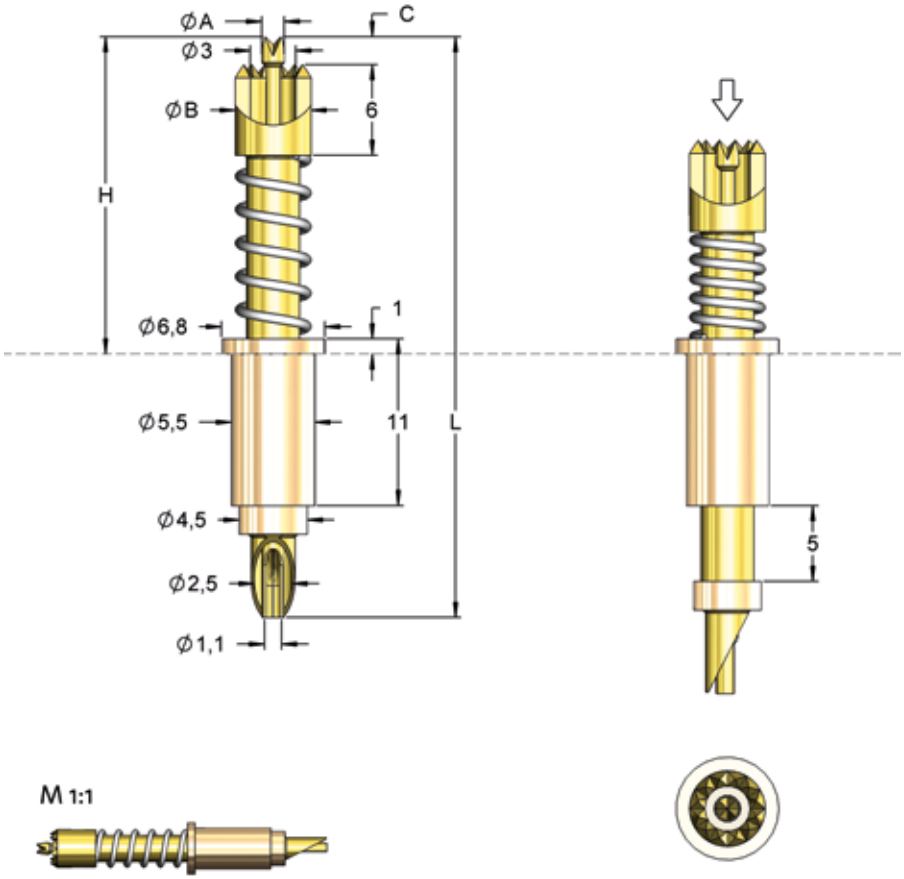
* Center deviating from standard, depending on diameter.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version	Screw-in Tool
F83203S0001L650		03	1,00	4,00	2,00	8,50	31,00	-	FWZ832; FWZ832T
F83203S0003L650		03	1,00	4,50	2,00	8,50	31,00	-	FWZ832; FWZ832T
F83203S0005L650		03	1,00	4,50	3,50	10,00	32,50	-	FWZ832; FWZ832T
F83205S0008L650IK10		05	0,60	4,00	2,80	9,30	31,80	IK	FWZ832; FWZ832T
F83205S0001L650		05	1,00	4,00	2,00	8,50	31,00	-	FWZ832; FWZ832T
F83205S0003L650		05	1,00	4,50	2,00	8,50	31,00	-	FWZ832; FWZ832T
F832110017L650		11	0,65	* 6,00	1,50	8,00	30,50	-	FWZ832; FWZ832T
F83217S0002L650		17	1,50	4,00	4,50	11,00	33,50	-	FWZ832; FWZ832T
F83239S0001L650		39	1,00	5,00	2,00	8,50	31,00	-	FWZ832; FWZ832T

F840

Kelvin Probe 275 mil
Plug-in

Centers (mm/mil)	7,00 / 275
Current (Circular)	30,0 A
Current (Internal)	5,0 A
Frequency	-
Temperature	-20°C...+80°C



Spring Force (cN ±20%)

	Preload	Nominal
Total		1780
Internal Cont.	200	280
Circular Cont.	100	1500

Travel (mm)

	Nominal	Maximum
Internal Cont.	1,9	6,4
Circular Cont.	5,0	5,5

Materials and Plating

Internal Cont.	Stahl, longtime gold plated
Circular Cont.	Stahl, longtime gold plated
Barrel	Brass, unplated
Spring Internal Cont.	Music Wire, silver plated
Spring Circular Cont.	Music Wire, silver plated

Drill Size (mm)

Barrel-Ø	5,49 -5,51

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
F84014S150L1780		14	1,50	5,00	1,85	21,00	38,85	-

Coaxial Probes for RF-Applications

For transmitting RF signals with coaxial probes the inner conductor carries the signal whereas the outer conductor serves as a shielding.

Typical applications are contacting various standard RF connectors or sockets like e.g. Fakra, HSD, SMA, SMB, SMC connectors or even very small SMD assembled switch connectors or direct test points on a PCB.

Radio Frequency Probes

Design of RF-Probes

Spring contact probes for RF-applications are coaxial probes. The inner and outer conductors are designed and dimensioned according the RF specific requirements. That means the signals within a wide frequency band are transmitted with a minimum loss. For evaluation of RF-probes various definitions and parameters are relevant.

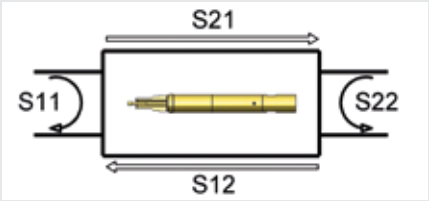
Two-Port Network

The common two-port network describes the characteristics of possible transmission paths. These can be wires, radio transmissions or RF-contact probes.

S-Parameters

In radio frequency technology the transmission characteristics of two-port networks are described by S-parameters (scattering parameters). The S-parameters are typically specified as attenuation given in decibel [dB].

S11: Reflection loss input side
S21: Insertion loss forward
S12: Insertion loss backward
S22: Reflection loss output side



Matching

The matching always refers to the impedance of the DUT and its RF related environment. The more constant the impedance on the transmission path, the better is the reflection and transmission behavior. For RF testing always the complete transmission path of DUT, RF-probe and connecting element has to be considered. A major part of the signal loss is caused by mismatching between RF probe and DUT. The frequency response charts in the specification sheets of the probes HF60 include the probe as well as an RF-connector (representing the DUT) and a connecting element with connected cable. The type and length of the cable is also influencing the transmission of the signal and may lead to a reduced bandwidth.
For reference, the values S21 and S11 for the HF60 without DUT and connecting element are shown as well.

Insertion Loss

The insertion loss describes the transmission behavior of a two-port network and is represented by the value S21. Very often the 3dB cutoff frequency is used as characteristic value. This is the frequency with an attenuation of -3dB. At this frequency
the power has reduced by 50% and the voltage by 30%.

New Order Codes for RF-Probes

RF-Series | DUT | Mounting version | Center

z.B. **HF60-0001 SMA-F 8 P MCX -**

Number | Cutoff frequency * | Connection

Order code:

Is composed of RF-Series and number

DUT (e.g.):

SMA-F (Female)
SMB-M (Male)
GSG (Ground-Signal-Ground)

Mounting options:

F (flange)
P (plug-in)
S (threaded)

Center:

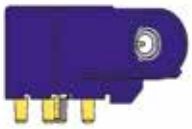
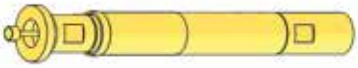
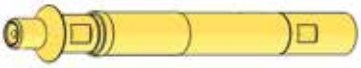
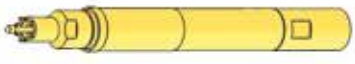
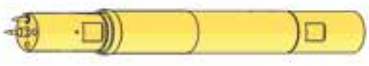
Center specifies only distance ground to signal, otherwise the field is left blank

* the specified value is the recommended maximum operating frequency.

HF60

Variants for Common RF Connector Types

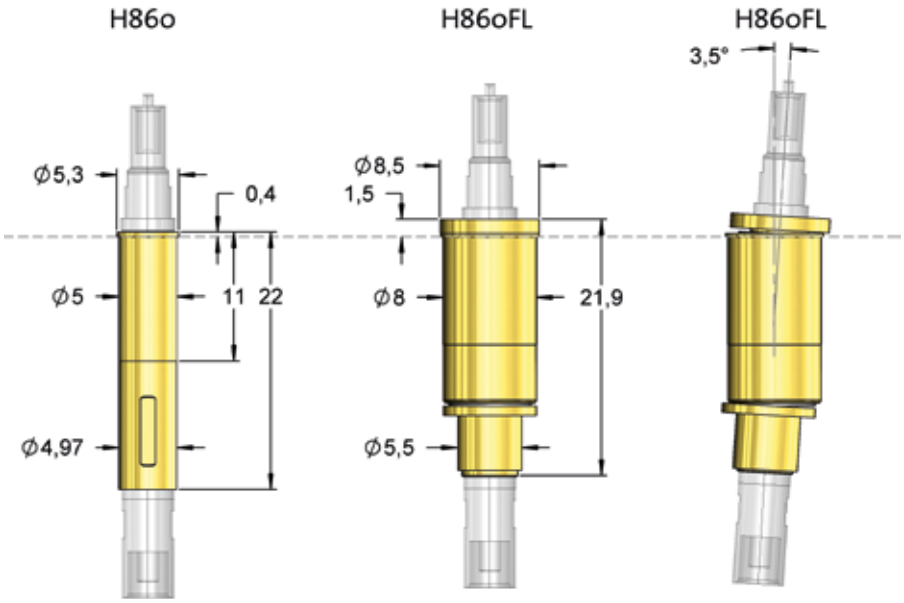
For test and signal transmission of common connector types (e.g. Sub-Miniature type A, B, C) different RF probes are available. This page shows a quick overview, the detailed specifications are available on the corresponding product pages and on our homepage.

DUT:		RF probe		Cutoff frequency up to:
Fakra-Male		 HF60-0006 FAKRA-M 6 P MCX	NEW	6 GHz
SMA-Female		 HF60-0001 SMA-F 8 P MCX		8 GHz
BMA-Male		 HF60-0011 BMA-M 5 P MCX	NEW	5 GHz
SMB-Female		 HF60-0005 SMB-F 6 P MCX		6 GHz
SMB-Male		 HF60-0004 SMB-M 5 P MCX		5 GHz
SMC-Male		 HF60-0003 SMC-M 5 P MCX		5 GHz
U.FL-Male		 HF60-0002 U.FL-M 5 P MCX		5 GHz
Micro RF-Male		 HF60-0007 RF-M 5 P MCX		5 GHz
PCB-Coax-open		 HF60-0008 PCB-coax-open 4 P MCX	NEW	4 GHz
PCB-Coax-open		 HF60-0010 PCB-coax-open 4 P MCX	NEW	4 GHz
PCB-GSG		 HF60-0009 GSG 4 P MCX 135	NEW	4 GHz

Receptacles

for Probe HF60

The new receptacle H860FL allows a flexible (floating) mounting of the high frequency probe HF60. It permits a wobbling by 360 degrees in case of a small offset to the DUT. Such a possible offset is compensated without damaging the DUT. In released mode the HF probe is returned to its zero point position.



Connection Cables

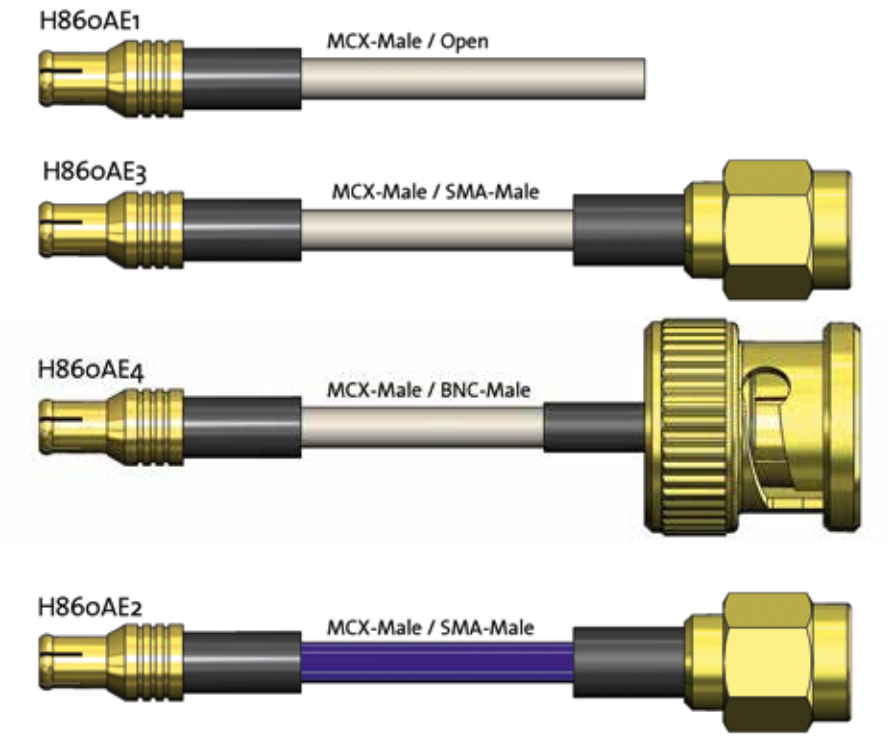
for Probe HF60

Connection element with pre-assembled coaxial cable RG 316.
Impedance: 50 Ohm
Cutoff frequency: recommended up to **3 GHz**
Standard length: 700 mm

Order code:
H860AE1
(MCX-Male - unassembled)
H860AE3
(MCX-Male - SMA-Male)
H860AE4
(MCX-Male - BNC-Male)

Connector with pre-assembled coaxial cable Multiflex 86.
Impedance: 50 Ohm
Cutoff frequency: recommended up to **10 GHz**
Standard length: 700 mm

Order code:
H860AE2
(MCX-Male - SMA-Male)



HF60-0006 FAKRA-M 6 P MCX

Contacting Fakra-Male

NEW

Centers (mm/mil)	6,00 / 236
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	470
Internal Cont.	75	150
Circular Cont.	90	320

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,7	3,7
Circular Cont.	3,0	3,5
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

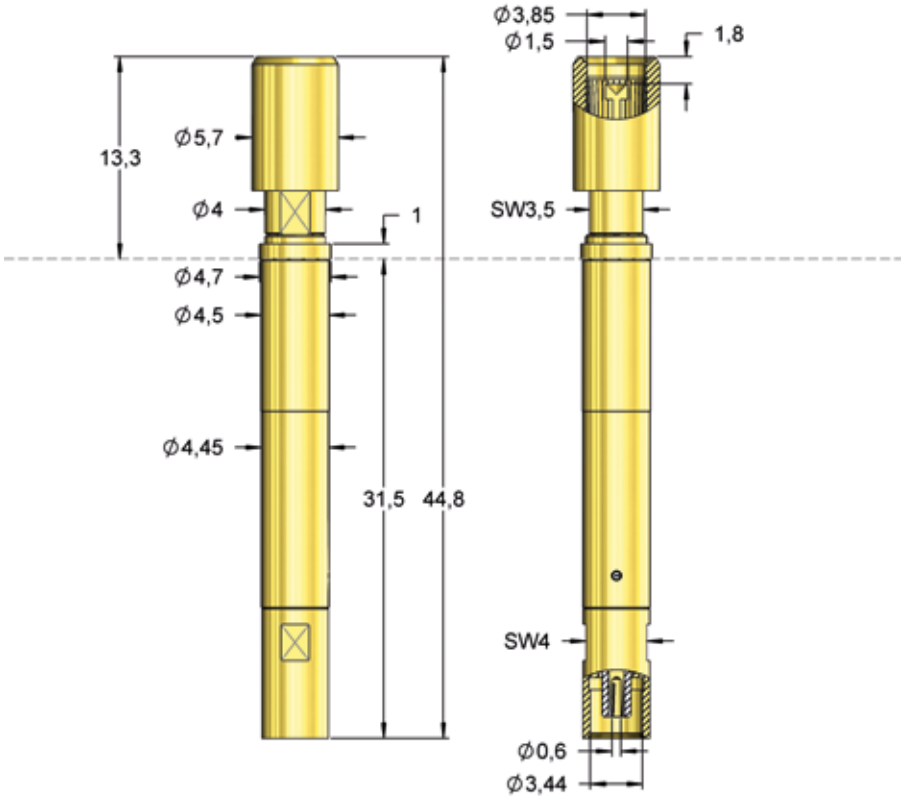
Drill Size (mm)

H860	4,99 - 5,00
H860FL	7,99 - 8,01

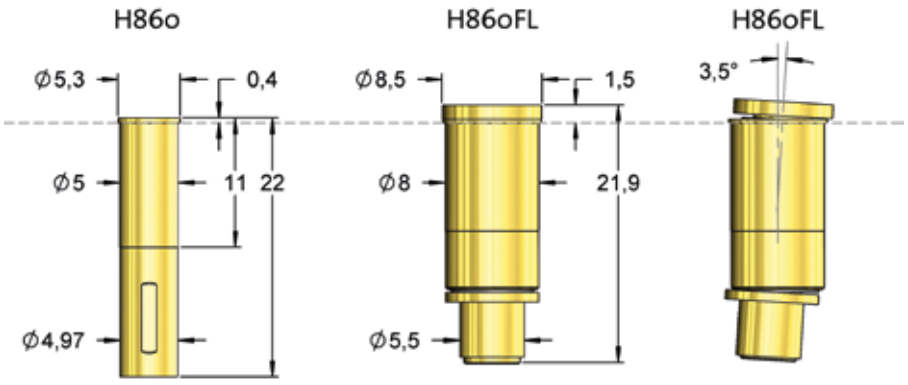
Projection Height (mm)

H860 with HF60-0006	13,7
H860FL with HF60-0006	14,8

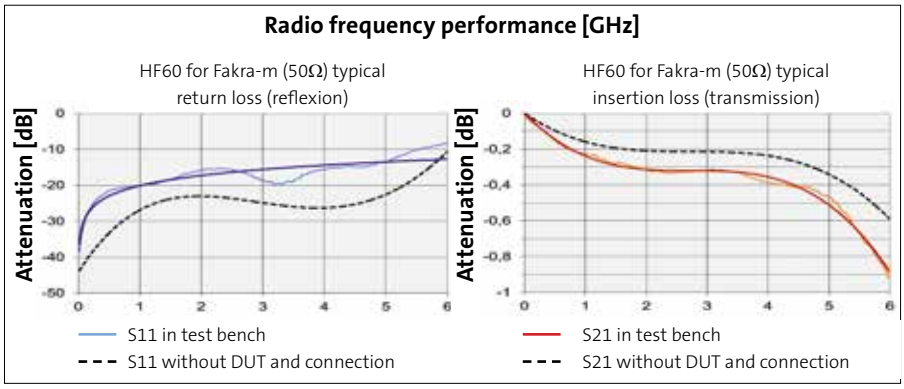
Fakra-Male



For contacting Fakra-Male connectors.



