SWITCH PROBES
STEP PROBES
THREADED PROBES
PUSH BACK PROBES

CONTACT PROBES

FOR WIRE HARNESS TEST

FEINMETALL
Contact Technologies

Version 1

CONTENTS

Contact probes for wire harness and connector test

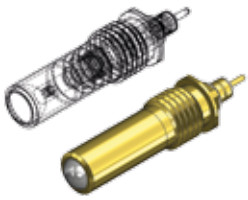
For many years FEINMETALL is a worldwide leading provider of contact probes for wire harness and connector test. Based on long-term experience and a strong customer focus we have consistently set high standards in developing innovative and practical contacting solutions. These solutions are included in this catalog.

Contact probes for other applications are shown in the corresponding further catalogs.

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.

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 a sufficient diameter 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 catalogue contains contact probes for wire harness and connector test. The whole contact probe portfolio as well as 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 Wire Harness Probes

01	02	03	04	05	06	07
Conical 90°	Conical 90° stepped	Conical 60°	Conical 60° stepped	Concave stepped	Serrated stepped	Hexagonal 90° stepped

08	09	10	11	12	14	15
Hexagonal 60° stepped	6-point crown 120° stepped	Flexible Needle	Spherical	Spherical stepped	4-point crown stepped (self cleaning	Triangular 45° stepped

16	17	18	20	21	NEW 22	27
Flat	Flat stepped	Conical 30°	4-point crown stepped (self cleaning)	4-point crown (self cleaning)	Special version for contacting into connector housings	Conical 120°

28	29	30	32	33	34	35
4-point crown stepped	4-point crown	Triangular 45°	Rigid needle 10°	Square lance 38°	Rigid needle 15° stepped	3-point crown stepped (self cleaning)

36	37	38	39	40	41	42
6-point crown with middle pin stepped	4-point crown stepped	Square lance 140°	Conical flat 30°	6-point crown	6-point crown stepped (self cleaning)	5-point crown stepped

43	45	46	50	55	60	62
Square lance 90°	Conical 120° with eccentric cut	W-profile	Concave with drill hole stepped	Concave (self cleaning)	3-point crown stepped	Triangular 30°

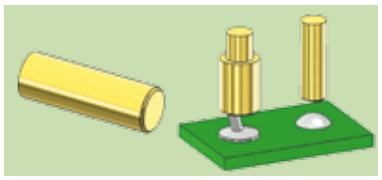
63	64	65	66	68	80	81
8-point crown stepped (self cleaning)	Mini-serrated stepped	Conical 45°	Serrated stepped (self cleaning)	6-point crown stepped with middle pin	Spade spadeØ < plungerØ	Reduced spade spadeØ < plungerØ

82	83	84	85	86	89	90
Spade spadeØ = plungerØ	Spade spadeØ > plungerØ	Reduced spade spadeØ > plungerØ	Square spade	Square spade not centric	Special version for spade tips	Rolling ball

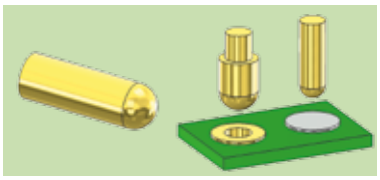
Special Versions

(17)H	(17)T	C	SP	PT	IK	IP
H = Synthetic head with ring	T = Insulated BeCu head	C = High current (marked by groove)	SP = Step probe	PT = Position test	IK = Insulating cap	IP = Insulating pin

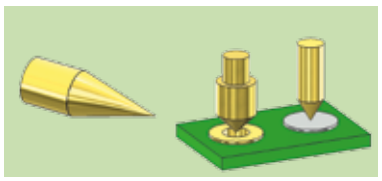
Typical Tip Styles and Applications



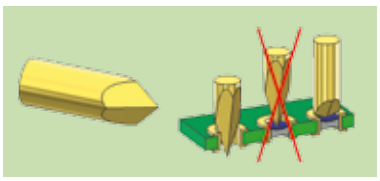
Flat
(16,17)
Suitable for solder pads and contact pins.



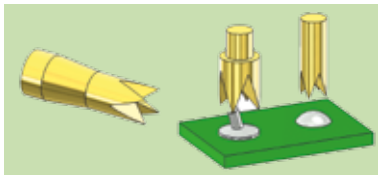
Spherical
(11,12)
For testing clean contact surfaces, does not leave marks or scratches.



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.

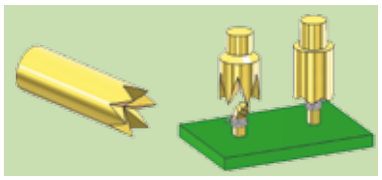


Multi-sided
(15,30,33,38,43,62)
For via holes and solder pads. The sharp edges penetrate flux residues and oxide layers.

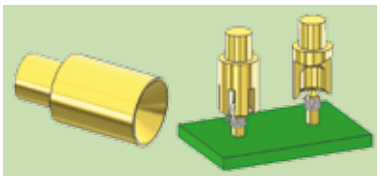


4-point crown
(14,20,21,28,29,37)
For pad surfaces and soldered pins. The sharp edges penetrate flux residues and oxide layers.

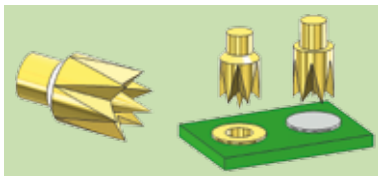
Hexagonal
(07,08)
For testing plated vias and pads. The sharp edges penetrate contamination and oxide layers.



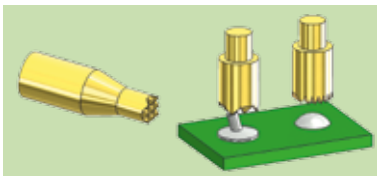
Crown
(09,35,40,41,42,60,63)
For wire wrap posts, even if the contacts are bent or twisted.



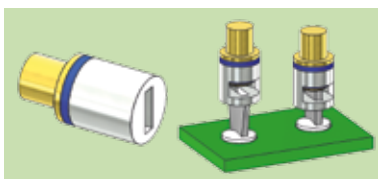
Concave
(05,50,55)
For a smooth contact of pins and wire wrap posts. The risk of contamination can be minimized by using a self cleaning version.



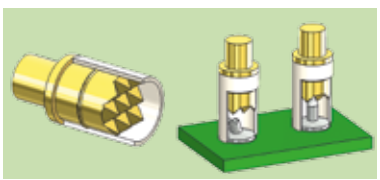
Crown with inner pin
(36,68)
Used for reliable contacting of plated or filled vias.



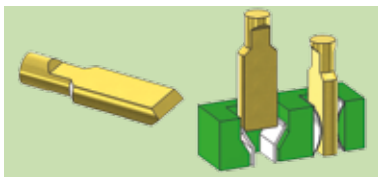
Serrated, W-profile
(06,46,64,66)
Universal tip style for contacting wires, pins and wire wrap posts, even suitable for bent contacts.



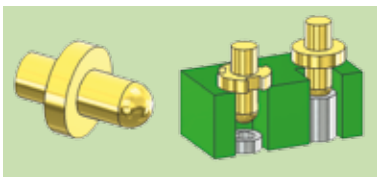
Slotted insulation cap for position test (PT)
(06,17)
For detecting the correct length and straightness of flat pins.



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



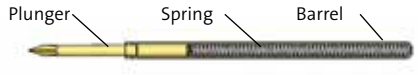
Spade
(80,81,82,83,84,85,86,89)
For twist proof contacting of connector elements.



Step probe
(06,11,12,16,89)
For position and presence tests of connectors.

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

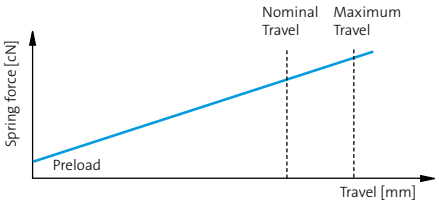
FEINMETALL barrels are usually made of nickel silver, bronze or brass. Nickel silver barrels are deep-drawn whereas barrels made of bronze are turned or deep-drawn and barrels of brass are turned. All barrels are usually silver or gold plated. A small hole in the bottom permits the barrels to be thoroughly 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 receptacles have a proper seat in the mounting plate.

Spacers

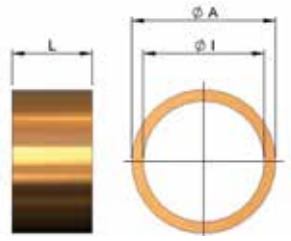
For height adjustment and balancing of tolerances.

Spacers H772DS/xx for 100mil Probes

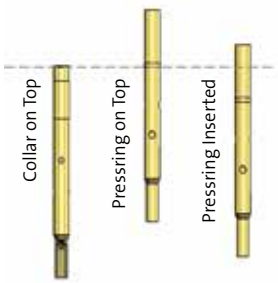
Order Code	Outer-Ø	Inner-Ø	Length
H772DS/10	2,20	1,70	1,00
H772DS/20	2,20	1,70	2,00
H772DS/30	2,20	1,70	3,00
H772DS/50	2,20	1,70	5,00

Spacers H773DS/xx for 138 mil Probes

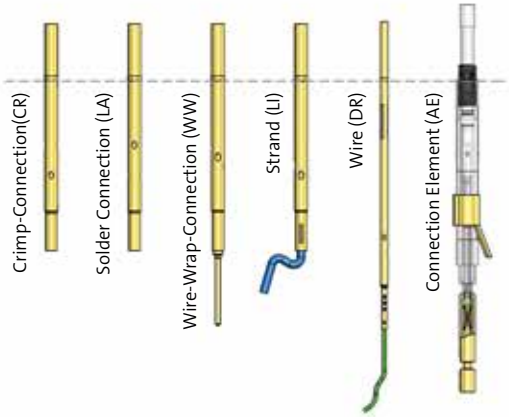
Order Code	Outer-Ø	Inner-Ø	Length
H773DS/01	3,20	2,70	0,10
H773DS/05	3,20	2,70	0,50
H773DS/10	3,20	2,70	1,00
H773DS/20	3,20	2,70	2,00
H773DS/30	3,20	2,70	3,00
H773DS/50	3,20	2,70	5,00



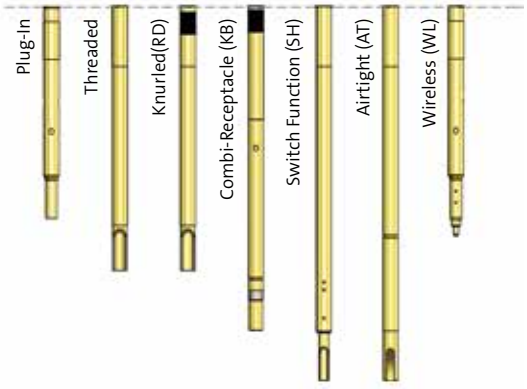
Mounting



Types of Connections



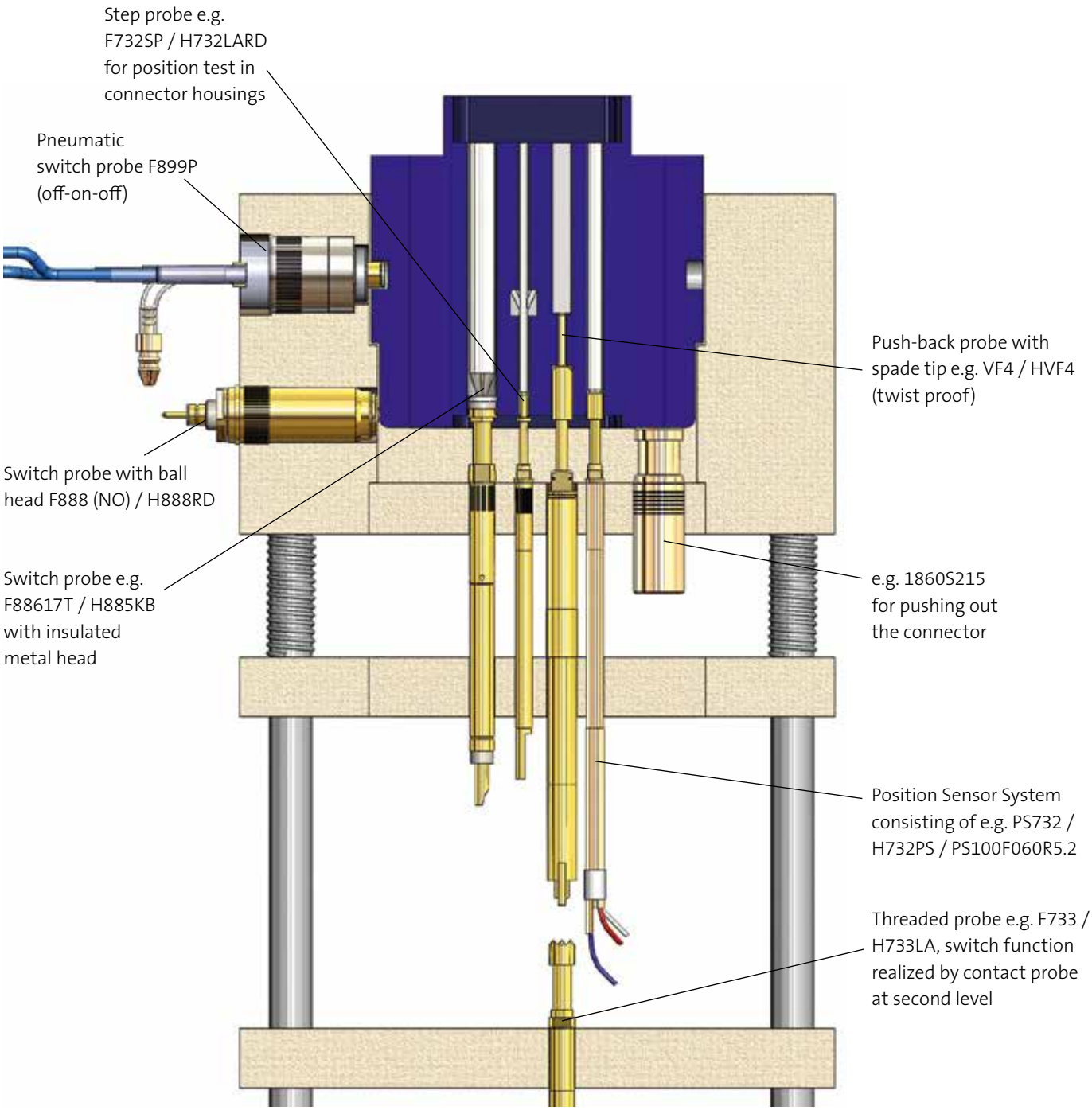
Types of Receptacles



Contact Probes for Wire Harness and Connector Test

As market leader FEINMETALL offers a wide range of special contact probes and accessories for the design of test modules. With innovative and cost-effective solutions FEINMETALL satisfies the demand in this market and is a real driving force in the wire harness testing technology.

The picture shows the schematic design of a connector test module with various contact probes.



Smart Solutions for Test Module Functions by FEINMETALL Products

Variable adjustment of the switch travel for push-back probes
The usage of push-back probes in combination with threaded probes on a second level allows a variable adjustment of the switch point (closing of the electric circuit) by height adjustability of the second level. To guarantee a reduced depth of the module we recommend the usage of the short-travel probe F722 together with the push-back probes VF4, VF3 or VF100.

Push-back probes with fix switch travel
As push back probes are commonly designed with continuous plunger, a switch function can be realized in different ways.
One option is to use a switch receptacle. In this receptacle the continuous plunger of the probe closes a switch circuit after a defined travel. If required, switch receptacles are also available in airtight version ("AT" = airtight).
Alternatively, push back probes with an integrated switch function can be used (V03 and V04). These probes do not require a separate receptacle.
However, they are not twist proof.

Push-back probes with same projection height
The threaded push-back probes VF3, VF4 and VF100 have identical projection heights and thus can be combined without any additional procedures for height adjustment.

Design of vacuum-tight modules
FEINMETALL offers a wide range of probes and receptacles for the design of vacuum-tight modules. The airtight version can be identified by the ending "AT" in the order code. No additional cost-intensive procedures for tightening are necessary at contact probes and receptacles. The maximum allowed leakage-rate of airtight modules is 5cm³/min.

Lateral presence test of connectors
The lateral presence test of connectors generally is a problem for conventional contact probes due to the lateral movement of the DUT. With Series F888 FEINMETALL offers an excellent and innovative solution for this application, providing lots of advantages.

- → Rolling ball as contact element is tolerant against lateral forces, which leads to a remarkably higher durability compared to contact probes with fix plunger head of similar shape
- → Airtight version for vacuum-tight modules
- → Galvanically isolated switch available
- → Very short length for a low installation depth
- → Variable height adjustment of the probe in combination with the corresponding receptacle
- → Adjustment of switching point without wiring by special tool FWZ888SA

Position test of contact elements with insulated probe tips
For an insulated position test FEINMETALL offers a great selection of insulated tip styles for the switch probe series F886. Especially the version with tip style 17T (insulated metal cap) is extremely rugged and durable. Its construction avoids any electrical connection to the barrel of the probe also at maximum travel. A silver plating helps to distinguish the insulated tip style 17T from the conducting gold plated BeCu heads.

Switch probes for backward assembly
Switch probes usually are assembled and exchanged from the top. If this is not possible or wanted, the switch probe F880 can be applied. This probe is for mounting from the bottom, and its switch point can be adjusted with the special tool FWZ888SA before fixing the wiring.

Short-circuit-proof modules by voltage-free switch probes
Short-circuit-proof modules and fixtures can be designed with the switch probes F881 and F888 with electrically isolated switch circuit. This is an important matter given by the fact that test tables in the market may be equipped with modules of different manufacturers. Due to different switching concepts and voltage levels at these different modules, the activation of the probe switch may lead to short-circuits with destructive consequences when using switch probes without electrical isolation. Isolated switch probes can avoid this problem. As the series F881 has the same installation dimensions as the standard switch probes F885/F886 no change of the design in the module is necessary for replacement. For the series F881 a special combi-receptacle (H881KB) for solderless replacement is available.

Note for the usage of voltage-free switch probes:
According to DIN VDE 0100 (part 410) a maximum of 25V AC (rms) or 60V DC is permitted which includes any potential over-voltages.

Contact probe for pushing out the connector
To ease taking the connector out of the test module after the test process, FEINMETALL offers a special push-out probe (e.g. 1860S215). Its high spring force just pushes the connector out of the module when the locking is opened.

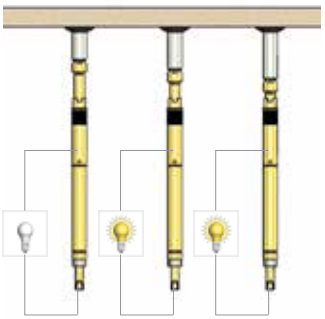
Detail view of test module

Different Solutions for Presence and Position Tests

The pictures below show different categories of FEINMETALL solutions with increasing accuracy. Simple solutions like using standard switch probes or step probes only allow a statement of OK or NOT OK. With the off-on-off switch probe with two switch points the result is more precise. With the position sensor system the exact position of a DUT can be measured and documented. The following pages include detailed information about corresponding probes and applications.

Standard Switch Probes

Situation: too short **OK** too long

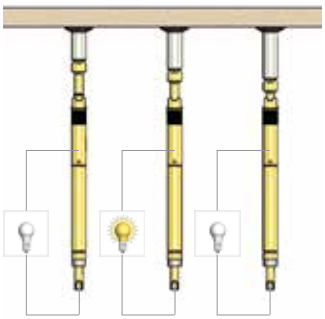


Result: NOK OK OK

Fault not detected

Off-on-off Switch Probes

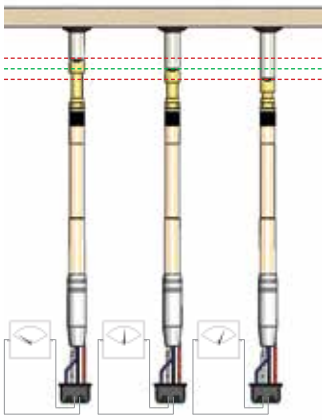
too short **OK** too long



NOK OK NOK

Position Sensor System

too short **OK** too long



3 exact measuring results

Standard Switch Probes
Switch probes with one switch point open or close a switch circuit after a defined switch travel.

NO – „normally open“ = closer
NC – „normally closed“ = opener

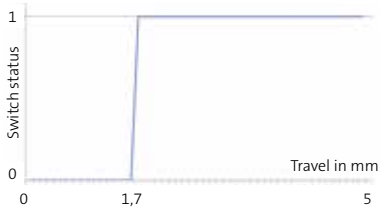
Off-on-off Switch Probes
Switch probes with off-on-off function have two switch points. After a defined travel the switch circuit is closed and after a further travel (e.g. 1,0 mm) the switch circuit is opened again.

Off-on-off - 2 switch points

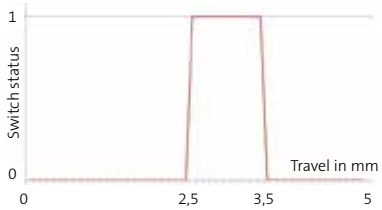
Position Sensor System
The position sensor system has a sensor element with integrated potentiometer, that allows an exact measurement of the travel.

Travel measurement

Switch Characteristic



Switch Characteristic



Measurement

Position Sensor System

The position sensor system is a modular designed contact probe with a small integrated potentiometer. In addition to realizing an electrical contact to the DUT it allows an exact measurement of the travel of the plunger. This can be useful whenever exact, quantitative and documentable measuring results are required, e.g. for testing connectors or housings in the automotive industry, for the evaluation of injection molded parts or for testing the bending of PCBs.

Position Sensor System

Contact Probe with Integrated Potentiometer

The position sensor system has been developed to enable an exact measurement of the plunger travel in addition to contacting the test item.

The system has a modular design and consists of a contact probe, a receptacle and a sensor element with integrated potentiometer. The potentiometer is galvanically isolated from the probe.

After applying an operating voltage, the sensor supplies a measurement voltage that is linear to the travel of the plunger (potentiometric operation). Alternatively, with restrictions regarding accuracy and life cycle, also the resulting resistance can be used as measurement value (resistive operation). FEINMETALL recommends the potentiometric operation for all position sensor systems. The measurement results can be analyzed by the available tester environment, commonly.

Variants

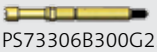
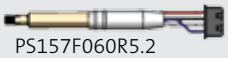
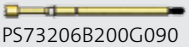
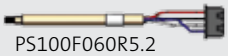
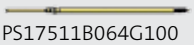
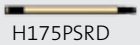
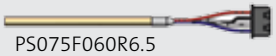
The position sensor system is available for different centers of 75 mil, 100 mil and 157 mil. For 100 mil centers a twist proof version is available (PS756).
The system for 157 mil is suitable for airtight modules or fixtures (i.e. leakage rate < 0,5 cm³ / min at 0,7 bar).

Measuring ranges

PS175: 0...6,4 mm (75 mil)
PS756: 0...4,4 mm (100 mil)
PS732: 0...5,0 mm (100 mil)
PS733: 0...5,0 mm (157 mil)

Modular Design of the Position Sensor System

Contact probe - Receptacle - Sensor element

 PS73306B300G250	 H733PSRD	 PS157F060R5.2	157 mil
 PS73206B200G090	 H732PSRD	 PS100F060R5.2	100 mil
 PS17511B064G100	 H175PSRD	 PS075F060R6.5	75 mil

Specification sensor element
Measuring principle: potentiometric
Accuracy: ≤ 2%
Reproducibility: typ. ≤ ±0,05 mm
Therm. resist. coeff. 5x10-5/K
Nominal spring force: 60 cN
Preload: 40 cN
Nominal: 4,0 mm

Connections
Red: Operating voltage U_0
Black: Measuring signal U_m or R_m
White: Mass
Blue: Test point of contact probe tip (maximum current 1 A)

Calibration

Due to test principle with a certain initial and final resistance and due to electrical and mechanical tolerances the exact plunger position in millimeter requires a calibration of the position sensor system after assembly.

Measurement of relative values

By calculating the difference between two measurement values of one probe deviations related to a required position can be determined in positive or negative travel direction.

Reference measurement

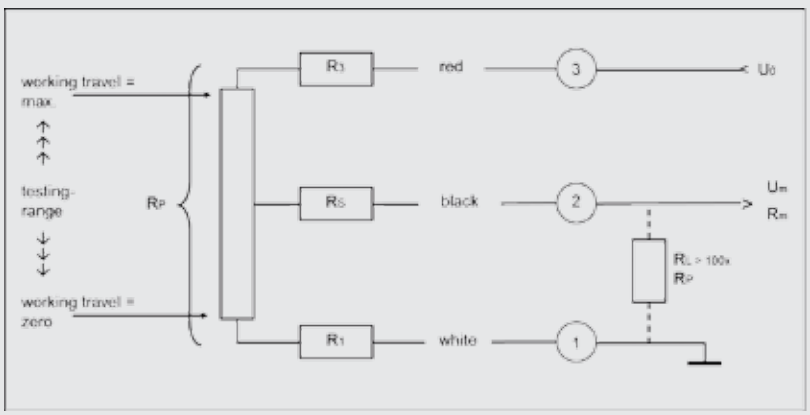
By calculating the difference between two measurement values of different probes deviations related to a reference position can be determined.
The reference can either be a certain reference point of the test item or a special “golden device”.

Zero balance

Depending on the hard- and software of the test system the measurement signal can be zeroed at user-defined positions. This method allows positive or negative deviations without calculating any differences.

FEINMETALL recommends periodic calibration and zeroing of the system.

U_0	Operating voltage (maximum 10 VDC)
U_m	Measuring voltage (potentiometric op.) ($U_1 < U_m < U_p - U_3$)
R_m	Measuring resistance (resistive op.) ($R_1 < R_m < R_p - R_3$)
R_1	Initial resistance
U_1	Initial voltage ($U_1 = I * R_1$)
R_3	Final resistance
U_3	Final voltage ($U_3 = I * R_3$)
R_p	Potentiometric resistance (4,5 kOhm ± 20%) ($R_p = R_1 + R + R_3$)
R_s	Slider resistance
R_L	Load resistor (optional to protect against over-current at the slider)



PS175

NEW

Position Sensor System 75 mil

UTILITY MODEL

Centers (mm/mil)	1,90 / 75
Current	5,0 A *
R typ	20 mOhm *
Temperature	-20°C...+80°C

Spring Force Probe+Sensor (cN ±20%)

Version	Preload	Nominal
Standard	50+40	100+60

Travel (mm)

Version	Nominal	Maximum
Standard	4,3	6,4
Thread (M)		1,0
Wrench Size		1,0
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, unplated

Accessories

Insertion tool receptacle	FEWZ-075E0
Screw-in tool probe	FWZ730S1; FWZ730T1
Screw-in tool sensor element	FWZPS075
Extension cable for Molex-connector (250mm)	2112221

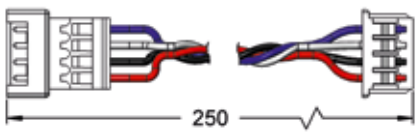
Drill Size (mm)

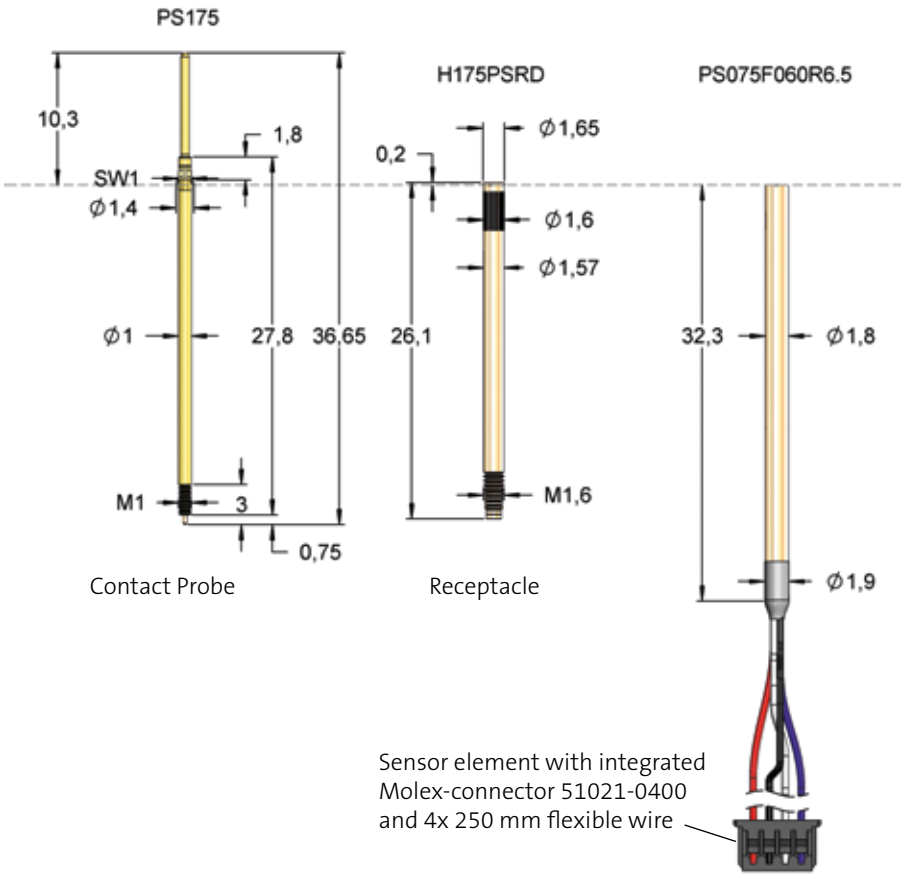
H175PSRD	1,59 - 1,60

Projection Height (mm)

H175PSRD with PS175	10,3

2112221:
Extension cable 250 mm for Molex-connector





The position sensor system consists of a special spring contact probe PS175..., a receptacle H175PSRD and a sensor element PS075.... These three elements are mounted into a fixture plate. The position sensor is screwed at the receptacle from backwards after the receptacle is mounted.

* The values for current and resistance are only valid for a soldered connection at the receptacle. The blue wire of the Molex connector only allows a maximum current of 1,0 A and R typ 500 mOhm.

Series			Tip-Ø		Spring Force (cN)
PS175	11	B	064	G	100
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 100 = 1,00 mm (e.g.)
Plating: G = Gold plated
Note: Additional receptacle and position sensor required, order code according to drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,20	-
	11	B	G	0,64	-
	17	B	G	1,20	-

PS732

Position Sensor System 100 mil

UTILITY MODEL

Centers (mm/mil)	2,54 / 100
Current	5,0 A *
R typ	20 mOhm *
Temperature	-20°C...+80°C

Spring Force Probe+Sensor (cN ±20%)

Version	Preload	Nominal
Standard	40+30	90+60

Travel (mm)

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

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, unplated

Accessories

Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe	FWZ732 (T)
Screw-in tool sensor	FWZPS100
Extension cable for Molex-connector (250 mm)	2112221

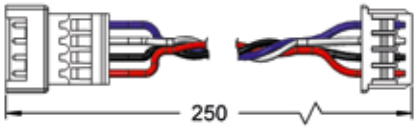
Drill Size (mm)

H732PSRD	1,99 - 2,00

Projection Height (mm)

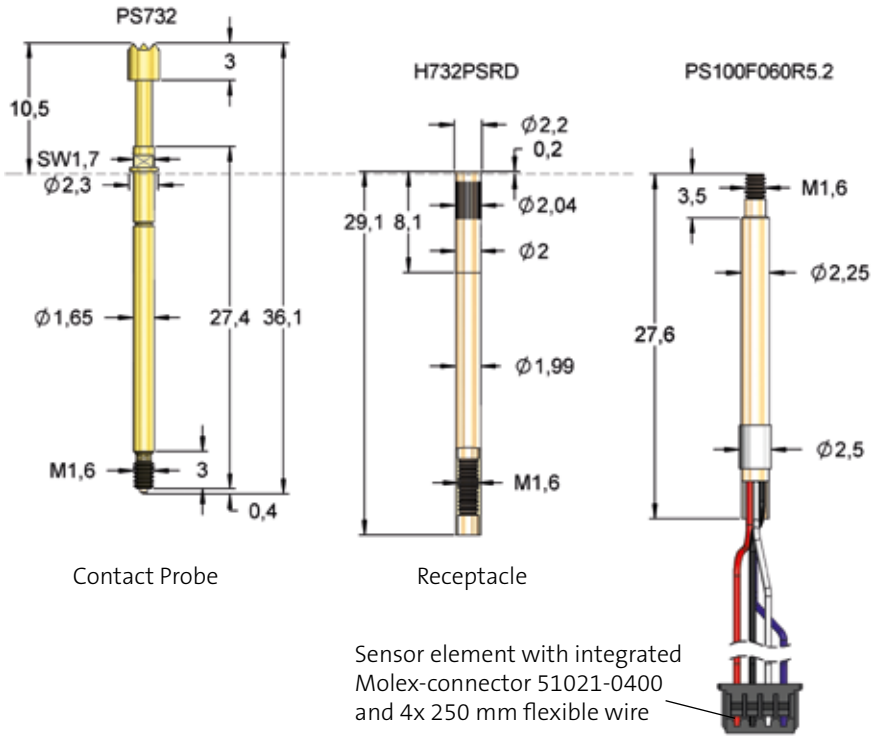
H732PSRD with PS732	10,5

2112221:
Extension cable 250 mm for Molex-connector



Series			Tip-Ø		Spring Force (cN)
PS732	05	B	180	G	090
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 180 = 1,80 mm (e.g.)
Plating: G = Gold plated
Note: Additional receptacle and position sensor required, order code according to drawing



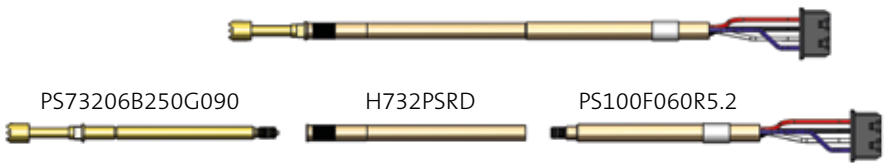
Contact Probe

Receptacle

Sensor element with integrated Molex-connector 51021-0400 and 4x 250 mm flexible wire

The position sensor system consists of a special spring contact probe PS732..., a receptacle H732PSRD and a sensor element PS100.... These three elements are mounted into a fixture plate. The position sensor is screwed at the receptacle from backwards after the receptacle is mounted.

* The values for current and resistance are only valid for a soldered connection at the receptacle. The blue wire of the Molex connector only allows a maximum current of 1,0 A and R typ 500 mOhm.