Radio frequency performance [GHz]



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0006		05	1,50	5,70	- 1,80	13,30	44,80	-

HF60-0001 SMA-F 8 P MCX

Contacting SMA-Female

Centers (mm/mil)	6,50 / 256
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	8 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	530
Internal Cont.	75	130
Circular Cont.	90	400

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	3,7
Circular Cont.	4,0	5,0
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

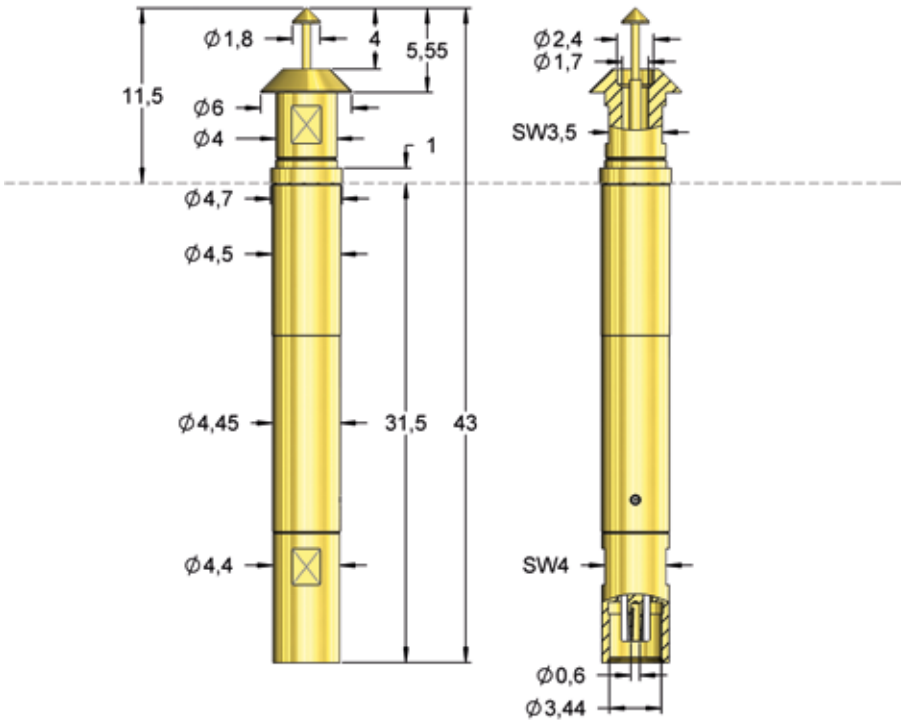
Drill Size (mm)

H860	4,99 - 5,00
H860FL	7,99 - 8,01

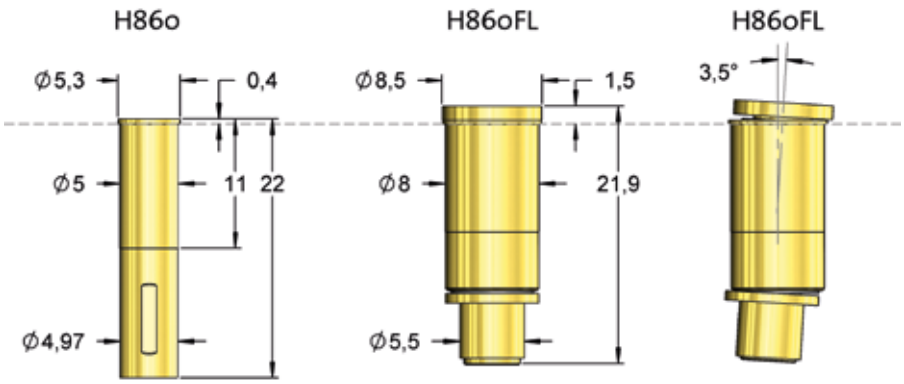
Projection Height (mm)

H860 with HF60-0001	11,9
H860FL with HF60-0001	13,0

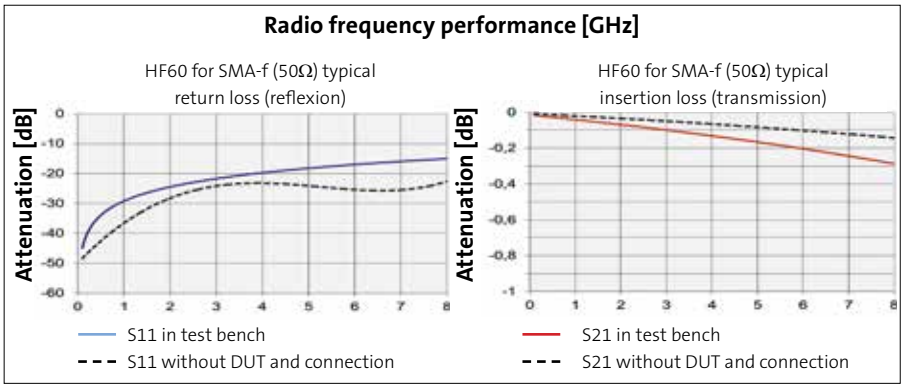
SMA-Female



For contacting SMA-Female connectors.



Radio frequency performance [GHz]



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0001		02	1,80	6,00	4,00	11,50	43,00	-

HF60-0011 BMA-M 5 P MCX

Contacting BMA-Male

NEW

Centers (mm/mil)	6,00 / 236
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	5 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	530
Internal Cont.	75	130
Circular Cont.	90	400

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	3,7
Circular Cont.	4,0	5,0
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

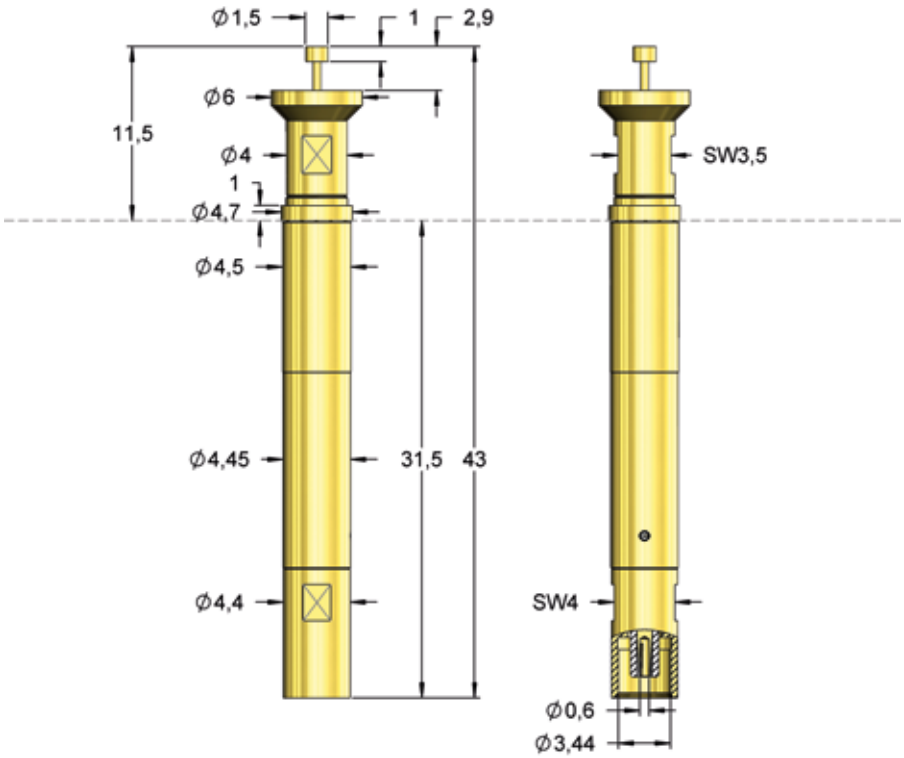
Drill Size (mm)

H860	4,99 - 5,00
H860FL	7,99 - 8,01

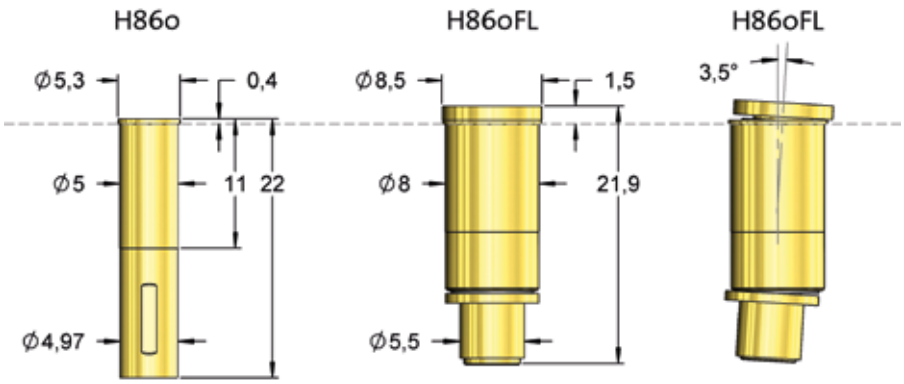
Projection Height (mm)

H860 with HF60-0011	11,9
H860FL with HF60-0011	13,0

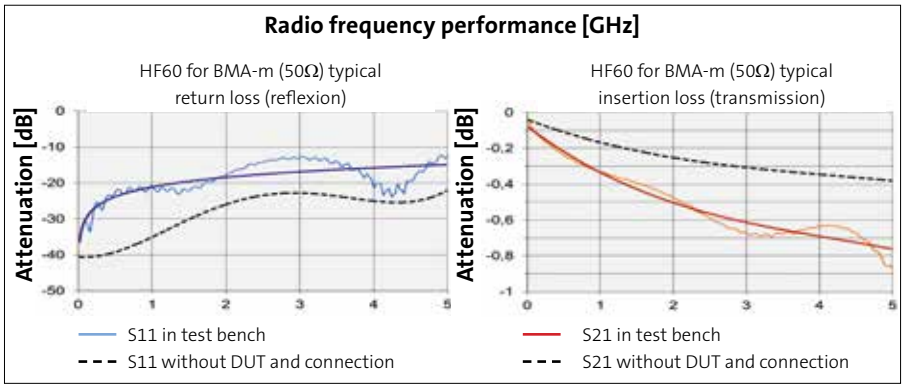
BMA-Male



For contacting BMA-Male connectors.



Radio frequency performance [GHz]



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0011		05	1,50	6,00	2,90	11,50	43,00	-

HF60-0005 SMB-F 6 P MCX

Contacting SMB-Female

Centers (mm/mil)	6,50 / 256
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	530
Internal Cont.	75	130
Circular Cont.	90	400

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	3,7
Circular Cont.	4,0	5,0
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

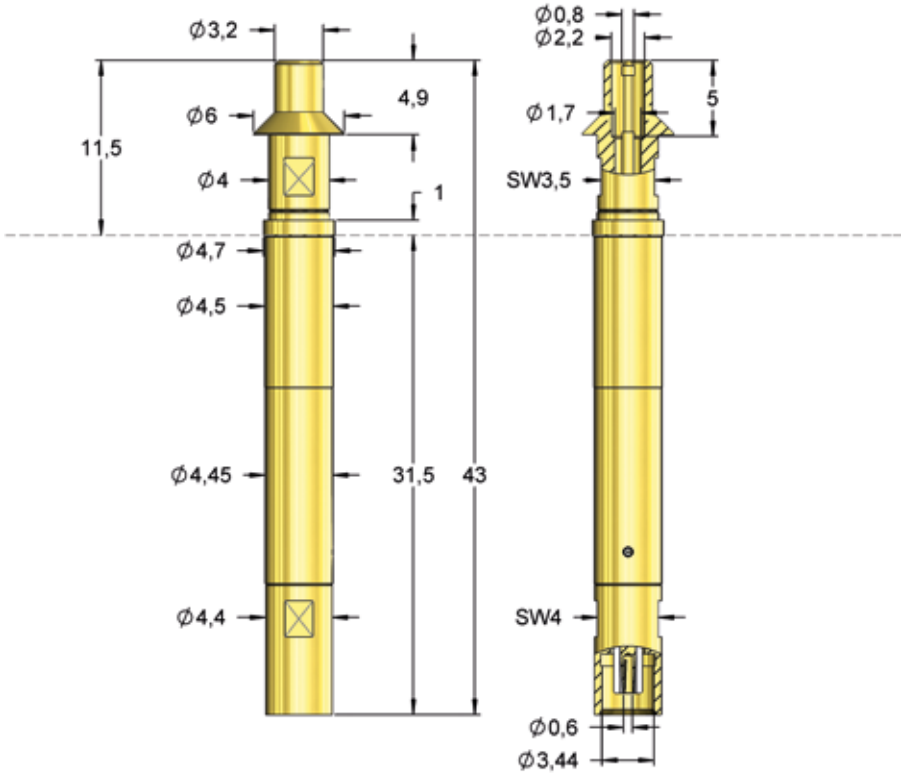
Drill Size (mm)

H860	4,99 - 5,00
H860FL	7,99 - 8,01

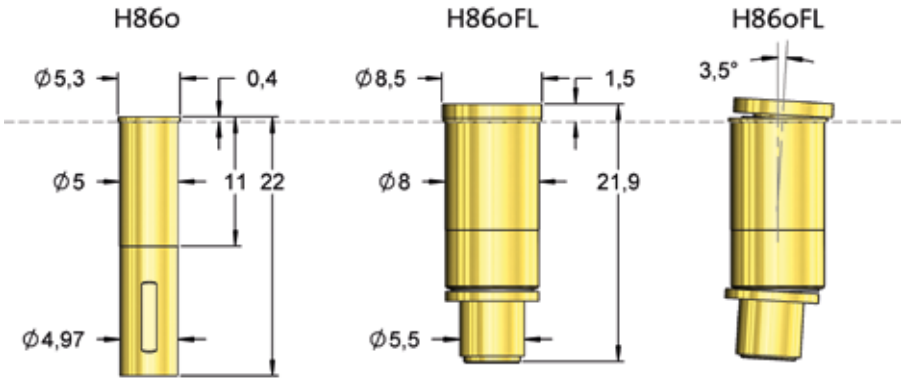
Projection Height (mm)

H860 with HF60-0002	11,9
H860FL with HF60-0002	13,0

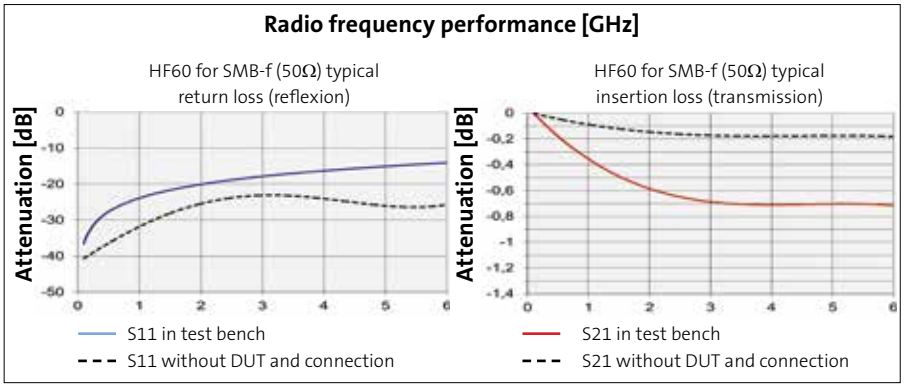
SMB-Female



For contacting SMB-Female connectors.



Radio frequency performance [GHz]



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0005		02	0,80	6,00	0,00	11,50	43,00	-

HF60-0004 SMB-M 5 P MCX

Contacting SMB-Male

Centers (mm/mil)	6,00 / 236
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	5 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	530
Internal Cont.	75	130
Circular Cont.	90	400

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	3,7
Circular Cont.	4,0	5,0
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

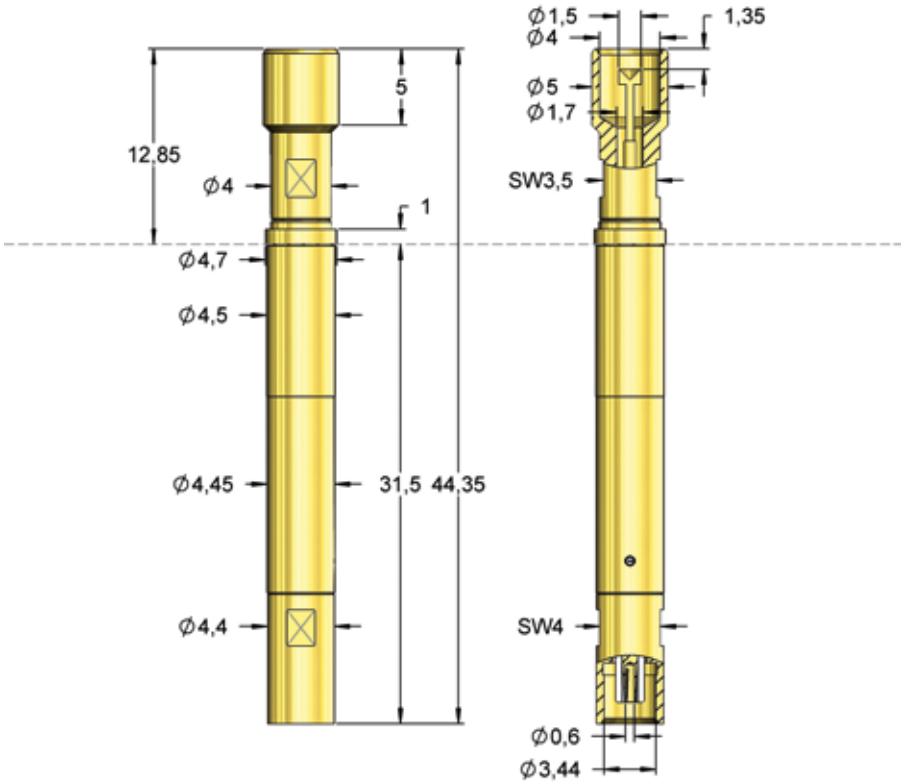
Drill Size (mm)

H860	4,99 - 5,00
H860FL	7,99 - 8,01

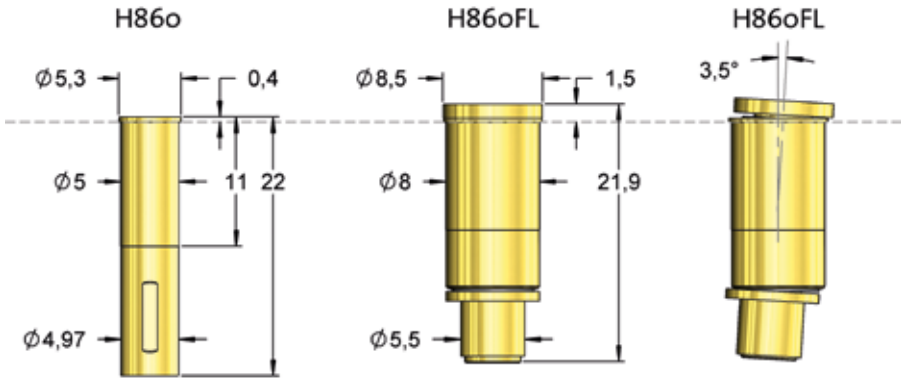
Projection Height (mm)

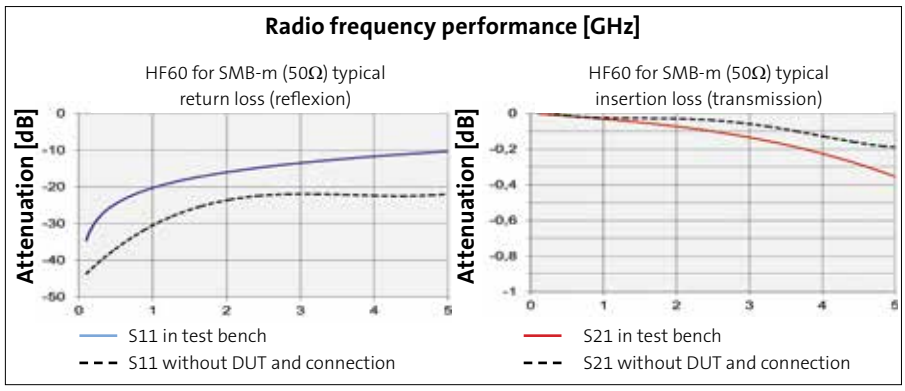
H860 with HF60-0004	13,25
H860FL with HF60-0004	14,35

SMB-Male



For contacting SMB-Male connectors.





Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0004		05	1,50	5,00	- 1,35	12,85	44,35	-

HF60-0003 SMC-M 5 P MCX

Contacting SMC-Male

Centers (mm/mil)	6,00 / 236
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	5 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	530
Internal Cont.	75	130
Circular Cont.	90	400

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	3,7
Circular Cont.	4,0	5,0
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

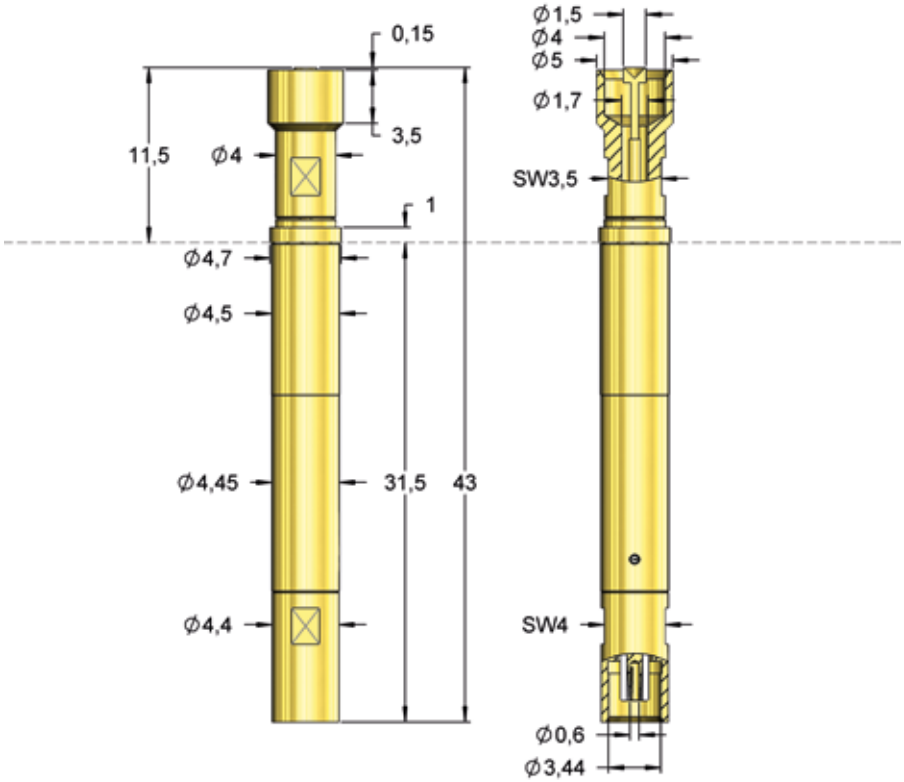
Drill Size (mm)

H860	4,99 - 5,00
H860FL	7,99 - 8,01

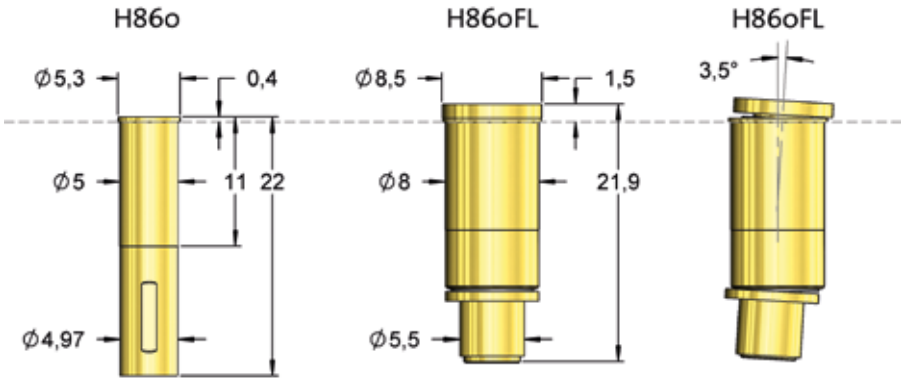
Projection Height (mm)

H860 with HF60-0003	11,9
H860FL with HF60-0003	13,0

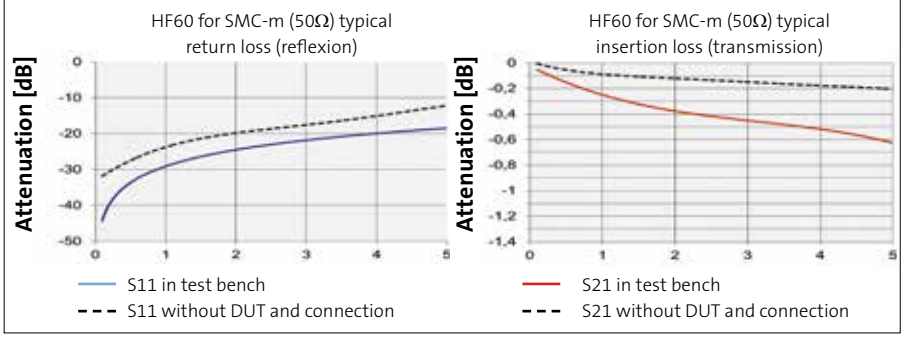
SMC-Male



For contacting SMC-Male connectors.



Radio frequency performance [GHz]



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0003		05	1,50	5,00	0,15	11,50	43,00	-

HF60-0007 RF-M 5 P MCX

Contacting
Micro RF-Male

Centers (mm/mil)	6,00 / 236
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	5 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	530
Internal Cont.	75	130
Circular Cont.	90	400

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	2,5
Circular Cont.	4,0	5,0
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

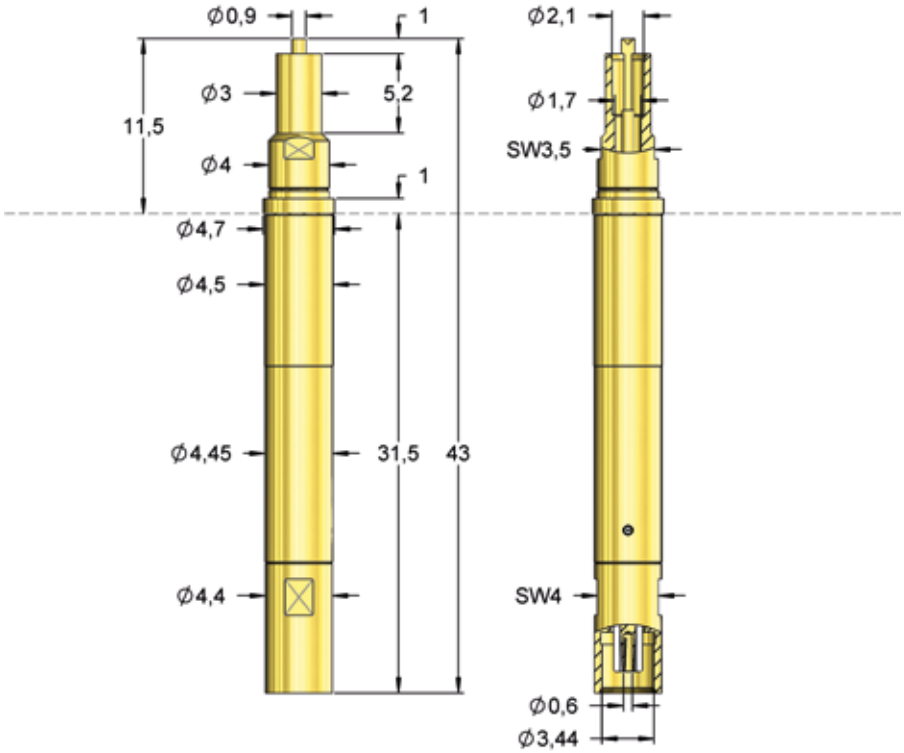
Drill Size (mm)

H860	4,99 - 5,00
H860FL	7,99 - 8,01

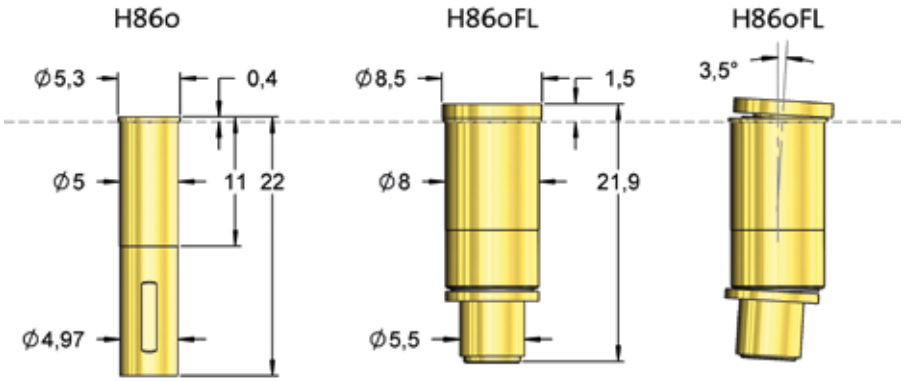
Projection Height (mm)

H860 with HF60-0007	11,9
H860FL with HF60-0007	13,0

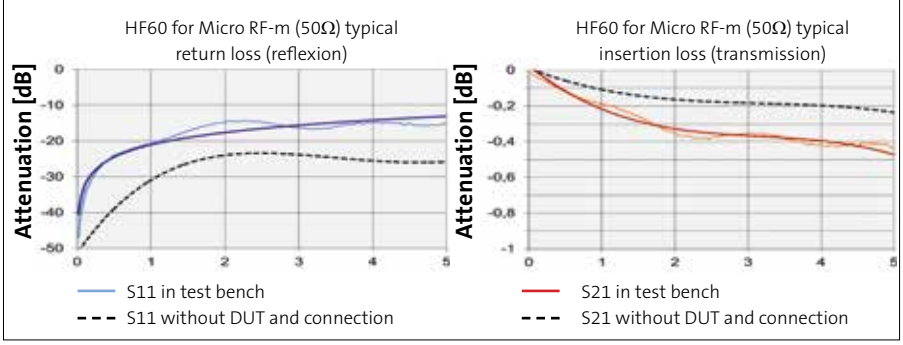
Micro RF-Male



For contacting Micro RF-Male connectors.



Radio frequency performance [GHz]



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0007		05	0,90	3,00	1,00	11,50	43,00	-

HF60-0002 U.FL-M 5 P MCX

Contacting U.FL-Male

Centers (mm/mil)	6,00 / 236
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	5 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	530
Internal Cont.	75	130
Circular Cont.	90	400

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	3,7
Circular Cont.	4,0	5,0
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

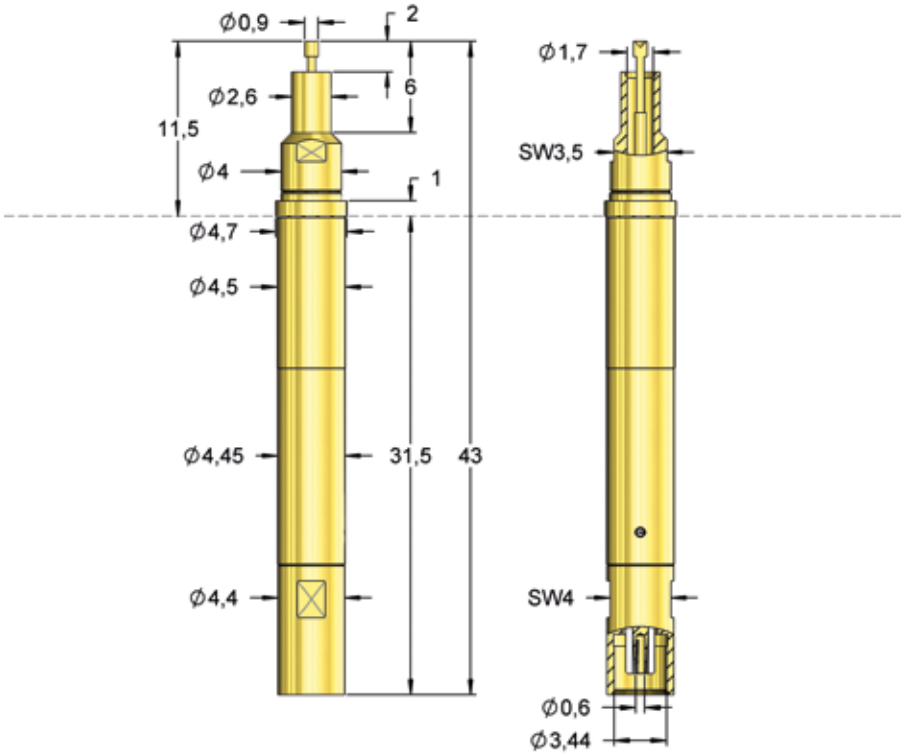
Drill Size (mm)

H860	4,99 - 5,00
H860FL	7,99 - 8,01

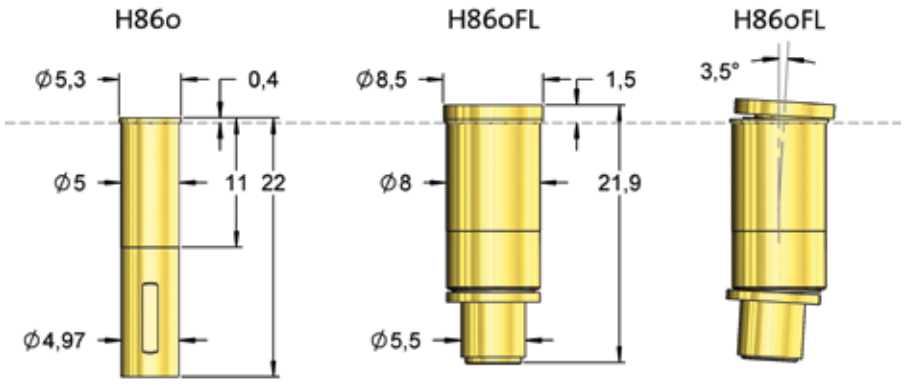
Projection Height (mm)

H860 with HF60-0002	11,9
H860FL with HF60-0002	13,0

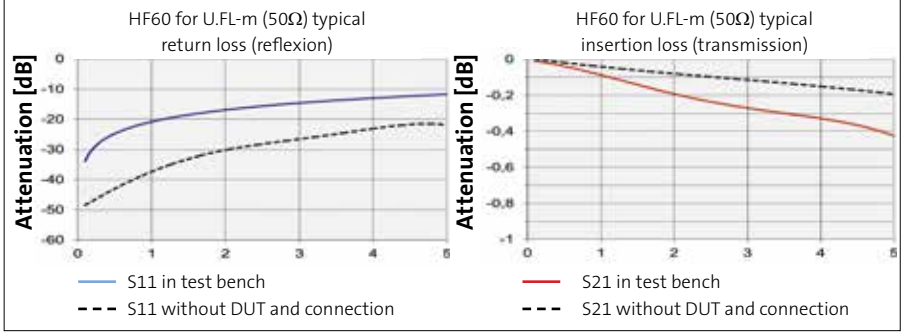
U.FL-Male



For contacting U.FL-Male connectors.



Radio frequency performance [GHz]



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0002		05	0,90	2,60	2,00	11,50	43,00	-

HF60-0009 GSG 4 P MCX 135

Contacting PCB-GSG

NEW

Centers (mm/mil)	6,00 / 236
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	4 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	960
Internal Cont.	0	0
Pins Circular Cont.	2x40	2x80
Core Circular Cont.	450	800

Travel (mm)

	Nominal	Maximum
Internal Cont.		
Pins Circular Cont.	1,0	1,5
Core Circular Cont.	4,0	5,0
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

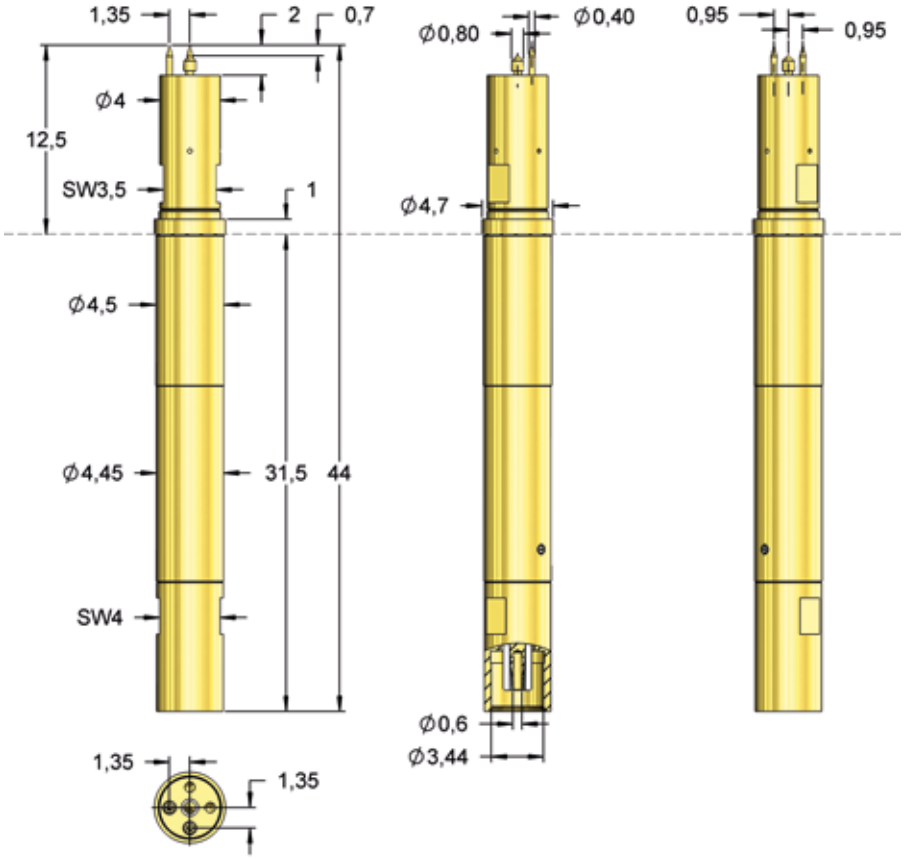
Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

Drill Size (mm)

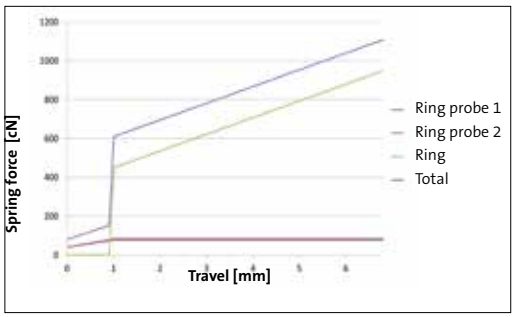
H860	4,99 - 5,00
H860FL	7,99 - 8,01

Projection Height (mm)

H860 with HF60-0002	12,9
H860FL with HF60-0002	14,0

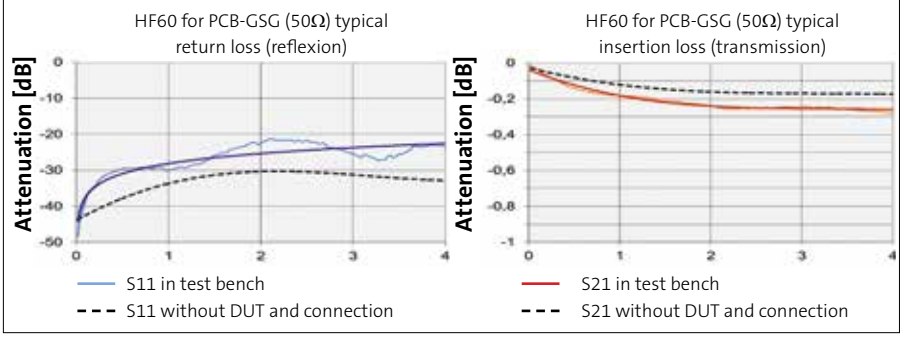


For contacting PCBs. The signal pin is not spring loaded. The ground pins have a spring force of 80 cN. Suitable mounting receptacles see H860 or H860FL.



PCB-GSG

Radio frequency performance [GHz]



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0009		02	0,80	4,00	-0,70	12,50	44,00	-

HF60-0008 PCB-coax-open 4 P MCX

Contacting PCB-coax-open

NEW

Centers (mm/mil)	6,00 / 236
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	4 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	530
Internal Cont.	75	130
Circular Cont.	90	400

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	2,5
Circular Cont.	4,0	5,0
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

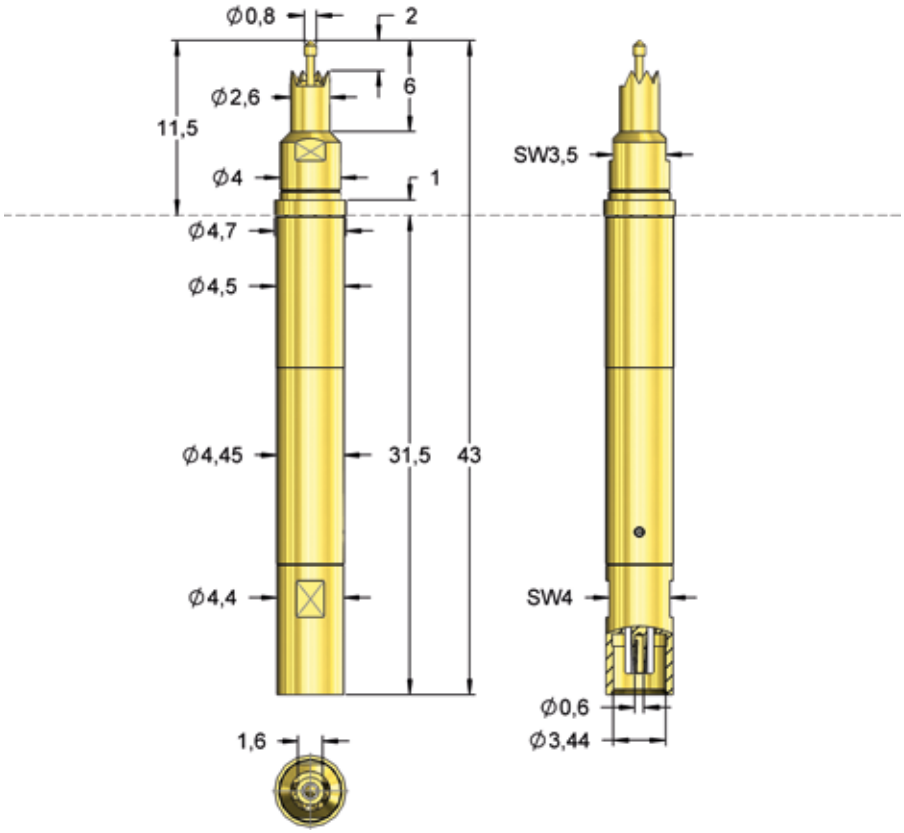
Drill Size (mm)

H860	4,99 - 5,00
H860FL	7,99 - 8,01

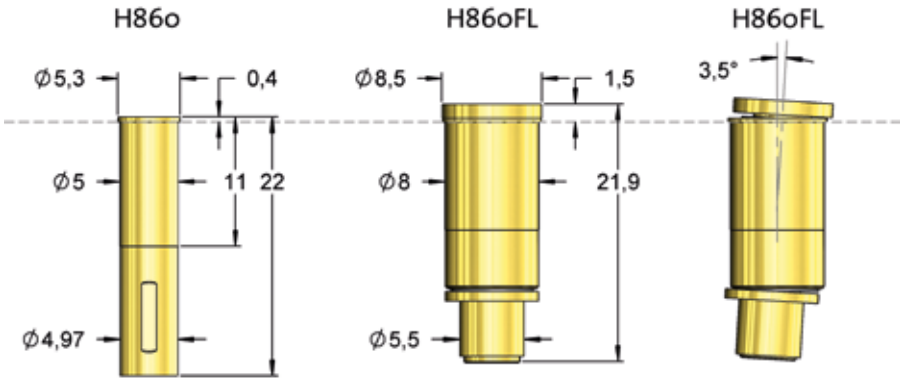
Projection Height (mm)

H860 with HF60-0008	11,9
H860FL with HF60-0008	13,0

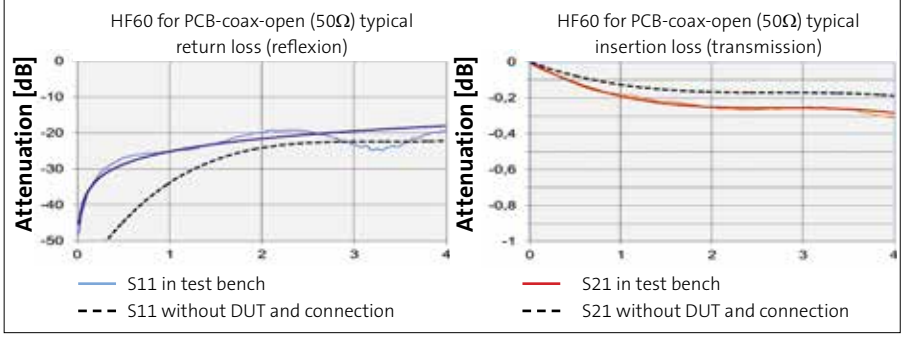
PCB-coax-open



For contacting PCBs.



Radio frequency performance [GHz]



Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0008		18	0,80	2,60	2,00	11,50	43,00	-

HF60-0010 PCB-coax-open 4 P MCX

Contacting PCB-coax-open

NEW

Centers (mm/mil)	6,00 / 236
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	50 Ohm
Frequency	4 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	530
Internal Cont.	75	130
Circular Cont.	90	400

Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	2,5
Circular Cont.	4,0	5,0
Wrench Size		3,5 / 4,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated
Receptacle	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-822E0
Receptacle Standard	H860
Floating Receptacle	H860FL
Cable 700 mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700 mm up to 10 GHz	H860AE2

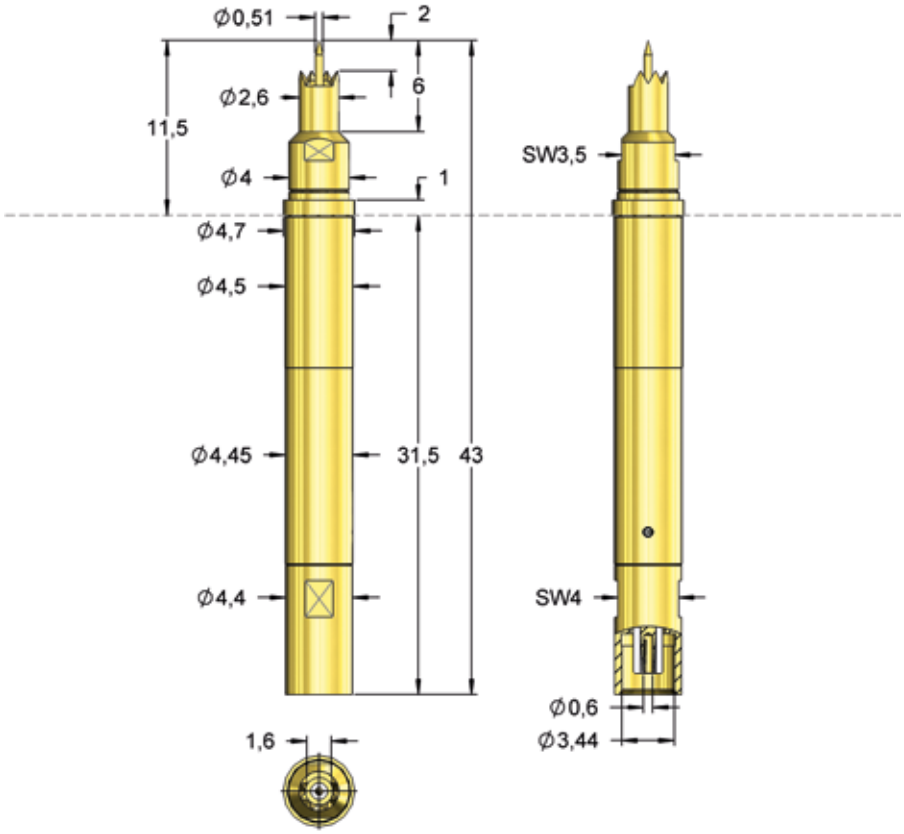
Drill Size (mm)

H860	4,99 - 5,00
H860FL	7,99 - 8,01

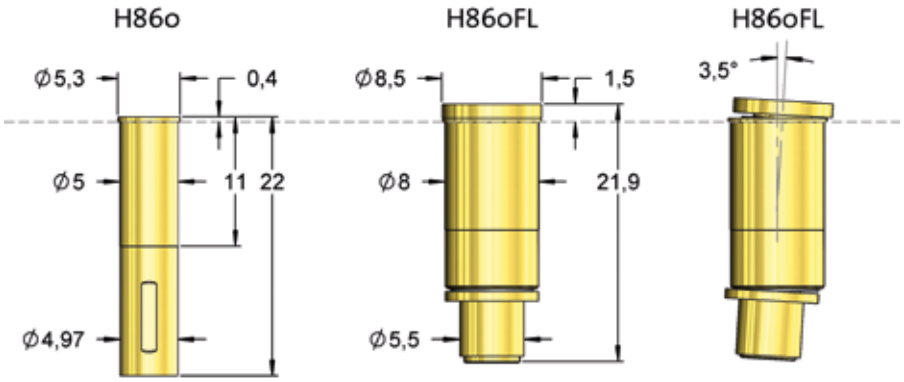
Projection Height (mm)

H860 with HF60-0010	11,9
H860FL with HF60-0010	13,0

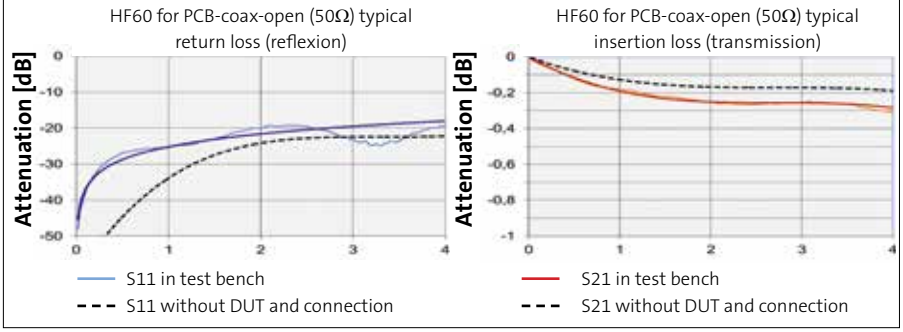
PCB-coax-open



For contacting PCBs.



Radio frequency performance [GHz]

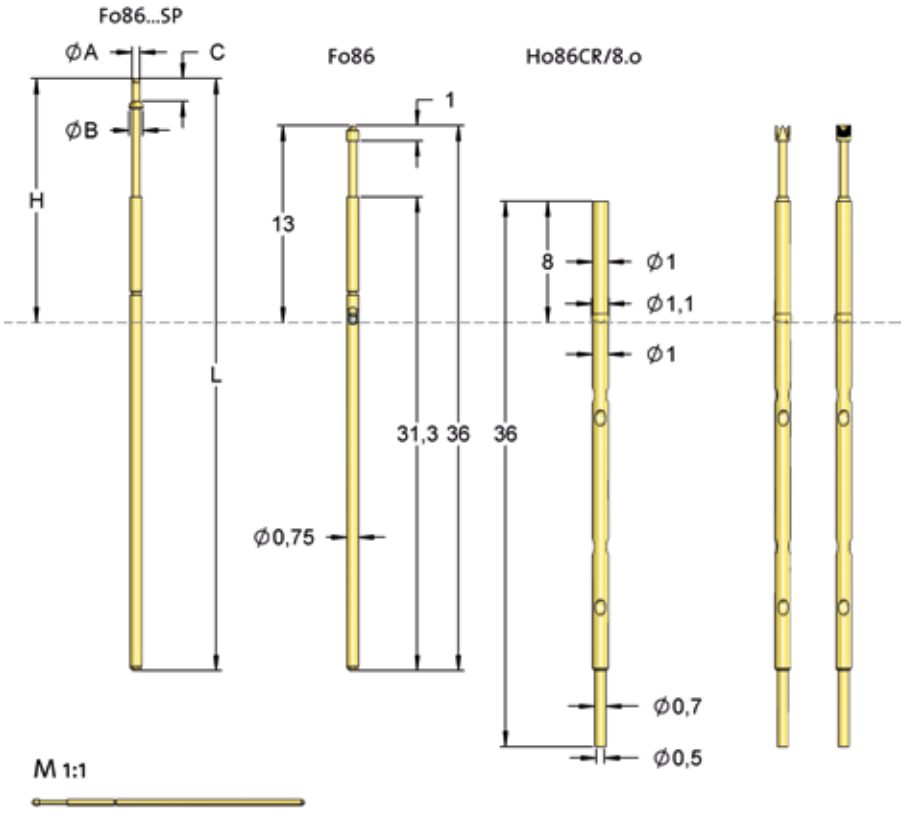


Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF60-0010		18	0,51	2,60	2,00	11,50	43,00	-

F086

Internal Contact for RF Probes HF19 and HF60

Centers (mm/mil)	1,27 / 50
Current	3,0 A
R typ	10 mOhm
Temperature	-20°C...+80°C



Probe F086 is the internal probe used as internal contact in RF probe HF60 and HF19.

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	75	130
SP	75	130

Travel (mm)

Version	Nominal	Maximum
Standard	2,0	3,7
SP	2,0	3,7
Pointing Accuracy		±0,05 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Bronze, gold plated
Spring	Music Wire, gold plated
Receptacle	Nickel silver, gold plated

Accessories

Insertion tool receptacle	FEWZ-050EV
Insertion tool receptacle	FEWZ-050E0
Insertion tool probe	FDWZ-050

Drill Size (mm)

Receptacle press ring as stop	0,99 - 1,00
Receptacle press ring inserted	1,05 -1,07

Projection Height (mm)

H086CR/8.0 with F086	5,0 - 13,0
H086CR/8.0 with F086...SP	8,1 - 16,1

Series			Tip-Ø		Spring Force (cN)
F086	14	S	090	L	130
	Tip Style	Material		Plating	Version

Material: B = BeCu, S = Steel
Tip-Ø: 090 = 0,90 mm (e.g.)
Plating: G = Gold plated , L = Longtime gold plated
Version: SP = Step Probe (see table)
Receptacle: Order Code according drawing

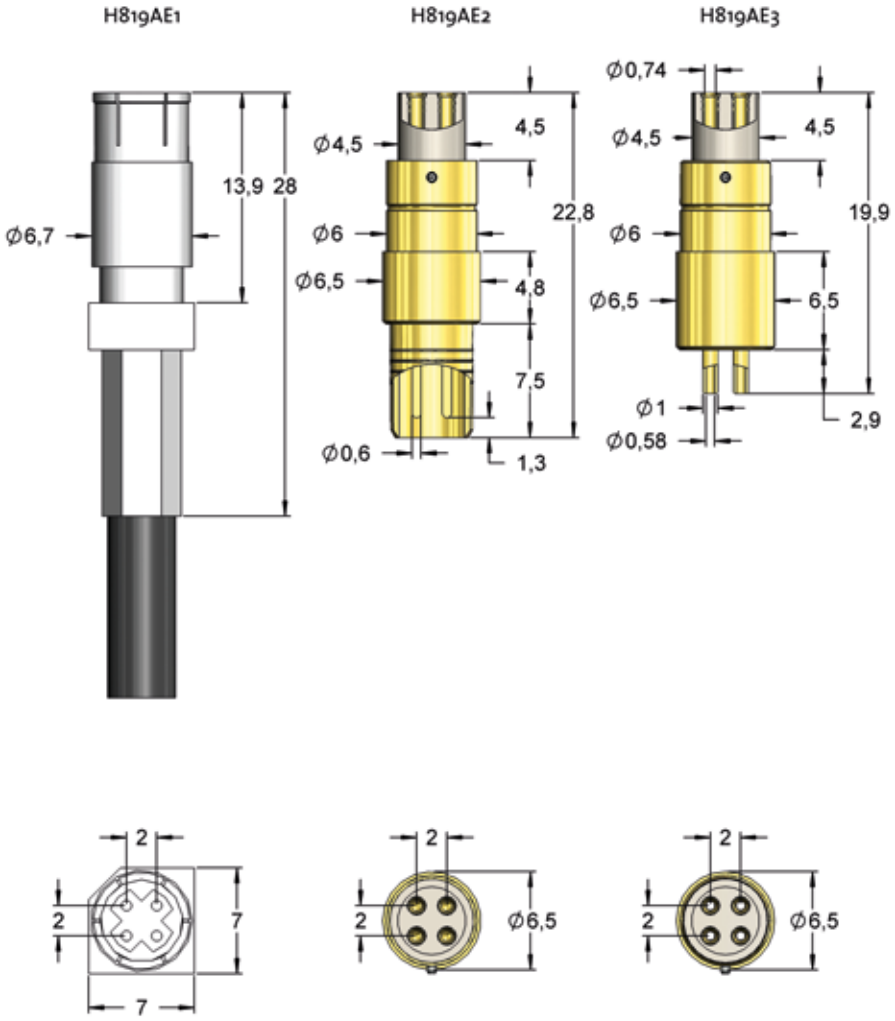
* deviating from standard, depending on diameter.

Tip Style	Number	Material	Plating	Ø in mm	Version
	02	B	G	0,80	-
	02	B	G	1,80	-
	05	B	G	0,90	-
	05	B	G	1,50	-
	11	B	G	0,51	-
	14	B	L	0,90	-
	18	B	G	0,51	-
	55	B	G	0,90	-

Order Code	Tip Style	Ø A	Ø B	C	H	L	Version
F08612B0002G130SP *	12	0,51	0,90	1,50	8,10	39,10	SP
F08612B0004G130SP *	12	0,60	0,90	1,50	8,10	39,10	SP
F08612B0003G130SP *	12	max. 0,60	0,90	1,50	8,10	39,10	SP

H819AEx

Connecting Elements for HF19



Connection on both sides:
D4K- Dacar 535,
socket 4-pole, straight
Length: 500 mm (± 10 mm)

By combining the connection elements H819AE2 and H819AE1 a defined and reproducible measuring setup with fix parameters can be realized.

HF19 H819AE2 H819AE1

Connection units selectable

HF19 H819AE3

for direct soldering

HF19-0003 HSD-M 3 P HSD

Contacting HSD-Male

NEW

Centers (mm/mil)	12,0 / 472
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	100 Ohm
Frequency	3 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

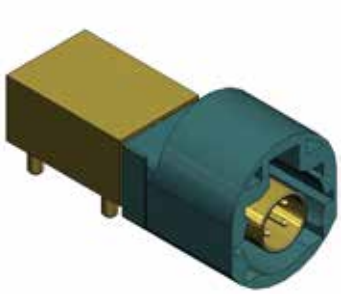
	Preload	Nominal
Total	-	2000
Internal Cont.	75	130
Circular Cont.	900	1500

Travel (mm)

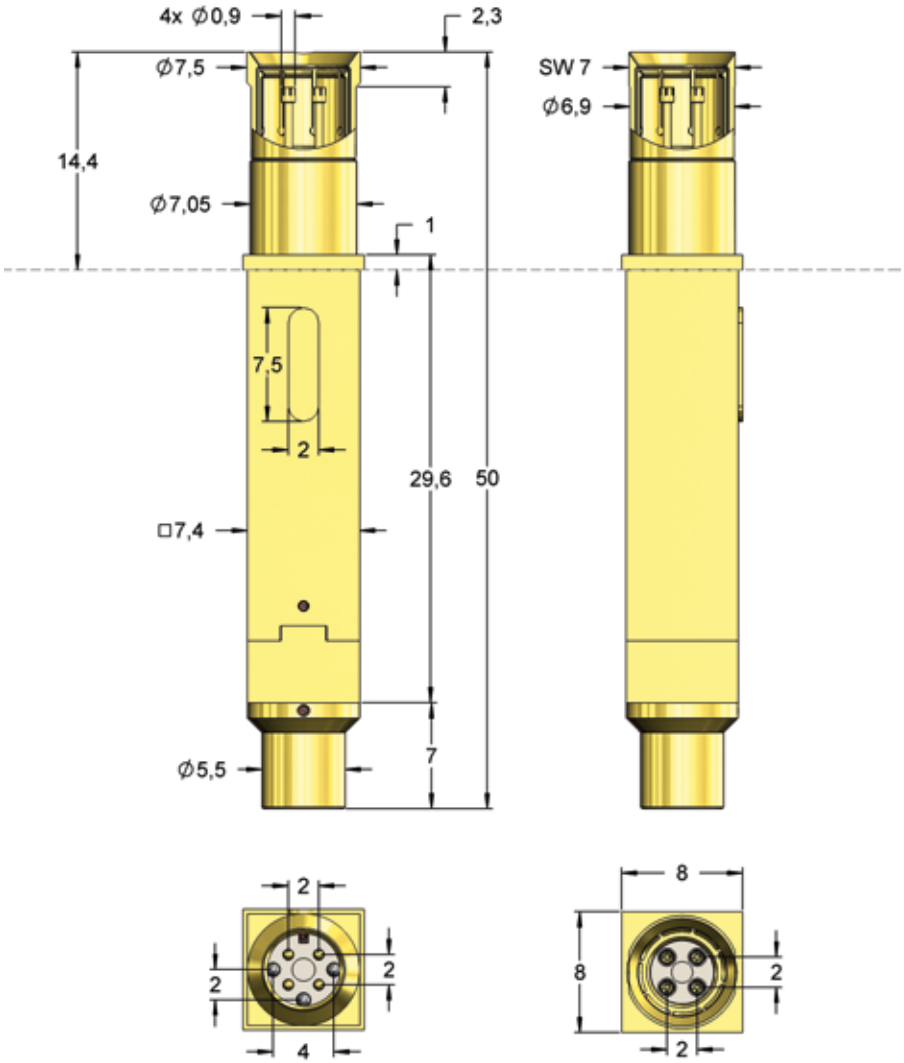
	Nominal	Maximum
Internal Cont.	2,0	3,7
Circular Cont.	5,0	6,0
Wrench Size		6,0 / 7,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated



HSD-Male (D4S20A-40MLS-Z)



Back view **Front view**

With its larger diameters of the internal pins and the self-cleaning tip style this version is well suitable for contacting contaminated DUTs. The reduced connection area allows a direct connection to connection element H819AE1. The three protruding alignment pins enable a guidance during the mounting of the connection cables and avoid any damages of the probe.