** Center differing from standard.

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	B	G	1,80	-
	06	B	G	1,50	-
	06	B	G	1,80	-
	06	B	G	2,00	-
	06	B	G	2,50 **	-
	11	B	G	0,64	-
	11	B	G	0,80	-
	11	B	G	1,00	-
	12	B	G	1,40	-
	16	B	G	0,80	-
	16	B	G	1,00	-
	17	B	G	1,40	-
	17	B	G	3,00 **	-

PS756

Position Sensor System 100 mil, Twist Proof

Centers (mm/mil)	2,54 / 100
Current	5,0 A *
R typ	20 mOhm *
Temperature	-20°C...+80°C

Spring Force Probe+Sensor (cN ±20%)

Version	Preload	Nominal
S2	40+30	90+60
Standard	60+30	150+60

Travel (mm)

Version	Nominal	Maximum
S2	4,0	4,4
Standard	4,0	4,4
Thread (M)		1,6
Wrench Size		1,7
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, unplated

Accessories

Insertion tool receptacle	FAWZ756
Screw-in tool probe	FWZ732 (T) FWZ732S1 (T1)
Screw-in tool sensor	FWZPS100
Extension cable for Molex-connector (250 mm)	2112221

Drill Size (mm)

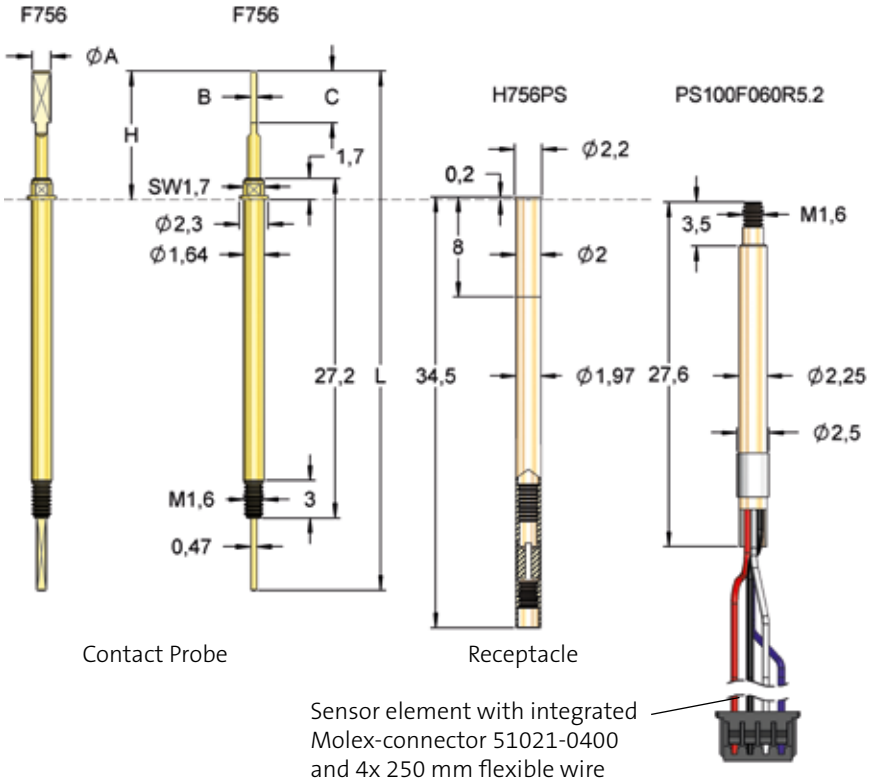
H756PS	1,99 - 2,00

Projection Height (mm)

H756PS with F756	10,5

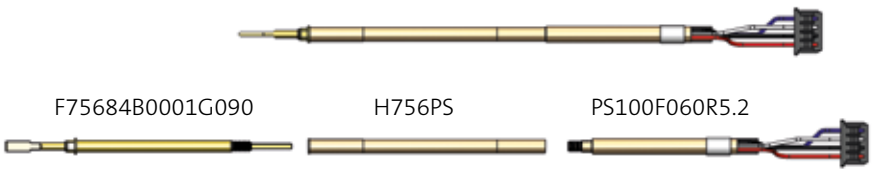
Series			Number		Spring Force (cN)	
F756	**84**	**B**	**0001**	**G**	**090**	**S2**
	Tip Style	Material		Plating		Version

Material: B = BeCu
Number: see table
Plating: G = Gold plated
Version: S2 = deviation from standard
Note: Additional receptacle and position sensor required, order code according to drawing

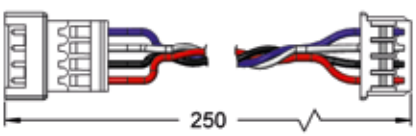


The position sensor system consists of a twist proof threaded probe F756..., a receptacle H756PS and a sensor element PS100.... These three elements are mounted into a fixture plate. The position sensor is screwed at the receptacle from backwards after the receptacle is mounted.

* The values for current and resistance are only valid for a soldered connection at the receptacle. The blue wire of the Molex connector only allows a maximum current of 1,0 A and R typ 500 mOhm.



2112221:
Extension cable 250 mm for Molex-connector



Order code	Tip Style	Ø A	B	C	H	L	Version	Screw-in Tool
F75684B0001G090S2	84	1,50	0,50	4,15	10,30	41,60	-	FWZ732S1; FWZ732T1
F75684B0001G150	84	1,50	0,50	4,15	10,30	41,60	-	FWZ732; FWZ732T
F75684B0004G150	84	1,50	1,00	4,15	10,30	41,60	-	FWZ732; FWZ732T
F75684B0003G150	84	2,00	0,80	4,15	10,30	41,60	-	FWZ732; FWZ732T

PS733

NEW

Position Sensor System 157 mil, Airtight

UTILITY MODEL

Centers (mm/mil)	4,00 / 157
Current	5,0 A *
R typ	20 mOhm *
Temperature	-20°C...+80°C

Spring Force Probe+Sensor (cN ±20%)

Version	Preload	Nominal
Standard	50+40	250+60

Travel (mm)

Version	Nominal	Maximum
Standard	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
Receptacles	Brass, unplated

Accessories

Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZ733 FWZ733T
Extension cable for Molex-Connector (250 mm)	2112221

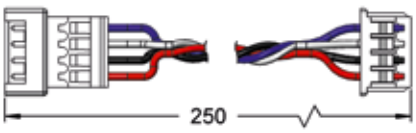
Drill Size (mm)

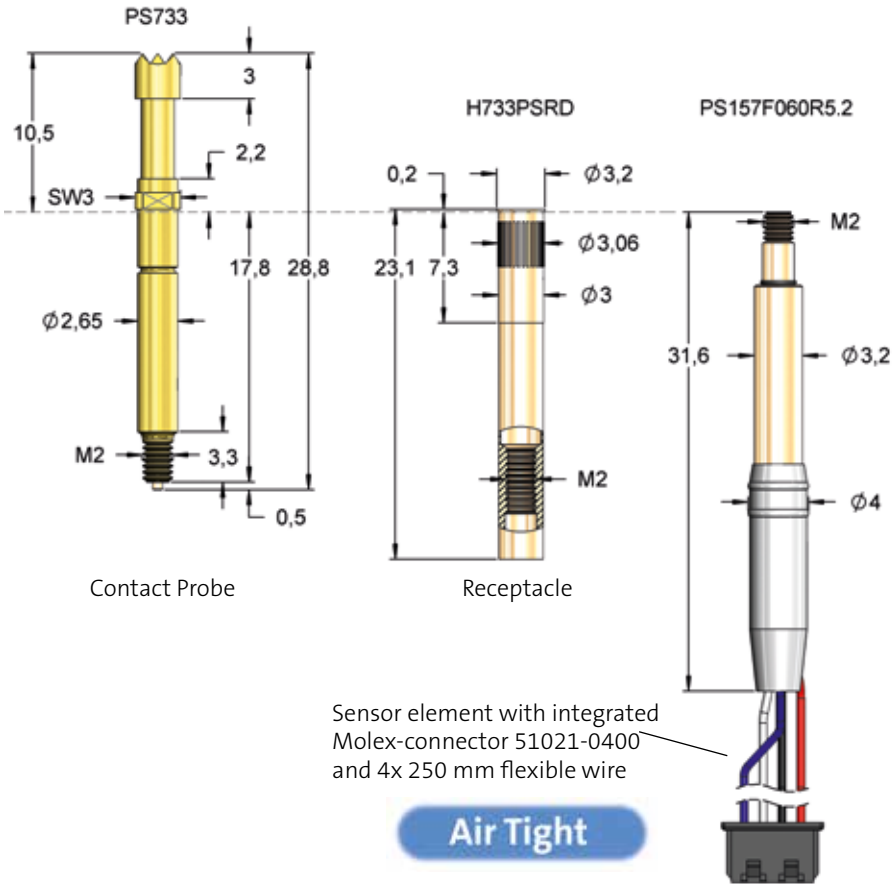
H733PSRD	3,01 - 3,05

Projection Height (mm)

H733PSRD with PS733	10,5

2112221:
Extension cable 250 mm for Molex-connector



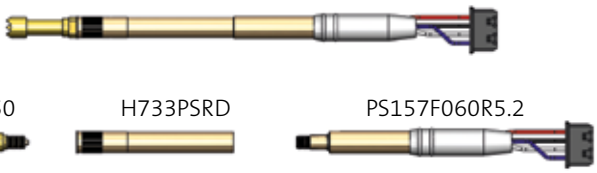


Contact Probe

Receptacle

The position sensor system PS733 can be used in vacuum fixtures or modules (max. leakage rate <0,5 cm³/min at 0,7bar). It consists of a special spring contact probe PS733..., a receptacle H733PSRD and a sensor element PS157.... These three elements are mounted into a fixture plate. The position sensor is screwed at the receptacle from backwards after the receptacle is mounted.

* The values for current and resistance are only valid for a soldered connection at the receptacle. The blue wire of the Molex connector only allows a maximum current of 1,0 A and R typ 500 mOhm.



Series			Tip-Ø		Spring Force (cN)
PS733	06	B	100	G	250
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 100 = 1,00 mm (e.g.)
Plating: G = Gold plated
Note: Additional Receptacle and position sensor required, order code according to drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,00	-
	06	B	G	2,00	-
	06	B	G	3,00	-
	17	B	G	2,30	-

Switch Probes

Switch probes are commonly used for presence and position tests of connectors or components. After reaching a defined travel switch probes open or close an integrated switch circuit.

The switch probes are sorted in this order:

→ Switch probes with off-on-off characteristic
→ Switch probes with ball head (NO)
→ Standard switch probes (NO/NC)

SWITCH PROBE TYPES

Standard Switch Probe

Standard switch probes are available in plug-in and threaded versions.
The switch function can work as an opener or as a closer. Standard switch probes are available in various diameters and lengths.

Switch Probes for Backward Assembly

Switch probes for backward assembly have been designed for applications with difficult access of the probes from the front.

Potential-free Switch Probes

Potential-free switch probes have a galvanically isolated switch circuit. This allows building short-circuit-proof fixtures or modules with separate electrical circuits for logic and test currents.

Switch Probes with Ball Head

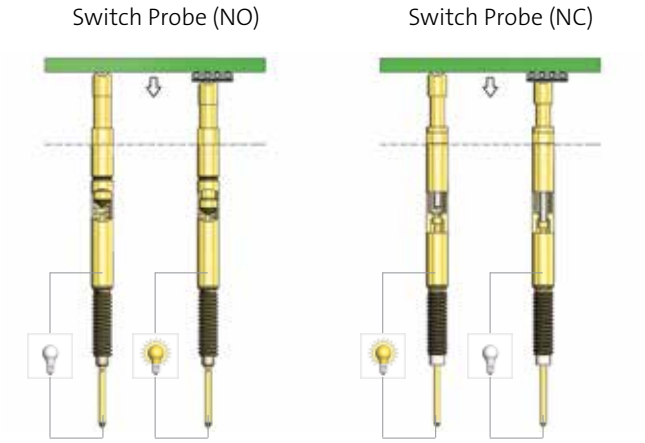
Switch probes with ball head have a rolling ball as contact element which makes them tolerant against lateral forces and avoids scratches at the contact surface. The most common application is the lateral presence test of connector housings in test modules.

Switch Probes with Off-on-off Function

The special switch probes with off-on-off function allow realizing more precise position tests of components or connector elements with little effort. While common switch probes only have one switch point after a specific travel, the special switch probes have two integrated switch points in a certain distance.

Presence Test with Switch Probes

Switch probes are contact elements which open or close an electric circuit after a defined switch travel. This condition persists beyond the switching point. FEINMETALL offers special combi-receptacles for the solderless exchange of switch probes (see below).



Typical applications:

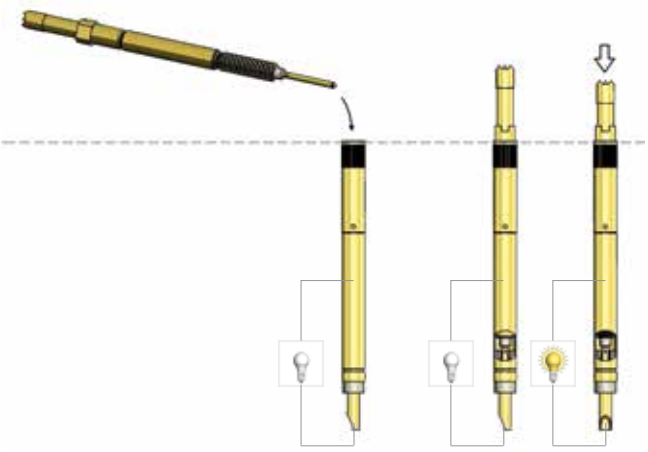
- Presence test of components or connectors
- Voltage-free detection with synthetic heads
- Short-circuit-proof modules by electrically isolated switch elements (voltage-free system)
- Installation of intrinsically save circuits (only with NC-versions, e.g.F873, F883)

Versions of switch probes:

- Openers (NC - normally closed), closers (NO - normally open)
- Different switch travels
- Probes for a gentle lateral contacting by ball head (F888)
- Short and long versions to realize different projection heights
- Long travel versions for depth determination (F375 and F385)

Solderless Replacement of Switch Probes and Kelvin Probes

Combi-receptacles allow a quick and solderless replacement of switch probes or kelvin probes (plug-in and threaded versions) without disassembly of the module or fixture. Secure connections of both signal circuits (inner and outer conductor) are realized by contact elements within the receptacle.



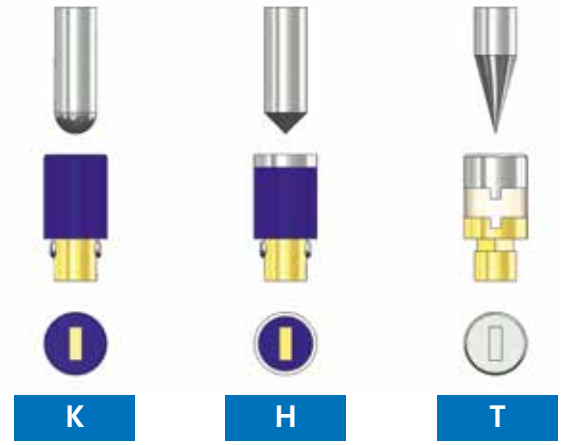
Advantages of the combi-receptacle

- Solderless replacement of switch probes and kelvin probes
- Prevention of incorrect wirings in case of maintenance
- Saving of time and expenses in case of maintenance
- Height adaptability of switch probes by the probe thread and pressure marks in the receptacle
- High frequency capabilities in combination with coaxial kelvin probes

Insulated Tips for Switch Probes

There are three different versions of insulated switch probe tips:

- Version K is made of synthetic material, it is the standard tip style for insulated contacting
- Version H is reinforced additionally by a brass ring, which allows higher stress on the synthetic head.
- Version T has a metal head, which is insulated against the plunger and therefore is suitable for applications with higher mechanical exposure. The special design avoids any electrical contact between tip and barrel, even at maximum travel. The tip of this version is silver-colored for better identification of the assembled probe.



F487

Switch Probe 157mil Threaded, Off-on-off

UTILITY MODEL

Centers (mm/mil)	4,00 / 157
Current	10,0 A
Current (Switch)	1,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	120	300

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
Switch point 1 (mm)		2,5
Switch point 2 (mm)		3,5
Thread (M)		3,0x0,35
Wrench Size		2,5
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	BeCu, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

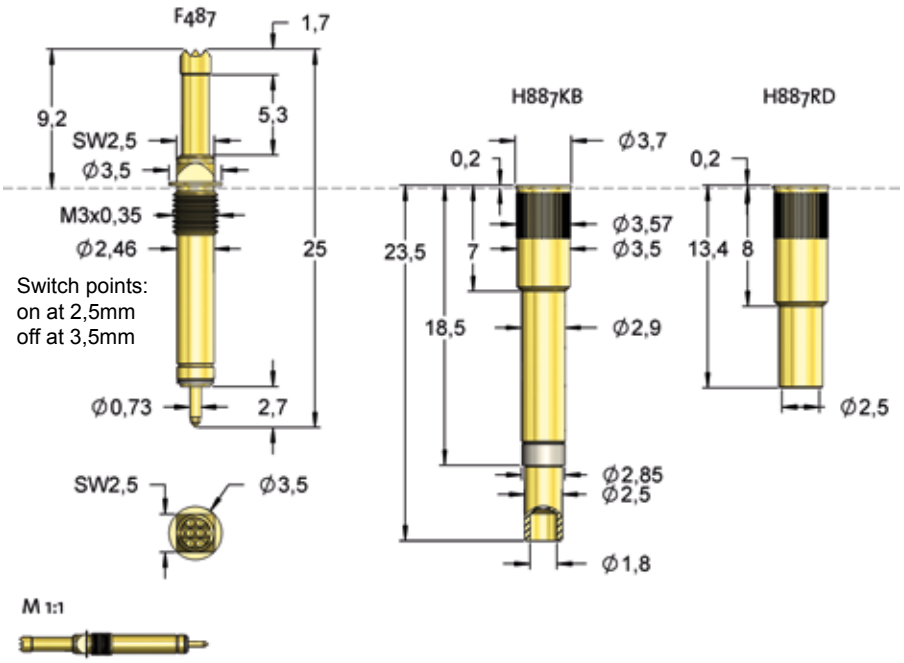
Insertion tool receptacle	FEWZ-340E0
Screw-in tool probe	FWZVF4 (T)

Drill Size (mm)

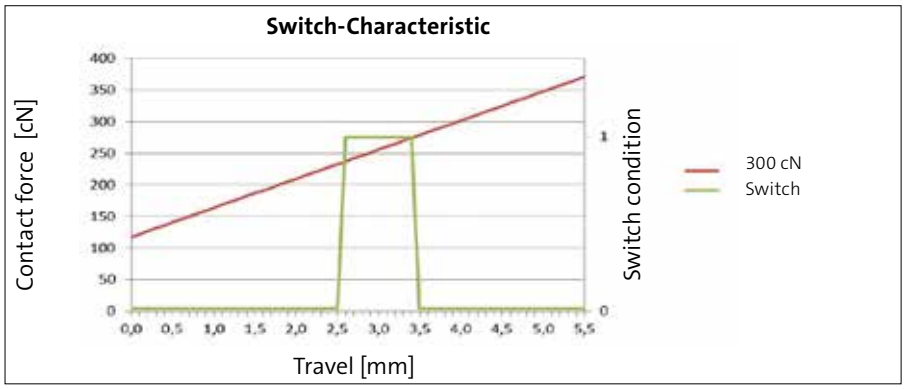
Receptacle with knurl	3,50 - 3,52

Projection Height (mm)

H887... with F487	9,2 - 11,2



The probe F487 allows an exact determination of depths and lengths with low efforts. It was specifically developed for position tests at limited space. Due to the off-on-off function of the probe, the correct position of the DUT, a correct pin length or hole depth can be verified. The probe can be used with the standard receptacle H887RD or H887KB which allows a solderless exchange of the probes.



Series			Tip-Ø		Spring Force (cN)
F487	06	B	200	G	300
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 200 = 2,00 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	2,00	-
	17	B	G	3,00	-

F485/F486

NEW

UTILITY MODEL

Switch Probe 157mil Threaded, Off-on-off

Centers (mm/mil)	4,00 / 157
Current	10,0 A
Current (Switch)	1,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	80	300

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
Switch point 1 (mm)		2,5
Switch point 2 (mm)		3,5
Thread (M)		2,5
Wrench Size		2,5
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

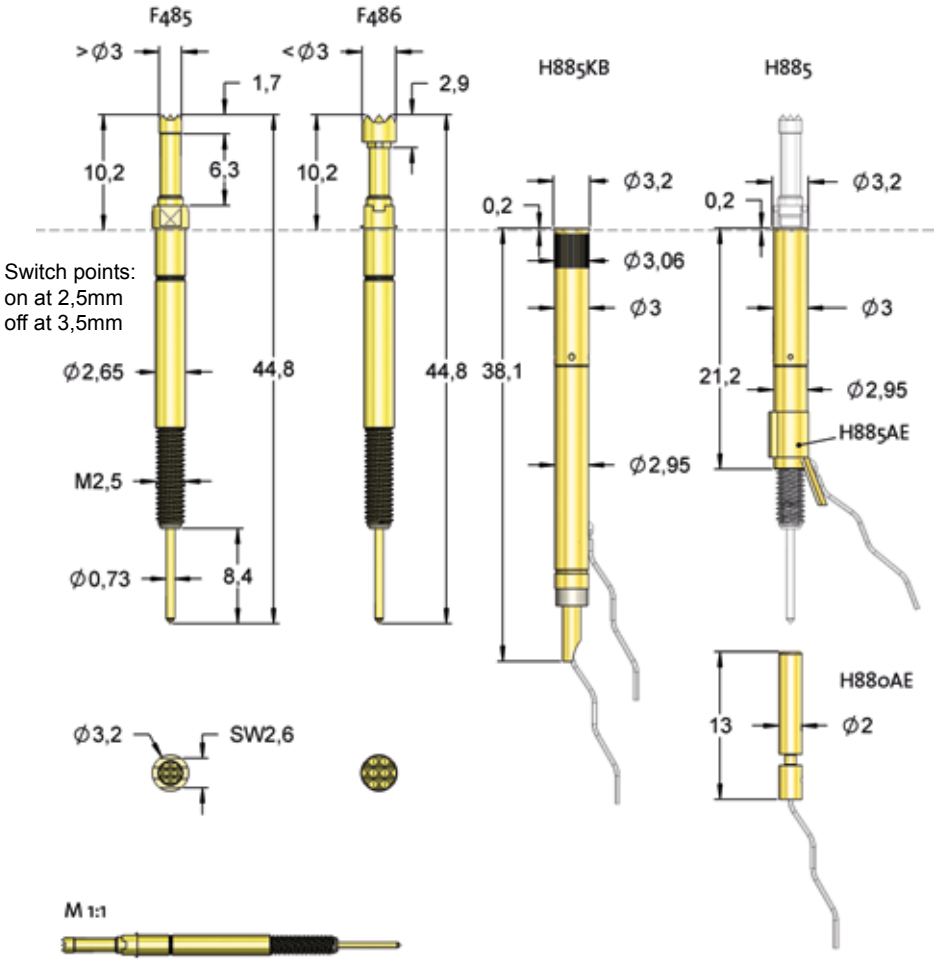
Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZ886S1/ FWZ886S2

Drill Size (mm)

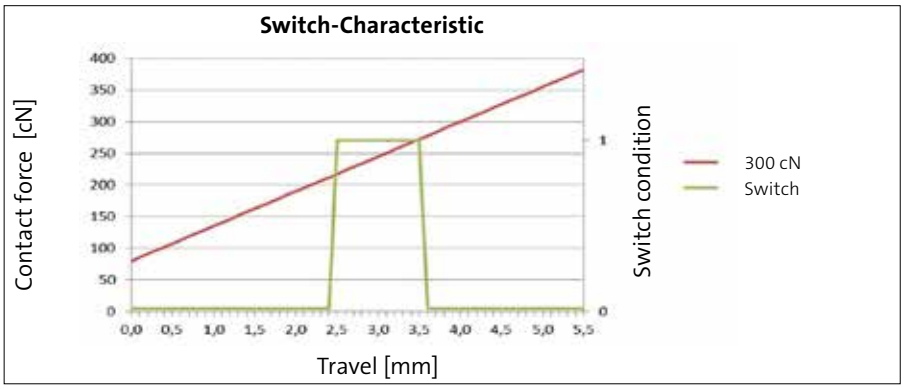
Receptacle without knurl	2,98 - 2,99
Receptacle with knurl	3,00 - 3,02

Projection Height (mm)

H885... with F485/F486	10,2 - 15,2
H885.../5 with F485/F486	15,0 - 20,0



The probes F485/F486 allow an exact determination of depths and lengths with low efforts. They were specifically developed for position tests at limited space. Due to the off-on-off function of the probes, the correct position of a DUT, a correct pin length or hole depth can be verified. The probes can be used with the standard receptacles H885 or H885KB which allows a solderless exchange of the probes.



Series			Tip-Ø		Spring Force (cN)
F48x	06	B	200	G	300
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 200 = 2,00 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style F485

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	2,00	-

Tip Style F486

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	3,00	-

F899P0001 / F899P0002

Switch Probe 394mil, Pneumatic, Off-on-off

UTILITY MODEL

Centers (mm/mil)	10,00 / 394
Current	3,0 A
Current (Switch)	1,0 A
R typ	100 mOhm
Temperature	-20°C...+80°C

Technical Specifications

Operating pressure	5-7 bar
Operating medium	Compressed air (dried & filtered)
Allowed leakage rate	5 cm³/min.
Thread (M)	8,0x1,0

F899P0001	**Working travel [mm]**	**Contact force at 6 bar [cN]**
Switch point 1	2,0 ±0,2	
Nominal	3,8	350 ±20%*
Switch point 2	4,0 ±0,2	
Maximum	5,3	

* Change 75 cN / bar

F899P0002	**Working travel [mm]**	**Contact force at 6 bar [cN]**
Switch point 1	3,0 ±0,2	
Nominal	3,8	350 ±20%
Switch point 2	4,0 ±0,2	
Maximum	5,3	

Materials and Plating

Plunger tip	Synthetic, unplated
Barrel	Brass, gold plated Synthetic, unplated
Spring	Music wire, silver plated
Receptacle	Brass, nickel plated

Included in Delivery

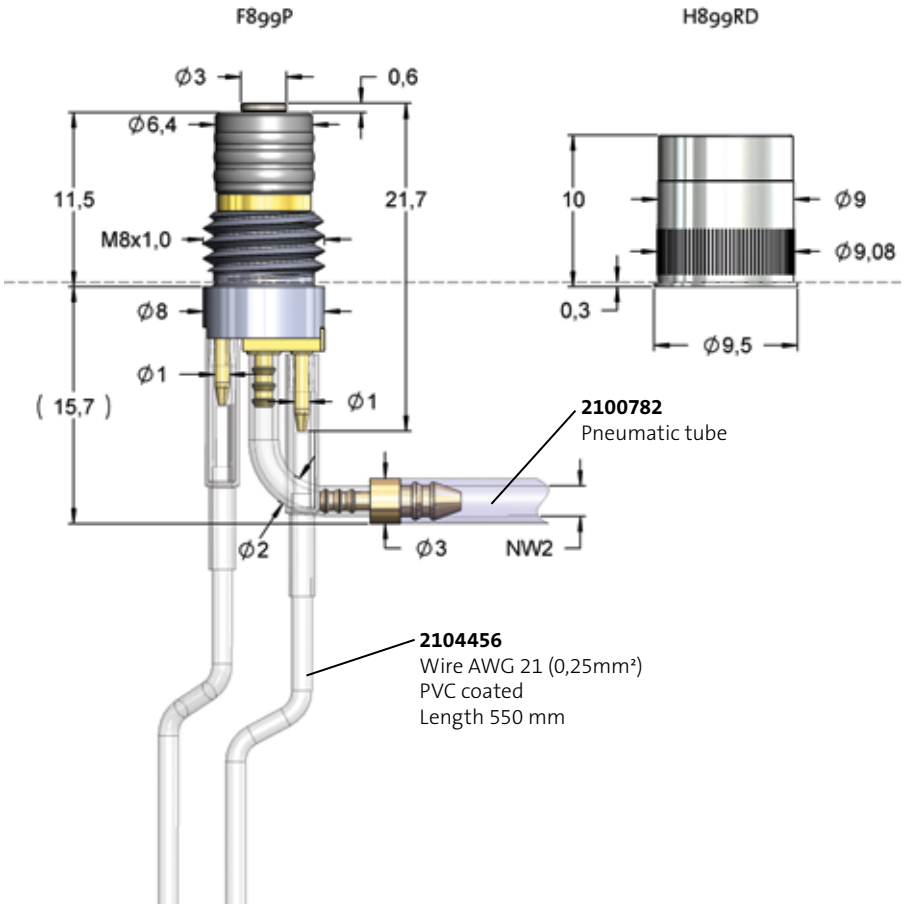
1x F899P000x Pneumatic switch probe
2x 2104456 Connection wire (AWG21)

Accessories

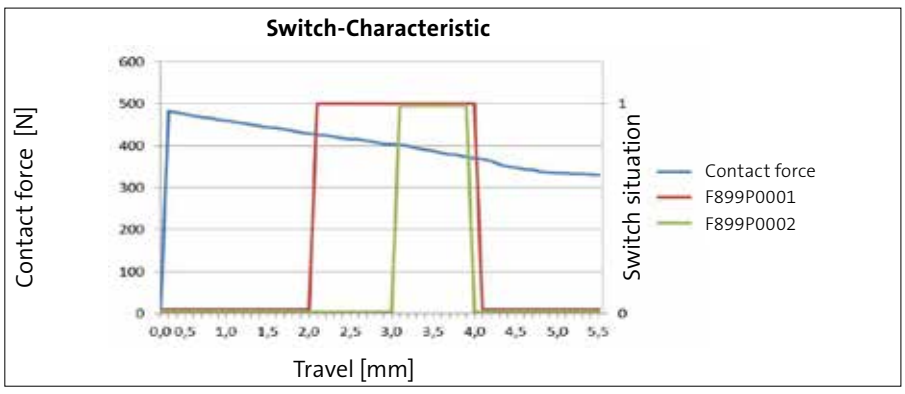
Pneumatic tube	2100782 (NW2)
Receptacle with knurl	H899RD
Screw-in tool probe	FWZ899

Drill Size (mm)

Receptacle with knurl	9,02 - 9,06



Special solution for pneumatic position tests at limited space.
The pneumatic micro switch probe F899P with two switch points (off-on-off) allows an exact determination of the DUT position.

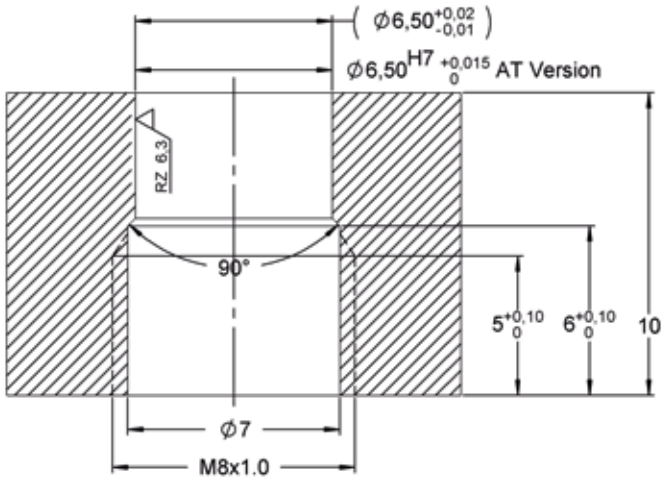


For a proper operation see the following mounting and operation instructions.

Mounting and Operation Instructions F899P

Drilling Recommendations for the Use without Receptacle

For mounting the probe F899P without receptacle a precise drilling is mandatory to hold the probe in its position. It is essential to consider if the module with the mounted probe needs to be airtight or not. An airtight module needs extremely precise drilling dimensions. As the ideal drilling diameters depend on the material, the recommendations here are only a guideline for your own drilling tests. **The permissible leakage rate for the construction of an airtight version is 5 cm³ / min.**

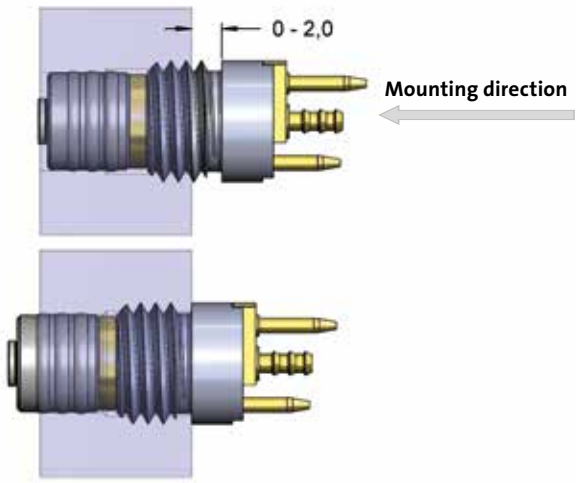


Mounting Tool FWZ899

The mounting tool fits into the corresponding notch of the probe and allows to screw in and position the probe securely from backwards.

Longitudinal Adjustment

The probe F899P can be mounted either on stop or it can be adjusted for up to 2,0 mm in longitudinal direction. This is realized by the thread of the probe. One full turn of the probe leads to 1,0 mm adjustment.



F88890S0003U100Sxx (NO)

Switch Probe with Ball Head Plug-In

UTILITY MODEL

Centers (mm/mil)	6,50 / 256
Current	10,0 A
Current (Switch)	1,0 A
R typ	25 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
S05	70	100
S08	70	100

Travel (mm)

Version	Nominal	Maximum
S05	1,4	1,4
S08	1,4	1,4
Switch Travel (mm)		
S05		0,5
S08		0,8

Materials and Plating

Ball	Steel, unplated
Barrel	Brass, gold plated
Spring	Stainless steel, unplated

Accessories

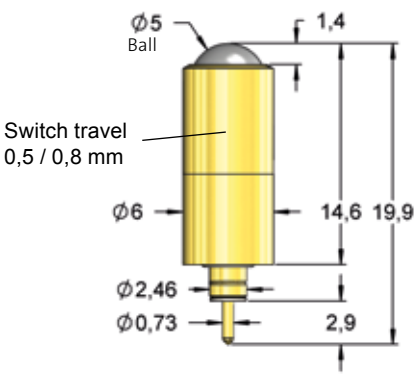
Connection element	H888AE

Drill Size (mm)

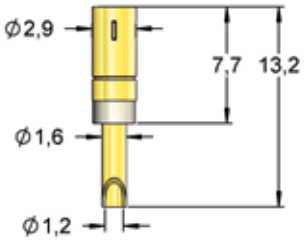
F88890S0003U100Sxx	6,00

Projection Height (mm)	**max.**
F88890S0003U100Sxx	1,40

F88890S0003U100S05/S08



H888AE



M 1:1

Due to a rolling ball as contact element probes of the series F888 are insensitive against lateral forces. A common application is the lateral presence test of connector housings in test modules. The switch circuit of this probe is **not** galvanically isolated against the barrel.

Series			Number		Spring Force (cN)	
F888	**90**	**S**	**0003**	**U**	**100**	**S08**
	Tip Style	Material		Plating		Version

Material: S = Steel

Number:

1. Digit
0 = Switch not galvanically isolated
1 = Switch galvanically isolated
2 = Without switch

2. Digit
0 = Without thread
1 = With thread

3.+4. Digit Running number

Plating: U = Unplated

Version: S08 = 0,8mm Switch travel (e.g..)

Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	90	S	U	5,00	S05
	90	S	U	5,00	S08

F88890S1101U200S05 (NO)

Switch Probe with Ball Head Threaded

UTILITY MODEL

Centers (mm/mil)	7,00 / 275
Current	10,0 A
Current (Switch)	1,0 A
R typ	25 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	100	200

Travel (mm)

Version	Nominal	Maximum
Standard	1,0	1,0
Switch Travel (mm)		0,5
Thread (M)		6,0x0,75
Wrench Size		5,0

Materials and Plating

Ball	Steel, unplated
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

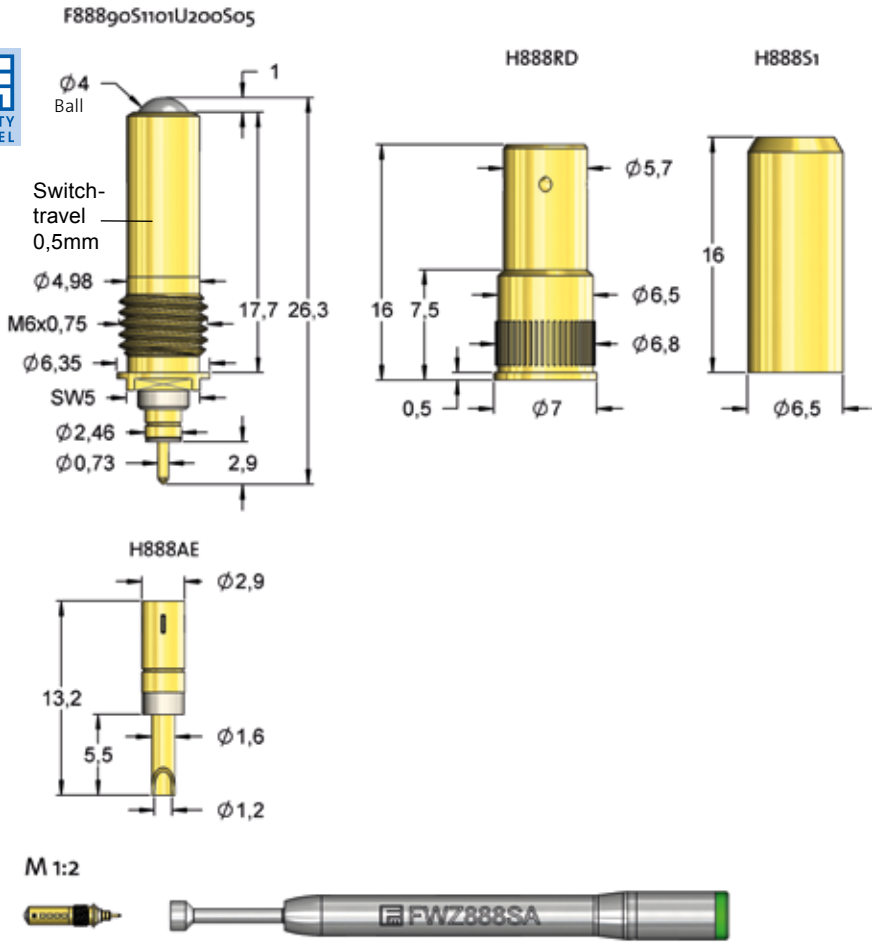
Accessories

Screw-in tool	FWZ888
Screw-in tool w. light indicator	FWZ888SA
Connection element	H888AE

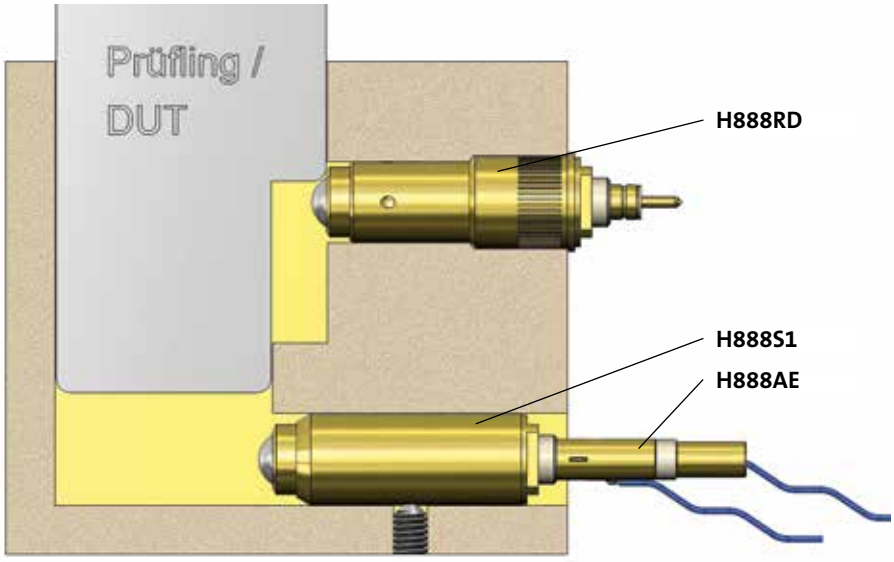
Drill Size (mm)

F88890S1101U200S05	M6x0,75
H888RD	6,55 - 6,70
H888S1	6,50

Projection Height (mm)	**max.**
F88890S1101U200S05	1,00



Due to a rolling ball as contact element probes of the series F888 are insensitive against lateral forces. A common application is the lateral presence test of connector housings in test modules. The switch circuit of this probe is galvanically isolated against the barrel.
The same probe just with a larger collar of 8,4 mm instead of 6,35 mm is available by order code **F88890S1103U200S05**.



Series			Number		Spring Force (cN)	
F888	90	S	1101	U	200	S05
	Tip Style	Material		Plating		Version

Material: S = Steel

Number:

1. Digit
  0 = Switch not galvanically isolated
  1 = Switch galvanically isolated
  2 = Without switch
2. Digit
  0 = Without thread
  1 = With thread
3.+4. Digit Running number

Plating: U = Unplated

Version: S05 = 0,5mm Switch travel (e.g.)

Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	90	S	U	4,00	-

F88890S1102U100S07 (NO)

Switch Probe with Ball Head Threaded

UTILITY MODEL

Centers (mm/mil)	9,00 / 354
Current	10,0 A
Current (Switch)	1,0 A
R typ	25 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	70	100

Travel (mm)

Version	Nominal	Maximum
Standard	1,5	1,5
Switch Travel (mm)		0,7
Thread (M)		8,0x0,5
Wrench Size		5,0

Materials and Plating

Ball	Steel, unplated
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacles	Brass, gold plated

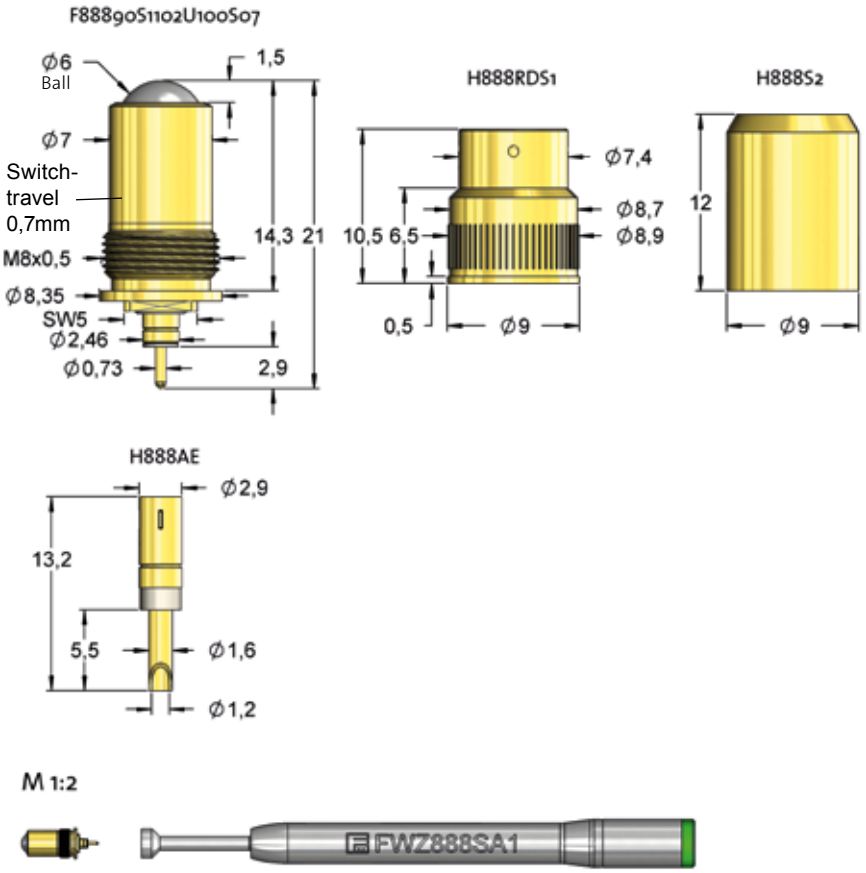
Accessories

Screw-in tool	FWZ888
Screw-in tool w. light indicator	FWZ888SA1
Connection element	H888AE

Drill Size (mm)

F88890S1101U200S05	M8x0,5
H888RDS1	8,75 - 8,85
H888S2	9,00

Projection Height (mm)	**max.**
F88890S1102U100S07	1,5



Due to a rolling ball as contact element probes of the series F888 are insensitive against lateral forces. A common application is the lateral presence test of connector housings in test modules. The switch circuit of this probe is galvanically isolated against the barrel.

Series			Number		Spring Force (cN)	
F888	90	S	1102	U	100	S07
	Tip Style	Material		Plating		Version

Material: S = Steel

Number:

1. Digit
0 = Switch not galvanically isolated
1 = Switch galvanically isolated
2 = Without switch

2. Digit
0 = Without thread
1 = With thread

3.+4. Digit Running number

Plating: U = Unplated

Version: S07 = 0,7mm Switch travel (e.g.)

Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	90	S	U	6,00	-

F863 (NO)

Switch Probe 75 mil Threaded

Centers (mm/mil)	1,90 / 75
Current	2,0 A
Current (Switch)	1,0 A
R typ	65 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	20	80
Standard	50	150
L	50	150

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
L	4,0	5,0
Switch Travel (mm)		3,5
Thread (M)		1,0
Wrench Size		1,00
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

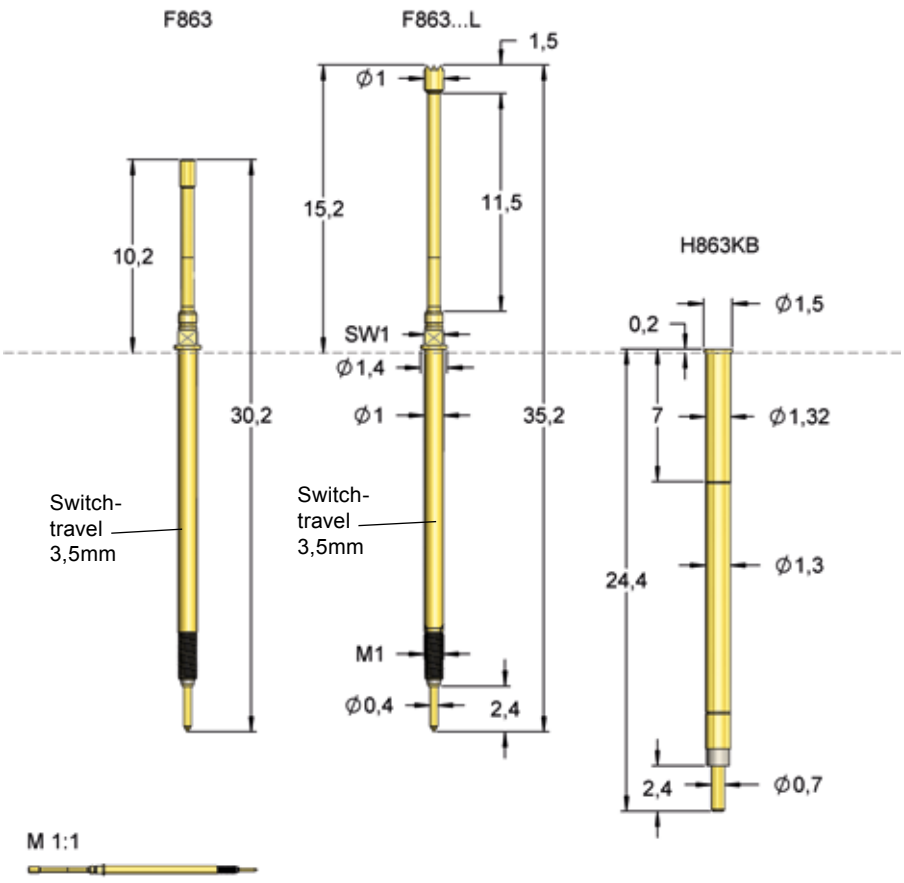
Insertion tool receptacle	FEWZ-100E0
Screw-in tool probe	FWZ730 (T) max. <Ø0,9 mm
Screw-in tool probe	FWZ730S1 (T1) max. <Ø1,5 mm

Drill Size (mm)

H863...	1,32 - 1,34

Projection Height (mm)

H863... with F863	10,2
H863... with F863...L	15,2



The F863 is the smallest threaded switch probe. It is the ideal solution for modules with centers down to 1,90 mm / 75 mil. It can be used with a combi-receptacle for solderless exchange of the probe.

Series			Tip-Ø		Spring Force (cN)	
F863	06	B	100	G	150	L
	Tip Style	Material		Plating		Version

Material: B = BeCu
Tip-Ø: 100 = 1,00 mm (e.g.)
Plating: G = Gold plated
Version: L = Long version
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,00	L
	11	B	G	0,50	-
	11	B	G	0,64	L
	12	B	G	0,75	L
	17	B	G	0,80	-

F865 (NO)

Switch Probe 100 mil Threaded

Centers (mm/mil)	2,54 / 100
Current	3,0 A
Current (Switch)	1,0 A
R typ	25 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	60	200

Travel (mm)

Version	Nominal	Maximum
Standard	5,0	6,3
Switch Travel (mm)		4,0
Thread (M)		1,6x0,2
Wrench Size		1,4
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

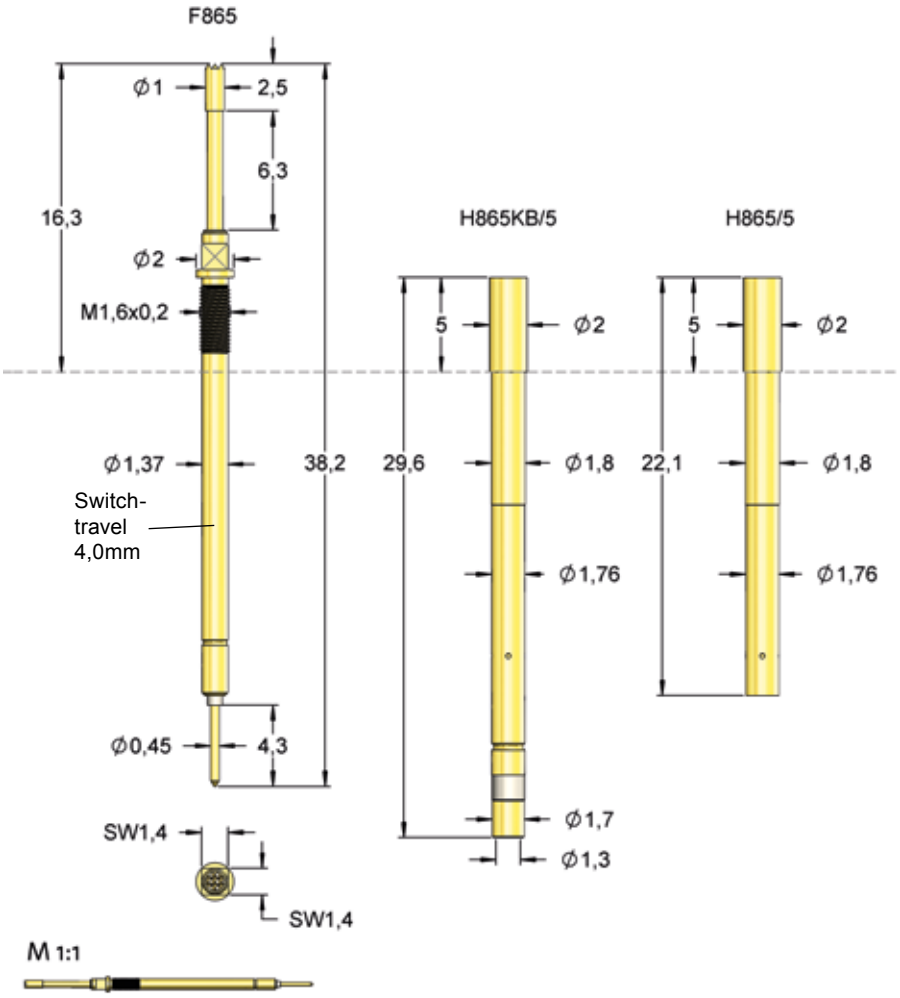
Insertion tool receptacle	FEWZ-100E0
Screw-in tool probe	FWZ731S1 (T1)

Drill Size (mm)

Receptacle without knurl	1,79 - 1,81

Projection Height (mm)

H865.../5 with F865	16,3



Series			Tip-Ø		Spring Force (cN)
F865	06	B	100	G	200
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 100 = 1,00 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,00	-
	06	B	G	1,30	-
	11	B	G	0,65	-
	17	B	G	1,00	-

F864 (NO)

Switch Probe 100 mil Plug-In

Centers (mm/mil)	2,54 / 100
Current	1,0 A
Current (Switch)	1,0 A
R typ	25 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	60	200

Travel (mm)

Version	Nominal	Maximum
Standard	5,0	6,3
Switch Travel (mm)		4,0
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Nickel silver, gold plated
Spring	Music wire, gold plated
Receptacles	Nickel silver, gold plated

Accessories

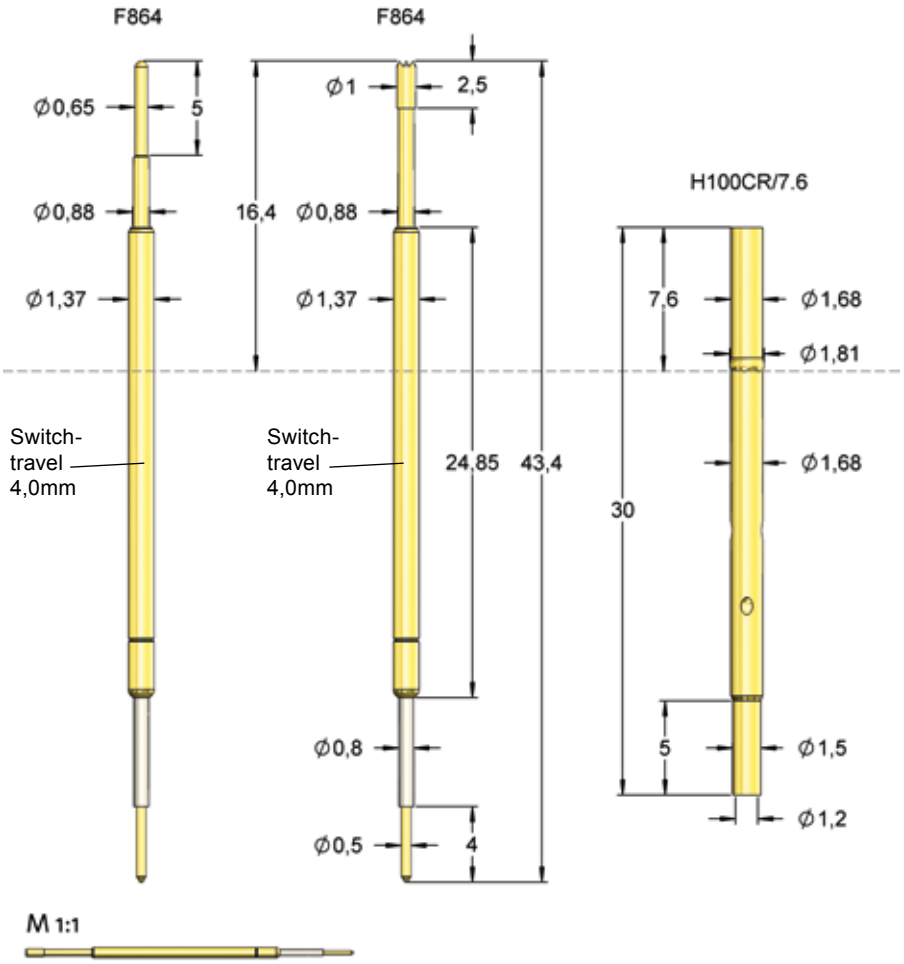
Insertion tool receptacle	FEWZ-100E0
Screw-in tool probe	FDWZ-100

Drill Size (mm)

H100 Press ring as stop	1,67 -1,69
H100 Press ring inserted	1,70 - 1,75

Projection Height (mm)

H100CR/7.6 with F864	8,8 - 16,4



Series			Tip-Ø		Spring Force (cN)
F864	06	B	100	G	200
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 100 = 1,00 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,00	-
	06	B	G	1,30	-
	11	B	G	0,65	-
	17	B	G	1,00	-

F879 (NO)

Switch Probe 100 mil
Short Version, Threaded

Centers (mm/mil)	2,54 / 100
Current	3,0 A
Current (Switch)	1,0 A
R typ	65 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	50	200

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
Switch Travel (mm)		2,6
Thread (M)		2,0x0,25
Wrench Size		1,7
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

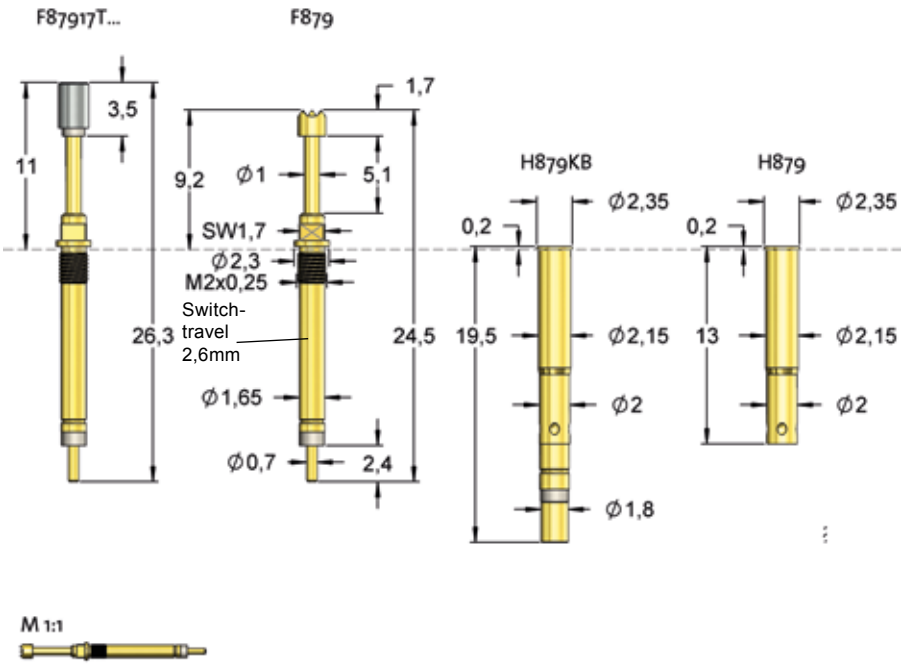
Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe	FWZ732 (T)

Drill Size (mm)

Receptacle without knurl	2,14 - 2,16

Projection Height (mm)

H879... with F879	9,2
H879... with F879...T	11,0



Version F87917T200N200 is 1,8 mm longer than standard (projection height with receptacle = 11,0 mm).

Series			Tip-Ø		Spring Force (cN)
F879	06	B	180	G	200
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 180 = 1,80 mm (e.g.)
Plating: G = Gold plated, N = Nickel plated
Receptacle: Order code according drawing

* deviation from standard see drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,80	-
	11	B	G	1,00	-
	16	B	G	1,00	-
	17	B	G	1,80	-
	17	T *	N	2,00	-

F877 (NO)

Switch Probe 100 mil Threaded

Centers (mm/mil)	2,54 / 100
Current	3,0 A
Current (Switch)	1,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
S26	20	80
S26	40	150
S26	110	300

Travel (mm)

Version	Nominal	Maximum
S26	4,0	5,3
Switch Travel (mm)		2,6
Thread (M)		2,0x0,25
Wrench Size		1,7
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

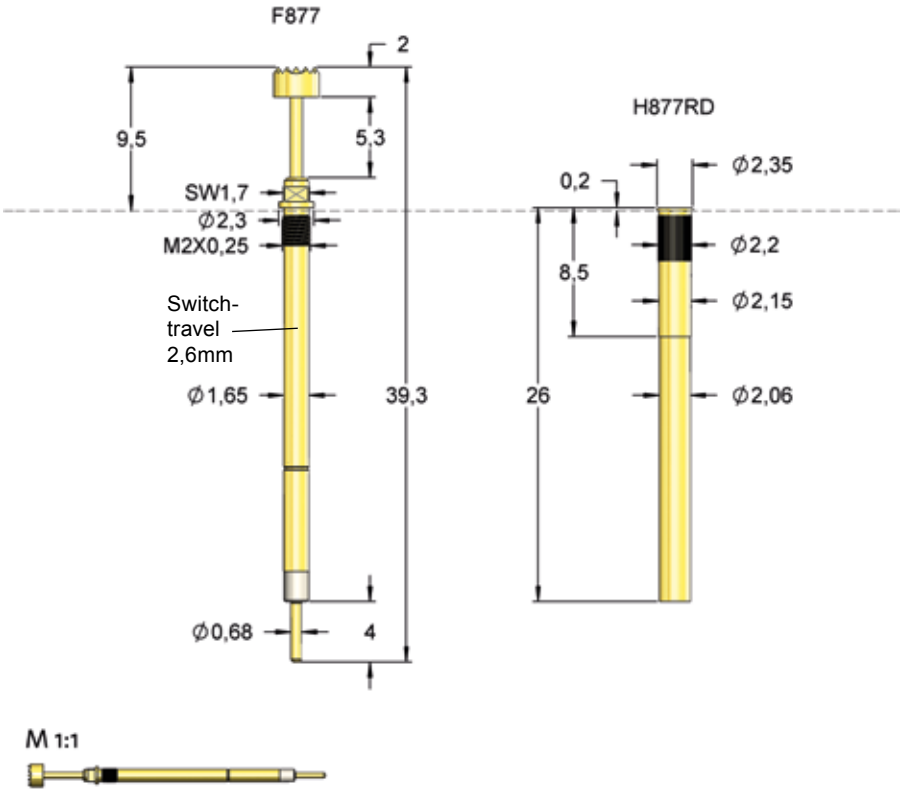
Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe	FWZ732 (T) max. Ø2,0 mm
Screw-in tool probe	FWZ732S1 (T1) max. Ø2,7 mm

Drill Size (mm)

Receptacle with knurl	2,16 - 2,19

Projection Height (mm)

H877RD with F877	9,5



Series			Tip-Ø		Spring Force (cN)	
F877	06	B	150	G	150	S26
	Tip Style	Material		Plating		Version

Material: B = BeCu
Tip-Ø: 150 = 1,50 mm (e.g.)
Plating: G = Gold plated
Version: S26 = Switch travel 2,6 mm
Receptacle: Order code according drawing

* Center differing from standard.

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,50	S26
	06	B	G	3,00 *	S26
	16	B	G	0,80	S26
	17	B	G	1,00	S26

F878 (NO)

Switch Probe 100 mil Plug-In

Centers (mm/mil)	2,54 / 100
Current	3,0 A
Current (Switch)	1,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
S26	20	80
S26	40	150
S26	110	300

Travel (mm)

Version	Nominal	Maximum
S26	4,0	5,3
Switch Travel (mm)		2,6
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

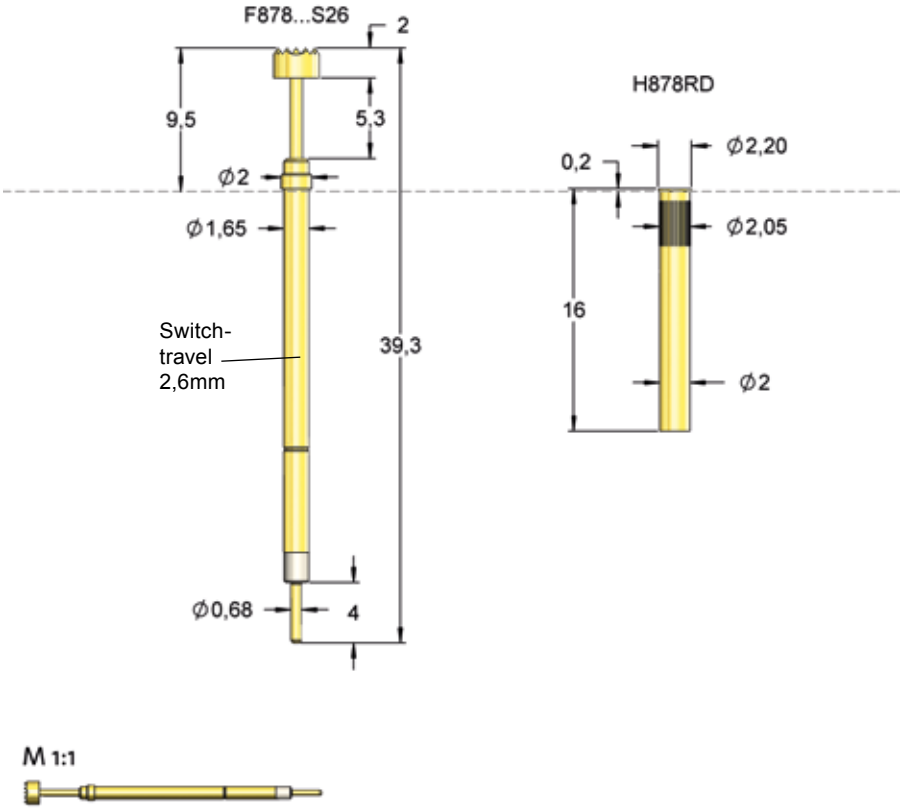
Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe	FDWZ-100

Drill Size (mm)

Receptacle with knurl	2,01 - 2,04

Projection Height (mm)

H878RD with F878	9,5



Series			Tip-Ø		Spring Force (cN)	
F878	06	B	150	G	150	S26
	Tip Style	Material	Plating		Version	

Material: B = BeCu
Tip-Ø: 150 = 1,50 mm (e.g.)
Plating: G = Gold plated
Version: S26 = Switch travel 2,6 mm
Receptacle: Order code according drawing

* Center differing from standard.