HF19

H819AE1

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF19-0003		55	0,90	7,50	- 2,30	14,40	50,00	-

HF19-0001 HSD-M 2 P H819AE2-3

Contacting HSD-Male

Centers (mm/mil)	12,0 / 472
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	100 Ohm
Frequency	1-2 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

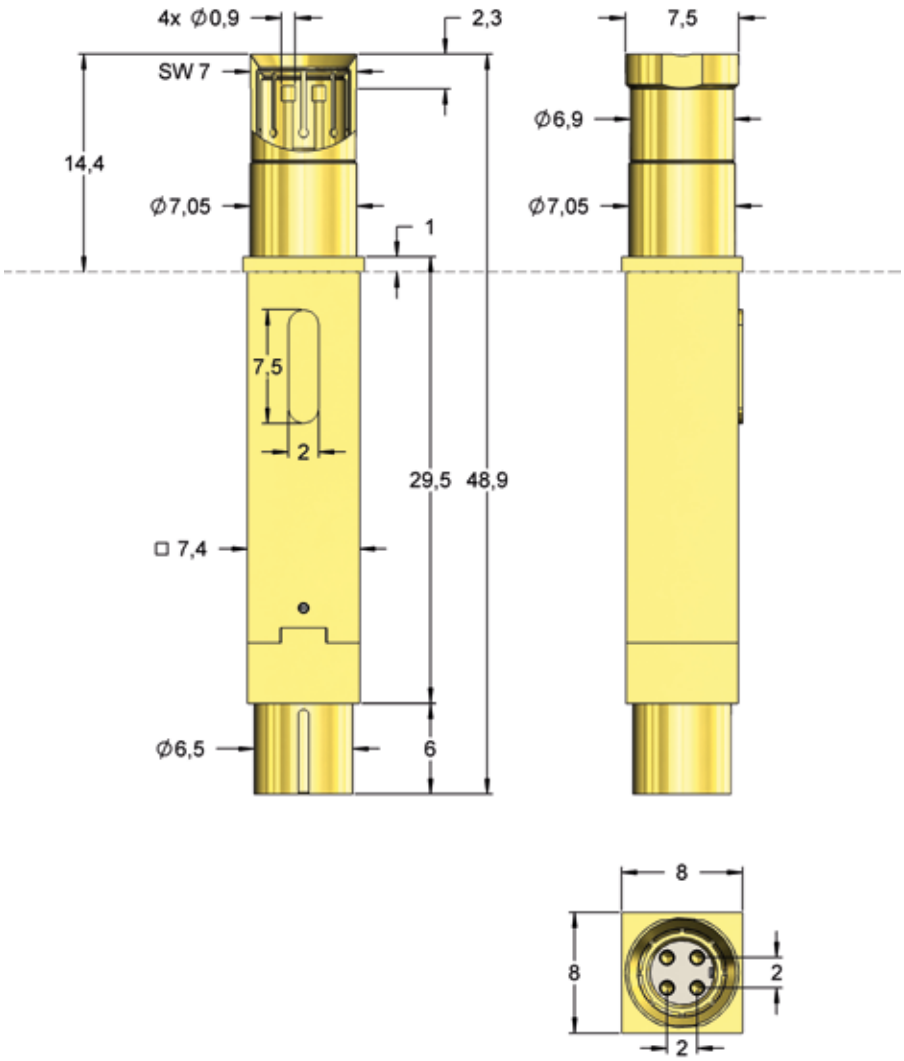
	Preload	Nominal
Total	-	1270
Internal Cont.	75	130
Circular Cont.	300	750

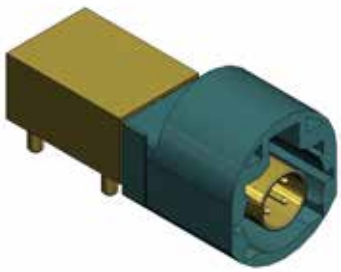
Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	3,7
Circular Cont.	5,0	6,0
Wrench Size		6,0 / 7,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated





HSD-Male (D4S20A-40MLS-Z)

By combining the connection elements H819AE2 and H819AE1 a defined and reproducible measuring setup with fix parameters can be realized.

HF19 H819AE2 H819AE1

Connection units selectable

HF19 H819AE3

for direct soldering

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF19-0001		05	0,90	7,50	- 2,30	14,40	48,90	-

HF19-0002 HSD-F 2 P H819AE2-3

Contacting HSD-Female

Centers (mm/mil)	12,0 / 472
Current (Circular)	10,0 A
Current (Internal)	3,0 A
Impedance [Z]	100 Ohm
Frequency	2 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

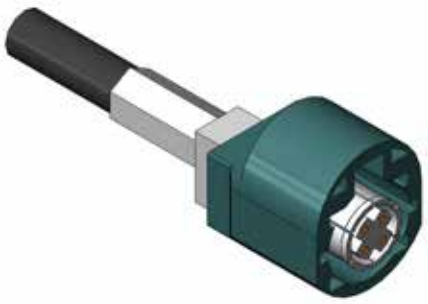
	Preload	Nominal
Total	-	2020
Internal Cont.	75	130
Circular Cont.	900	1500

Travel (mm)

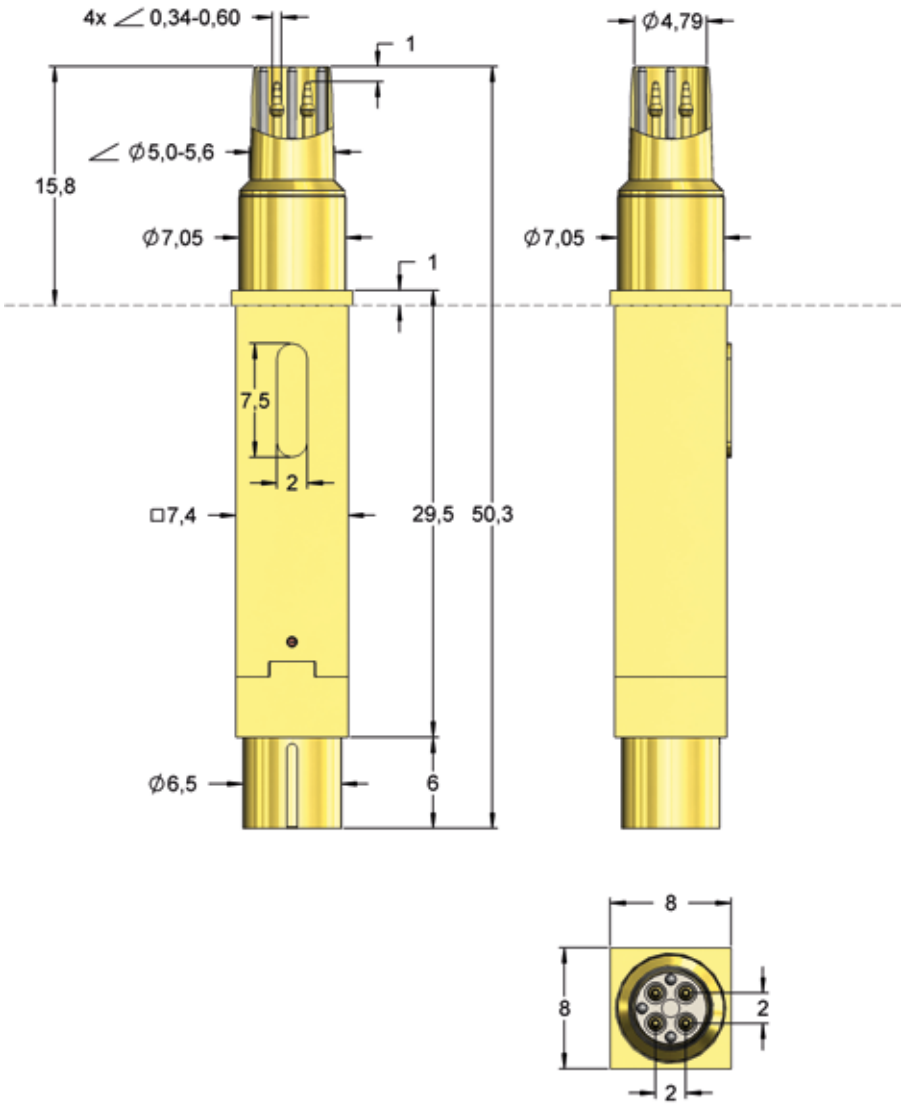
	Nominal	Maximum
Internal Cont.	2,0	3,7
Circular Cont.	5,0	6,0
Wrench Size		6,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated



HSD-Female (H819AE1)



This version of probe HF19 has several advantages: conical shape for better contacting, a special step shape for better disconnection of HSD-F with head inlay, protruding alignment pins in the tip for better guidance during the mounting and for avoiding any damages of the internal pins.

By combining the connection elements H819AE2 and H819AE1 a defined and reproducible measuring setup with fix parameters can be realized.

HF19 H819AE2 H819AE1

Connection units selectable

HF19 H819AE3 for direct soldering

* deviating from standard, depending on diameter.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF19-0002		12 *	max. 0,60	max. 5,60	- 1,00	15,80	50,30	-

Mounting of the New RF Probes

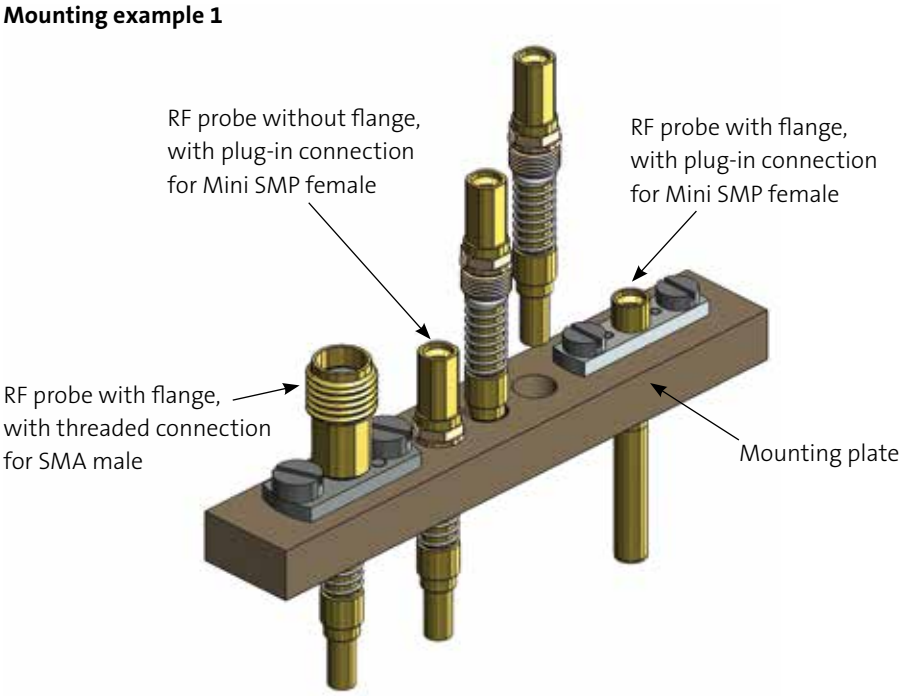
Mounting Options

For the new RF probe series HF66 and HF05 different mounting options are possible.

Some probes can be threaded directly into the mounting plate.

Some versions have a flange that is screwed to the mounting plate, this version allows a simple adjusting and contacting of the DUT. The drill hole for mounting needs to have a sufficient diameter to allow a movement of the probe.

Mounting example 1



Mounting with Flange

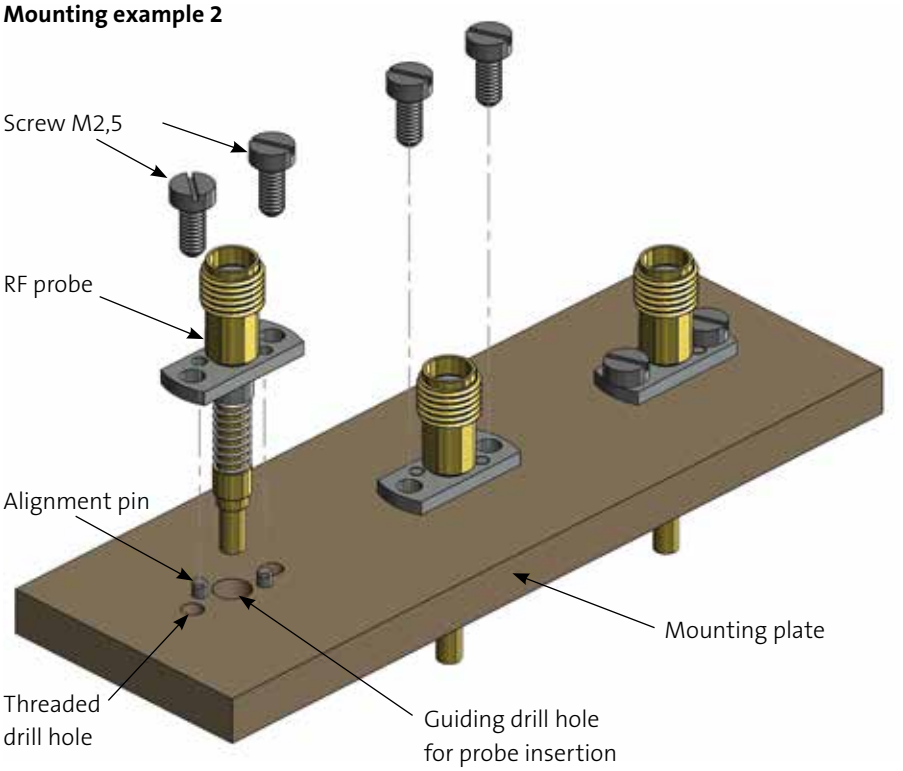
For mounting RF probes with flange drill holes for the centering pins, threaded holes for the fixing screws as well as guiding holes for the probe are needed. These need to correspond with the pattern of the flange.

At first, the RF probe is inserted into the guiding hole and brought into the correct position with the alignment pins.

Afterwards the RF probe can be fixed with the screws.

The last step is the connection of the probe with a suitable connection cable. We recommend coaxial cables with low attenuation and low stiffness, because the cables move with the end of the probe when the probe is compressed and they need to allow a certain movement of the probes.

Mounting example 2



HF66-0006 HSC 6 S M-SMP

Contacting HSC (Male)

NEW

Centers (mm/mil)	4,50/ 177
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	535
Internal Cont.	95	120
Circular Cont.	280	415

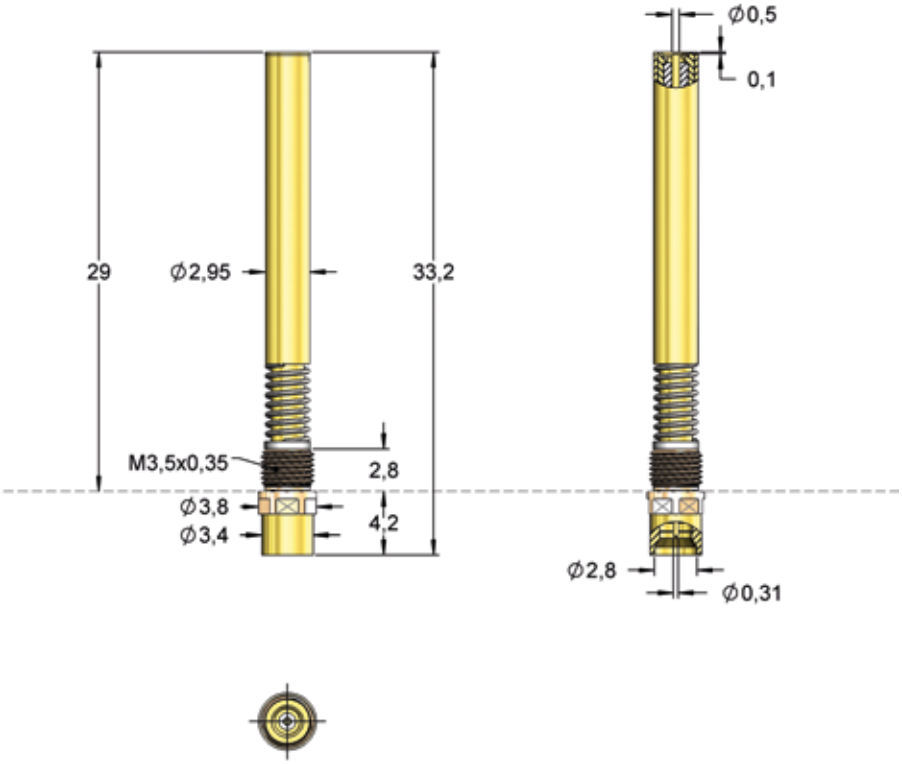
Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	1,4	2,2
Thread		M3,5x0,35
Wrench Size		3,5

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

HSC (Male)



Cable connection with standard connector Mini SMP female.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	DC up to 3 GHz	3 GHz up to 6 GHz
Maximum	0,4 dB	0,7 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	20 dB	14 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0006		16	0,50	2,95	-0,10	29,00	33,20	-

HF66-0008 HSC 6 F SMA

Contacting HSC (Male)

NEW

Centers (mm/mil)	10,0 / 394
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	480
Internal Cont.	95	120
Circular Cont.	240	360

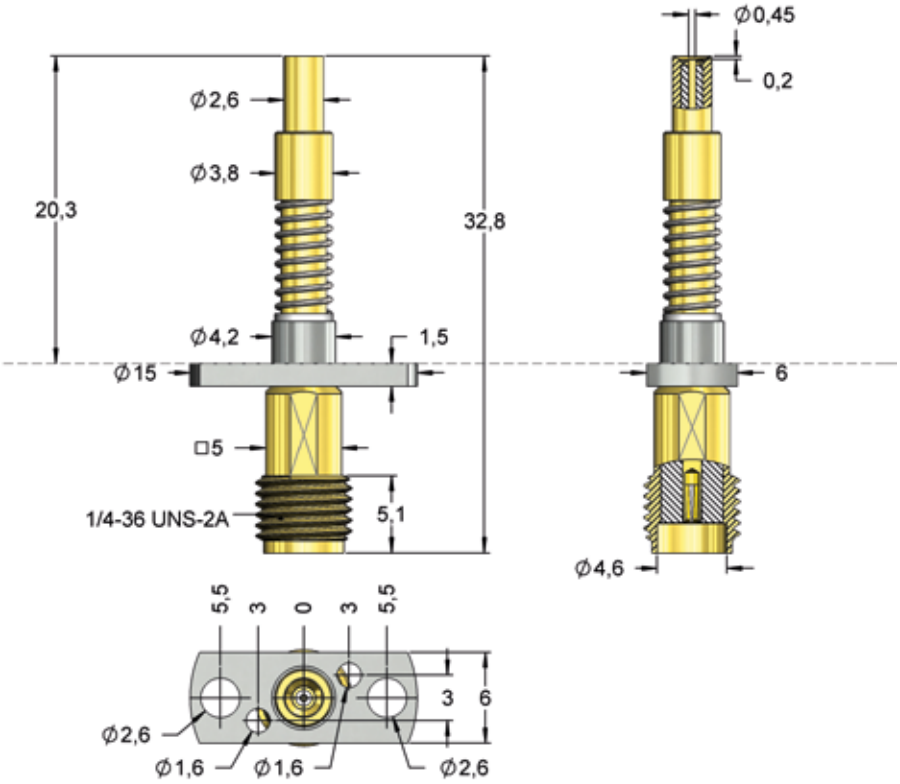
Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	1,5	1,8
Thread		1/4“
Wrench Size		5,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

HSC (Male)



The probe can be mounted with a flange.
Cable connection with standard connector SMA male.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,4 dB	0,6 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	19 dB	16 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0008		16	0,45	2,60	-0,20	21,80	32,80	-

HF66-0014 MHF/U.FL 6 F M-SMP

Contacting MHF/U.FL-Male

NEW

Centers (mm/mil)	4,50 / 177
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	535
Internal Cont.	95	120
Circular Cont.	280	415

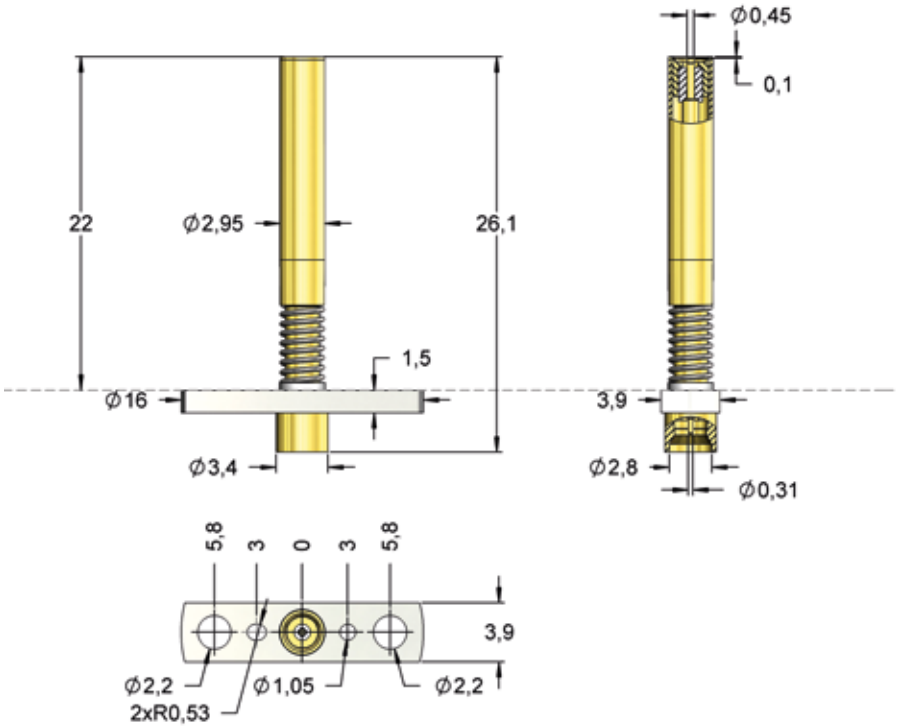
Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	1,4	2,2
Thread		-
Wrench Size		-