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,50	S26
	06	B	G	3,00 *	S26
	16	B	G	0,80	S26
	17	B	G	1,00	S26

F876 (NO)

Switch Probe 100 mil Threaded

Centers (mm/mil)	2,54 / 100
Current	3,0 A
Current (Switch)	1,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
S26	40	150
S26	110	300
S40	40	150
S40	110	300

Travel (mm)

Version	Nominal	Maximum
S26	4,0	5,3
S40	4,0	5,3
Switch Travel (mm)		
S26		2,6
S40		4,0
Thread (M)		2,0x0,25
Wrench Size		1,7
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

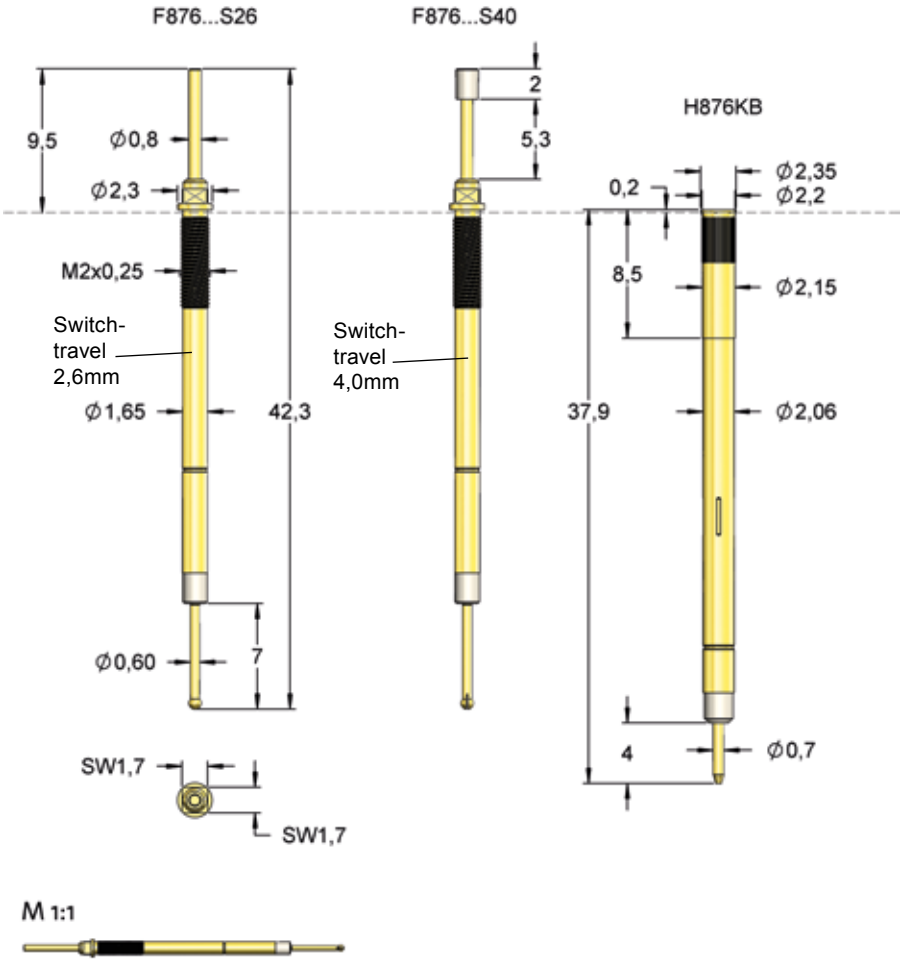
Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe	FWZ732 (T) max. Ø2,0 mm
Screw-in tool probe	FWZ732S1 (T1) max. Ø2,7 mm

Drill Size (mm)

Receptacle with knurl	2,16 - 2,19

Projection Height (mm)

H876KB with F876	9,5



Series			Tip-Ø		Spring Force (cN)	
F876	**06**	**B**	**150**	**G**	**150**	**S26**
	Tip Style	Material		Plating		Version

Material: B = BeCu, K = Synthetic
Tip-Ø: 150 = 1,50 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: S26 = Switch travel 2,6 mm (e.g.)
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,50	S26
	16	B	G	0,80	S26
	17	B	G	1,50	S26
	17	K	U	1,50	S26
	06	B	G	1,50	S40
	16	B	G	0,80	S40
	17	B	G	1,50	S40
	17	K	U	1,50	S40

F873 (NC)

Switch Probe 100 mil Opener, Threaded

UTILITY MODEL

Centers (mm/mil)	2,54 / 100
Current	5,0 A
Current (Switch)	1,0 A
R typ	65 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	50	250

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
Switch Travel (mm)		1,5
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	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

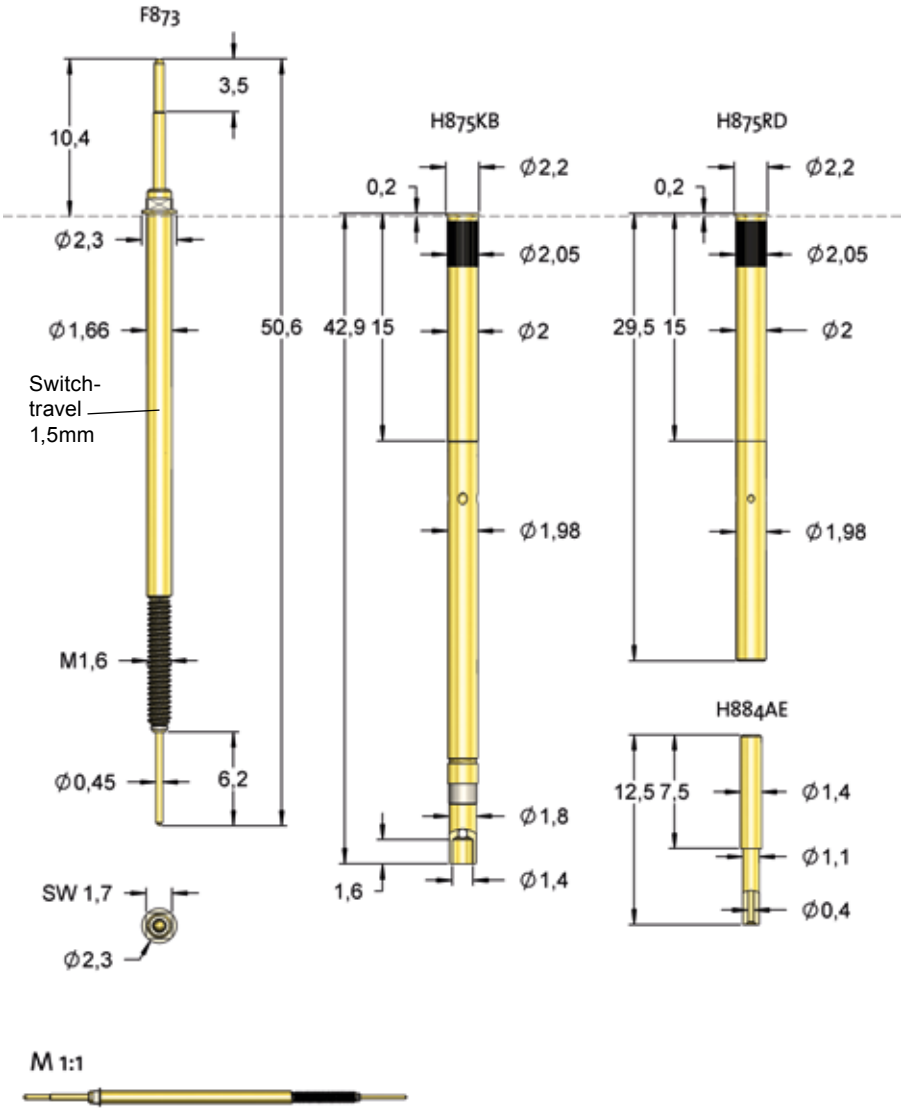
Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe	FWZ732 (T) max. Ø 2,0 mm
Screw-in tool probe	FWZ732S1 (T1) max. Ø 2,7 mm

Drill Size (mm)

Receptacle without knurl	1,99 - 2,00
Receptacle with knurl	2,02 - 2,03

Projection Height (mm)

H875 / H875RD / H875KB with F873	10,4 - 15,4
H875/5 /H875KB/5 with F873	15,2 - 20,2



The probe F873 can be height adjusted by 5,0 mm independently from the used receptacle. It is held in its position by pressure marks. For further receptacles see datasheet H875.

Series			Tip-Ø		Spring Force (cN)
F873	16	B	100	G	250
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 100 = 1,00 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	11	B	G	0,64	-
	16	B	G	1,00	-

H875

Receptacles for Switch Probe Series F875, F873 and F375

Receptacle H875
This receptacle allows variable projection heights of
F873: 10,4 – 15,4 mm F875: 10,4 – 15,4 mm
F375: 15,0 – 20,0 mm F875 ... L: 16,9 – 21,9 mm
Material: Brass, gold plated

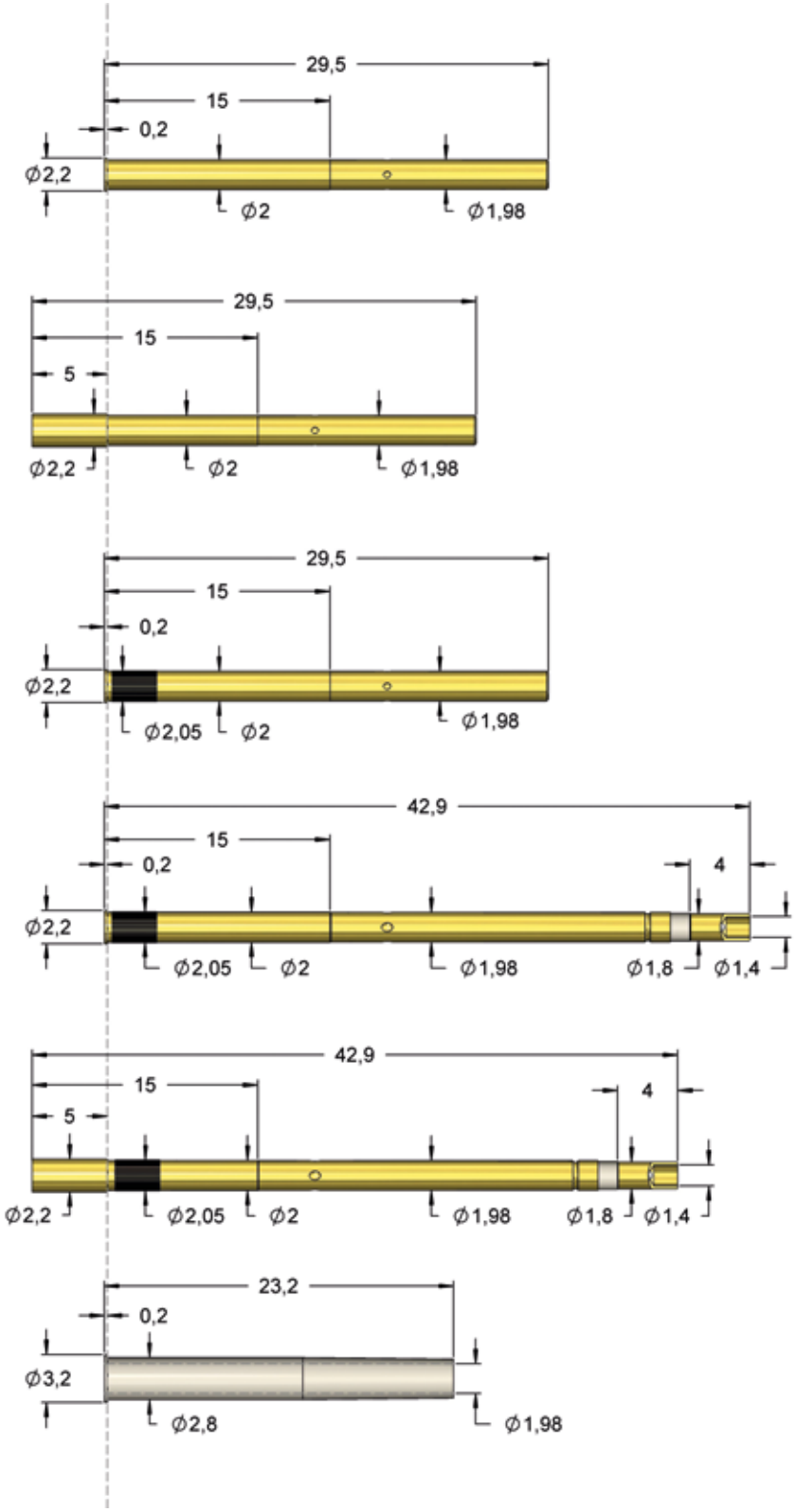
Receptacle H875/5
This receptacle has a collar of 5,0 mm for larger projection heights:
F873: 15,2 – 20,2 mm F875: 15,2 – 20,2 mm
F375: 19,8 – 24,8 mm F875 ... L: 21,7 – 26,7 mm
Material: Brass, gold plated

Receptacle H875RD
This receptacle has the same dimensions as H875, but it has a knurl for a secure seat in the drill hole
Projection heights:
F873: 10,4 – 15,4 mm F875: 10,4 – 15,4 mm
F375: 15,0 – 20,0 mm F875 ... L: 16,9 – 21,9 mm
Material: Brass, gold plated

Receptacle H875KB for solderless exchange of probes
In combination with this receptacle switch probes can be exchanged solderless. The projection height is adjustable as with receptacle H875:
F873: 10,4 – 15,4 mm F875: 10,4 – 15,4 mm
F375: 15,0 – 20,0 mm F875 ... L: 16,9 – 21,9 mm
Solder temperature max. 300 °C.
Material: Brass, gold plated

Receptacle H875KB/5 for solderless exchange of probes
This receptacle is the same as H875KB, just with a collar of 5,0 mm for larger projection heights:
F873: 15,2 – 20,2 mm F875: 15,2 – 20,2 mm
F375: 19,8 – 24,8 mm F875 ... L: 21,7 – 26,7 mm
Solder temperature max. 300 °C.
Material: Brass, gold plated

Insulating sleeve H875IS
In combination with insulating sleeves it is possible to mount all H875 receptacles insulated into conductive material , e.g. steel Because of the collar the projection height is increased by 0,2 mm.
The insulating sleeve can be used up to 260 °C.
Material: Polyetheretherketone, PEEK



Drill Size (mm)

Receptacle without knurl	1,99 - 2,00
Receptacle with knurl	2,00 - 2,02
Insulating sleeve	2,78 - 2,79

For inserting the receptacles the tool FEWZ-772E0 can be used.

F875 (NO)

Switch Probe 100 mil Threaded

UTILITY MODEL

Centers (mm/mil)	2,54 / 100
Current	5,0 A
Current (Switch)	1,0 A
R typ	65 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	20	80
Standard	30	135
Standard	60	200
Standard	60	300
Standard	80	350
Standard	170	500
L	30	135
L	60	200
L	60	300
L	80	350

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
L	4,0	5,0
Switch Travel (mm)		1,5
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	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

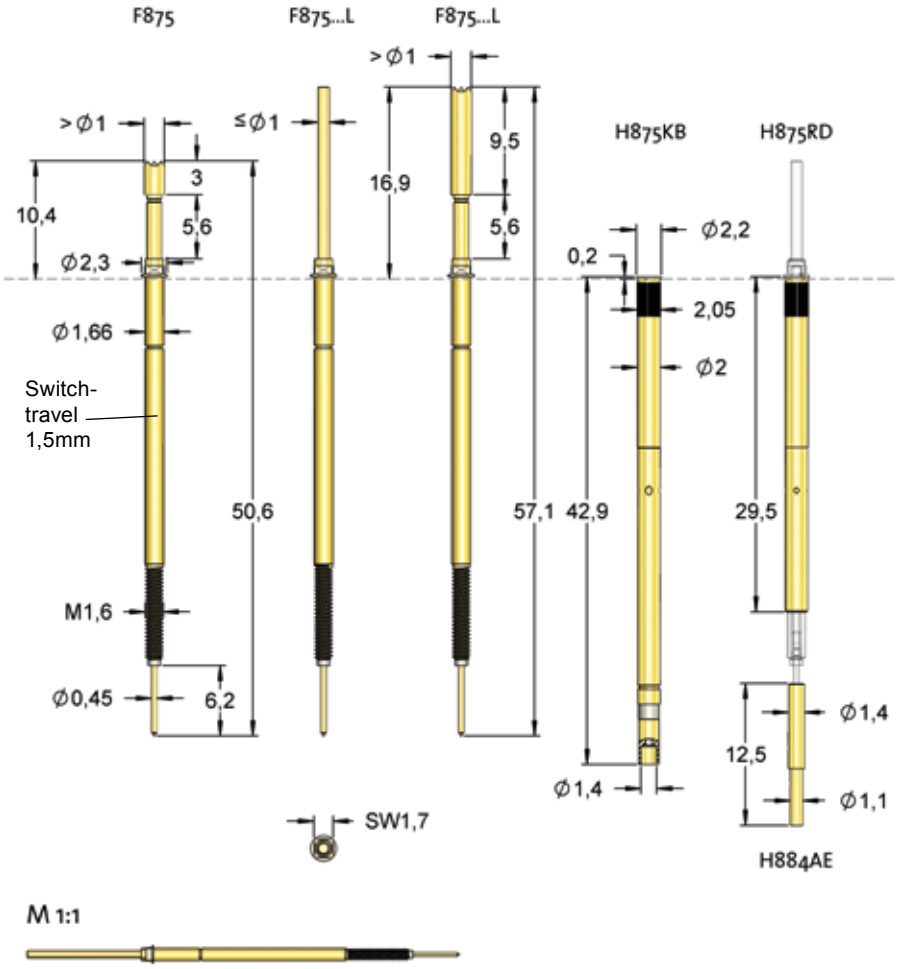
Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe	FWZ732 (T) max. Ø 2,0 mm
Screw-in tool probe	FWZ732S1 (T1) max. Ø 2,7 mm

Drill Size (mm)

Receptacle without knurl	1,99 - 2,00
Receptacle with knurl	2,02 - 2,03

Series			Tip-Ø		Spring Force (cN)	
F875	16	B	100	G	135	L
	Tip Style	Material		Plating		Version

Material: B = BeCu, K = Synthetic, T = BeCu-Head insulated
Tip-Ø: 100 = 1,00 mm (e.g.)
Plating: G = Gold plated, N = Nickel plated, U = Unplated
Version: L = Long version
Receptacle: Order code according drawing



The probe F875 can be height adjusted by 5,0 mm independently from the used receptacle. It is held in its position by pressure marks. For further receptacles see datasheet H875.

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	B	G	1,80	-
	06	B	G	1,00	L
	06	B	G	1,30	-
	06	B	G	1,40	L
	06	B	G	1,50	-
	06	B	G	1,80	-
	06	B	G	1,80	L
	06	B	G	2,00	-
	06	B	G	2,30	-
	11	B	G	0,64	-
	11	B	G	1,00	-
	11	B	G	1,00	L
	16	B	G	0,60	-

F875 (NO)

Switch Probe 100 mil Threaded

Projection Height (mm)	
H875 / H875RD / H875KB with F875	10,4 - 15,4
H875/5 / H875KB/5 with F875	15,2 - 20,2
H875 / H875RD / H875KB with F875...L	16,9 - 21,9
H875/5 / H875KB/5 with F875...L	21,7 - 26,7

Tip Style	Number	Material	Plating	Ø in mm	Version
	16	B	G	0,64	-
	16	B	G	0,70	-
	16	B	G	0,80	-
	16	B	G	1,00	-
	16	B	G	1,00	L
	17	B	G	1,80	-
	17	B	N	1,80	-
	17	B	G	2,00	-
	17	K	U	1,80	-
	17	T	N	1,80	-

F375 (NO)

Switch Probe 100 mil
Long Version, Threaded

Centers (mm/mil)	2,54 / 100
Current	5,0 A
Current (Switch)	1,0 A
R typ	50 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	30	200

Travel (mm)

Version	Nominal	Maximum
Standard	8,0	9,5
Switch Travel (mm)		1,5
Thread (M)		1,6
Wrench Size		1,7
Pointing Accuracy		±0,15 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

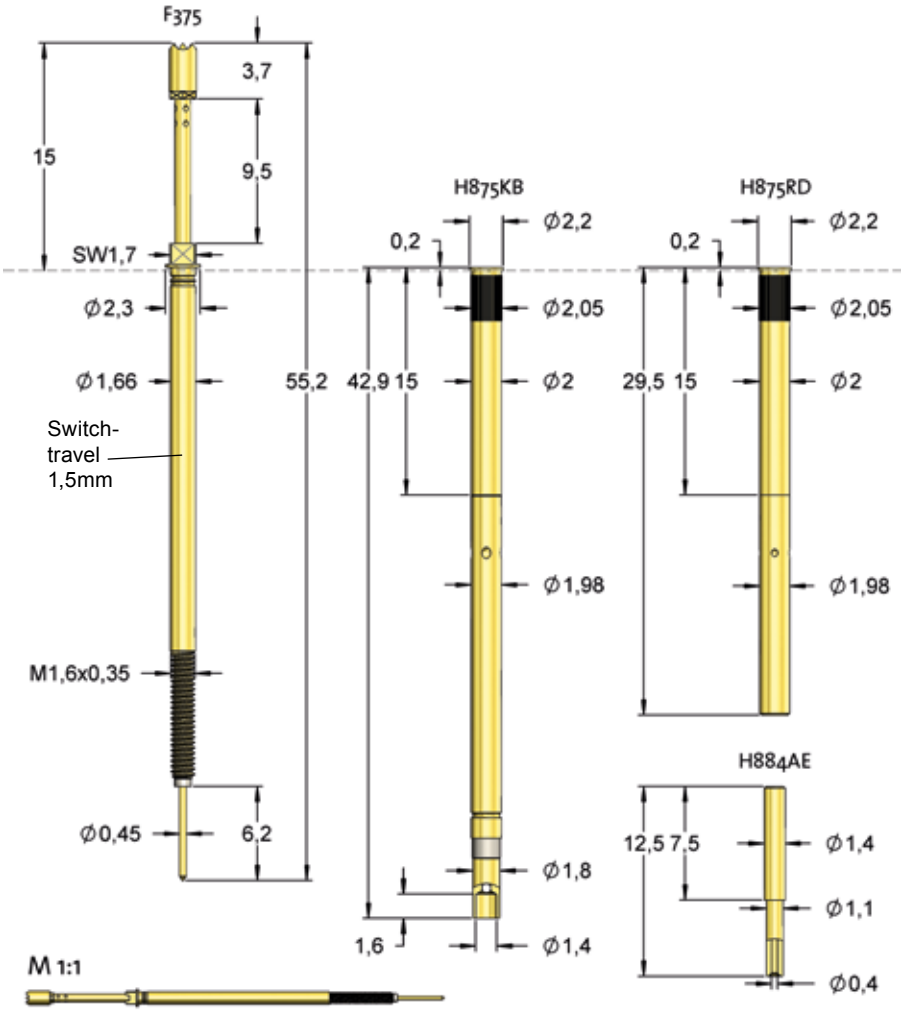
Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe	FWZ732 (T) max. Ø 2,0 mm
Screw-in tool probe	FWZ732S1 (T1) max. Ø 2,7 mm

Drill Size (mm)

Receptacle without knurl	1,99 - 2,00
Receptacle with knurl	2,02 - 2,03

Projection Height (mm)

H875 / H875RD / H875KB with F375	15,0 - 20,0
H875/5 / H875KB/5 with F375	19,8 - 24,8



The probe F375 can be height adjusted by 5,0 mm, independently from the used receptacle. It is held in its position by pressure marks. For further receptacles see datasheet H875.

Series			Tip-Ø		Spring Force (cN)
F375	06	B	180	G	200
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 180 = 1,80 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,80	-
	17	B	G	1,80	-

F867 (NO)

Switch Probe 138 mil Threaded

UTILITY MODEL

Centers (mm/mil)	3,50 / 138
Current	5,0 A
Current (Switch)	1,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	50	130
Standard	70	180
Standard	120	300
Standard	450	800
S40	50	130
S40	70	180
S40	120	300
S40	450	800

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
S40	4,0	5,0
Switch Travel (mm)		
Standard		1,7
S40		4,0
Thread (M)		3,0x0,35
Wrench Size		3,0
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

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

Drill Size (mm)

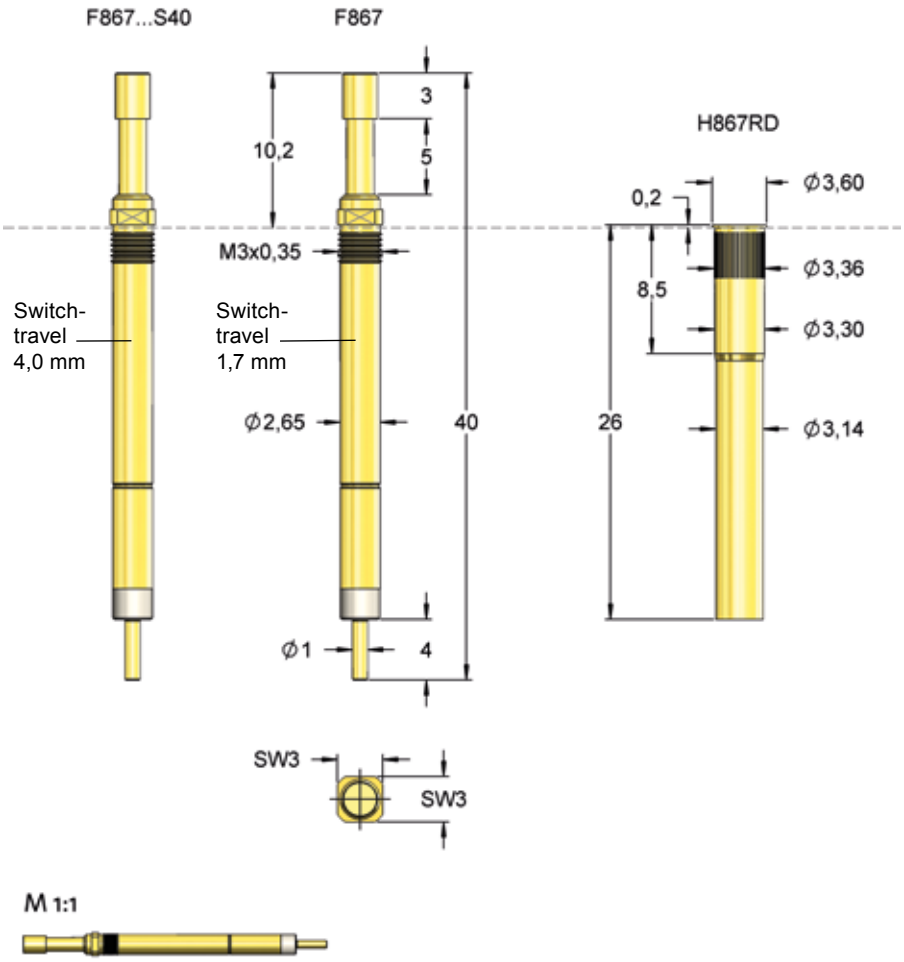
Receptacle without knurl	2,98 -2,99
Receptacle with knurl	3,00 -3,02

Projection Height (mm)

H867RD with F867	10,2

Series			Tip-Ø		Spring Force (cN)	
F867	**06**	**B**	**180**	**G**	**130**	**S40**
	Tip Style	Material		Plating		Version

Material: B = BeCu, K = Synthetic
Tip-Ø: 180 = 1,80 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: S40 = 4,0mm switch travel (differing from standard)
Receptacle: Order code according drawing



Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,80	-
	06	B	G	2,30	-
	16	B	G	1,80	-
	17	B	G	2,30	-
	17	K	U	2,30	-
	06	B	G	1,80	S40
	06	B	G	2,30	S40
	16	B	G	1,80	S40
	17	B	G	2,30	S40
	17	K	U	2,30	S40

F866 (NO)

Switch Probe 138 mil Threaded

UTILITY MODEL

Centers (mm/mil)	3,50 / 138
Current	10,0 A
Current (Switch)	1,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	50	230
Standard	70	280
Standard	120	400
Standard	450	900
S40	50	130
S40	70	180
S40	120	300
S40	450	800

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
S40	4,0	5,0
Switch Travel (mm)		
Standard		1,7
S40		4,0
Thread (M)		3,0x0,35
Wrench Size		3,0
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

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

Drill Size (mm)

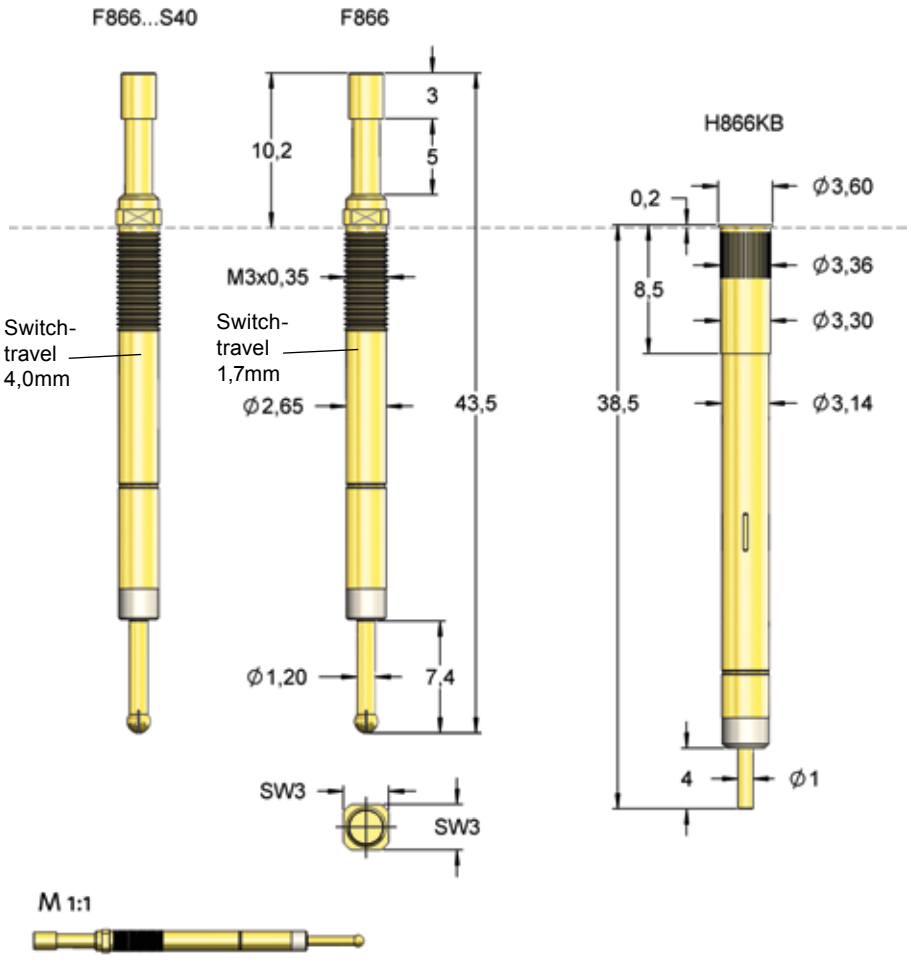
Receptacle with knurl	3,30 - 3,33

Projection Height (mm)

H866KB with F866	10,2

Series			Tip-Ø		Spring Force (cN)	
F866	**06**	**B**	**180**	**G**	**130**	**S40**
	Tip Style	Material		Plating		Version

Material: B = BeCu, K = Synthetic
Tip-Ø: 180 = 1,80 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: S40 = 4,0mm switch travel (differing from standard)
Receptacle: Order code according drawing



Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,80	-
	06	B	G	2,30	-
	16	B	G	1,80	-
	17	B	G	2,30	-
	17	K	U	2,30	-
	06	B	G	1,80	S40
	06	B	G	2,30	S40
	16	B	G	1,80	S40
	17	B	G	2,30	S40
	17	K	U	2,30	S40

F884 (NO)

Switch Probe 138 mil Plug-In

Centers (mm/mil)	3,50 / 138
Current	10,0 A
Current (Switch)	1,0 A
R typ	50 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
LM	50	200
LM	80	350
SM	50	200
SM	80	350
SM	220	900

Travel (mm)

Version	Nominal	Maximum
LM	4,0	5,0
SM	4,0	5,0
Switch Travel (mm)		1,7
Pointing Accuracy		±0,09 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

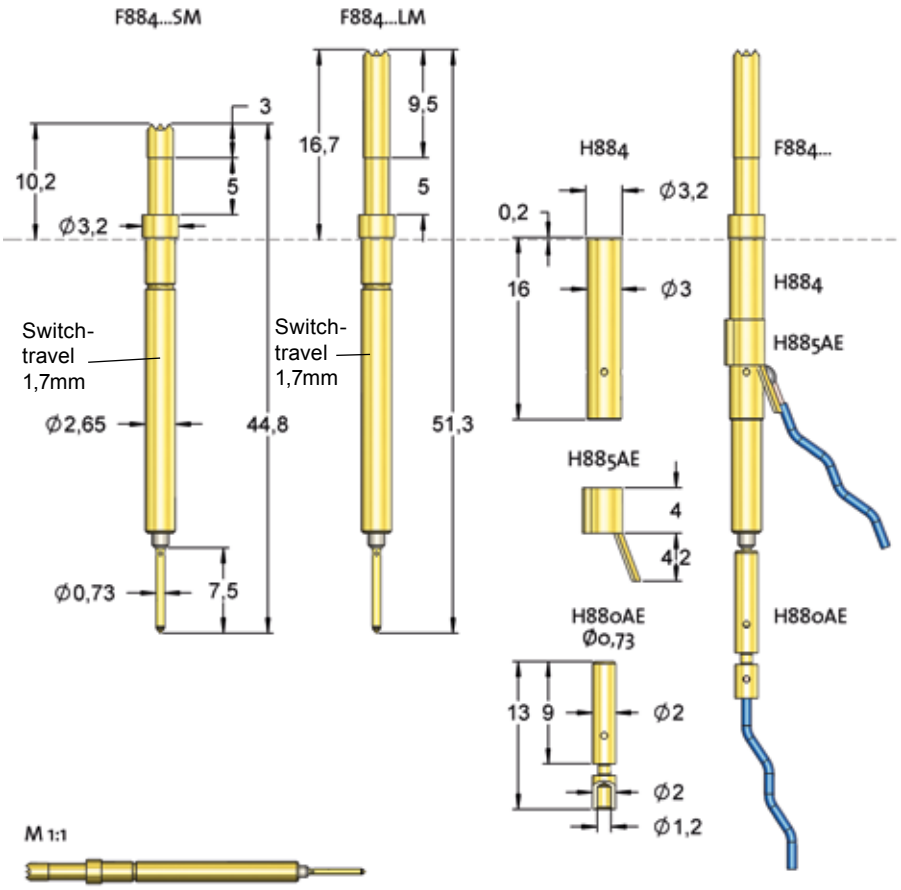
Insertion tool receptacle	FEWZ-774E0

Drill Size (mm)

Receptacle without knurl	2,98 - 2,99

Projection Height (mm)

H884 / H884/23 with F884...SM	10,2
H884 / H884/23 with F884...LM	16,7



Series			Tip-Ø		Spring Force (cN)	
F884	**06**	**B**	**100**	**G**	**350**	**SM**
	Tip Style	Material		Plating		Version

Material: B = BeCu, K = Synthetic
Tip-Ø: 100 = 1,00 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: SM = Short version, LM =Long version
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	2,30	LM
	06	B	G	1,00	SM
	06	B	G	2,30	SM
	17	B	G	2,30	SM
	17	B	G	3,00	SM
	17	K	U	3,00	SM

F880 (NO)

Switch Probe for Backward Assembly, Threaded

UTILITY MODEL

Centers (mm/mil)	3,50 / 138
Current	10,0 A
Current (Switch)	1,0 A
R typ	50 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	80	350
L	50	150
L	80	350

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
L	4,0	5,0
Switch Travel (mm)		1,7
Thread (M)		2,5x0,35
Wrench Size		2,2
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

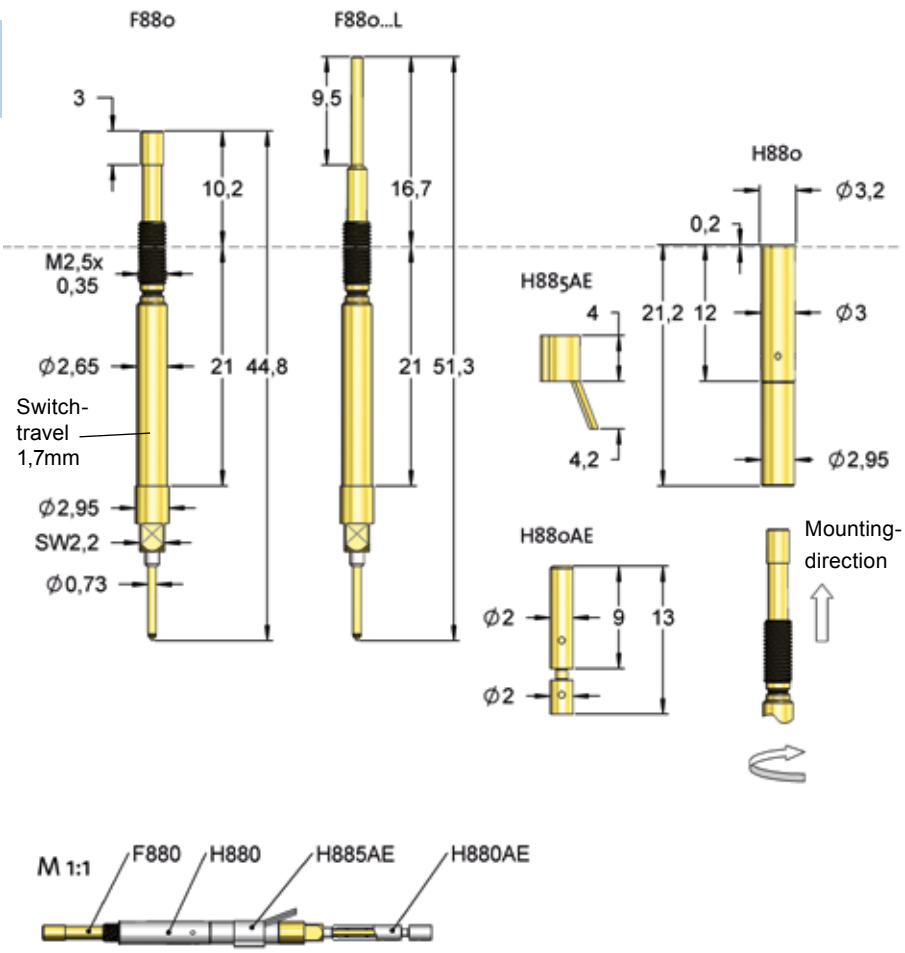
Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZVF3 (T)
Screw-in tool with LED	FWZ880SA

Drill Size (mm)

H880	2,98-2,99

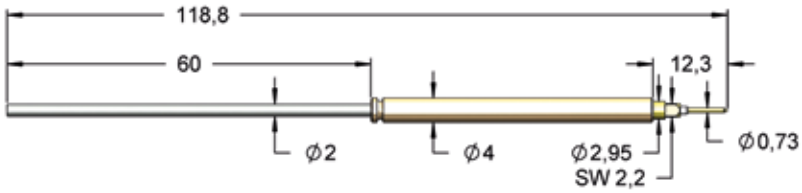
Projection Height (mm)

H880 with F880	6,2 - 10,2
H880 with F880...L	12,7 - 16,7



The probe F880 can be mounted and exchanged from backwards, which can be useful for modules that are difficult to access, e.g. a second level of a test module.

Special version 1860S206 NEW



For the special version 1860S206 the probe F88016B100G150L was built up with an extension in a brass receptacle. Datasheet available on request.

Series			Tip-Ø		Spring Force (cN)	
F880	16	B	100	G	150	L
	Tip Style	Material		Plating		Version

Material: B = BeCu
Tip-Ø: 100 = 1,00 mm (e.g.)
Plating: G = Gold plated
Version: L = Long version
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	16	B	G	1,00	L
	17	B	G	2,00	-

F881 (NO)

Electrically Isolated Switch Probe, Threaded

UTILITY MODEL

Centers (mm/mil)	3,50 / 138
Current	10,0 A
Current (Switch)	1,0 A
R typ	25 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	80	380

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
Switch Travel (mm)		1,7
Thread (M)		2,5
Wrench Size		2,6
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

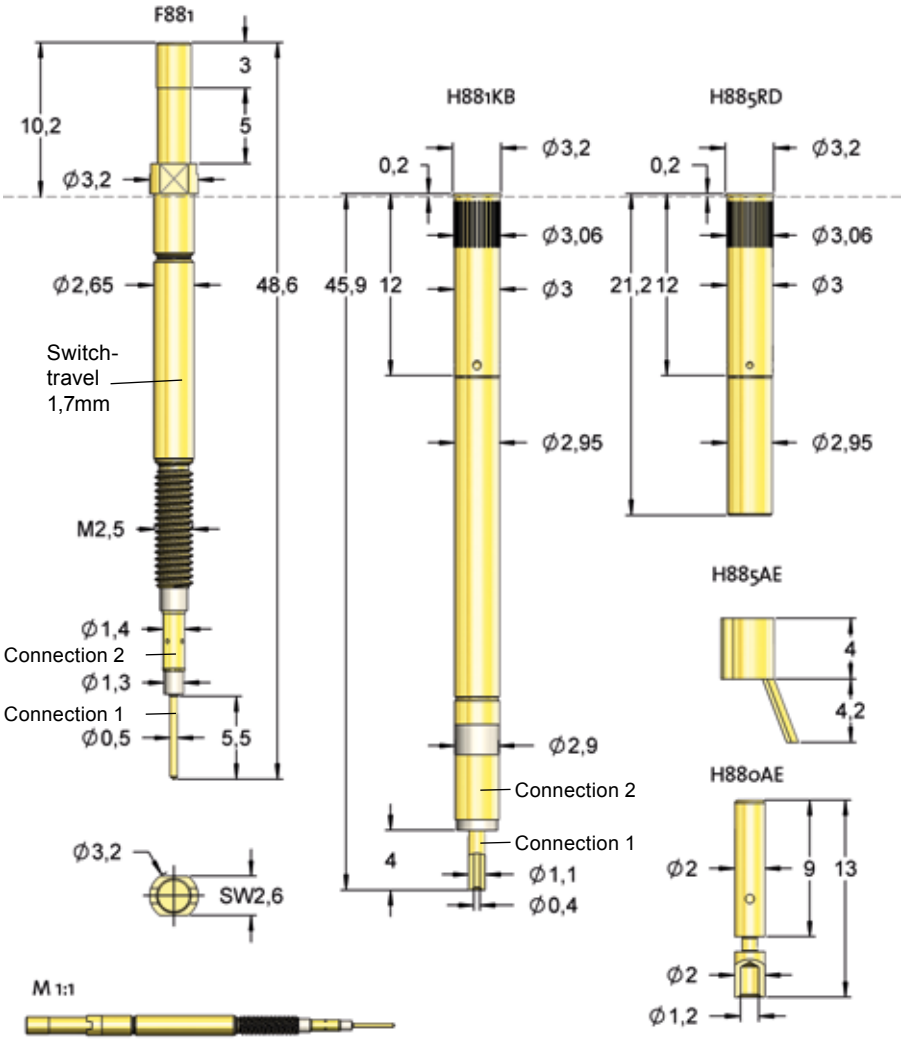
Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZ885 (T) max. Ø2,5 mm
Screw-in tool probe	FWZ885S1 (T1) max. Ø3,1 mm

Drill Size (mm)

Receptacle with knurl	3,00 - 3,02

Projection Height (mm)

H881KB with F881	10,2 - 12,2
H885 / H885RD with F881	10,2 - 15,2
H885/5 with F881	15,0 - 20,0



The probe F881 can be height adjusted by 5,0 mm, independently from the used receptacle. It is held in its position by pressure marks. For further receptacles see datasheet H885.

Series			Tip-Ø		Spring Force (cN)
F881	05	B	230	G	380
	Tip Style	Material		Plating	Version

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

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	B	G	2,30	-
	05	B	G	3,00	-
	06	B	G	2,30	-
	06	B	G	3,00	-
	17	B	G	2,30	-
	17	B	G	3,00	-

F883 (NC)

Switch Probe 138 mil Opener, Threaded

UTILITY MODEL

Centers (mm/mil)	3,50 / 138
Current	10,0 A
Current (Switch)	1,0 A
R typ	50 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
LM	40	230
SM	40	230

Travel (mm)

Version	Nominal	Maximum
LM	4,0	5,0
SM	4,0	5,0
Switch Travel (mm)		1,7
Thread (M)		2,5
Wrench Size		2,6
Pointing Accuracy		±0,09 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZ885 (T) max. Ø2,5 mm
Screw-in tool probe	FWZ885S1 (T1) max. Ø3,1 mm

Drill Size (mm)

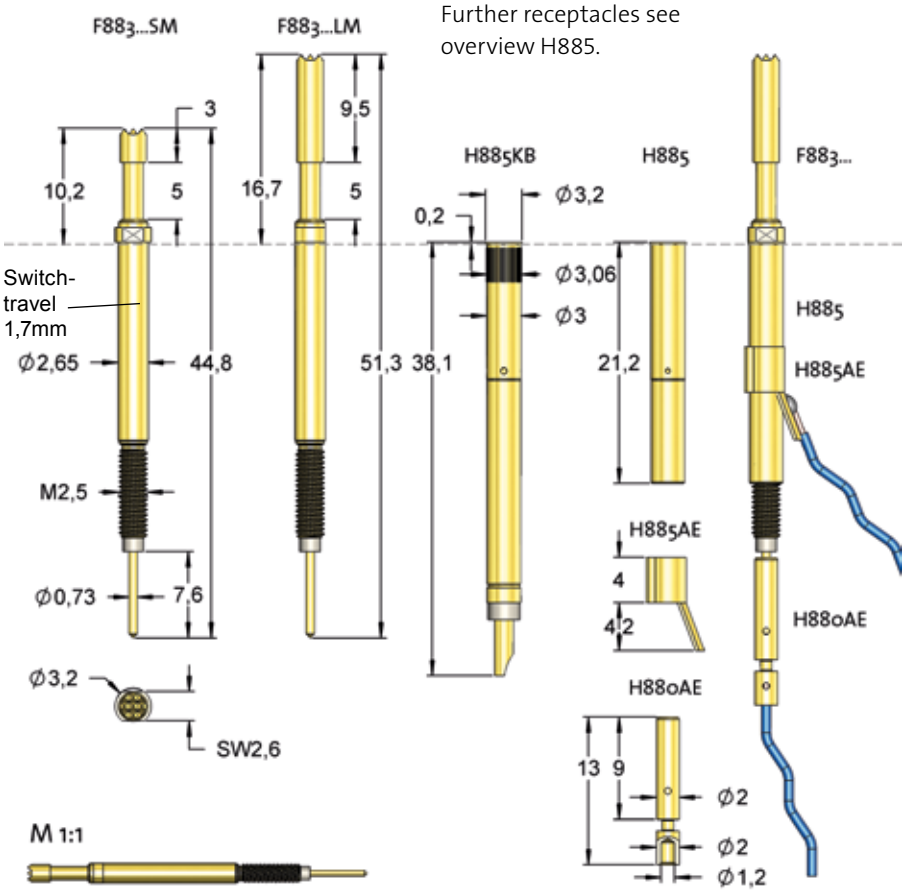
Receptacle without knurl	2,98 - 2,99
Receptacle with knurl	3,00 - 3,02

Projection Height (mm)

H885 / H885RD / H885KB with F883...SM	10,2 - 15,2
H885/5 / H885KB/5 with F883...SM	15,0 - 20,0
H885 / H885RD / H885KB with F883...LM	16,7 - 21,7
H885/5 / H885KB/5 with F883...LM	21,5 - 26,5

Series			Tip-Ø		Spring Force (cN)	
F883	05	B	230	G	230	SM
	Tip Style	Material		Plating		Version

Material: B = BeCu, K = Synthetic
Tip-Ø: 230 = 2,30 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: SM = Short version, LM =Long version
Receptacle: Order code according drawing



Further receptacles see overview H885.

The probe F883 can be height adjusted by 5,0 mm, independently from the used receptacle. It is held in its position by pressure marks. For further receptacles see datasheet H885.
Versions with switch travel 0,5 mm available on request.

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	B	G	2,30	SM
	06	B	G	2,30	LM
	06	B	G	2,30	SM
	16	B	G	1,80	SM
	17	B	G	2,30	SM
	17	K	U	2,30	SM

H885

Receptacles for Switch Probe Series F883, F885, F886, F485, F486 and F385

Receptacle H885RD
This receptacle has the same dimensions as H885, bit just has a knurl for a secure seat in the drill hole.
Projection heights:
F883: 10,2 – 15,2 mm F885/F886 ... SM 10,2 – 15,2 mm
F385: 17,0 – 22,0 mm F885/F886 ... LM: 16,7 – 21,7 mm
Material: Brass, gold plated

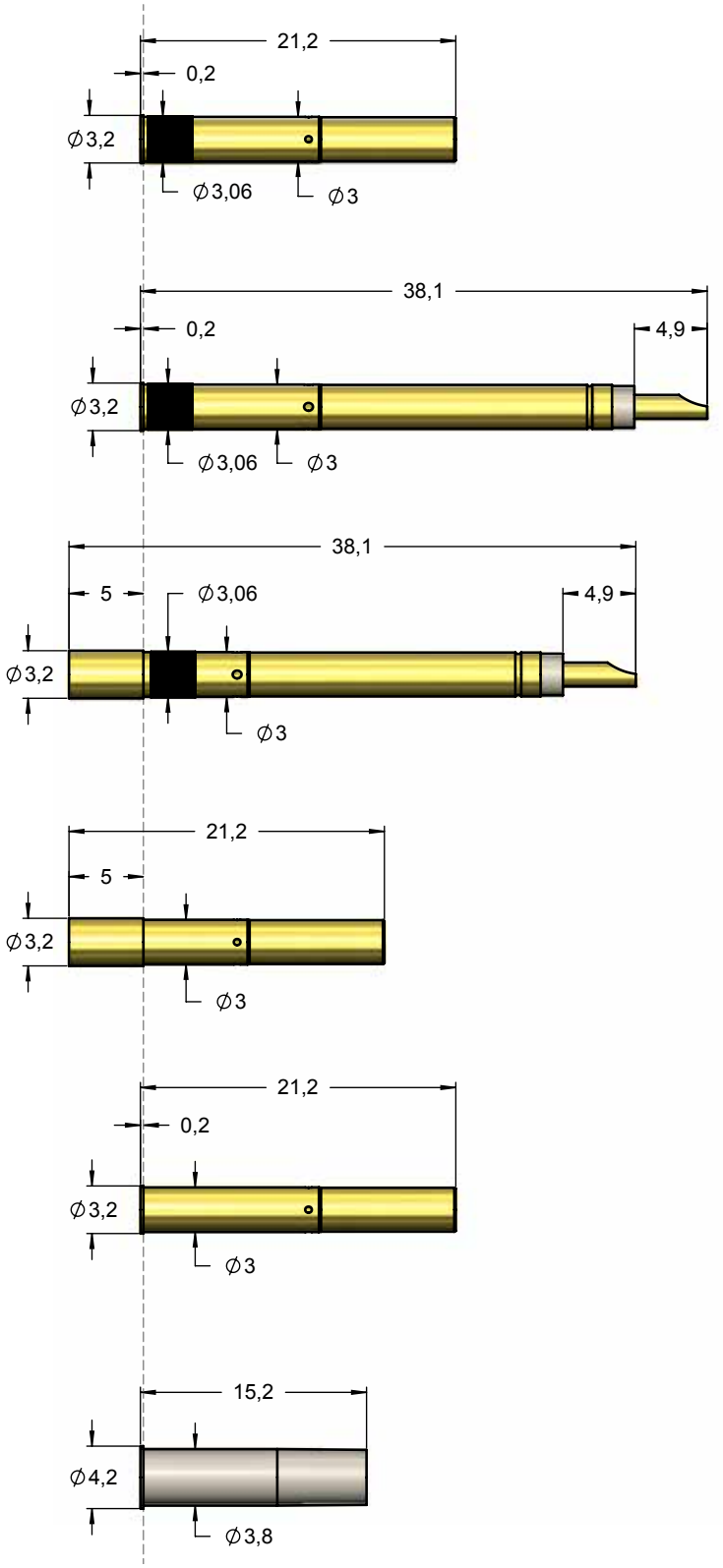
Receptacle H885KB for solderless exchange of probes
In combination with this receptacle switch probes can be exchanged solderless. The projection height is adjustable as with receptacle H885:
F883: 10,2 – 15,2 mm F885/F886 ... SM 10,2 – 15,2 mm
F385: 17,0 – 22,0 mm F885/F886 ... LM: 16,7 – 21,7 mm
Solder temperature max. 300 °C.
Material: Brass, gold plated

Receptacle H885KB/5 for solderless exchange of probes
This receptacle is the same as H885KB, but with a collar of 5,0 mm for larger projection heights:
F883: 15,0 – 20,0 mm F885/F886 ... SM: 15,0 – 20,0 mm
F385: 21,8 – 26,8 mm F885/F886 ... LM: 21,5 – 26,5 mm
Solder temperature max. 300 °C.
Material: Brass, gold plated

Receptacle H885/5
This receptacle has a collar of 5,0 mm for larger projection heights:
F883: 15,0 – 20,0 mm F885/F886 ... SM: 15,0 – 20,0 mm
F385: 21,8 – 26,8 mm F885/F886 ... LM: 21,5 – 26,5 mm
Material: Brass, gold plated

Receptacle H885
This receptacle allows variable projection heights:
F883: 10,2 – 15,2 mm F885/F886 ... SM 10,2 – 15,2 mm
F385: 17,0 – 22,0 mm F885/F886 ... LM: 16,7 – 21,7 mm
Material: Brass, gold plated

Insulating sleeve H885IS
In combination with insulating sleeves it is possible to mount all H885 receptacles insulated into conductive material, e.g. steel. Because of the collar the projection height is increased by 0,2 mm.
The insulating sleeve can be used up to 260 °C.
Material: Polyetheretherketone, PEEK



Drill Size (mm)

Receptacle without knurl	2,98 - 2,99
Receptacle with knurl	3,00 - 3,02
Insulating sleeve	3,78 - 3,79

For inserting the receptacles the tool FEWZ-774E0 can be used.

F885 (NO)

Switch Probe 138 mil Threaded

UTILITY MODEL

Centers (mm/mil)	3,50 / 138
Current	10,0 A
Current (Switch)	1,0 A
R typ	50 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
LM	50	200
LM	80	350
LM	120	550
LM	220	900
LM	300	1250
SM	30	70
SM	50	200
SM	80	350
SM	120	550
SM	220	900
SM	300	1250
S2	80	350

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
Switch Travel (mm)		1,7
Thread (M)		2,5
Wrench Size		2,6
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

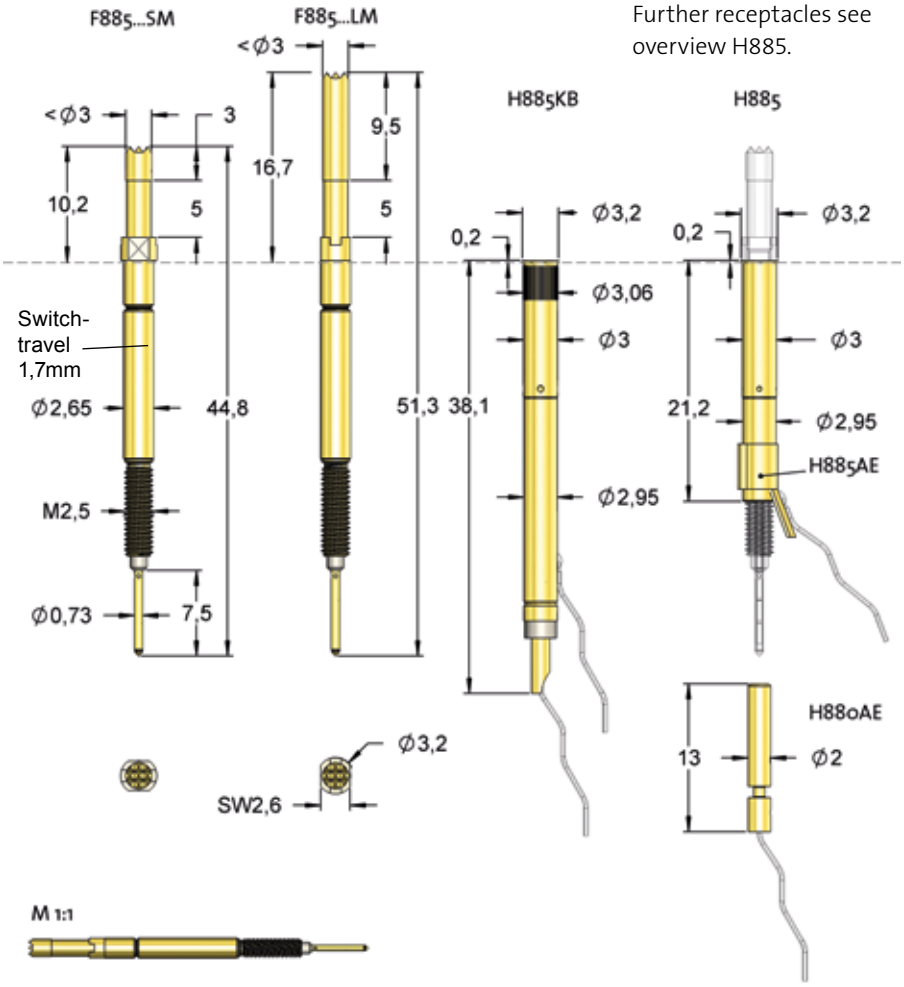
Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZ885 (T) max. Ø2,5 mm
Screw-in tool probe	FWZ885S1 (T1) max. Ø3,1 mm

Drill Size (mm)

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

Series			Tip-Ø		Spring Force (cN)	
F885	**03**	**B**	**080**	**G**	**135**	**SM**
	Tip Style	Material		Plating		Version

Material: B = BeCu, K = Synthetic
Tip-Ø: 080 = 0,80 mm (e.g.)
Plating: G = Gold plated, U = Unplated
Version: SM = Short version, LM =Long version
Receptacle: Order code according drawing



Further receptacles see overview H885.

The probe F885 can be height adjusted by 5,0 mm independently from the used receptacle. It is held in its position by pressure marks. For further receptacles see datasheet H885.
Versions with switch travel 3,5 mm available on request.
The version with spring force 1250 cN has a reduced maximum travel of 4,2 mm.

Tip Style	Number	Material	Plating	Ø in mm	Version
	03	B	G	0,80	SM
	05	B	G	2,30	LM
	05	B	G	2,30	SM
	05	B	G	3,00	LM
	05	B	G	3,00	SM
	06	B	G	0,70	SM
	06	B	G	1,00	LM
	06	B	G	1,00	SM
	06	B	G	1,30	SM
	06	B	G	1,30	S2
	06	B	G	1,40	LM

F885 (NO)

Switch Probe 138 mil Threaded

UTILITY MODEL

Projection Height (mm)	
H885 / H885RD / H885KB with F885...SM	10,2 - 15,2
H885/5 / H885KB/5 with F885...SM	15,0 - 20,0
H885 / H885RD / H885KB with F885...LM	16,7 - 21,7
H885/5 / H885KB/5 with F885...LM	21,5 - 26,5

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,80	LM
	06	B	G	1,80	SM
	06	B	G	2,30	LM
	06	B	G	2,30	SM
	16	B	G	1,00	LM
	16	B	G	1,00	SM
	16	B	G	1,20	LM
	16	B	G	1,40	SM
	16	B	G	1,80	SM
	17	B	G	2,30	SM
	17	K	U	2,30	LM
	17	K	U	2,30	SM
	55	B	G	2,30	LM

F886 (NO)

Switch Probe 138 mil Threaded

UTILITY MODEL

Centers (mm/mil)	> 3,50 / 138
Current	10,0 A
Current (Switch)	1,0 A
R typ	50 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
LM	30	70
LM	30	120
LM	50	200
LM	80	350
LM	220	900
SM	30	70
SM	30	120
SM	50	200
SM	80	350
SM	120	550
SM	220	900
SM	300	1250

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
Switch Travel (mm)		1,7
Thread (M)		2,5
Wrench Size		2,6
Pointing Accuracy		±0,09 mm

Materials and Plating

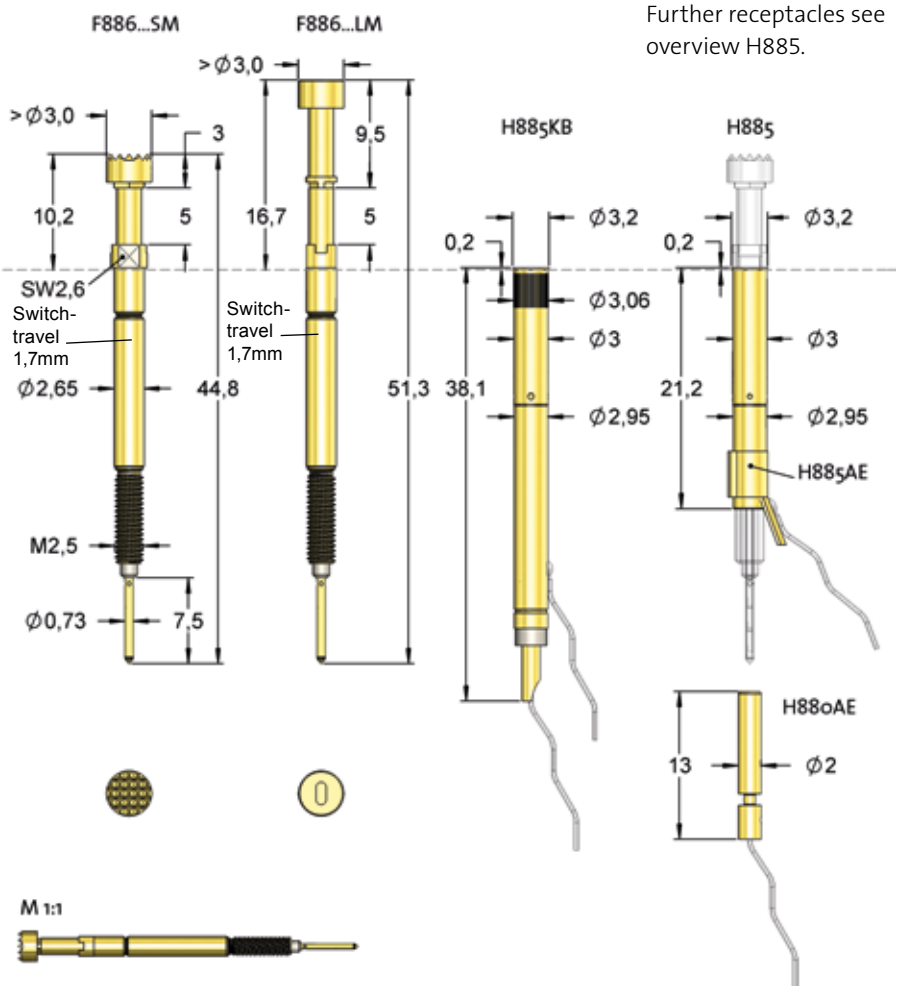
Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZ885S1 max. Ø3,1 mm
Screw-in tool probe	FWZ760S1 max. Ø4,0 mm
Screw driver	FWZ886S2

Series			Tip-Ø		Spring Force (cN)	
F886	**17**	**T**	**350**	**N**	**350**	**SM**
	Tip Style	Material		Plating		Version

Material: B = BeCu, K = Synthetic, H = Synthetic head with ring, T = BeCu head isolated, Gold plated
Tip-Ø: 350 = 3,50 mm (e.g.)
Plating: G = Gold plated, N = Nickel plated, U = Unplated
Version: SM = Short version, LM =Long version
Receptacle: Order code according drawing



Further receptacles see overview H885.

The probe F886 can be height adjusted by 5,0 mm, independently from the used receptacle. It is held in its position by pressure marks. For further receptacles see datasheet H885.
For higher order volumes also versions with 3,5 mm switch travel are possible on request (e.g. F88617B300G900SM35).

* Center differing from standard.

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	3,00	LM
	06	B	G	3,00	SM
	06	B	G	4,00 *	SM
	17	B	G	3,00	LM
	17	B	G	3,00	SM
	17	B	G	3,50 *	LM
	17	B	G	3,50 *	SM
	17	B	G	4,00 *	LM
	17	B	G	4,00 *	SM
	17	B	G	4,50 *	LM
	17	B	G	4,50 *	SM

F886 (NO)

Switch Probe 138 mil Threaded

UTILITY MODEL

Drill Size (mm)	
Receptacle without knurl	2,98 -2,99
Receptacle with knurl	3,00 -3,02

Projection Height (mm)	
H885 / H885RD / H885KB with F886...SM	10,2 - 15,2
H885/5 / H885KB/5 with F886...SM	15,0 - 20,0
H885 / H885RD / H885KB with F886...LM	16,7 - 21,7
H885/5 / H885KB/5 with F886...LM	21,5 - 26,5

Tip Style	Number	Material	Plating	Ø in mm	Version
	17	B	G	5,00 *	SM
	17	B	G	5,50 *	SM
	17	B	G	5,90 *	LM
	17	B	G	5,90 *	SM
	17	H	U	3,00	LM
	17	H	U	3,00	SM
	17	H	U	3,50 *	LM
	17	H	U	3,50 *	SM
	17	H	U	4,00 *	LM
	17	H	U	4,00 *	SM
	17	H	U	4,50 *	LM
	17	H	U	4,50 *	SM
	17	H	U	5,00 *	LM
	17	H	U	5,00 *	SM
	17	H	U	5,50 *	SM
	17	H	U	6,00 *	SM
	17	K	U	3,00	LM
	17	K	U	3,00	SM
	17	K	U	3,50 *	LM
	17	K	U	3,50 *	SM
	17	K	U	4,00 *	SM
	17	K	U	4,50 *	SM
	17	K	U	5,00 *	SM
	17	K	U	5,50 *	SM
	17	K	U	5,90 *	SM
	17	T	N	3,00	SM
	17	T	N	3,50 *	SM
	17	T	N	5,00 *	SM

F385 (NO)

UTILITY MODEL

Switch Probe 157 mil
Long Version, Threaded

Centers (mm/mil)	4,00 / 157
Current	10,0 A
Current (Switch)	1,0 A
R typ	50 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	40	200

Travel (mm)

Version	Nominal	Maximum
Standard	9,0	11,0
Switch Travel (mm)		1,7
Thread (M)		2,5
Wrench Size		2,6
Pointing Accuracy		±0,15 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

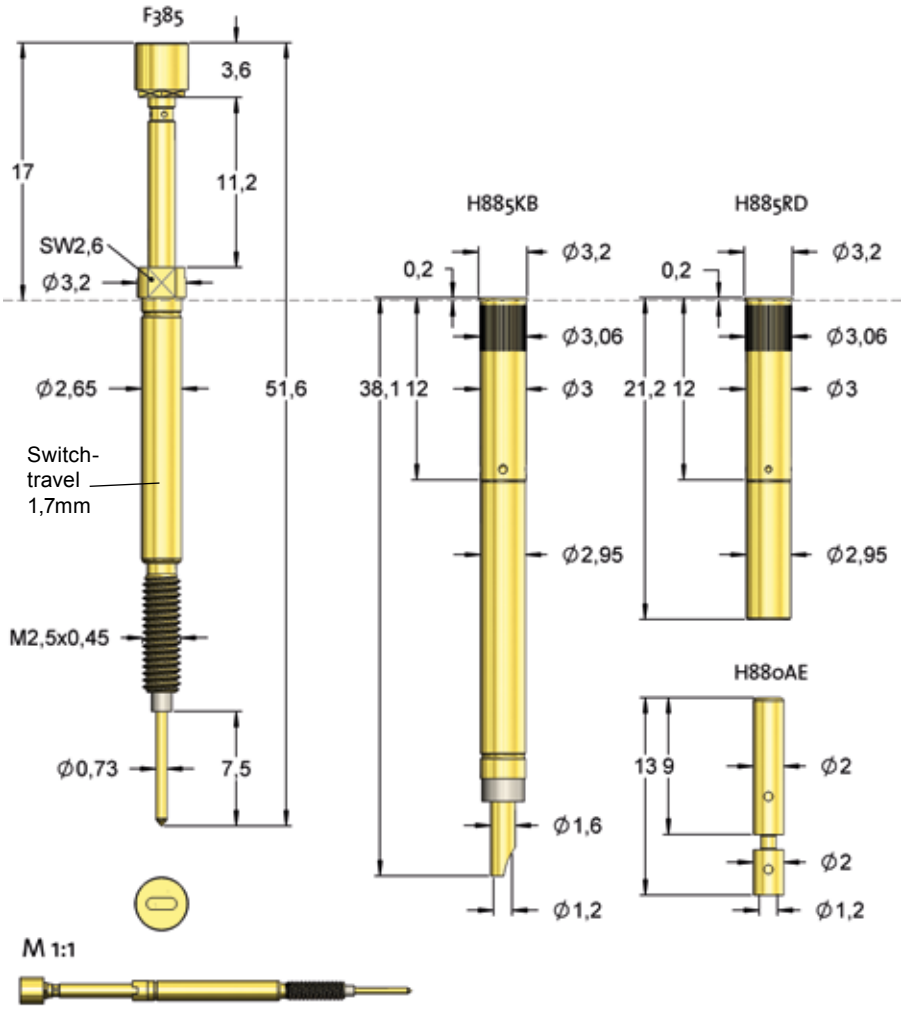
Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZ760S1

Drill Size (mm)

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

Projection Height (mm)

H885 / H885RD / H885KB with F385	17,0 - 22,0
H885/5 / H885KB/5 with F385	21,8 - 26,8



The probe F385 can be height adjusted by 5,0 mm independently from the used receptacle. It is held in its position by pressure marks. For further receptacles see datasheet H885.

Series			Tip-Ø		Spring Force (cN)
F385	06	B	350	G	200
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 350 = 3,50 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	3,50	-
	17	B	G	3,50	-

F887 (NO)

UTILITY MODEL

Switch Probe 157 mil
Short Version, Threaded

Centers (mm/mil)	4,00 / 157
Current	10,0 A
Current (Switch)	1,0 A
R typ	40 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	60	150
Standard	60	200
Standard	140	300

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
Switch Travel (mm)		1,7
Thread (M)		3,0x0,35
Wrench Size		2,5
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	BeCu, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

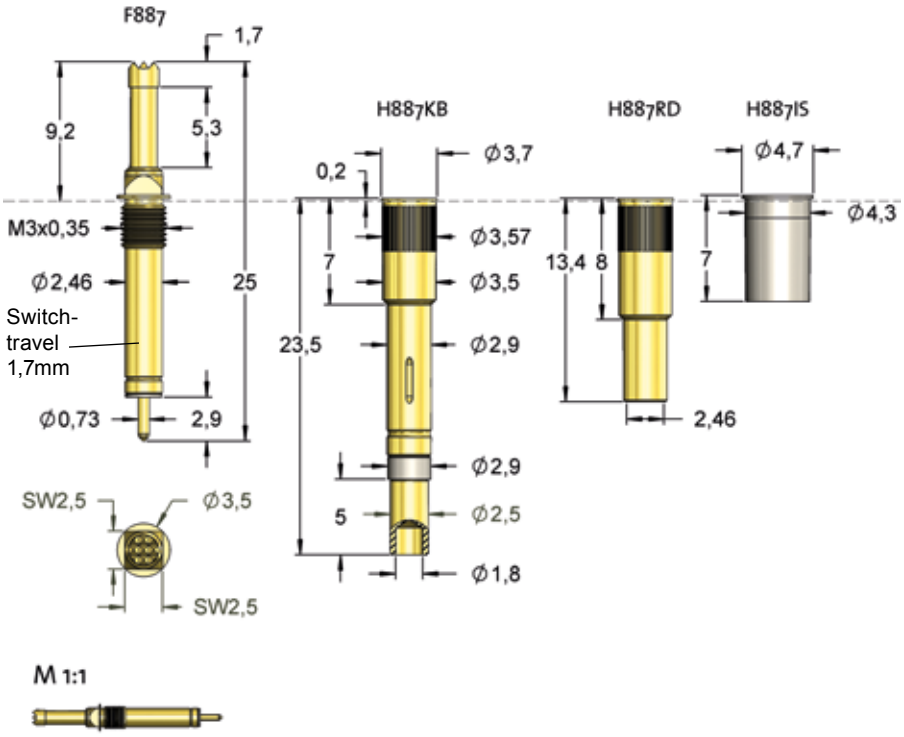
Insertion tool receptacle	FEWZ-340E0
Screw-in tool probe	FWZVF4 (T)

Drill Size (mm)

Receptacle with knurl	3,50 - 3,52
Insulating sleeve	4,28 - 4,29

Projection Height (mm)

H887... with F887	9,2 - 11,2



The probe F887 can be height adjusted by 2,0 mm. The probe is held in its position by pressure marks.