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

MHF/U.FL (Male)



Cable connection with standard connector Mini SMP female.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	DC up to 3 GHz	3 GHz up to 6 GHz
Maximum	0,4 dB	0,7 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	20 dB	14 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0014		16	0,45	2,95	-0,10	23,50	26,10	-

HF66-0002 JSC 6 S M-SMP

Contacting JSC-Male

NEW

Centers (mm/mil)	4,50/ 177
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	535
Internal Cont.	95	120
Circular Cont.	280	415

Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	1,4	2,2
Thread		M3,5x0,35
Wrench Size		3,5

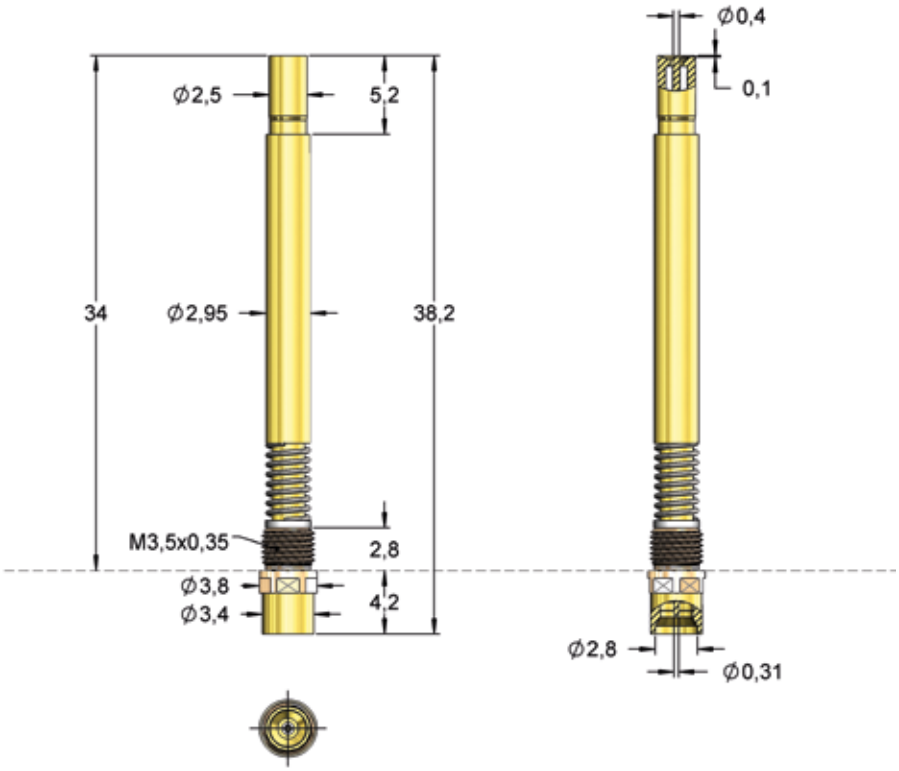
Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

Drill Size (mm)

Thread	M3,5x0,35

JSC (Male)



Cable connection with standard connector Mini SMP female.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	DC up to 3 GHz	3 GHz up to 6 GHz
Maximum	0,5 dB	0,7 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	18 dB	13 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0002		16	0,40	2,50	-0,10	34,00	38,20	-

HF66-0010 JSC 6 S M-SMP

Contacting JSC-Male

NEW

Centers (mm/mil)	5,00 / 197
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	480
Internal Cont.	95	120
Circular Cont.	240	360

Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	2,0	3,0
Thread		M4,5x0,35
Wrench Size		3,3 / 4,0

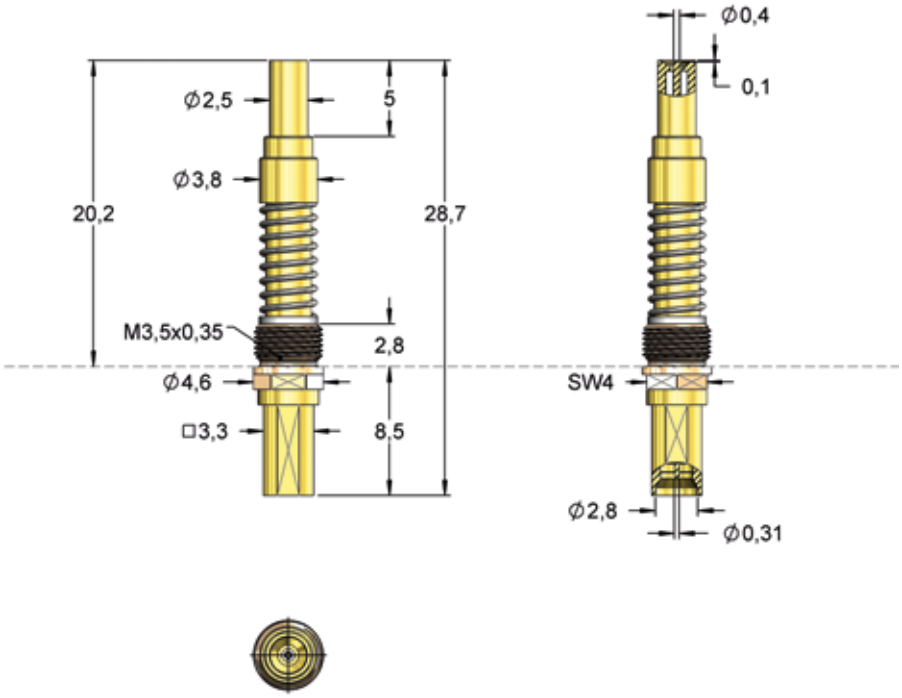
Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

Drill Size (mm)

Thread	M3,5x0,35

JSC (Male)



Cable connection with standard connector Mini SMP female.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	DC up to 3 GHz	3 GHz up to 6 GHz
Maximum	0,4 dB	0,7 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	20 dB	14 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0010		16	0,40	2,50	-0,10	20,2	28,70	-

HF66-0012 JSC 6 F SMA

Contacting JSC-Male

NEW

Centers (mm/mil)	10,0 / 394
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	480
Internal Cont.	95	120
Circular Cont.	240	360

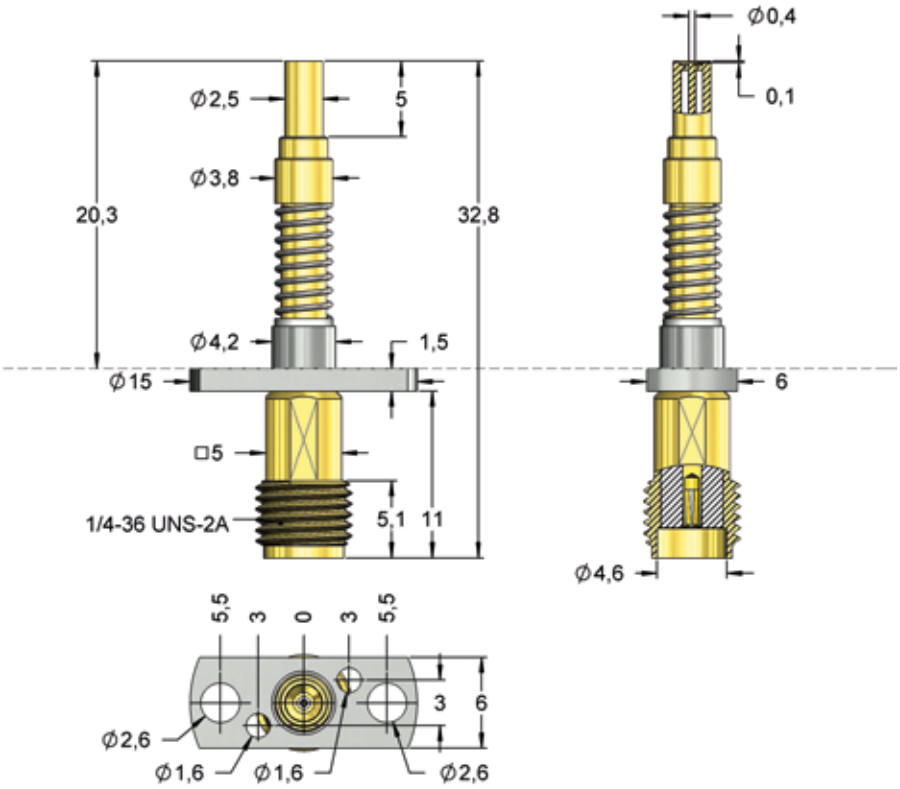
Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	2,0	3,0
Thread		1/4“
Wrench Size		5,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

JSC (Male)



The probe can be mounted using the flange.
Cable connection with standard connector SMA male.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,4 dB	0,6 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	19 dB	16 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0012		16	0,40	2,50	-0,10	21,80	32,80	-

HF66-0005 KSC 6 F M-SMP

Contacting KSC-Male

NEW

Centers (mm/mil)	4,50/ 177
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	540
Internal Cont.	95	120
Circular Cont.	150	420

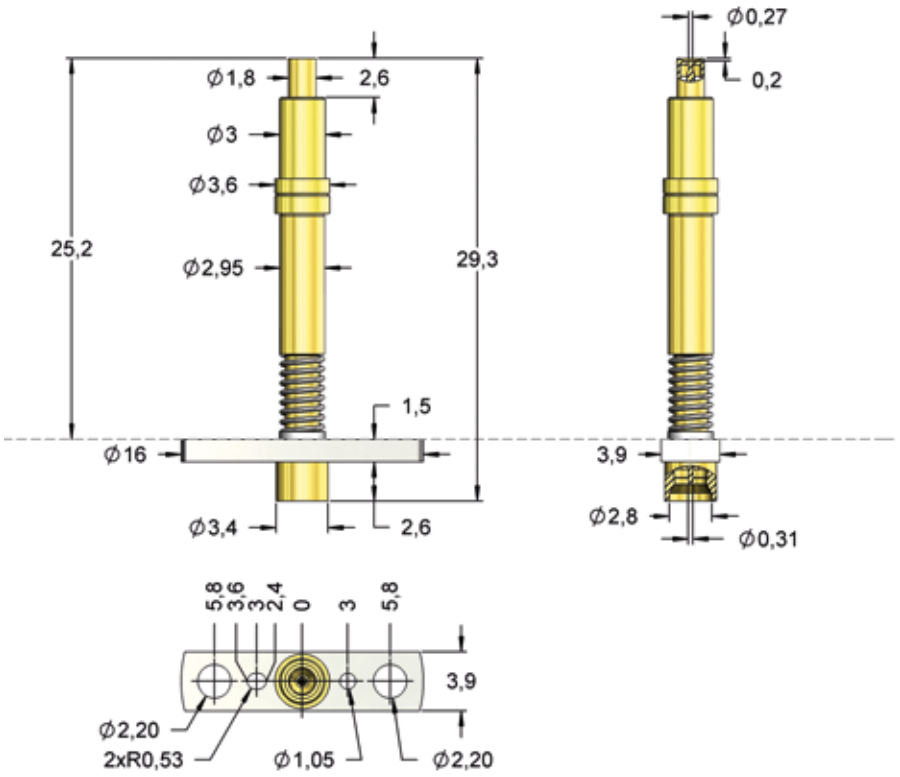
Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	2,0	3,0
Thread		-
Wrench Size		-

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

KSC (Male)



The probe can be mounted using the flange.
Cable connection with standard connector Mini SMP female.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,4 dB	0,6 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	22 dB	16 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0005		16	0,27	1,80	-0,20	26,70	29,30	-

HF66-0003 KSC 6 F SMA

Contacting KSC-Male

NEW

Centers (mm/mil)	10,0 / 394
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	480
Internal Cont.	95	120
Circular Cont.	240	360

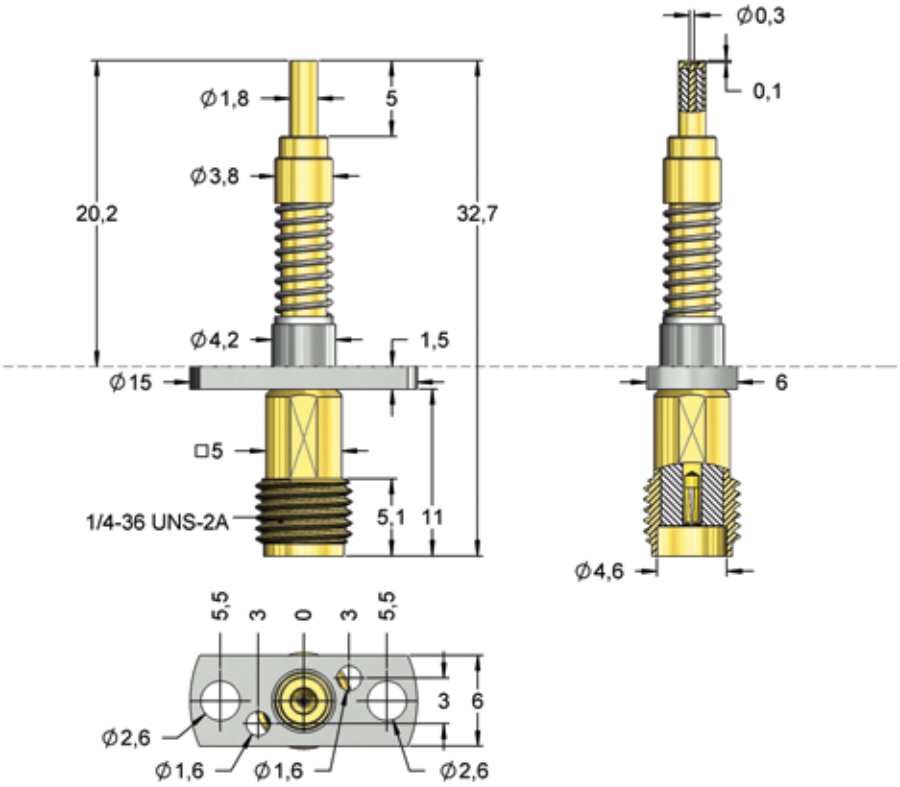
Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	2,0	3,0
Thread		1/4“
Wrench Size		5,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

KSC (Male)



The probe can be mounted using the flange.
Cable connection with standard connector SMA-Male.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,4 dB	0,6 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	18 dB	15 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0003		16	0,30	1,80	-0,10	21,70	32,70	-

HF66-0004 LSC 6 F M-SMP

Contacting LSC-Male

NEW

Centers (mm/mil)	4,50/ 177
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	540
Internal Cont.	95	120
Circular Cont.	280	420

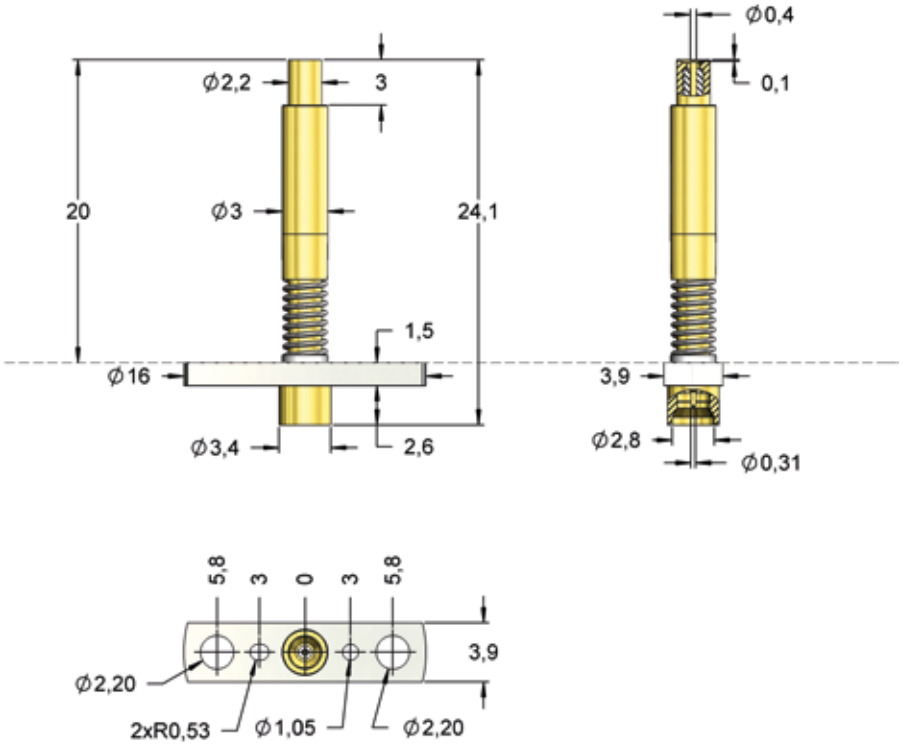
Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	1,4	2,2
Thread		-
Wrench Size		-

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

LSC (Male)



The probe can be mounted using the flange.
Cable connection with standard connector Mini SMP female.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,5 dB	0,8 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	20 dB	14 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0004		16	0,40	2,20	-0,10	21,50	24,10	-

HF66-0011 LSC 6 F SMA

Contacting LSC-Male

NEW

Centers (mm/mil)	10,0 / 394
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	480
Internal Cont.	95	120
Circular Cont.	240	360

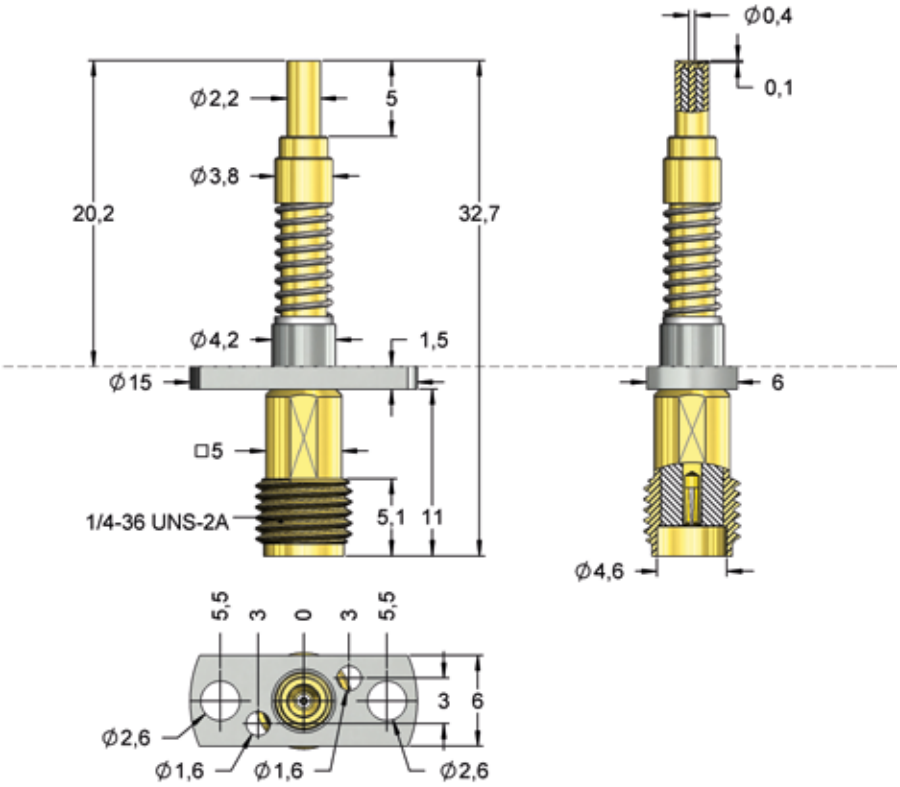
Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	2,0	3,0
Thread		1/4“
Wrench Size		5,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

LSC (Male)



The probe can be mounted using the flange.
Cable connection with standard connector SMA male.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,4 dB	0,6 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	19 dB	16 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0011		16	0,40	2,20	-0,10	21,70	32,70	-

HF66-0007 SWG 6 F SMA

Contacting SWG-Female

NEW

Centers (mm/mil)	10,0 / 394
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	340
Internal Cont.	95	120
Circular Cont.	140	220