Series			Tip-Ø		Spring Force (cN)
F887	06	B	200	G	150
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 200 = 2,00 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,00	-
	06	B	G	2,00	-
	06	B	G	3,00	-
	16	B	G	1,00	-
	17	B	G	2,00	-
	17	B	G	3,00	-
	17	K	U	2,00	-

F419 (NO)

NEW

Switch Probe 256 mil
Long Travel Version, Threaded

Centers (mm/mil)	6,50 / 256
Current	10,0 A
Current (Switch)	1,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	200	400

Travel (mm)

Version	Nominal	Maximum
Standard	11,0	16,0
Switch Travel (mm)		2,0
Thread (M)		4,0x0,5
Wrench Size		5,0
Pointing Accuracy		±0,06 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-340E0
Screw-in tool probe	FWZ888 (T)

Drill Size (mm)

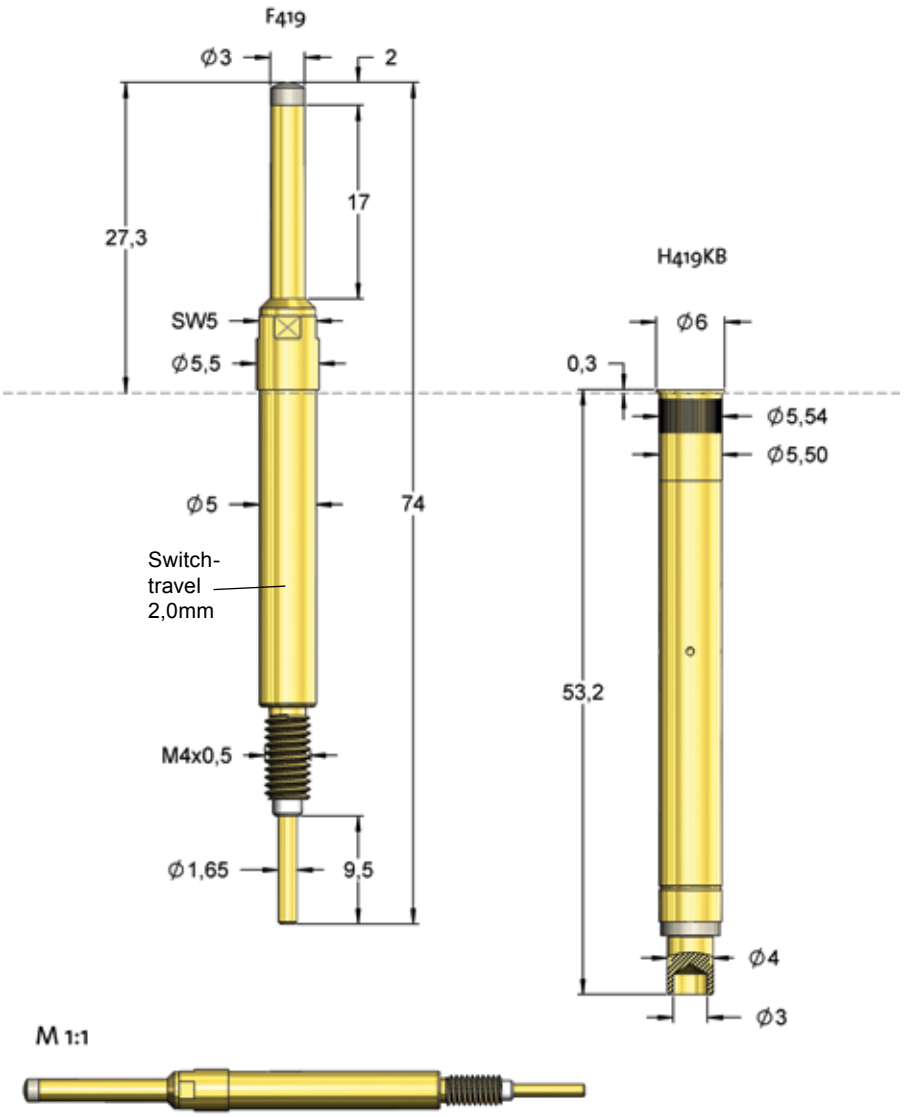
Receptacle with knurl	5,50 - 5,54

Projection Height (mm)

H419KB with F419	27,3

Series			Tip-Ø		Spring Force (cN)
F419	11	K	300	U	400
	Tip Style	Material		Plating	Version

Material: K = Synthetic
Tip-Ø: 300 = 3,00 mm (e.g.)
Plating: U = Unplated
Receptacle: Order code according drawing



This probe is often used for detecting if a DUT is inserted in test fixtures. The switch function of the probe is activated when the lid of the fixture closes and pushes down the DUT (switch travel of 2,0 mm). The high maximum travel of 16 mm still allows to cover the whole fixture travel of further 10 to 14 mm.

Tip Style	Number	Material	Plating	Ø in mm	Version
	11	K	U	3,00	-

1860S215

NEW

Push-out Probe 256 mil
for Pressing-in

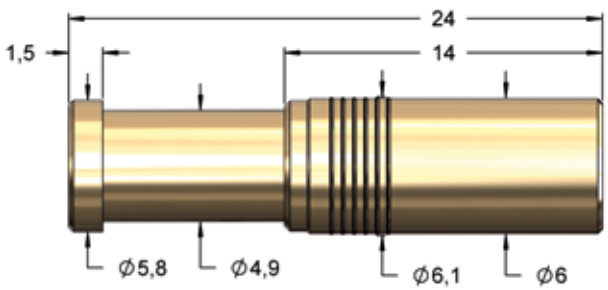
Centers (mm/mil)	6,50 / 256
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	200	400

Travel (mm)

Version	Nominal	Maximum
Standard	6,0	7,5



The 1860S215 is an unplated and cost effective probe for mechanical applications, e.g. for pushing a connector out of the module after the locking is opened.

Step Probes

Step probes can be used whenever a tested contact is located in a housing or a cavity. The test principle is based on on the fact that the plate comes to rest on the DUT (e.g. connector housing) after a certain penetration of the pin. If the connector element is not present or too short, no electrical contact is made.

The connector test with a step probe is very simple, but it requires the availability of certain dimensions of step probes. So a large variety of dimensions is essential.

POSITION TEST

With Standard Step Probe
Step probes allow testing the correct position of a contact element in a connector housing. If the position of the contact element is correct, the pin of the step probe creates an electrical contact to the contact element. If the contact element is too short, the plate is stopped at the connector housing and the pin does not connect to the contact element.

PLATE STANDARD

	Series			Number		Spring force	
e.g.	F732	16	B	0xxx	G	150	SP
		Tip Style	Material	Plating		Version	

0 = without slot, plate-Ø smaller than wrench size

PLATE OVERSIZED

	Series			Number		Spring force	
e.g.	F732	16	B	1xxx	G	150	SP
		Tip Style	Material	Plating		Version	

1 = with slot, plate-Ø larger than wrench size

Position Test with Partially Insulated Step Probe
Step probes with partially insulated pins allow testing coaxial or multi-pole connectors or connectors that need to be contacted in a certain depth of the connector housing only from the front side.

PLATE STANDARD, INSULATED PIN

	Series			Number		Spring force	
e.g.	F732	16	B	2xxx	G	150	SP
		Tip Style	Material	Plating		Version	

2 = without slot, plate-Ø smaller than wrench size

PLATE OVERSIZED, INSULATED PIN

	Series			Number		Spring force	
e.g.	F732	16	B	3xxx	G	150	SP
		Tip Style	Material	Plating		Version	

3 = with slot, plate-Ø larger than wrench size

Position Test with Fully Insulated Step Probe
Step probes with fully insulated pins allow testing and contacting the ring contact of connector sleeves. Only if the connector sleeve has the correct length and is not damaged or bent, the plate of the step probe creates an electrical contact.

PLATE STANDARD, FULLY INSULATED PIN

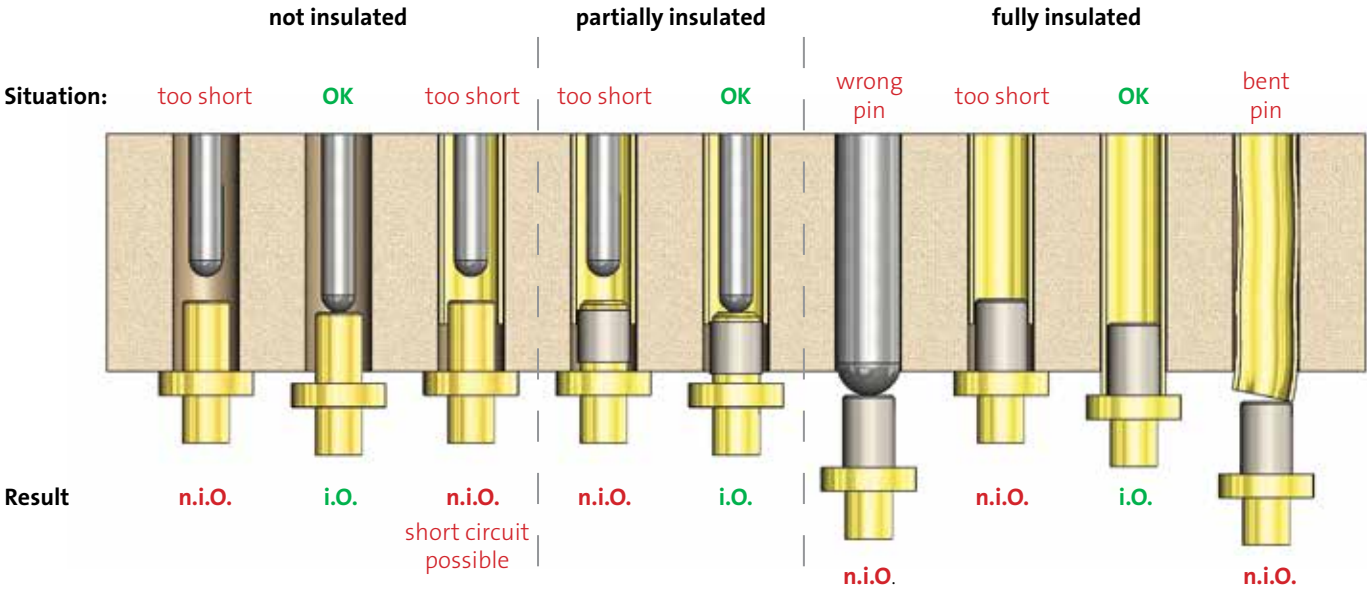
	Series			Number		Spring force	
e.g.	F732	16	B	4xxx	G	150	SP
		Tip Style	Material	Plating		Version	

4 = without slot, plate-Ø smaller than wrench size

PLATE OVERSIZED, FULLY INSULATED PIN

	Series			Number		Spring force	
e.g.	F732	16	B	5xxx	G	150	SP
		Tip Style	Material	Plating		Version	

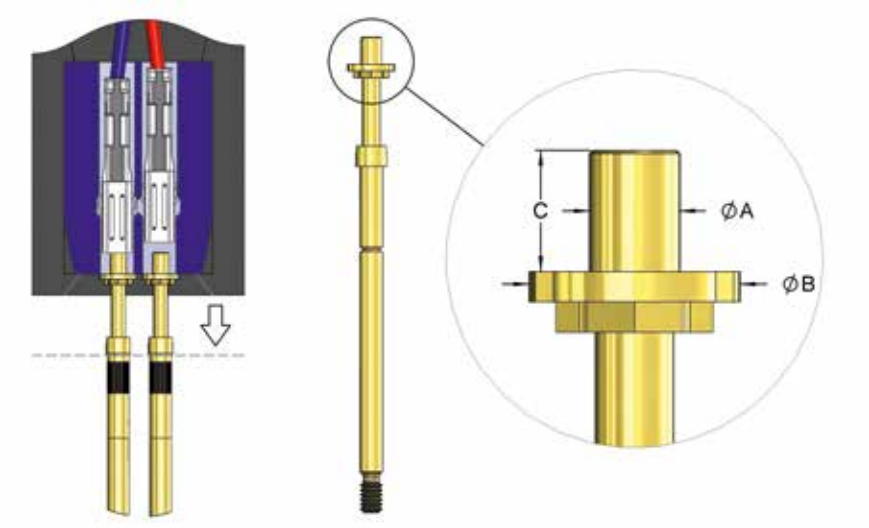
5 = with slot, plate-Ø larger than wrench size



Position Test with Step Probes

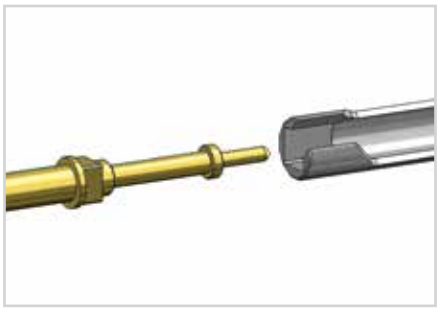
The test principle of a step probe is based on the fact that the plate comes to rest on the DUT (e.g. connector housing) and thereby a defined penetration of the pin in the connector housing is given. The pin of the step probe identifies the presence and/or the correct position of the contact element by contacting.

FEINMETALL offers a great variety of step probes with different diameters and pin lengths.



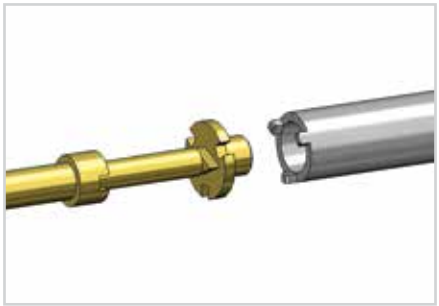
Standard Screw-in Tool Hook Wrench

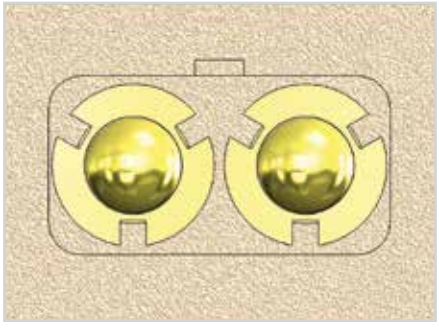
The hook wrench is the standard tool for all probes with square wrench sizes even if the head diameter is larger than the wrench size.



Innovative 3-Point Screw-in Tool

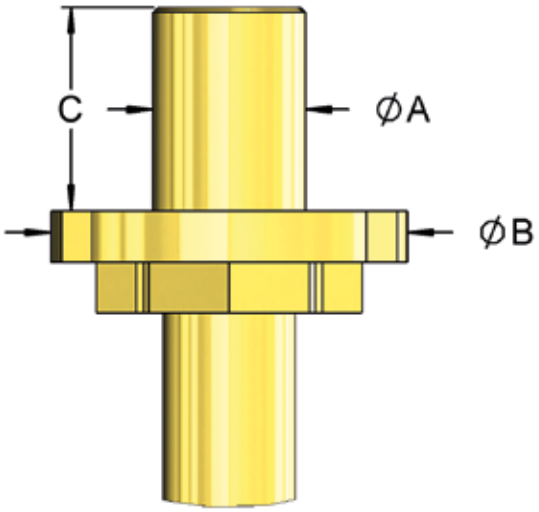
For step probes with oversized plates (plate-Ø larger than probe-Ø or wrench size), FEINMETALL has developed a 3-point-tool that allows mounting the probes even at very small centers. But also in other applications with limited space this tool can be a good alternative to the standard tool.





Overview of Further Step Probes

Exact dimensions and technical details see datasheets of relevant series.



F086	**Order Code** Spring force Pin-Ø A Plate-Ø B Pin Length C	**F08612B0002G130SP** 130 cN Ø 0,51 mm Ø 0,90 mm 1,5 mm		
F100	**Order Code** Spring force Pin-Ø A Plate-Ø B Pin Length C	**F10016B0001N100BSP** 100 cN Ø 0,64 mm Ø 2,00 mm 2,8 mm		
F773	**Order Code** Spring force Pin-Ø A Plate-Ø B Pin Length C	**F77311B0002G300SP** 300 cN Ø 1,40 mm Ø 3,50 mm 4,0 mm		
F737	**Order Code** Spring force Pin-Ø A Plate-Ø B Pin Length C	**F73716B0001G300SP** 300 cN Ø 1,00 mm Ø 2,30 mm 8,0 mm	**F73716B0002G300SP** 300 cN Ø 1,00 mm Ø 1,80 mm 8,0 mm	**F73716B0003G300SP** 300 cN Ø 1,65 mm Ø 1,80 mm 8,0 mm
F755	**Order Code** Spring force Pin-Ø A Plate-Ø B Pin Length C	**F75589B0001G300E13** 300 cN Ø 1,8 x 0,8 mm Ø 3,00 mm 2,6 mm	**F75589B0004G300E15** 300 cN Ø 3,0 x 0,7 mm Ø 4,00 mm 1,5 mm	
F756	**Order Code** Spring force Pin-Ø A Plate-Ø B Pin Length C	**F75689B0001G150** 150 cN Ø 1,5x 0,5 mm Ø 2,70 mm 1,5 mm	**F75689B0002G150** 150 cN Ø 1,0x 0,5 mm (eccentric) Ø 2,70 mm 1,5 mm	**F75689B0003G150** 150 cN Ø 1,5x 0,5 mm Ø 2,00 mm 2,0 mm
F875	**Order Code** Spring force Pin-Ø A Plate-Ø B Pin Length C	**F87511B1002G200SP** 200 cN Ø 0,65 mm Ø 2,10 mm 5,0 mm		
F885	**Order Code** Spring force Pin-Ø A Plate-Ø B Pin Length C	**F88506B0001G200SP** 200 cN Ø 1,00 mm Ø 3,00 mm 2,6 mm	**F88506B0002G200SP** 200 cN Ø 1,00 mm Ø 2,30 mm 2,6 mm	**F88506B0003G200SP** 200 cN Ø 1,00 mm Ø 2,30 mm 9,1 mm
VF4	**Order Code** Spring force Pin-Ø A Plate-Ø B Pin Length C	**VF416B0001G15SP** 1500 cN Ø 3,80 mm Ø 5,50 mm 1,5 mm		

F730SP

Step Probe 50 mil

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

Spring Force (cN ±20%)

Version	Preload	Nominal
SP	50	110

Travel (mm)

Version	Nominal	Maximum
SP	4,0	5,0
Thread (M)		0,9x0,175
Wrench Size		1,0
Pointing Accuracy		±0,08 mm

Materials and Plating

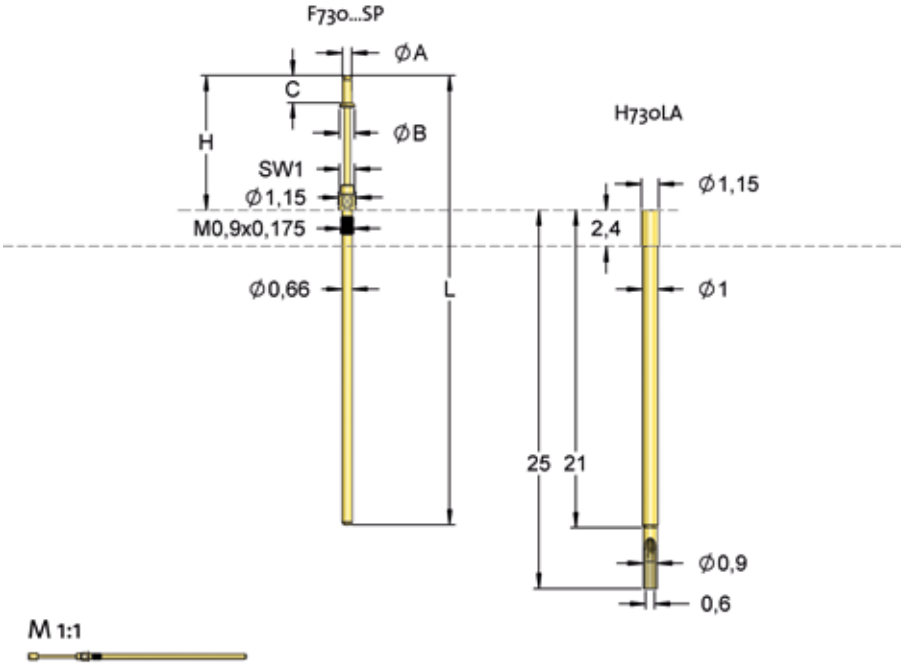
Plunger	BeCu, gold plated
Barrel	Bronze, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-511E0
Screw-in tool probe max. Tip-Ø 0,9 mm	FWZ730; FWZ730T
Screw-in tool probe max. Tip-Ø 1,5 mm	FWZ730S1; FWZ730T1

Drill Size (mm)

H730LA	0,99 - 1,00



Order Code	Tip Style	Ø A	Ø B	C	H	L	Version	Screw-in tool
F73011B0006G110SP	11	0,50	1,00	3,60	10,70	31,50	SP	FWZ730; FWZ730T
F73011B0014G110SP	11	0,50	1,00	4,00	11,10	31,90	SP	FWZ730; FWZ730T
F73012B0011G110SP	12	0,50	0,90	0,80	7,90	28,70	SP	FWZ730; FWZ730T
F73012B0005G110SP	12	0,50	0,90	1,00	8,10	28,90	SP	FWZ730; FWZ730T
F73012B0004G110SP	12	0,50	0,90	1,10	8,20	29,00	SP	FWZ730; FWZ730T
F73012B0003G110SP	12	0,50	0,90	1,40	8,50	29,30	SP	FWZ730; FWZ730T
F73012B0008G110SP	12	0,50	0,90	2,00	9,10	29,90	SP	FWZ730; FWZ730T
F73012B0010G110SP	12	0,50	0,90	3,50	10,60	31,40	SP	FWZ730; FWZ730T
F73012B0001G110SP	12	0,60	0,90	1,80	8,90	29,70	SP	FWZ730; FWZ730T
F73012B0002G110SP	12	0,60	1,00	2,60	9,70	30,50	SP	FWZ730; FWZ730T
F73012B0009G110SP	12	0,80	1,30	2,60	9,70	30,50	SP	FWZ730S1; FWZ730T1
F73016B0007G110SP	16	0,50	1,00	0,60	7,70	28,50	SP	FWZ730; FWZ730T
F73017B0012G065SPS1	17	0,50	0,90	1,00	5,00	25,80	SP	FWZ730; FWZ730T
F73017B0013G065SPS1	17	0,60	0,90	1,10	5,00	25,80	SP	FWZ730; FWZ730T

Further variants see our homepage.

F175SP

Step Probe 75 mil

Centers (mm/mil)	1,90 / 75
Current	4,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
SP	50	100
SP	70	150

Travel (mm)

Version	Nominal	Maximum
SP	4,3	6,4
Thread (M)		1,0
Wrench Size		1,0
Pointing Accuracy		±0,08 mm

Materials and Plating

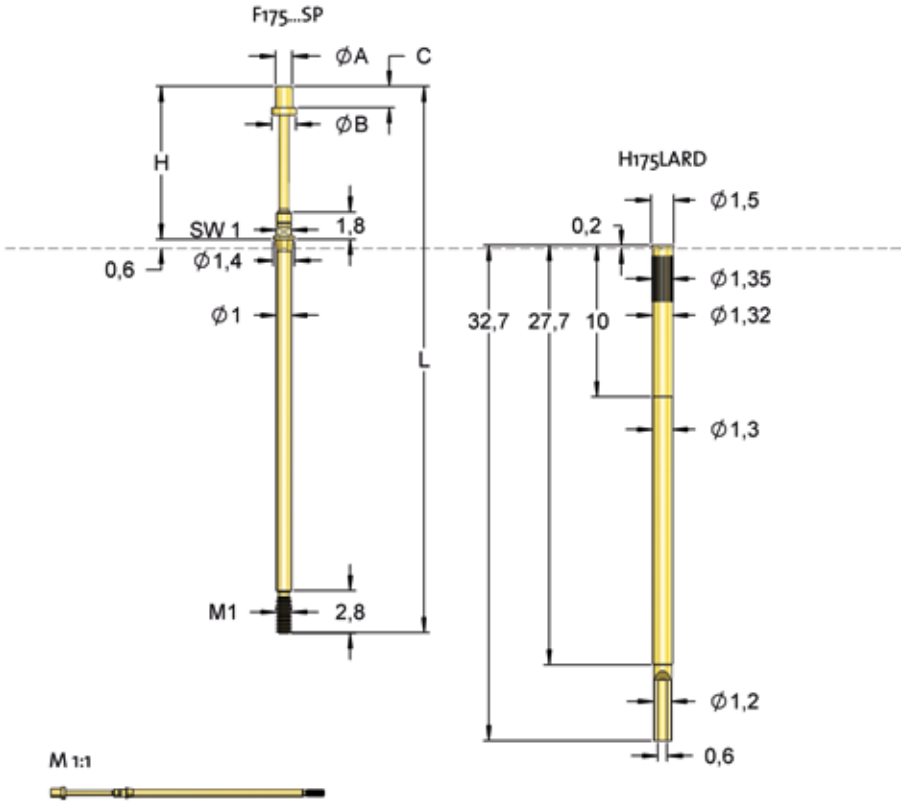
Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-075E0
Screw-in tool probe max. Tip-Ø 1,6 mm	FWZ730S1 (T1)

Drill Size (mm)

H175LARD	1,32 - 1,34



Order Code	Tip Style	Ø A	Ø B	C	H	L	Version	Screw-in tool
F17511B0011G100SP	11	0,50	1,00	1,50	10,60	36,60	SP	FWZ730S1; FWZ730T1
F17511B0012G150SP	11	0,60	1,20	2,00	11,10	37,10	SP	FWZ730S1; FWZ730T1
F17511B0002G100SP	11	0,60	1,50	2,00	11,10	37,10	SP	FWZ730S1; FWZ730T1
F17511B0003G100SP	11	0,60	1,50	2,50	11,60	37,60	SP	FWZ730S1; FWZ730T1
F17511B0004G100SP	11	0,60	1,50	3,00	12,10	38,10	SP	FWZ730S1; FWZ730T1
F17511B0005G100SP	11	0,60	1,50	3,60	12,70	38,70	SP	FWZ730S1; FWZ730T1
F17511B0006G100SP	11	0,60	1,50	4,10	13,20	39,20	SP	FWZ730S1; FWZ730T1
F17511B0007G100SP	11	0,60	1,50	4,60	13,70	39,70	SP	FWZ730S1; FWZ730T1
F17511B0008G100SP	11	0,60	1,50	5,10	14,20	40,20	SP	FWZ730S1; FWZ730T1
F17516B0010G150SP	16	0,60	1,40	0,60	9,30	35,30	SP	FWZ730S1; FWZ730T1
F17516B0009G150SP	16	0,80	1,50	1,00	9,70	35,70	SP	FWZ730S1; FWZ730T1
F17516B0001G150SP	16	1,10	1,60	1,40	10,10	36,10	SP	FWZ730S1; FWZ730T1

Further variants see our homepage.

F731SP

Step Probe 94 mil

Centers (mm/mil)	2,40 / 94
Current	5,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

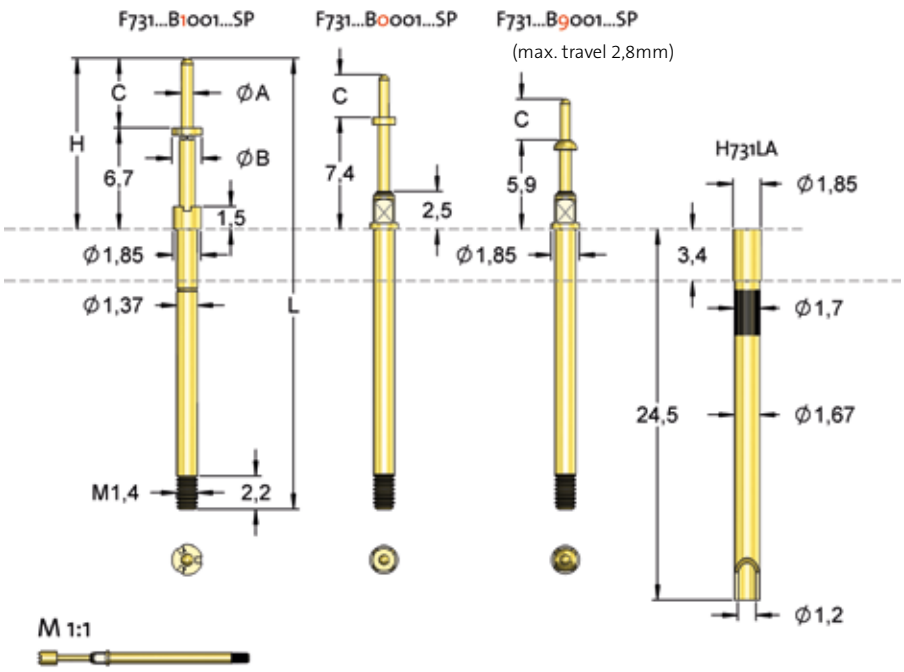
Version	Preload	Nominal
SP	50	110
SP	50	150
SP	50	300

Travel (mm)

Version	Nominal	Maximum
F731...B90...SP	2,0	2,8
SP	3,5	4,4
Thread (M)		1,4
Wrench Size		1,4
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated



Drill Size (mm)

H731LA	1,67 - 1,68

Accessories

Insertion tool receptacle	FEWZ-100E0
Screw-in tool probe max. Tip-Ø 1,0	FWZ731SP (T)
Screw-in tool probe max. Tip-Ø 1,1	FWZ731S1 (T1)

Order Code	Tip Style	Ø A	Ø B	C	H	L	Version	Screw-in tool
F73111B0004G150SP	11	0,65	1,40	5,50	12,90	31,40	SP	FWZ731S1; FWZ731T1
F73111B0014G300SP	11	0,65	1,50	1,50	8,90	27,40	SP	FWZ731S1; FWZ731T1
F73111B0012G300SP	11	0,65	1,50	2,50	9,90	28,40	SP	FWZ731S1; FWZ731T1
F73111B0002G150SP	11	0,65	1,50	2,80	10,30	28,80	SP	FWZ731S1; FWZ731T1
F73111B0017G300SP	11	0,65	1,50	3,00	10,40	28,90	SP	FWZ731S1; FWZ731T1
F73111B0007G080SP	11	0,65	1,50	3,40	10,80	29,30	SP	FWZ731S1; FWZ731T1
F73111B0001G150SP	11	0,65	1,50	4,00	11,50	30,00	SP	FWZ731S1; FWZ731T1
F73111B0015G300SP	11	0,65	1,50	4,50	11,90	30,40	SP	FWZ731S1; FWZ731T1
F73111B0016G300SP	11	0,65	1,50	5,00	12,40	30,90	SP	FWZ731S1; FWZ731T1
F73111B0010G150SP	11	0,70	1,50	3,50	10,90	29,40	SP	FWZ731S1; FWZ731T1
F73111B0003G150SP	11	0,70	1,50	4,00	11,40	29,90	SP	FWZ731S1; FWZ731T1
F73111B9013G150SP	11	0,75	1,50	2,00	7,90	26,40	SP	FWZ731S1; FWZ731T1
F73111B1009G150SP	11	0,80	2,00	4,60	11,30	29,80	SP	FWZ731SP; FWZ731SPT
F73112B0019G150SP	12	0,65	1,40	4,20	11,60	30,10	SP	FWZ731S1; FWZ731T1
F73112B9008G110SP	12	0,65	1,50	2,70	8,60	27,10	SP	FWZ731S1; FWZ731T1
F73112B9007G110SP	12	0,65	1,50	3,40	9,30	27,80	SP	FWZ731S1; FWZ731T1
F73112B9001G110SP	12	0,65	1,50	4,00	9,90	28,40	SP	FWZ731S1; FWZ731T1
F73116B0018G150SP	16	0,65	1,50	1,30	8,70	27,20	SP	FWZ731S1; FWZ731T1
F73116B0006G150SP	16	0,65	1,50	2,10	9,50	28,00	SP	FWZ731S1; FWZ731T1
F73116B0022G150SP	16	0,70	1,50	2,50	9,90	28,40	SP	FWZ731S1; FWZ731T1
F73116B0020G150SP	16	0,70	1,50	3,00	10,40	28,90	SP	FWZ731S1; FWZ731T1
F73116B0023G150SP	16	0,80	1,50	0,80	8,20	26,70	SP	FWZ731S1; FWZ731T1

Further variants see our homepage.

F732SP

Step Probe 100 mil

Centers (mm/mil)	2,54 / 100
Current	5,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
SP	30	80
SP	50	100
SP (1)	60	150
SP (1)	60	300

Travel (mm)

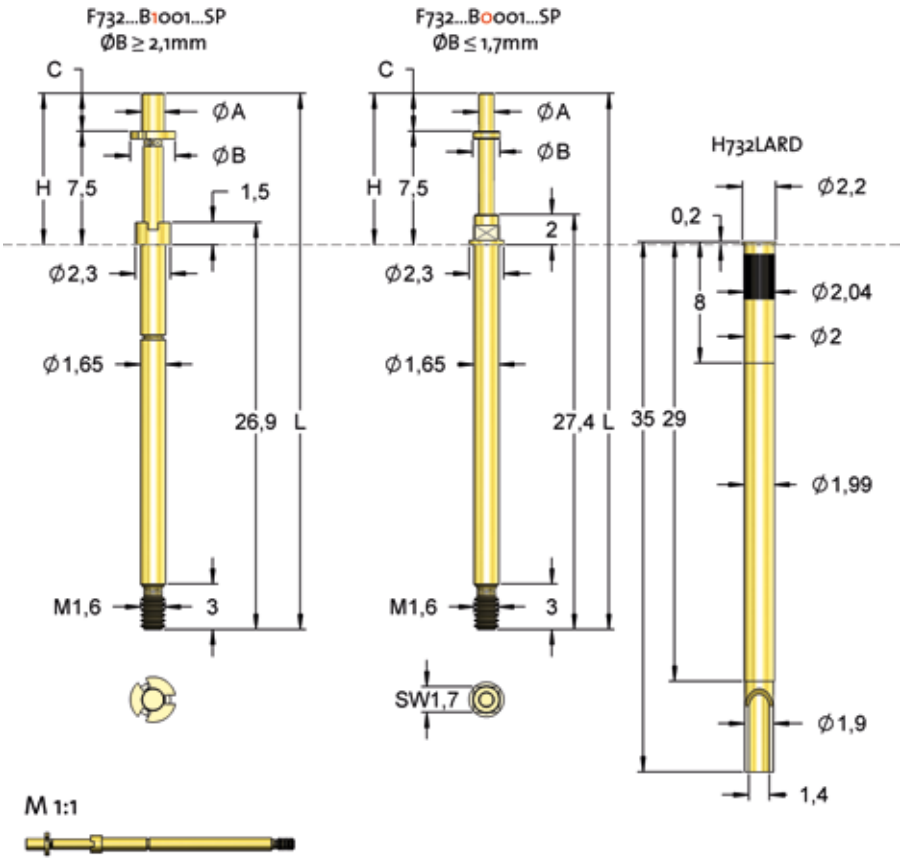
Version	Nominal	Maximum
SP (1)	4,0	5,0
Thread (M)		1,6
Wrench Size		1,7
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Drill Size (mm)

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



Accessories

Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe max. Tip-Ø 2,0 mm	FWZ732 (T)
Screw-in tool probe 3-point bit max. Tip-Ø 2,2mm	FWZ732SP(T)1
Screw-in tool probe 3-point bit max. Tip-Ø 6,8 mm	FWZ732SP(T)

Order Code	Tip Style	Ø A	Ø B	C	H	L	Version	Screw-in tool
F73211B0043G150SP	11	0,65	1,50	2,50	10,00	35,40	SP	FWZ732;FWZ732T
F73211B0024G150SP	11	0,65	1,50	4,30	11,80	37,20	SP	FWZ732;FWZ732T
F73211B0018G150SP	11	0,65	1,50	5,00	12,50	37,90	SP	FWZ732;FWZ732T
F73211B1041G150SP	11	0,65	2,10	2,50	10,00	35,40	SP	FWZ732SP; FWZ732SPT
F73211B1054G150SP	11	0,65	2,10	3,00	10,50	35,90	SP	FWZ732SP; FWZ732SPT
F73211B1042G150SP	11	0,65	2,10	3,60	11,10	36,50	SP	FWZ732SP; FWZ732SPT
F73211B1005G150SP	11	0,65	3,00	3,40	10,90	36,30	SP	FWZ732SP; FWZ732SPT
F73211B1037G150SP	11	0,80	2,10	2,80	10,30	35,70	SP	FWZ732SP; FWZ732SPT
F73211B1036G150SP	11	0,80	2,10	4,00	11,50	36,90	SP	FWZ732SP; FWZ732SPT
F73211B1038G150SP	11	1,00	2,10	2,00	9,50	34,90	SP	FWZ732SP; FWZ732SPT
F73211B1056G150SP	11	1,00	2,30	2,60	10,10	35,50	SP	FWZ732SP; FWZ732SPT
F73211B1003G150SP	11	1,00	2,50	2,60	10,10	35,50	SP	FWZ732SP; FWZ732SPT
F73211B1064G300SP1	11	2,00	4,00	2,00	9,50	34,90	SP1	FWZ732SP1; FWZ732SPT1
F73211B1034G300SP1	11	2,00	4,00	3,10	10,60	36,00	SP1	FWZ732SP1; FWZ732SPT1
F73212B0017G150SP	12	0,65	1,50	2,70	10,30	35,70	SP	FWZ732;FWZ732T
F73216B1043G150SP	16	0,70	2,10	2,00	9,50	34,90	SP	FWZ732SP; FWZ732SPT
F73216B1052G150SP	16	0,80	2,10	3,20	10,70	36,10	SP	FWZ732SP; FWZ732SPT
F73216B1038G150SP	16	1,00	2,10	2,00	9,50	34,90	SP	FWZ732SP; FWZ732SPT
F73216B1012G150SP	16	1,00	2,30	3,30	10,80	36,20	SP	FWZ732SP; FWZ732SPT

Further variants see our homepage.

F733SP

Step Probe 157 mil

Centers (mm/mil)	4,00 / 157
Current	10,0 A
R typ	25 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
SP (1)	50	150
SP (1)	50	300

Travel (mm)

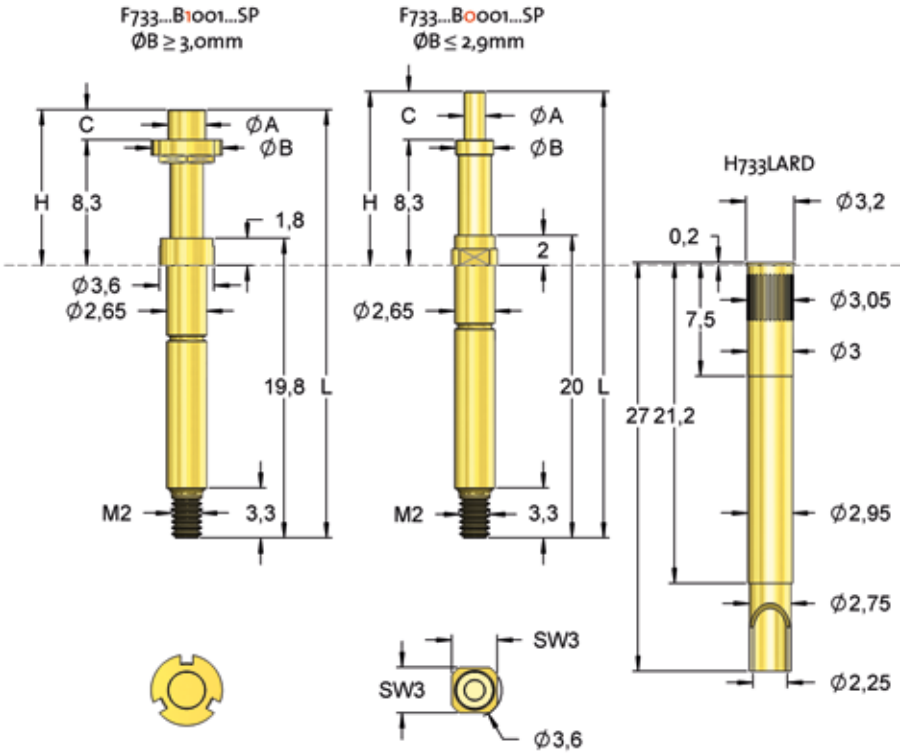
Version	Nominal	Maximum
SP (1)	4,0	5,0
Thread (M)		2,0
Wrench Size		3,0
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Drill Size (mm)

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



Accessories

Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe max. Tip-Ø 2,2mm	FWZ732SP(T)1
Screw-in tool probe max. Tip-Ø 2,9mm	FWZ733S1(T1)
Screw-in tool probe 3-point bit max. Tip-Ø 3,3 mm	FWZ733SP(T)
Screw-in tool probe max. Tip-Ø 3,9mm	FWZ733(T)
Screw-in tool probe 3-point bit max. Tip-Ø 6,8 mm	FWZ732SP(T)

Order Code	Tip Style	Ø A	Ø B	C	H	L	Version	Screw-in tool
F73311B1027G150SP1	11	1,40	3,50	2,40	10,70	28,70	SP1	FWZ732SP1; FWZ732SPT1
F73311B1035G150SP1	11	1,40	3,50	2,70	11,00	29,00	SP1	FWZ732SP1; FWZ732SPT1
F73311B1049G150SP1	11	1,40	3,50	3,20	11,50	29,50	SP1	FWZ732SP1; FWZ732SPT1
F73311B1048G150SP1	11	1,80	4,00	3,00	11,30	29,30	SP1	FWZ732SP1; FWZ732SPT1
F73316B1005G150SP	16	1,30	4,70	2,70	11,00	29,00	SP	FWZ733SP; FWZ733SPT
F73316B1031G150SP1	16	1,40	3,50	1,70	10,00	28,00	SP1	FWZ732SP1; FWZ732SPT1
F73316B1016G150SP1	16	1,40	3,50	2,00	10,30	28,30	SP1	FWZ732SP1; FWZ732SPT1
F73316B1027G150SP1	16	1,40	3,50	2,40	10,70	28,70	SP1	FWZ732SP1; FWZ732SPT1
F73316B1032G150SP1	16	1,40	3,50	3,00	11,30	29,30	SP1	FWZ732SP1; FWZ732SPT1
F73316B1034G150SP1	16	1,70	3,50	2,20	10,50	28,50	SP1	FWZ732SP1; FWZ732SPT1
F73316B1036G150SP1	16	1,80	3,50	1,60	9,90	27,90	SP1	FWZ732SP1; FWZ732SPT1
F73316B1015G150SP1	16	1,80	3,50	2,20	10,50	28,50	SP1	FWZ732SP1; FWZ732SPT1
F73316B1009G150SP	16	1,80	4,70	4,20	12,50	30,50	SP	FWZ733SP; FWZ733SPT
F73316B1076G300SP1	16	2,00	4,00	2,50	10,80	28,80	SP1	FWZ732SP1; FWZ732SPT1
F73316B1077G300SP1	16	2,00	4,00	3,00	11,30	29,30	SP1	FWZ732SP1; FWZ732SPT1
F73316B1078G300SP1	16	2,00	4,00	3,50	11,80	29,80	SP1	FWZ732SP1; FWZ732SPT1
F73316B1079G300SP1	16	2,00	4,00	4,00	12,30	30,30	SP1	FWZ732SP1; FWZ732SPT1
F73316B1080G300SP1	16	2,00	4,00	4,50	12,80	30,80	SP1	FWZ732SP1; FWZ732SPT1
F73316B1081G300SP1	16	2,00	4,00	5,00	13,30	31,30	SP1	FWZ732SP1; FWZ732SPT1
F73316B1043G150SP1	16	2,20	3,50	2,00	10,30	28,30	SP1	FWZ732SP1; FWZ732SPT1

Further variants see our homepage.

F737SP

Step Probe 157 mil

Centers (mm/mil)	4,00 / 157
Current	10,0 A
R typ	8 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
SP	80	300
SP	180	500

Travel (mm)

Version	Nominal	Maximum
SP	12,0	14,3
Thread (M)		2,0
Wrench Size		3,0
Pointing Accuracy		±0,15 mm

Materials and Plating

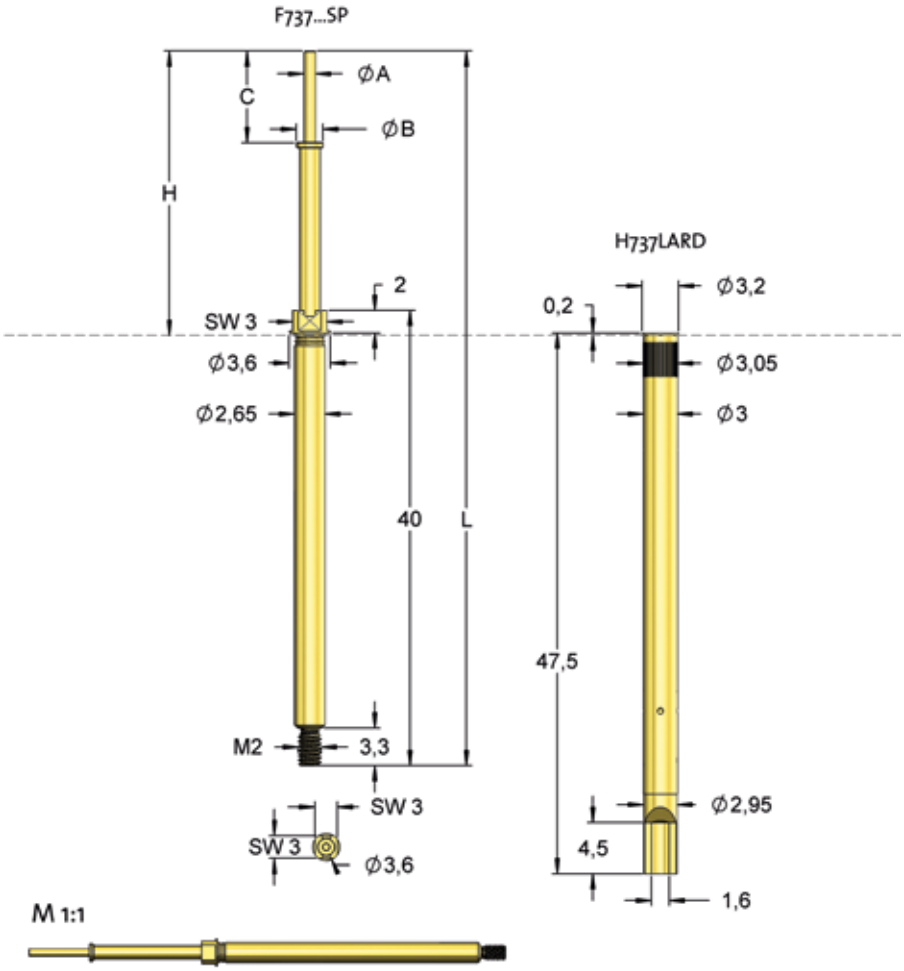
Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Drill Size (mm)

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

Accessories

Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe	FWZ733S1; FWZ733ST1



Order Code	Tip Style	Ø A	Ø B	C	H	L	Version	Screw-in tool
F73716B0002G300SP	16	1,00	1,80	8,00	24,80	62,80	SP	FWZ733S1; FWZ733ST1
F73716B0001G300SP	16	1,00	2,30	8,00	24,80	62,80	SP	FWZ733S1; FWZ733ST1
F73716B0003G300SP	16	1,65	1,80	8,00	24,80	62,80	SP	FWZ733S1; FWZ733ST1
F73716B0004G500SP	16	1,65	2,30	8,00	24,80	62,80	SP	FWZ733S1; FWZ733ST1

Further variants see our homepage.

Threaded Probes

Threaded probes and step probes are mainly used in modules for the test of wire harnesses and connectors. They can be screwed in with a corresponding screw-in tool. The advantage is that even under difficult conditions a secure seat of the probes is guaranteed.

F730

Threaded Probe 50 mil Standard

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

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	50	110

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	5,0
Thread (M)		0,9x0,175
Wrench Size		1,0
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Bronze, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

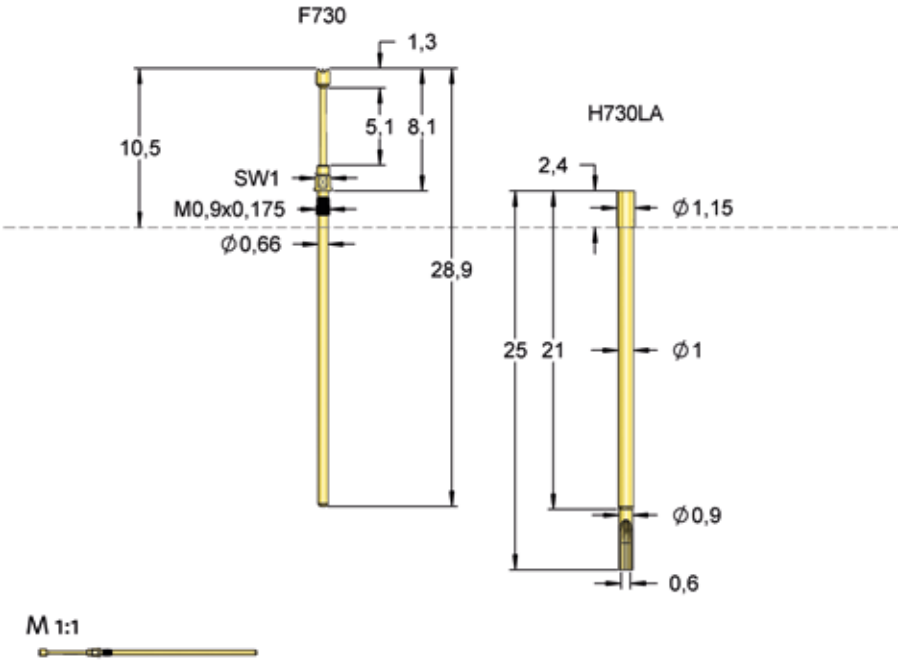
Insertion tool receptacle	FEWZ-511E0
Screw-in tool probe max. Tip-Ø 0,9 mm	FWZ730; FWZ730T

Drill Size (mm)

H730...	0,99 - 1,00

Projection Height (mm)

H730LA with F730	10,5



Series			Tip-Ø		Spring Force (cN)
F730	06	B	090	G	110
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 090 = 0,90 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	090	-
	12	B	G	0,64	-
	16	B	G	0,40	-
	17	B	G	0,64	-
	18	B	G	0,40	-

F176

Threaded Probe 75 mil
Short Version

Centers (mm/mil)	1,90 / 75
Current	4,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	30	80
Standard	85	150

Travel (mm)

Version	Nominal	Maximum
Standard	2,4	3,0
Thread (M)		1,0
Wrench Size		1,0
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

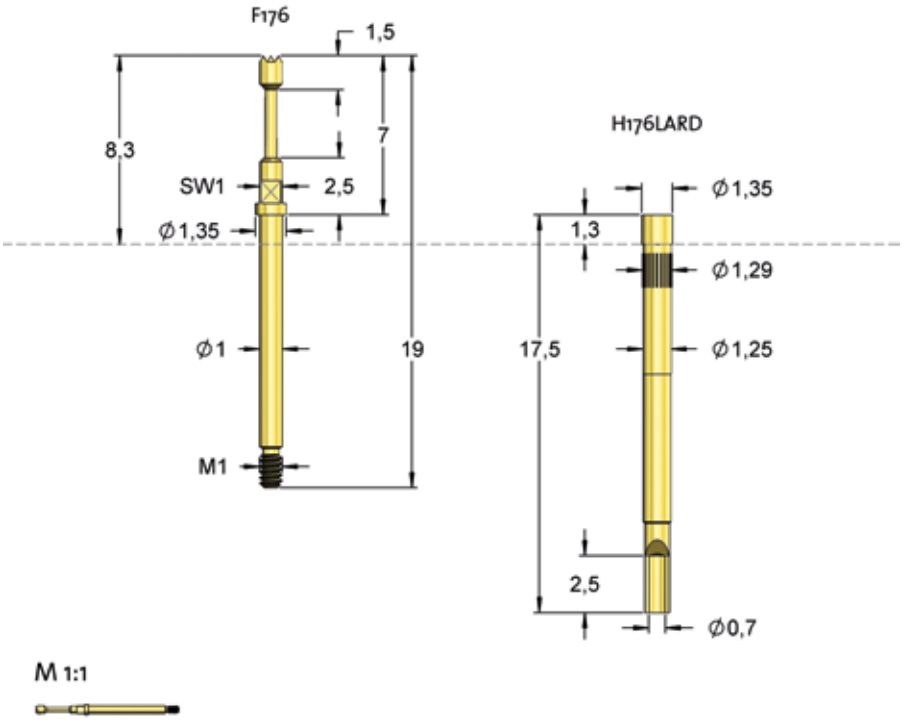
Insertion tool receptacle	FEWZ-075E0
Screw-in tool probe max. Tip-Ø 1,5 mm	FWZ730S1; FWZ730T1

Drill Size (mm)

H176LARD	1,25 - 1,27

Projection Height (mm)

H176LARD with F176	8,3



Series			Tip-Ø		Spring Force (cN)
F176	06	B	100	G	080
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 100 = 1,00 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,00	-
	11	B	G	0,40	-
	11	B	G	0,50	-
	12	B	G	0,65	-
	17	B	G	1,00	-
	18	B	G	0,45	-

F175

Threaded Probe 75 mil Standard

Centers (mm/mil)	1,90 / 75
Current	4,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	50	100
Standard	70	150
Standard	100	280

Travel (mm)

Version	Nominal	Maximum
Standard	4,3	6,4
Thread (M)		1,0
Wrench Size		1,0
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

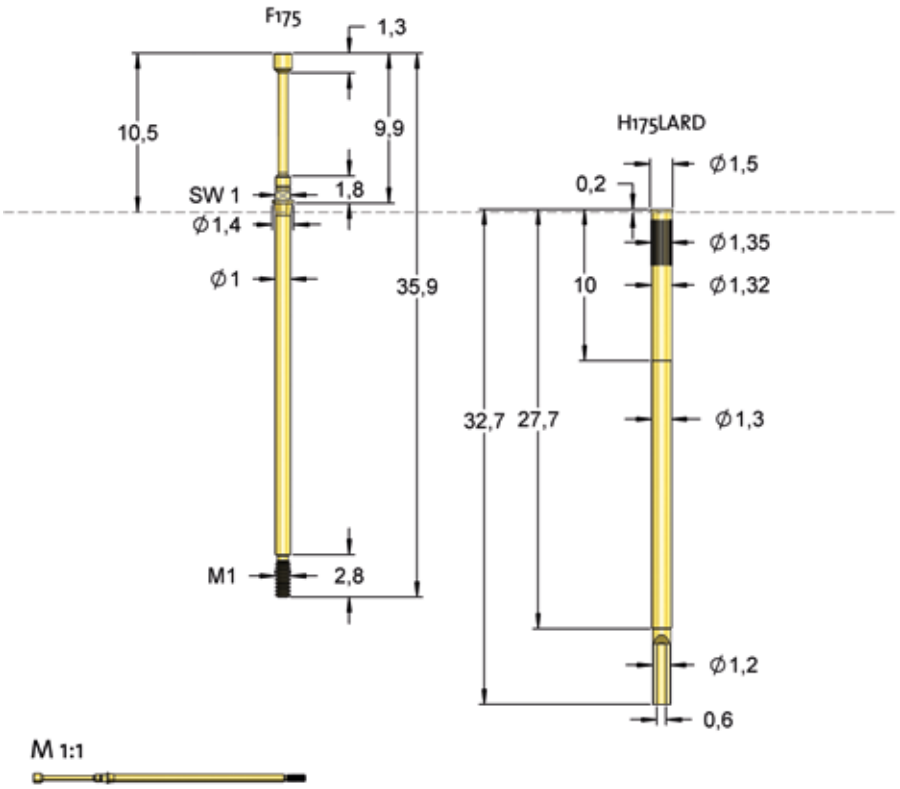
Insertion tool receptacle	FEWZ-075E0
Screw-in tool probe max. Tip-Ø 1,5 mm	FWZ730S1; FWZ730T1

Drill Size (mm)

H175LARD	1,32 - 1,34

Projection Height (mm)

H175LARD with F175	10,5



Series			Tip-Ø		Spring Force (cN)
F175	05	B	120	G	150
	Tip Style	Material		Plating	Version

Material: B = BeCu, S = Steel
Tip-Ø: 120 = 1,20 mm (e.g.)
Plating: G = Gold plated, L = Longtime gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	B	G	1,20	-
	06	B	G	1,20	-
	11	B	G	0,50	-
	11	B	G	0,64	-
	12	B	G	0,78	-
	17	B	G	1,20	-
	18	B	G	0,64	-
	18	B	G	0,78	-
	21	S	L	0,64	-
	30	S	L	0,64	-

F731

Threaded Probe 94 mil Standard

Centers (mm/mil)	2,40 / 94
Current	5,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
L	50	300
Standard	20	60
Standard	50	100
Standard	50	150
Standard	50	250
Standard	50	300

Travel (mm)

Version	Nominal	Maximum
L	3,5	4,4
Standard	3,5	4,4
Thread (M)		1,4
Wrench Size		1,4
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-100E0
Screw-in tool probe max. Tip-Ø 2,0 mm	FWZ731; FWZ731T
Screw-in tool probe max. Tip-Ø 1,3 mm	FWZ731S1; FWZ731T1

Drill Size (mm)

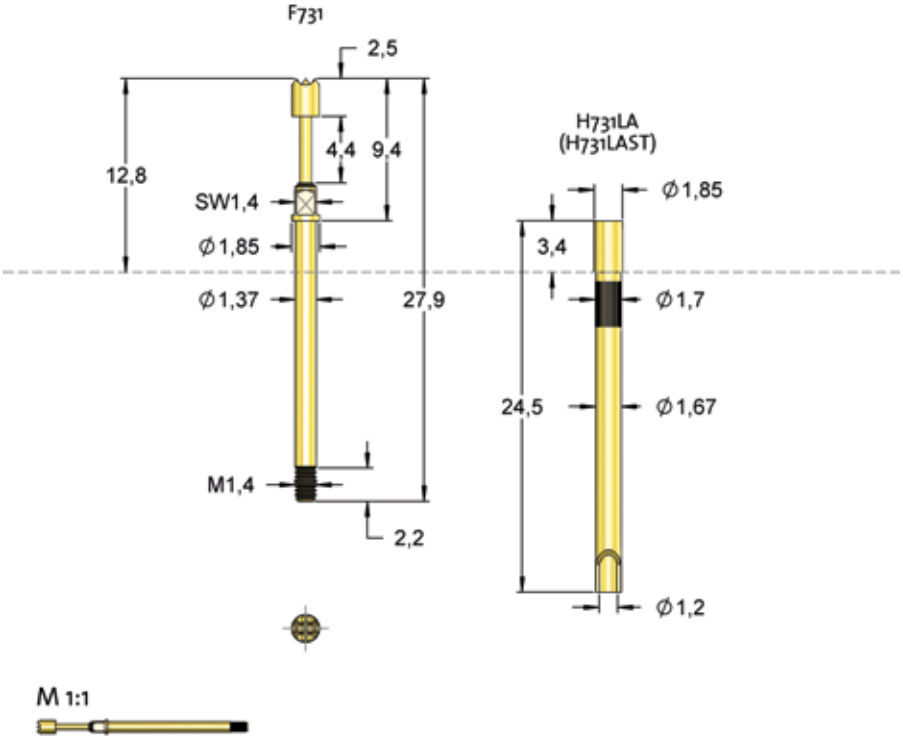
H731LA	1,67 - 1,68

Projection Height (mm)

H731LA with F731	12,8
H731LA with F731...L	16,9

Series			Tip-Ø		Spring Force (cN)	
F731	11	B	075	G	300	L
	Tip Style	Material		Plating		Version

Material: B = BeCu, S = Steel
Tip-Ø: 075 = 0,75 mm (e.g.)
Plating: G = Gold plated, L = Longtime gold plated
Version: L = Long version
Receptacle: Order code according drawing



A solder tight receptacle is available (H731LAST).

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	B	G	1,80	-
	06	B	G	1,00	-
	06	B	G	1,30	-
	06	B	G	1,80	-
	11	B	G	0,50	-
	11	B	G	0,60	-
	11	B	G	0,65	-
	11	B	G	0,75	-
	11	B	G	0,75	L
	12	B	G	1,80	-
	16	B	G	0,75	-
	17	B	G	1,50	-
	18	B	G	0,75	-
	32	S	L	0,75	-

F732

Threaded Probe 100 mil Standard

Centers (mm/mil)	2,54 / 100
Current	5,0 A
R typ	25 mOhm
Temperature	-20°C...+80°C, -40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	30	80
Standard	50	100
Standard	60	150
Standard	60	200
Standard	60	300
E14	60	150
H	60	150
H	100	300
IK	60	150
IK	60	300
RP	60	150
RP	60	300

Travel (mm)

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

Materials and Plating

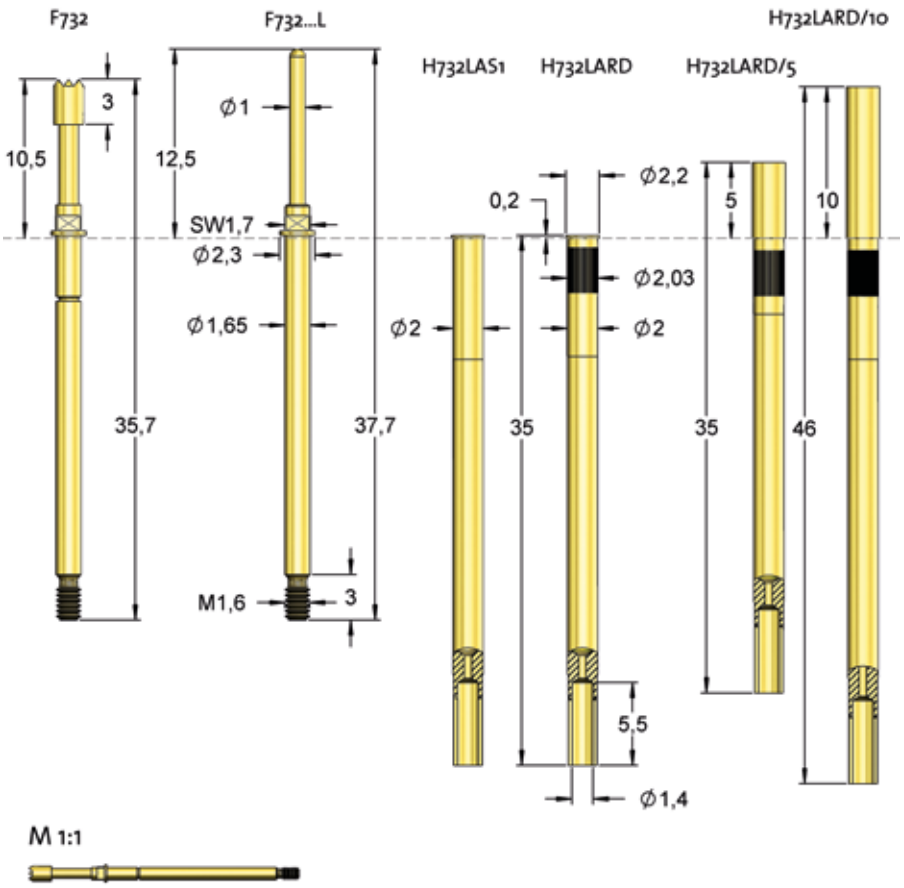
Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

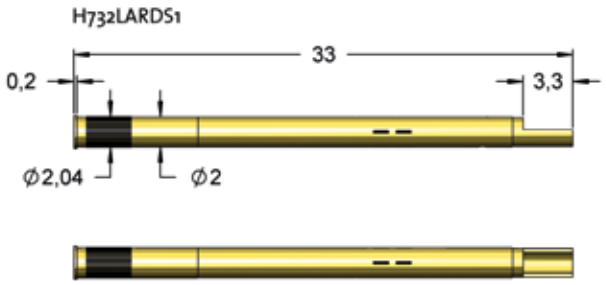
Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe max. Tip-Ø 2,0 mm	FWZ732; FWZ732T
Screw-in tool probe max. Tip-Ø 2,7 mm	FWZ732S1; FWZ732T1

Series			Tip-Ø		Spring Force (cN)	
F732	**06**	**B**	**120**	**G**	**150**	**IK05**
	Tip Style	Material		Plating		Version

Material:	B = BeCu, S = Steel
Tip-Ø:	120 = 1,20 mm (e.g.)
Plating:	G = Gold plated, L = Longtime gold plated, N = Nickel plated, R = Rhodanized
Version:	H = High temperature, IK = Insulating cap, RP = „Wobbling Plunger“, E14 = Projection height 14mm
Receptacle:	Order code according drawing



A solder tight version with a closed receptacle with knurl is available (H732LARDS1), which also has further press marks for a better hold of the probe even at conditions with stronger vibrations.