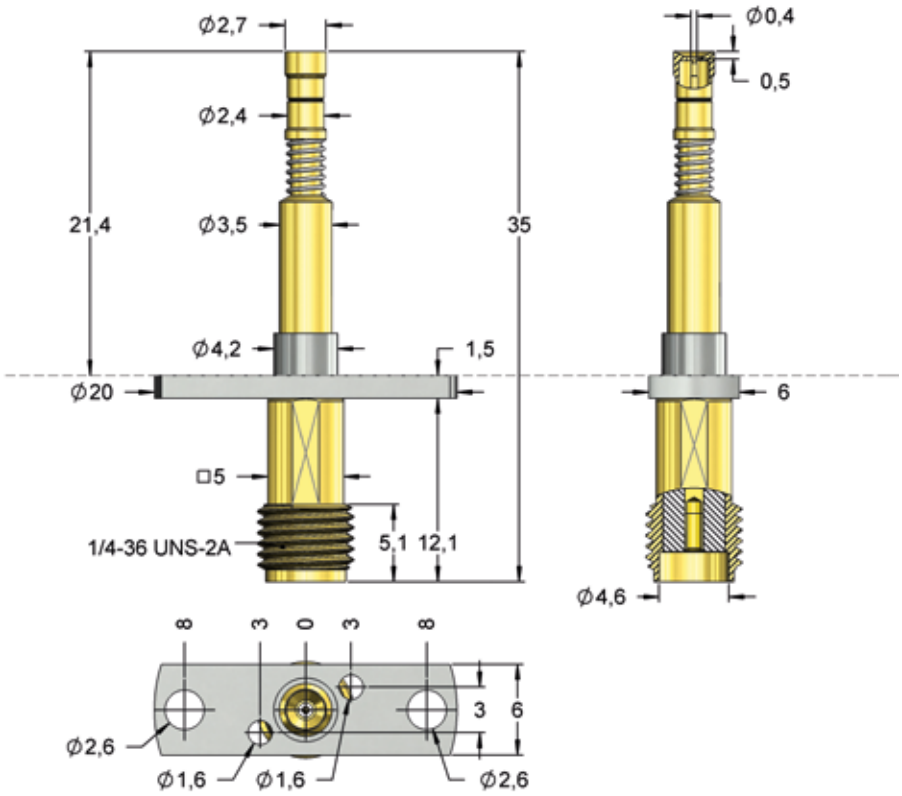
Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	1,5
Circular Cont.	1,5	1,8
Thread		1/4“
Wrench Size		5,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

SWG (Female)



The probe can be mounted using the flange.
Cable connection with standard connector SMA male.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,6 dB	0,8 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	18 dB	14 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0007		39	0,40	2,70	-0,50	22,90	35,00	-

HF66-0013 SW-D/F/G 6 F SMA

Contacting SWD/SWF/SWG-Female

NEW

Centers (mm/mil)	10,00 / 394
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	660
Internal Cont.	120	210
Circular Cont.	240	450

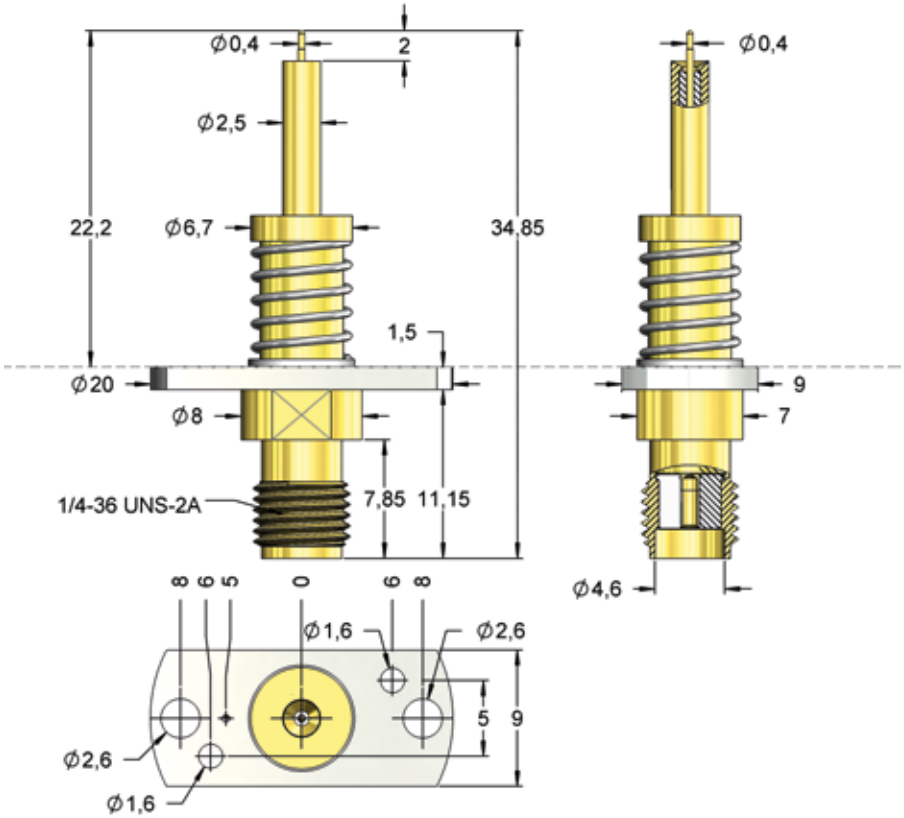
Travel (mm)

	Nominal	Maximum
Internal Cont.	2,0	3,0
Circular Cont.	2,0	4,5
Thread		1/4“
Wrench Size		7,0

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

SWD/SWF/SWG (Female)



The probe can be mounted using the flange.
Cable connection with standard connector SMA male.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,4 dB	0,6 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	21 dB	13 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0013		11	0,40	2,50	2,00	23,70	34,85	-

HF66-0009 SWH 6 S M-SMP

Contacting SWH-Female

NEW

Centers (mm/mil)	5,00 / 197
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	480
Internal Cont.	95	120
Circular Cont.	240	360

Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	2,0	3,0
Thread		M3,5x0,35
Wrench Size		3,3 / 4,0

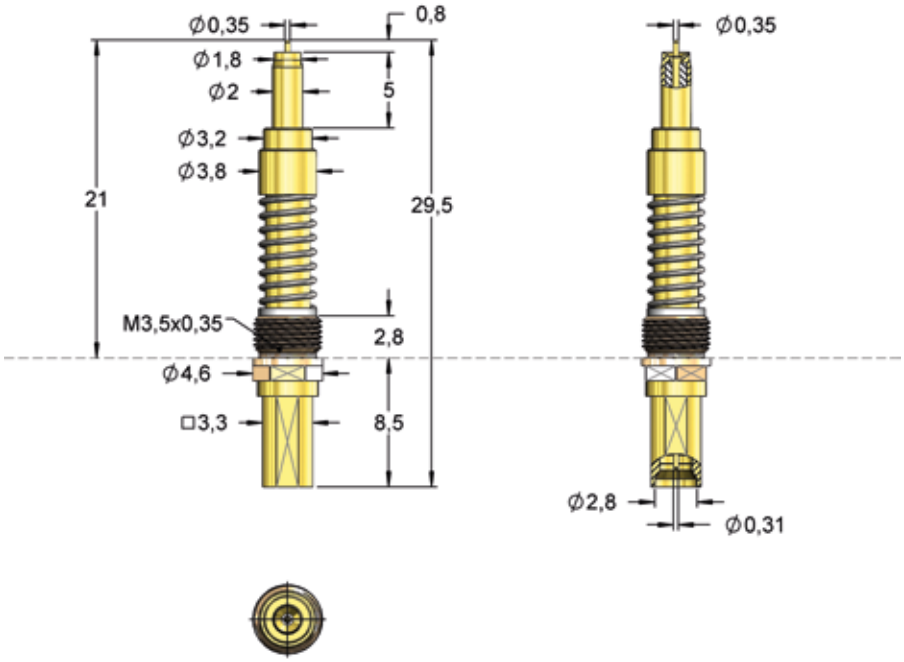
Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

Drill Size (mm)

Thread	M3,5x0,35

SWH (Female)



Connection with Mini SMP female.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,4 dB	0,7 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	20 dB	14 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0009		11	0,35	1,80	0,80	21,00	29,50	-

HF66-0001 SWJ 6 F M-SMP

Contacting SWJ-Female

NEW

Centers (mm/mil)	4,50/ 177
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	540
Internal Cont.	95	120
Circular Cont.	150	420

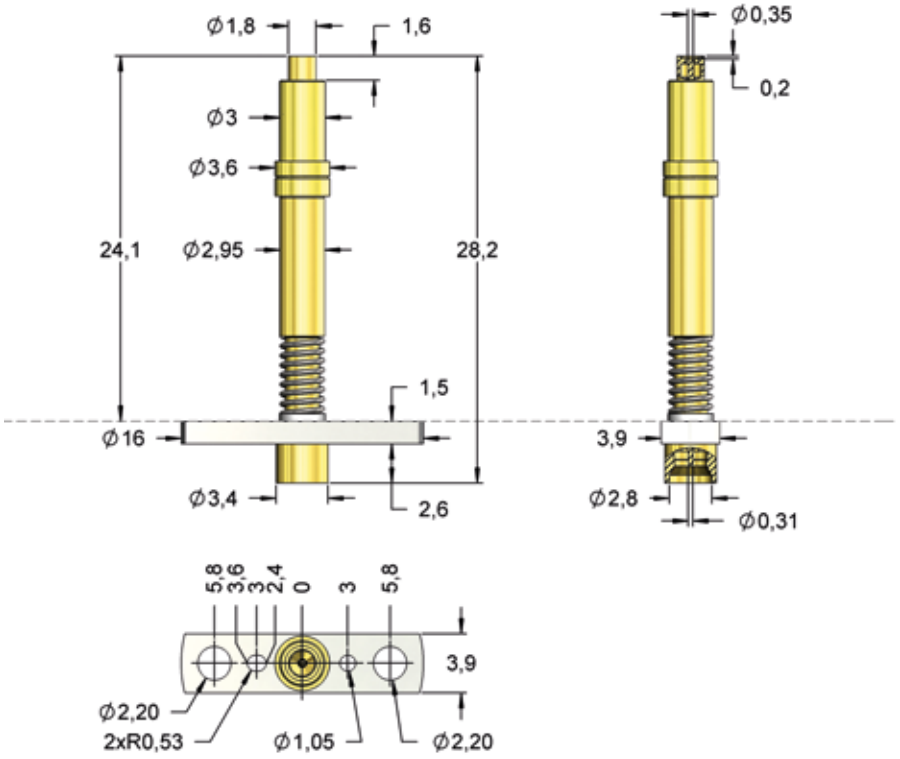
Travel (mm)

	Nominal	Maximum
Internal Cont.	0,5	0,8
Circular Cont.	2,0	3,0
Thread		-
Wrench Size		-

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	Brass, gold plated
Barrel	Brass, gold plated
Spring Internal Cont.	Music Wire, gold plated
Spring Circular Cont.	Stainless steel, unplated

SWJ (Female)



The probe can be mounted using the flange.
Cable connection with standard connector Mini SMP female.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,4 dB	0,6 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	22 dB	16 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF66-0001		11	0,35	1,80	-0,20	25,60	28,20	-

HF05-0001 GSG 6 F M-SMP 050

Contacting PCBs GSG

NEW

Centers (mm/mil)	5,00 / 197
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	430
Internal Cont.	-	-
Pins Circular Cont.	65	80
Core Circular Cont.	240	270

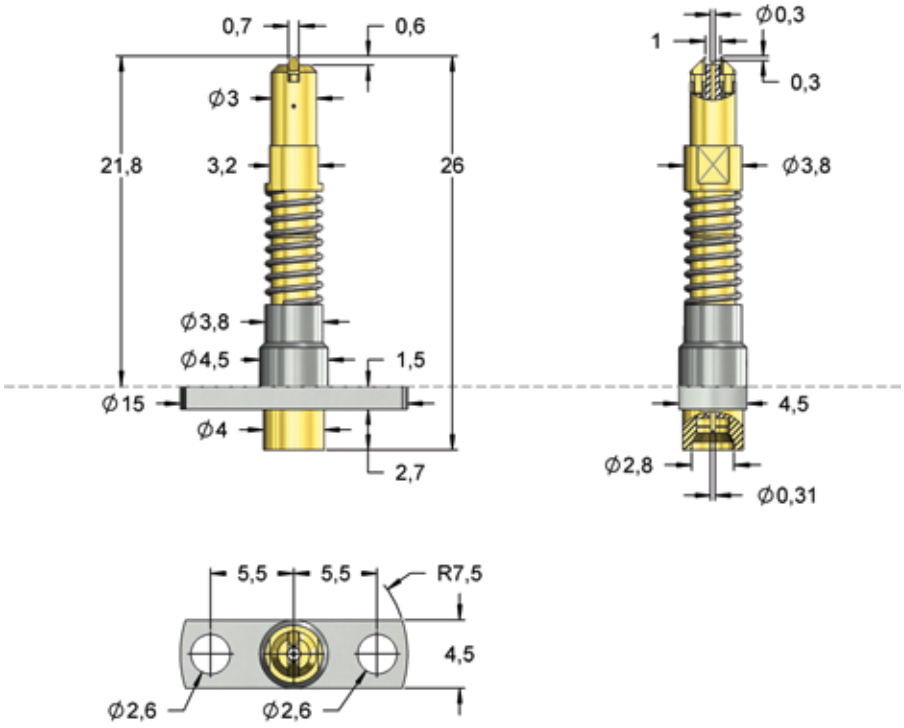
Travel (mm)

	Nominal	Maximum
Circular Cont. Tips	0,5	0,8
Circular Cont. Body	0,5	3,0
Thread		-
Wrench Size		3,2

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Tip Circular Cont.	Stainless steel, gold plated
Spring Circular Cont.	Stainless steel, unplated

PCB-GSG in Center 0,5 mm



The probe can be mounted using the flange. For ensuring a correct alignment the probe is twist proof mounted in the flange. This probe design does not allow a wobble function of the probe. Cable connection with standard connector Mini SMP female.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,6 dB	1,0 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	14 dB	14 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF05-0001		03	0,30	3,00	-0,30	23,30	28,00	-

HF05-0002 GSG 6 F M-SMP 050

Contacting PCBs GSG

NEW

Centers (mm/mil)	5,00 / 197
Current (Circular)	0,5 A
Current (Internal)	0,1 A
Impedance [Z]	50 Ohm
Frequency	6 GHz
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

	Preload	Nominal
Total	-	430
Internal Cont.	-	-
Pins Circular Cont.	65	80
Core Circular Cont.	240	270

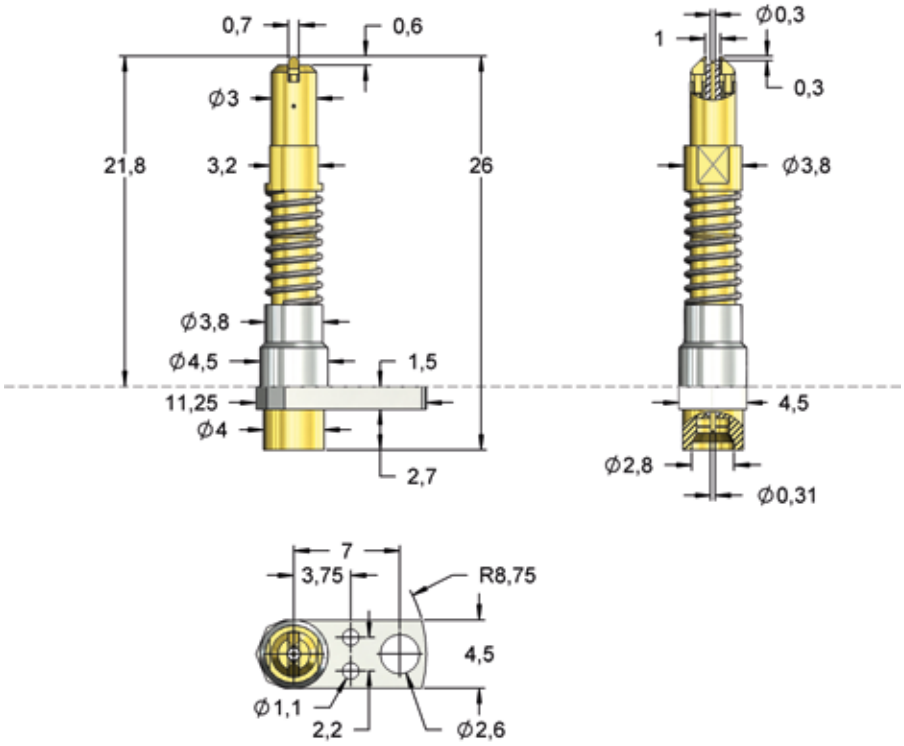
Travel (mm)

	Nominal	Maximum
Circular Cont. Tips	0,5	0,8
Circular Cont. Body	0,5	3,0
Thread		-
Wrench Size		3,2

Materials and Plating

Internal Cont.	BeCu, gold plated
Circular Cont.	BeCu, gold plated
Barrel	Brass, gold plated
Spring Tip Circular Cont.	Stainless steel, gold plated
Spring Circular Cont.	Stainless steel, unplated

PCB-GSG in Center 0,5 mm



The asymmetric flange allows mounting of close neighboring probes with different alignment of the ground pins. For ensuring a correct alignment the probe is twist proof mounted in the flange. This probe design does not allow a wobble function of the probe. Cable connection with standard connector Mini SMP female.

RADIO FREQUENCY PERFORMANCE

Typical insertion loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Maximum	0,6 dB	1,0 dB
Typical return loss	**DC up to 3 GHz**	**3 GHz up to 6 GHz**
Minimum	14 dB	14 dB

This table shows the reference values in the middle and at the end of the recommended frequency.

Order Code	Sense Pin	Tip Style	Ø A	Ø B	C	H	L	Version
HF05-0002		11	0,30	3,00	-0,30	23,30	28,00	-

FK50

Toolbox with Spring Force Gauge

Contents:
1x Spring force gauge with receptacle for measuring sleeves
1x Measuring sleeve Ø5,0 mm
1x Calibration certificate
1x Empty box for probes and accessories

FM-TOOLBOX

Toolbox for Mounting Tools (empty)

Contents:
Empty case with corresponding inlay for bits,
handles and other accessories
1x Bit box with 15 empty slots for bits
3x Empty boxes for probes and accessories

FM-TOOLBOX-SET-001

Toolbox with Predefined Mounting Tools (filled)

Contents:
22x Bits
3x Handles (standard)
3x Handles (with ratchet)
2x Alignment tools, 1x handle
2x Screw driver
3x Empty boxes for probes and accessories

FM-TOOLBOX-SET-002

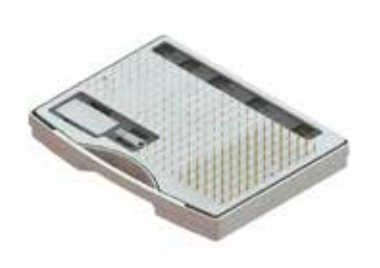
Cordless Screwdriver Set

Contents:
1x Cordless screwdriver
(shape changeable from pistol to straight shape)
1x Power connector for 230V
3x Magnetic holder with different ratchets
1x Bit box with 15 empty slots for bits
2x Empty boxes for probes and accessories

FM-SAMPLEBOX-SP

Step Probe Box

Sample box with a large variety of step probes



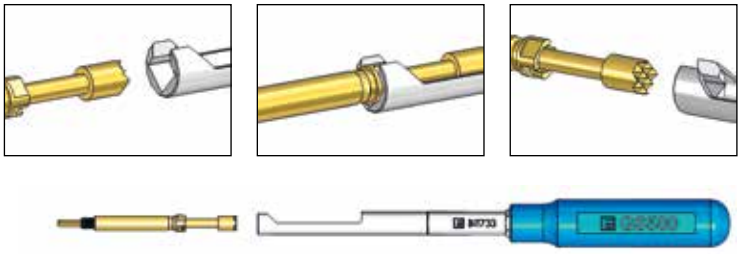
Tools and Accessories

For installation and maintenance of contact probes and receptacles FEINMETALL offers a great variety of tools. For the mounting of standard probes practical insertion- and screw-in tools are useful. For a simple and effective mounting of switch probes tools with integrated functions are ideal, for example to adjust the correct position of the switch point. A spring force gauge additionally enables the measurement of spring forces, for example to identify inserted contact probes in existing modules or fixtures.

Options for Screw-in Tools (FWZ)

Hook Wrench

The hook wrench is the standard tool for all probes with square wrench sizes even if the head diameter is larger than the wrench size.

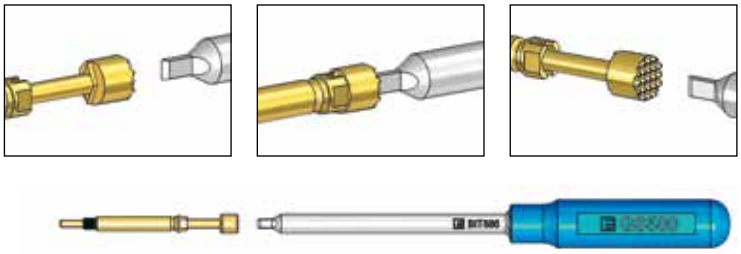


Socket Wrench

The socket wrench can be used for square wrench sizes if the head diameter is smaller than the wrench size. The tool helps to assemble probes within small centers.

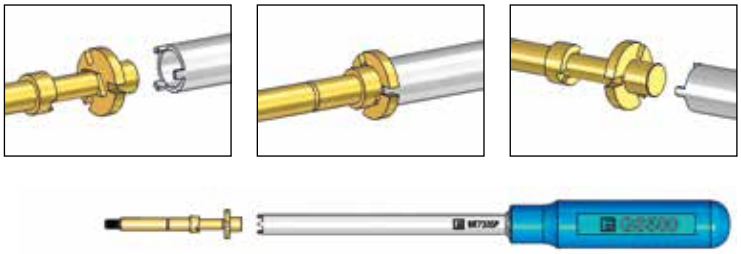
Screw Driver

Screw drivers can be used if the contact area has any support (e.g. serrated honeycomb or slit) and the head has an integrated locking system.



Tool for Step Probes

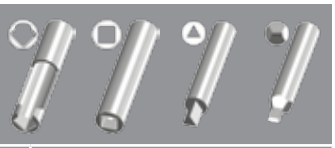
For assembly of oversized step probes FEINMETALL has developed a special tool for applications with very limited space between the probes.



Tool for Coaxial Probes

For the mounting of large outer conductors FEINMETALL has developed a special tool that enables applications with limited space between the probes.

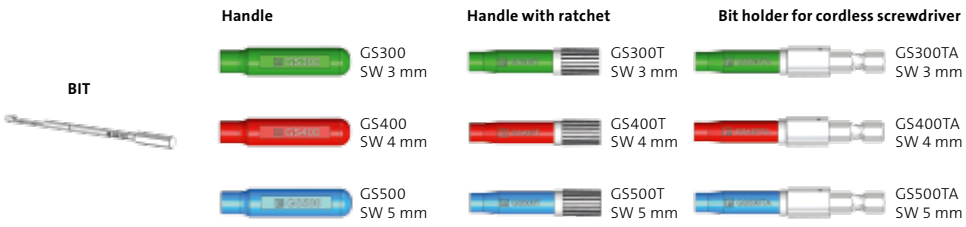
Screw-in Tools



SW	max. Tip-Ø	Shank-ØA	Bit type	FWZ	Handle	BIT	FWZ...T	Handle	Used for (e.g.)
1,0	0,9	1,7	Socket Wrench	FWZ730	GS300	BIT730	FWZ730T	GS300T	F730
1,0	1,5	2,0	Hook Wrench	FWZ730S1		BIT730S1	FWZ730T1		F175, F730
1,4	1,3	2,4	Socket Wrench	FWZ731S1	GS400	BIT731S1	FWZ731T1	GS400T	F731
1,4	2,0	2,8	Hook Wrench	FWZ731		BIT731	FWZ731T		F731
1,7	1,6	2,7	Socket Wrench	FWZ732S2		BIT732S2	FWZ732T2		F732 (C)
1,7	2,0	2,8	Hook Wrench	FWZ732		BIT732	FWZ732T		F722, F732 (C), F727, F756, F873, F875
1,7	2,7	3,5	Hook Wrench	FWZ732S1		BIT732S1	FWZ732T1		F722, F732 (C), F727, F756, F873, F875
1,8	2,0	2,8	Socket Wrench	FWZVF100		BITVF100	FWZVF100T		VF100
1,8	2,7	3,5	Hook Wrench	FWZVF100S1		BITVF100S1	FWZVF100T1		VF100
2,2	2,3	3,5	Socket Wrench	FWZVF3S4	GS500	BITVF3S4	FWZVF3T4	GS500T	VF3
2,2	2,7	3,5	Hook Wrench	FWZVF3		BITVF3	FWZVF3T		VF3
2,2	3,1	4,0	Hook Wrench	FWZVF3S1		BITVF3S1	FWZVF3T1		VF3
2,2	2,3	3,5	Socket Wrench	FWZVF3S2		BITVF3S2	FWZVF3T2		VF3, F880
2,2	4,0	5,0	Hook Wrench	FWZVF3S3		BITVF3S3	FWZVF3T3		VF3
2,5	3,1	4,0	Hook Wrench	FWZVF4S1		BITVF4S1	FWZVF4T1		VF4, F887
2,5	4,0	5,0	Hook Wrench	FWZVF4		BITVF4	FWZVF4T		VF4, F887
2,6	2,5	3,8	Socket Wrench	FWZ885		BIT885	FWZ885T		F835, F881, F883, F885
2,6	3,1	4,0	Hook Wrench	FWZ885S1		BIT885S1	FWZ885T1		F835, F881, F883, F885, F886
2,6	4,0	5,0	Hook Wrench	FWZ760S1		BIT760S1	FWZ760T1		F760, F835, F881, F883, F885, F886
2,6	4,9	6,5	Hook Wrench	FWZ760S2		BIT760S2	FWZ760T2		F760, F835, F881, F883, F885, F886
3,0	3,0	5,0	Socket Wrench	FWZ733S1		BIT733S1	FWZ733T1		F723 (C), F733 (C), F737, F755
3,0	4,0	5,0	Hook Wrench	FWZ733		BIT733	FWZ733T		F723 (C), F733 (C), F737, F755
3,5	4,4	5,5	Hook Wrench	FWZ735		BIT735	FWZ735T		F735(C)
5,0	-	8,0	Hook Wrench	FWZ888		BIT888	FWZ888T		F888
	-	4,0	3-point tool	FWZ832		BIT832	FWZ832T		F832
	-	4,0	Screw driver	FWZ886		BIT886	FWZ886T		F88617...

Combination Options of Screw-in Tools

Bits and handles can be ordered separately. The handles are color marked due to the wrench size (SW). For each bit a standard handle as well as a handle with ratchet and a bit holder for usage in the cordless screwdriver are available. Each handle can be used with the same bits that are available for all contact probes.

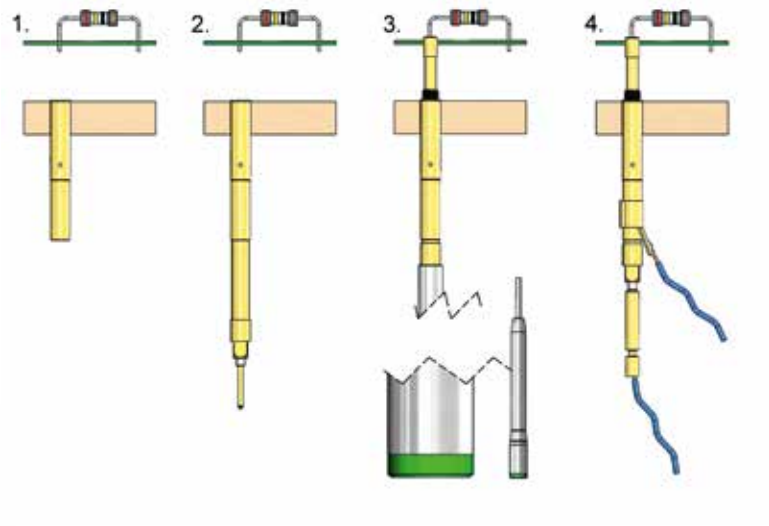


Screw-in Tools with Signal Indicator for Switch Probes

Contact Probe	SW	Shank-ØA	FWZ	Batteries	Socket wrench
F880...	2,2	3,7	FWZ880SA	2x AAAA 1,5 V	X
F88890S1101U200S05	5,0	8,0	FWZ888SA	2x AAAA 1,5 V	X
F88890S1102U100S07	5,0	8,0	FWZ888SA1	2x AAAA 1,5 V	X

Batteries not included in delivery

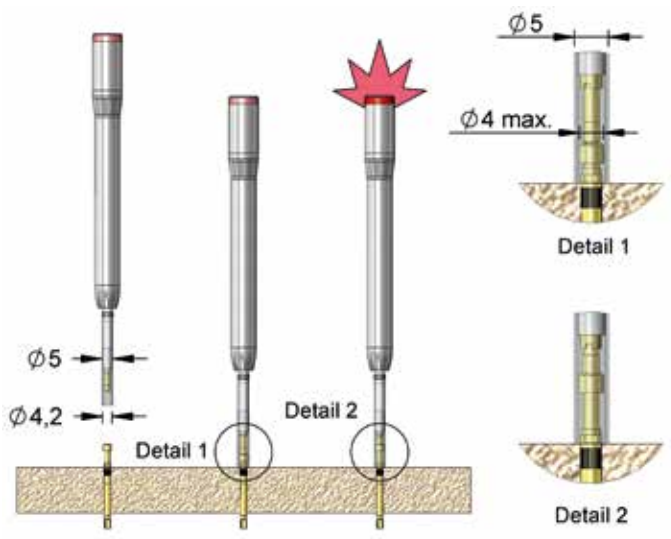
The tool FWZ...SA enables the mounting and correct positioning of switch probes before the final electrical connections are made. The exact switching position can be adjusted by help of the integrated light signal which is illuminated as soon as the switch circuit is closed.



Tool for detection of blocked or tight plungers

With this tool the correct function of contact probes built in at test modules or fixtures can be tested very quickly (max. spring force 600 cN). Thereby a potential damage of connector elements can be avoided.

- → Simple tool with integrated switch probe (F885) and light signal
- → Test height (nominal travel) adjustable by threaded sleeve
- → Spring force adjustment possible by exchange of the integrated switch probe



Order code:
32001 (max. Tip-Ø 4,1 mm)
32002 (max. Tip-Ø 2,2 mm)
32003 Blocking Tester Set composed of:
32001 + adaption for 32002

FK50

Spring Force Gauge

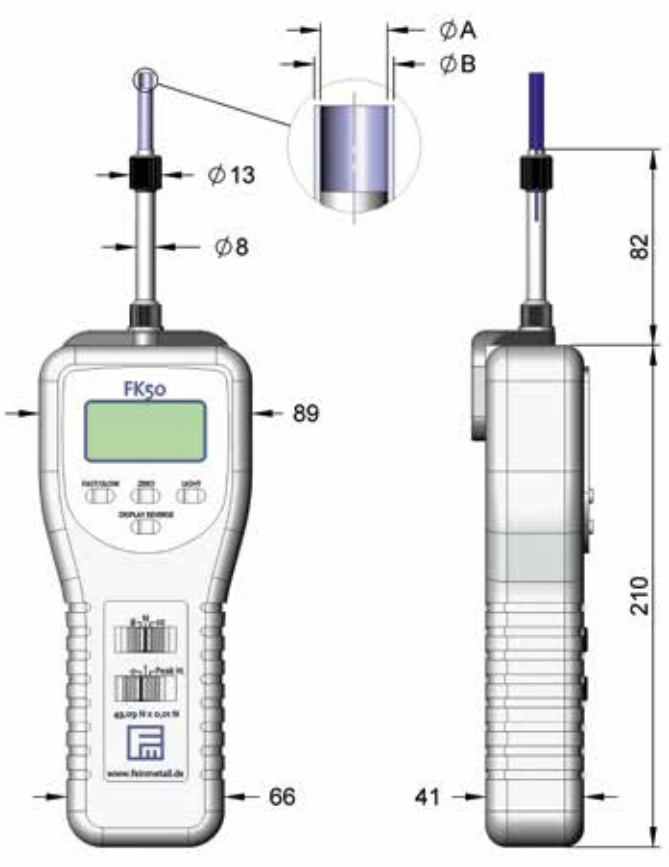
The Spring Force Gauge allows force measurement at all types of spring contact probes up to 50N. This instrument allows in a very simple way to verify, if a probe is still intact and to determine the spring force of the probe. The measuring results are displayed at the instrument and the display can be electrically turned by 180° if needed, e.g. for overhead applications. For the measurement just put the measuring sleeve over the probe and push it to the mounting plate. The sleeves depth can be adjusted according to the projection height of the probe. Adjustable measuring sleeves are available with three different diameters.

Technical Specifications

Minimum force:	3g / 0,10oz / 0,03N
Resolution	1g / 0,03oz / 0,01N
Measuring accuracy:	+/- 0,5% at 25°C
Data output:	via RS 232 (order code 2111810)
Power supply:	6 x 1,5V AA (UM-3 batteries)
	(Batteries non included in delivery)

Included in Delivery:

- Spring Force Gauge with receptacle for measuring sleeve
- Measuring sleeve Ø 5,0mm
- Calibration certificate
- Carrying case



Operating manual available on the homepage.

Dimensions of adjustable measuring sleeves			
Measuring sleeve	**Inner-Ø A [mm]**	**Outer-Ø B [mm]**	**Height adjustable from/to [mm]**
MS30	3,00	4,00	0 - 40,50
MS40	4,00	5,00	0 - 40,50
MS50	5,00	6,00	0 - 40,50

Example for height adjustment at measuring sleeve

Projection height of probe, e.g. F732:	= 10,50 mm
Nominal:	= 4,00 mm
Projection height - nominal:	= 10,50 - 4,00 mm
Value of height to fix:	= 6,50 mm

Description	Order code
Spring force gauge FK50	FK50
Measuring sleeve Ø 3,0 mm	MS30
Measuring sleeve Ø 4,0 mm	MS40
Measuring sleeve Ø 5,0 mm	MS50
Data cable RS232	2111810

Rigid measuring sleeves with fixed stop

Rigid measuring sleeves for repeat measurements at probes with fixed projection height are available with different diameters.

Measuring sleeve	Order code	for series	Inner-Ø A [mm]	Outer-Ø B [mm]	Projection Height [mm]	Nominal Travel [mm]
Measuring sleeve F732	MS230E065	F732	2,30	2,70	10,50	4,00
Measuring sleeve F733	MS360E065	F733	3,60	4,00	10,50	4,00
Measuring sleeve VF3	MS270E355	VF3	2,70	3,20	40,50	5,00
Measuring sleeve VF4	MS370E355	VF4	3,70	4,20	40,50	5,00
Measuring sleeve VF5	MS460E315	VF5	4,60	5,00	36,50	4,80

Insertion tools (FDWZ) for plug-in contact probes

Insertion tool	Shank-ø (mm)	Length (mm)
FDWZ-050	1,50	100,0
FDWZ-075	2,50	100,0
FDWZ-100	3,50	100,0
FDWZ-650	Outer-Ø=6,00; Inner-Ø=4,10	100,0

For inserting the probe into the receptacle tool FDWZ is helpful. After the probe is pushed into the receptacle and stopped by the pressure marks, the probe is driven into the receptacle with the FDWZ tool. The tool is made of a synthetic material to avoid any damaging of the plunger tips.

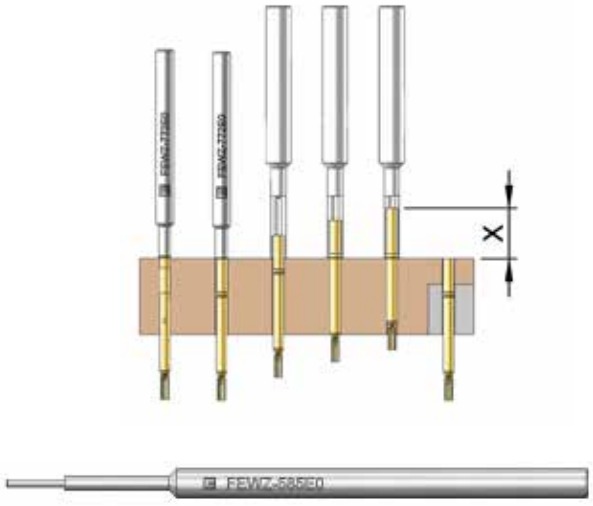
Mounting tool for twist proof receptacles

Receptacles	(BIT + Handle)	BIT	Handle
H751	FAWZ751	AS751	GSFAWZ500
H756	FAWZ756	AS756	GSFAWZ500
H760, H762	FAWZ761	AS761	GSFAWZ500
HVF3	FAWZVF3	ASVF3	GSFAWZ500
HVF4, H755	FAWZVF4	ASVF4	GSFAWZ500
HVF100	FAWZVF100	ASVF100	GSFAWZ500

Receptacles for twist proof probes need to be mounted well aligned into the fixture or module. This can be done with the alignment tool FAWZ. This tool can be chucked into a lever press. In this case the alignment only needs to be done once.

Insertion tool (FEWZ) for receptacles with fixed stop (collar or press ring on top)

Receptacle	Insertion height (mm)	Pin-Ø (mm)	Insertion tool
H050, H787	0,0	0,8	FEWZ-050E0
H075, H175, H176, H310, H701	0,0	0,9	FEWZ-075E0
H100, H320, H502, H708, H731, H805, H863, H865	0,0	1,3	FEWZ-100E0
H109	0,0	0,5	FEWZ-109E0
H330	0,0		FEWZ-330E0
H340, H419, H887	0,0		FEWZ-340E0
H348, H349	0,0		FEWZ-348E0
H111, H511, H730	0,0	0,6	FEWZ-511E0
H563	0,0	2,0	FEWZ-563E0
H564	0,0	2,4	FEWZ-564E0
H735, H725, H775	0,0	3,5	FEWZ-735E0
H755	0,0		FEWZ-755E0
H772, H727, H732, H752, H875, H876, H877, H878, H879	0,0	1,6	FEWZ-772E0
H774, H566, H713, H723, H733, H735, H737, H773, H810, H866, H867, H880, H881, H884, H885,	0,0	2,6	FEWZ-774E0
H822, H832, H860	0,0		FEWZ-822E0



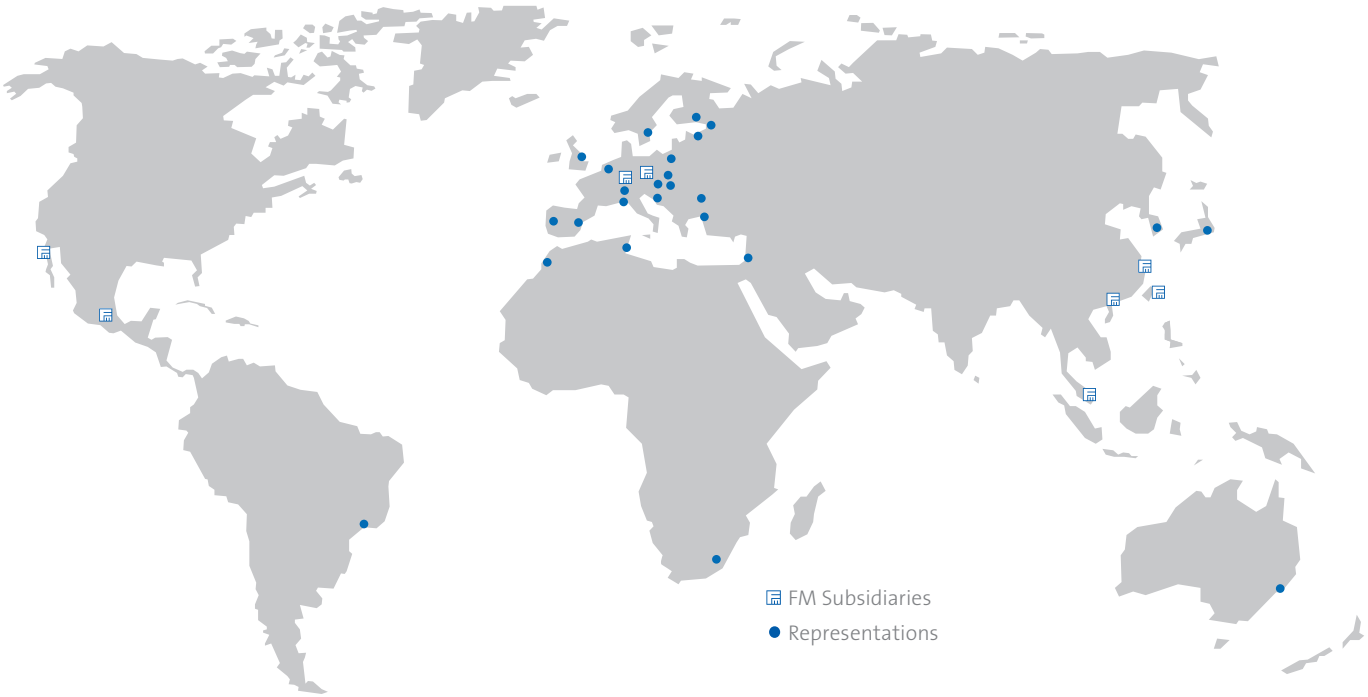
All receptacles with dead stop (collar) can be inserted with tool FEWZ-...E0. Press ring at receptacles can be used also as dead stop.
The guiding pin of the tool helps to stabilize and properly mount the receptacle.

Application Specific Catalogs

In order to find the right contact probe for your application quickly and at a glance, we have now created four application specific catalogs with appropriate contact probes, including many technical details and application notes.

All catalogs and brochures are available on our homepage
http://www.feinmetall.com/downloads/catalogues-and-flyers/

WORLDWIDE PRESENT FOR YOU



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- 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

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Version 1

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