F732

Threaded Probe 100 mil Standard

Drill Size (mm)	
Receptacle without knurl	1,99 - 2,00
Receptacle with knurl	2,00 - 2,02

Projection Height (mm)	
H732... with F732	10,5
H732.../5 with F732	15,3
H732.../10 with F732	20,3
H732... with F732...L	12,5
H732.../5 with F732...L	17,3
H732.../10 with F732...L	22,3

Tip Style	Number	Material	Plating	⌀ in mm	Version
	05	B	G	1,80	-
	05	B	G	2,00	-
	06	B	G	1,20	IK
	06	B	G	1,30	-
	06	B	G	1,40	-
	06	B	G	1,50	-
	06	B	G	1,80	-
	06	B	G	1,80	IK
	06	B	G	2,00	-
	06	B	G	2,00	H
	06	B	G	2,50	-
	07	S	L	1,75	-
	07	S	L	1,75	H
	11	B	G	0,64	-
	11	B	G	0,64	E14
	11	B	G	0,64	H
	11	B	G	0,64	RP
	11	B	G	0,80	-
	11	B	G	1,00	-
	11	B	G	1,30	-
	12	B	G	1,40	-
	12	B	G	1,60	-
	12	B	G	1,80	-
	12	B	G	2,00	-
	14	S	L	2,00	-
	15	B	R	1,70	-
	16	B	G	0,64	-
	16	B	G	0,80	-
	16	B	G	1,00	-
	17	B	G	1,40	-
	17	B	G	1,50	-
	17	B	G	2,00	-
	18	B	G	1,30	-
	18	B	G	1,30	H
	21	S	L	1,30	-
	30	B	G	1,30	-
	41	B	G	2,00	-

F722

Threaded Probe 100 mil
Short Version

Centers (mm/mil)	2,54 / 100
Current	5,0 A
R typ	25 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	40	100

Travel (mm)

Version	Nominal	Maximum
Standard	1,5	2,2
Thread (M)		1,6x0,2
Wrench Size		1,7
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	see Tip Style
Barrel	BeCu, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

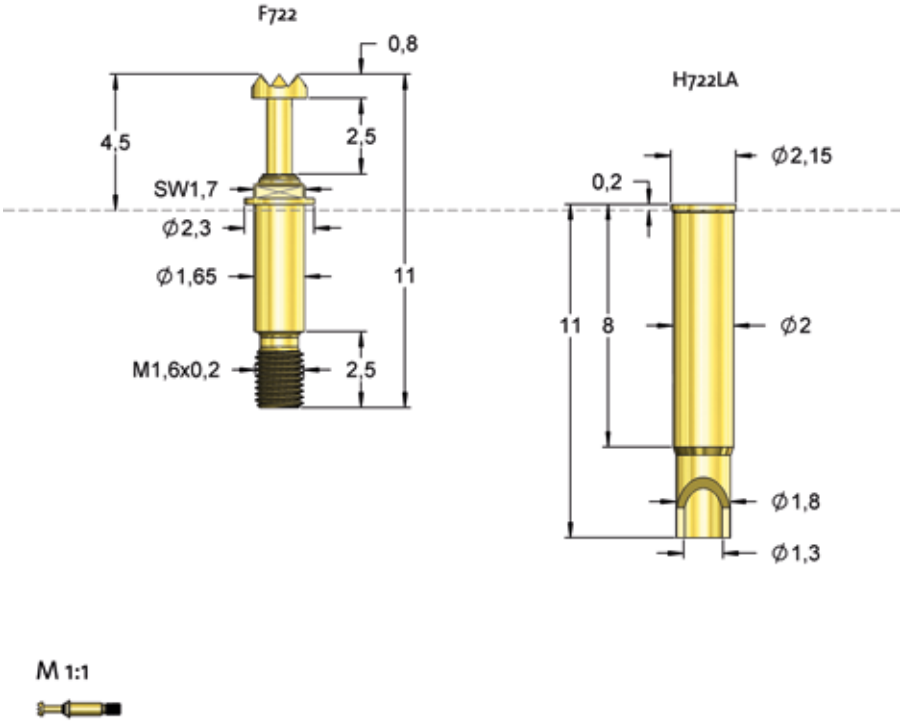
Screw-in tool probe max. Tip-Ø 2,0 mm	FWZ732; FWZ732T

Drill Size (mm)

H722LA	1,99 - 2,00

Projection Height (mm)

H722LA with F722	4,5



Series			Tip-Ø		Spring Force (cN)
F722	05	B	180	G	100
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 180 = 1,80 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	B	G	1,80	-
	06	B	G	1,80	-
	11	B	G	0,64	-
	11	B	G	0,85	-
	17	B	G	1,80	-

F727

Threaded Probe 100 mil
Long Travel Version

Centers (mm/mil)	2,54 / 100
Current	5,0 A
R typ	25 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	110	300

Travel (mm)

Version	Nominal	Maximum
Standard	12,0	14,5
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	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

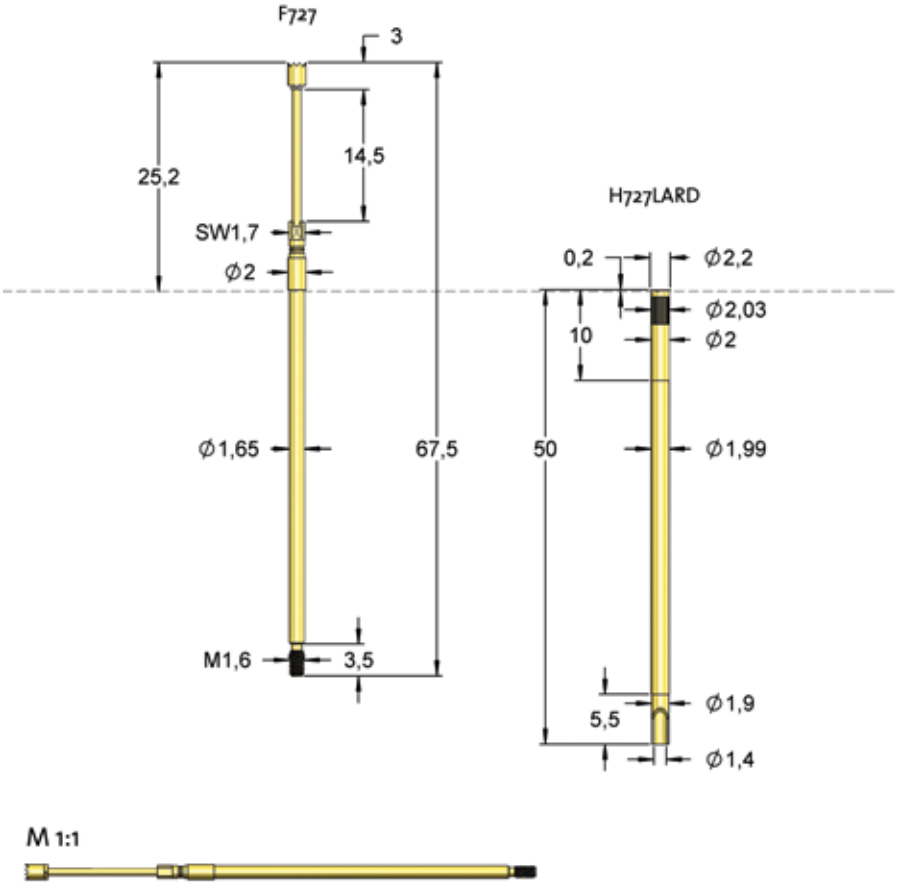
Insertion tool receptacle	FEWZ-772E0
Screw-in tool probe max. Tip-Ø 2,0 mm	FWZ732; FWZ732T

Drill Size (mm)

H727LARD	2,00 - 2,02

Projection Height (mm)

H727LARD with F727	25,2



Series			Tip-Ø		Spring Force (cN)
F727	06	B	200	G	300
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 200 = 2,00 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	2,00	-
	15	B	G	2,00	-

F733

Threaded Probe 157 mil Standard

Centers (mm/mil)	4,00 / 157
Current	10,0 A
R typ	8 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	50	150
Standard	80	300
Standard	30	400
Standard	70	600

Travel (mm)

Version	Nominal	Maximum
Standard	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	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe max. Tip-Ø 3,0 mm	FWZ733S1; FWZ733T1
Screw-in tool probe max. Tip-Ø 4,0 mm	FWZ733; FWZ733T
Plug lock	H733VS

Drill Size (mm)

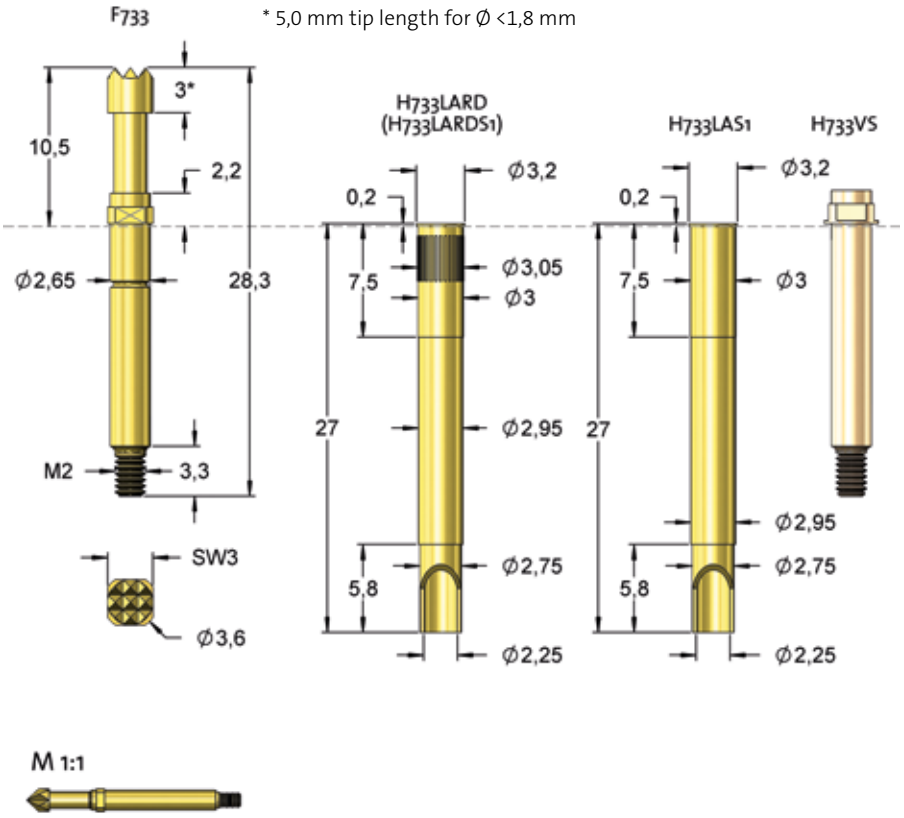
Receptacle without knurl	2,98 - 2,99
Receptacle with knurl	3,00 - 3,02

Projection Height (mm)

H733... with F733	10,5

Series			Tip-Ø		Spring Force (cN)	
F733	04	B	230	G	150	-
	Tip Style	Material		Plating		Version

Material: B = BeCu, S = Steel
Tip-Ø: 230 = 2,30 mm (e.g.)
Plating: G = Gold plated, L = Longtime gold plated
Receptacle: Order code according drawing



A solder tight version with a closed receptacle with knurl is available (H733LARDS1) which also has further press marks for a better hold of the probe even at conditions with stronger vibrations. Available high temperature versions see homepage.

** Center differing from standard.

Tip Style	Number	Material	Plating	Ø in mm	Version
	04	B	G	2,30	-
	05	B	G	1,80	-
	05	B	G	2,00	-
	05	B	G	2,30	-
	05	B	G	3,00	-
	06	B	G	1,60	-
	06	B	G	2,30	-
	06	B	G	2,50	-
	06	B	G	3,00	-
	06	B	G	3,50	-
	06	B	G	4,00 **	-
	06	S	L	2,30	-
	07	S	L	1,80	-
	07	S	L	2,30	-
	07	S	L	3,00	-

F733

Threaded Probe 157 mil Standard

Tip Style	Number	Material	Plating	⌀ in mm	Version
	09	S	L	2,30	-
	11	B	G	0,64	-
	11	B	G	0,80	-
	11	B	G	1,00	-
	11	B	G	1,40	-
	11	B	G	1,80	-
	12	B	G	2,30	-
	12	B	G	3,00	-
	14	S	L	2,30	-
	15	B	G	2,30	-
	15	B	G	3,00	-
	16	B	G	0,80	-
	16	B	G	1,00	-
	16	B	G	1,40	-
	16	B	G	1,80	-
	17	B	G	2,30	-
	17	B	G	3,00	-
	18	B	G	1,80	-
	21	S	L	1,80	-
	28	B	G	2,30	-
	29	B	G	1,80	-
	39	B	G	1,80	-

F723

Threaded Probe 157 mil
Short Version

Centers (mm/mil)	4,00 / 157
Current	10,0 A
R typ	15 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	40	80
Standard	70	150

Travel (mm)

Version	Nominal	Maximum
Standard	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
Receptacles	Brass, gold plated

Accessories

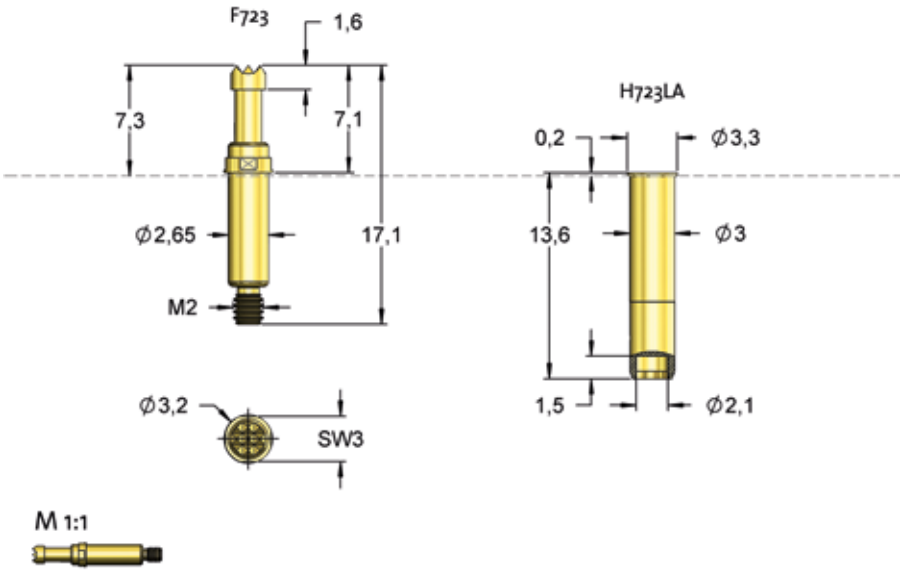
Screw-in tool probe max. Tip-Ø 3,0 mm	FWZ733S1; FWZ733T1

Drill Size (mm)

H723LA	2,98 - 2,99

Projection Height (mm)

H723LA with F723	7,3



Corresponding plug-in version see F713, which is included in the catalogue for fine pitches, low heights and for direct soldering or on our homepage..

Series			Tip-Ø		Spring Force (cN)
F723	02	B	230	G	150
	Tip Style	Material		Plating	Version

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

Tip Style	Number	Material	Plating	Ø in mm	Version
	02	B	G	2,30	-
	06	B	G	2,30	-
	12	B	G	2,30	-
	17	B	G	2,30	-

F734

Threaded Probe 157 mil
Long Travel Version

Centers (mm/mil)	4,00 / 157
Current	10,0 A
R typ	8 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	60	150
Standard	120	300

Travel (mm)

Version	Nominal	Maximum
Standard	5,6	7,0
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	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

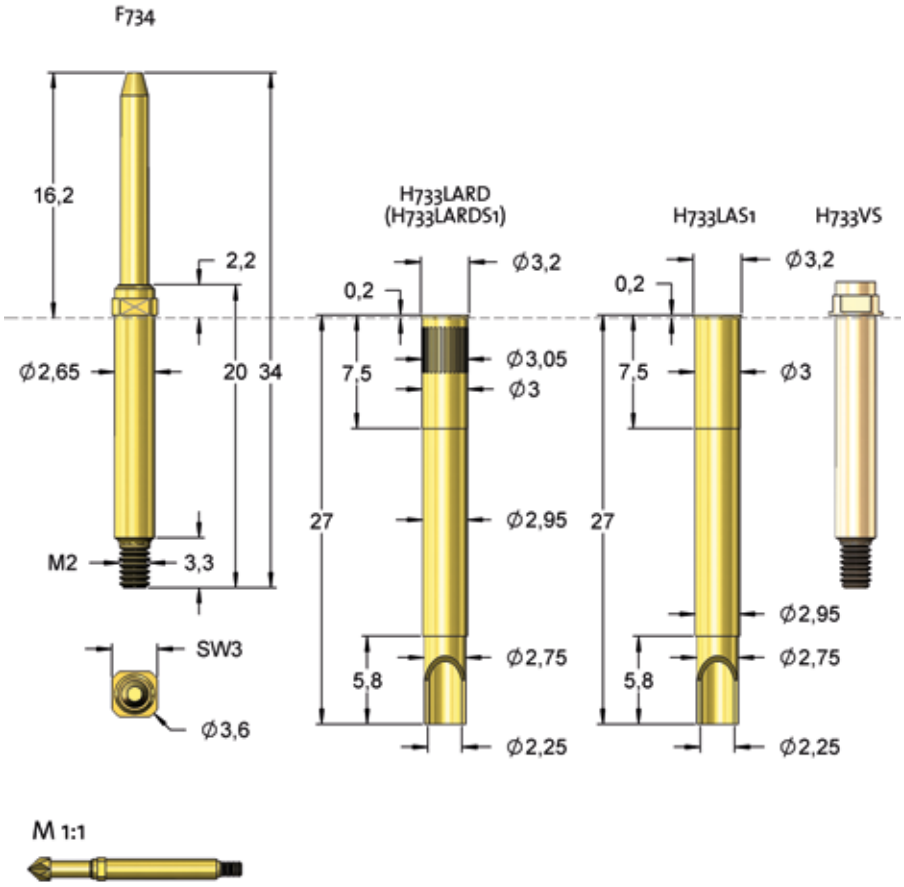
Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe max. Tip-Ø 3,0 mm	FWZ733S1; FWZ733T1
Screw-in tool probe max. Tip-Ø 4,0 mm	FWZ733; FWZ733T
Plug lock	H733VS

Drill Size (mm)

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

Projection Height (mm)

H733... with F734	16,2



A solder tight version with a closed receptacle with knurl is available (H733LARDS1), which also has further press marks for a better hold of the probe even at conditions with stronger vibrations.

Series			Tip-Ø		Spring Force (cN)
F734	16	B	180	G	150
	Tip Style	Material		Plating	Version

Material: B = BeCu, S = Steel
Tip-Ø: 180 = 1,80 mm (e.g.)
Plating: G = Gold plated, L = Longtime gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	16	B	G	1,80	-
	18	S	L	1,80	-
	39	B	G	1,80	-

F737

Threaded Probe 157 mil
Long Travel Version

Centers (mm/mil)	4,00 / 157
Current	10,0 A
R typ	8 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	60	150
Standard	80	300

Travel (mm)

Version	Nominal	Maximum
Standard	12,0	14,3
Thread (M)		2,0
Wrench Size		3,0
Pointing Accuracy		±0,15 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Accessories

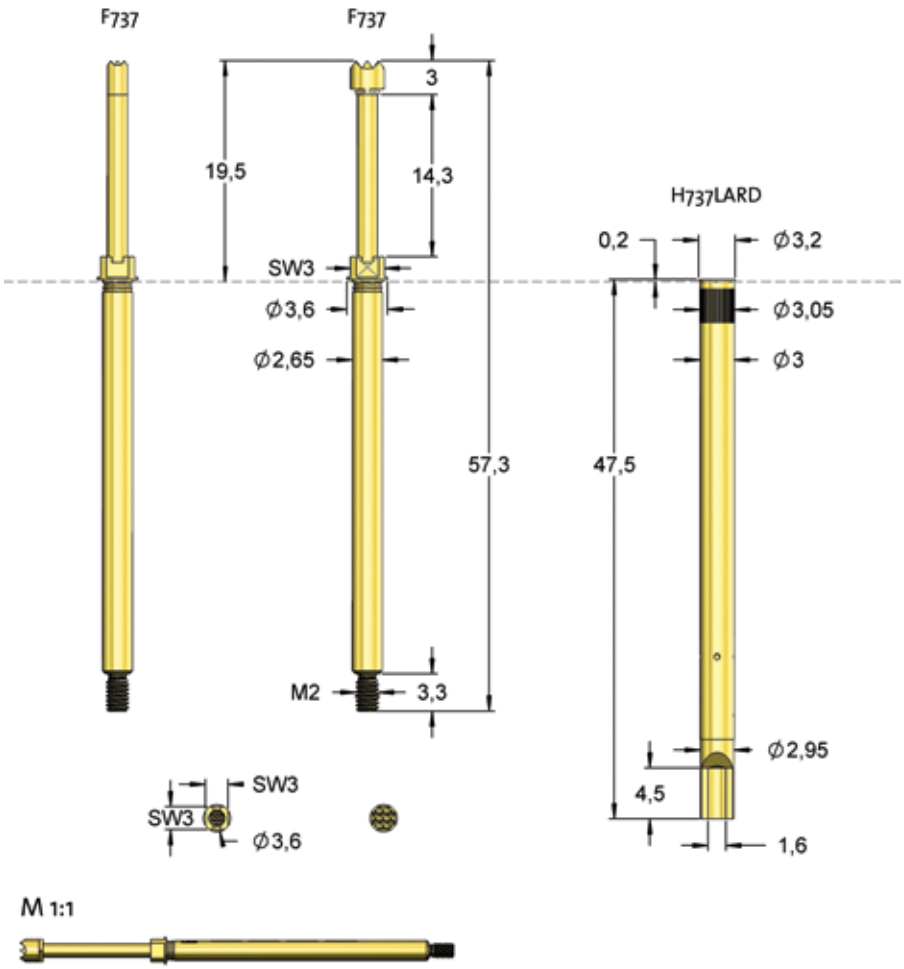
Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe max. Tip-Ø 3,0 mm	FWZ733S1; FWZ733T1
Screw-in tool probe max. Tip-Ø 4,0 mm	FWZ733; FWZ733T
Plug lock	H733VS

Drill Size (mm)

H737LARD	3,00 - 3,02

Projection Height (mm)

H737LARD with F737	19,5



Step probe versions see chapter step probes.

Series			Tip-Ø		Spring Force (cN)
F737	06	B	180	G	300
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 180 = 1,80 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,80	-
	06	B	G	3,00	-
	06	B	G	4,00	-
	16	B	G	1,80	-

F735

NEW

Threaded Probe 197 mil Standard

Centers (mm/mil)	5,00 / 197
Current	12,0 A
R typ	5 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	150	500

Travel (mm)

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

Materials and Plating

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

Accessories

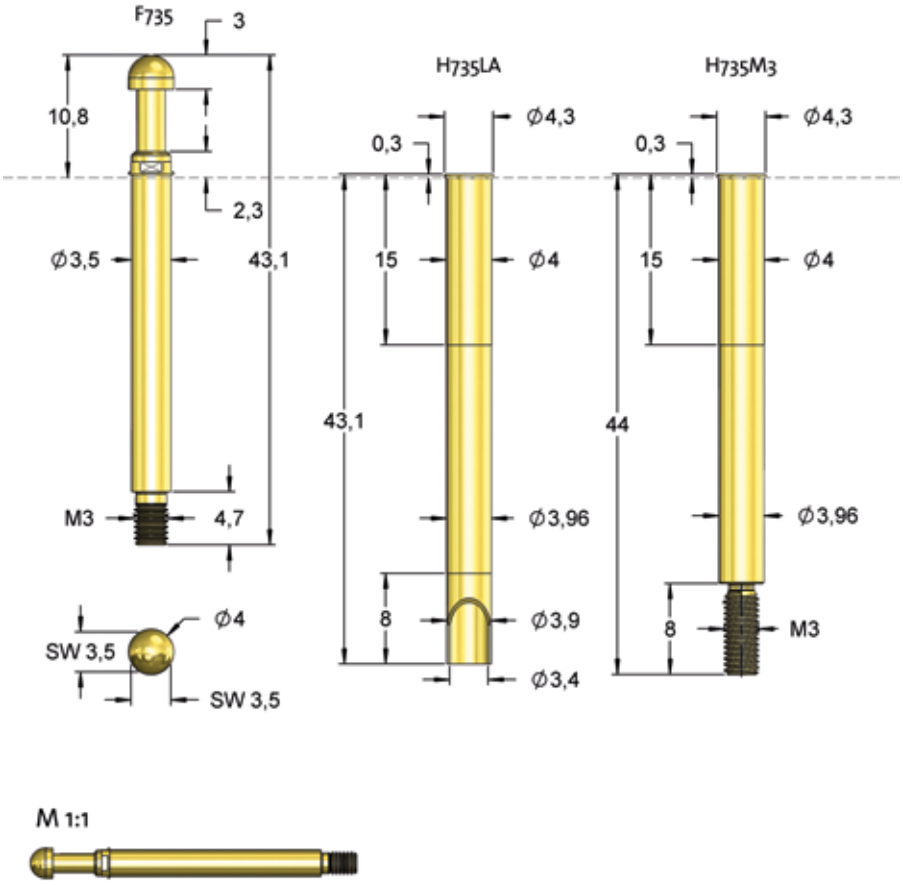
Insertion tool receptacle	FEWZ-774E0
Screw-in tool probe max. Tip-Ø 4,4 mm	FWZ735; FWZ735T

Drill Size (mm)

H735...	3,98 - 3,99

Projection Height (mm)

H735... with F735	10,8



M 1:1

Series			Tip-Ø		Spring Force (cN)
F735	12	B	400	G	500
	Tip Style	Material		Plating	Version

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

Tip Style	Number	Material	Plating	Ø in mm	Version
	12	B	G	4,00	-

F88890M2104G150

Threaded Probe with Ball Head

Centers (mm/mil)	6,00 / 236
Current	10,0 A
R typ	25 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	100	150

Travel (mm)

Version	Nominal	Maximum
Standard	0,8	0,8
Thread (M)		5,0

Materials and Plating

Kugel	Brass, gold plated
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacles	Brass, gold plated

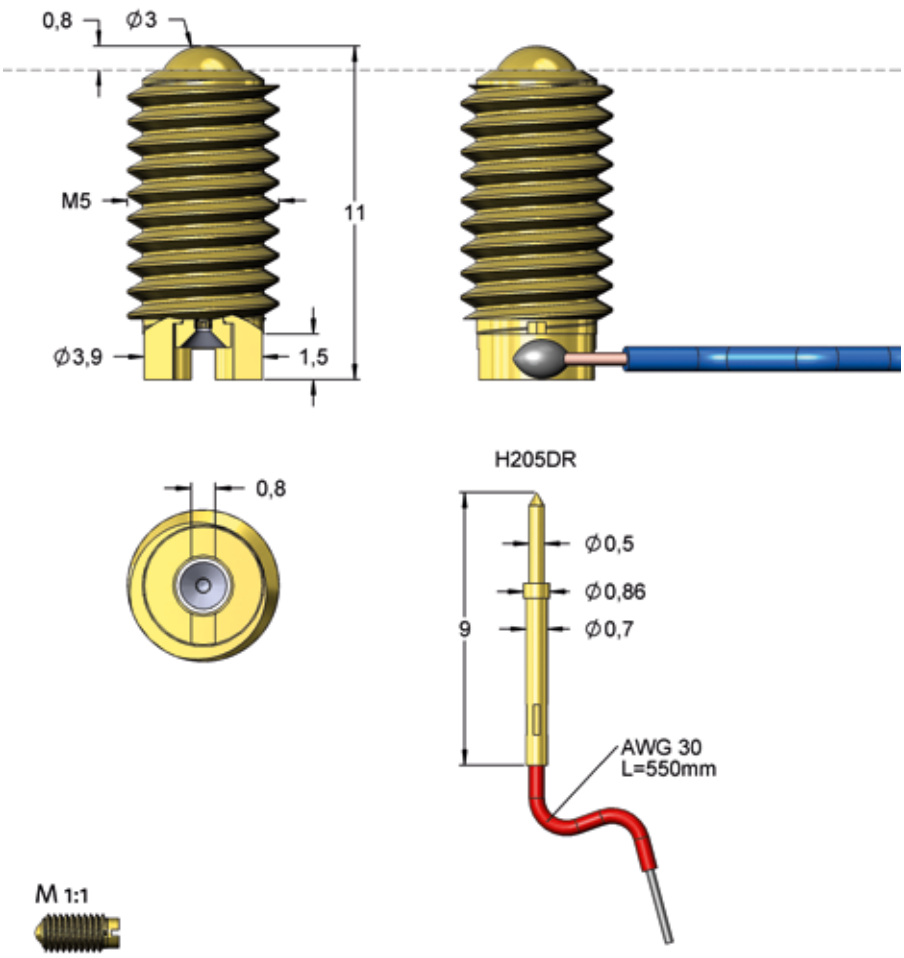
Accessories

Screw driver	FWZ888S2
Insertion tool for Connection element	FWZ888S1
Connection element	H205DR

Drill Size (mm)

F88890M2104G150	M5

Projection Height (mm)	**max.**
F88890M2104G150	0,8



Due to a rolling ball as contact element probes of the series F888 are insensitive against lateral forces. **This special version does not have a switch function.** It can be used like a normal contact probe.

Series			Tip-Ø		Spring Force (cN)
F888	**90**	**M**	**2104**	**G**	**150**
	Tip Style	Material		Plating	Version

Material: M = Messing

Number:

1. Digit: 0 = Switch not galvanically isolated; 1 = Switch galvanically isolated; 2 = Without switch
2. Digit: 0 = Without thread; 1 = With thread
3.+4. Digit: Running number

Plating: G = Gold plated

Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	90	M	G	3,00	-

Twist Proof Probes

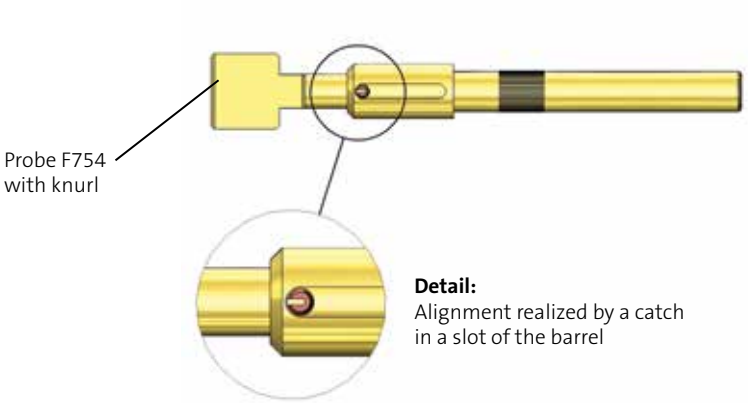
Twist proof probes are used for testing aligned connectors and contact blades. In these applications rectangular shaped probes are needed, that move into the connector housing well aligned. The twist proof design is realized either within the probe or by mounting into a receptacle.

Functional Principle

Twist proof probes are mainly used for testing connectors in rectangular cavities in which contact probes need to be inserted, or for testing contact blades. In these applications the alignment of the probe needs to have a certain direction. This alignment is realized by a twist proof design of the probe, either directly in the probe or in combination with a receptacle.

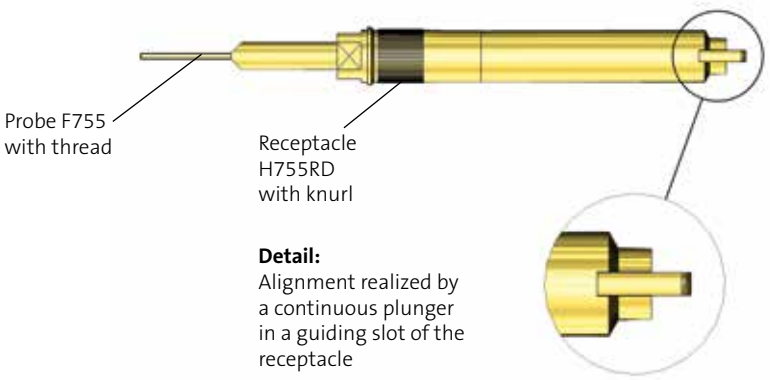
Twist proof design within a probe
When mounting a twist proof plug-in probe the correct alignment needs to be considered. If a receptacle is used, it can be mounted without alignment tool.
Advantage:
Probe can be mounted cost effectively without receptacle.

Example for a twist proof plug-in probe



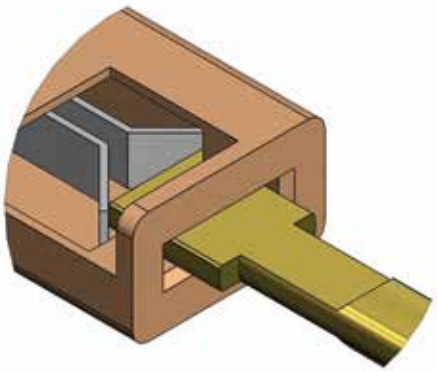
Twist proof design by guiding slot in the receptacle:
In this application the correct alignment needs to be considered already when mounting the slotted receptacle.
The threaded probes have a rectangular continuous plunger that is guided in a slot of the receptacle and makes sure that the probe is also aligned.
Advantage:
The correct alignment is already done after mounting the receptacle, there's no risk of alignment mistakes when probes are exchanged.

Example of a twist proof design with receptacle



Application Example

The twist proof spade tip moves through the hole in the plastic housing and contacts the inner connector inlay.



Twist Proof Insulation Caps

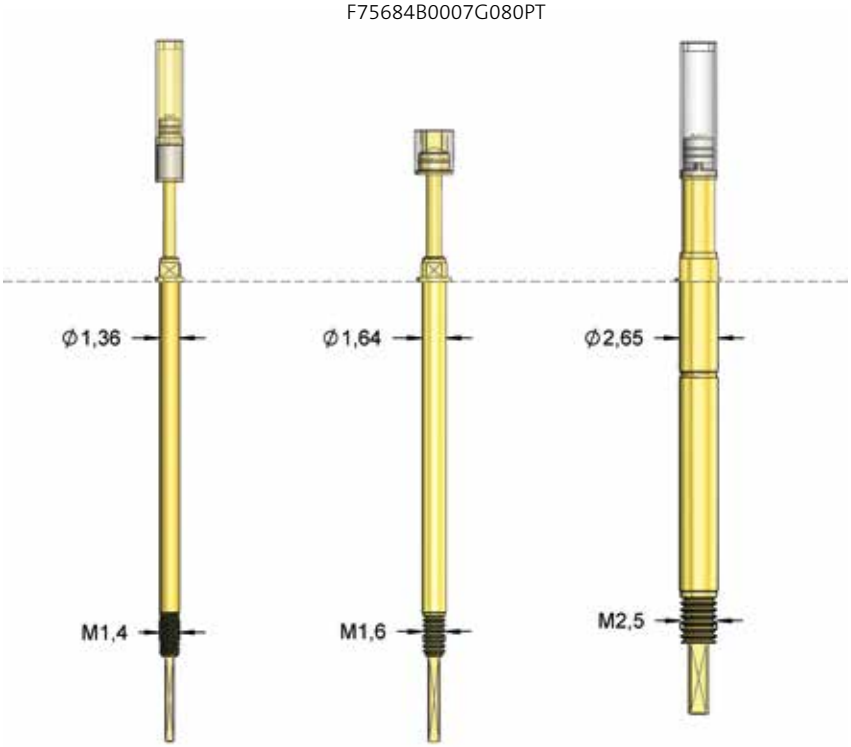
For testing the correct position and alignment of flat contact elements FEINMETALL has developed a simple and effective solution. With a slotted tip style in combination with a twist proof probe, flat contact elements can be tested regarding the correct length. Additionally deformed, twisted or too thick false contacts can be detected.

Slotted insulating caps are available for the twist proof probes F751, F756 and F760. They can be identified by the ending PT (Position Test) in the order code, e.g. PT50 = 5,0 mm overlap.

F75106B0001G150PT50

F76006B0001G300PT62

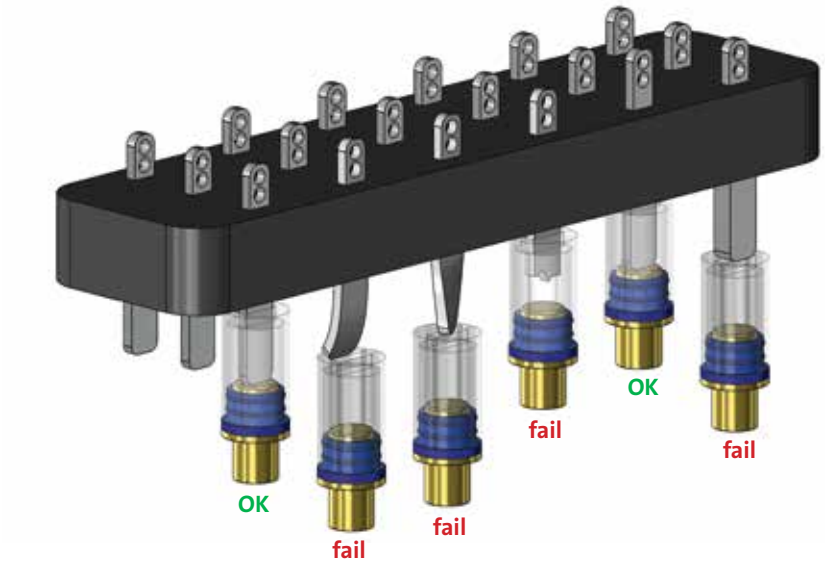
F75684B0007G080PT

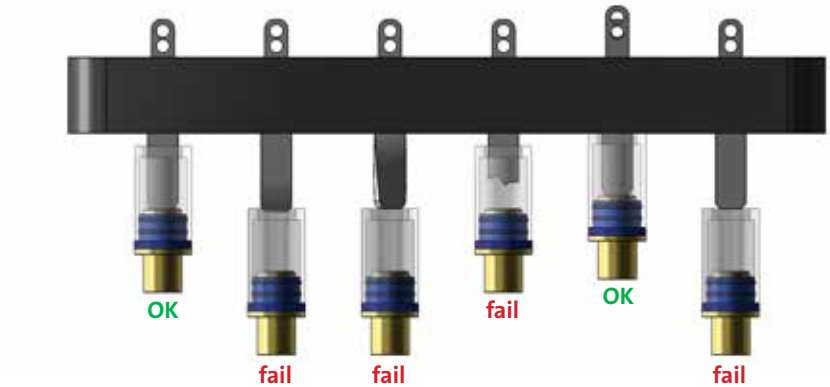


Functional Principle and Application Examples

With the new slotted insulating cap in combination with a twist proof probe the correct length as well as the correct alignment of a contact element can be tested. If flat contact elements are deformed, twisted or too thick, the insulating cap goes solid and does not establish an electrical connection. Only if length, alignment and shape of the contact is OK, the insulating cap can be moved over the contact element and an electrical contact to the test item is established.

This method allows to detect a great variety of failures reliably and in a very simple way.





F751

NEW

Threaded Probe 87 mil Twist Proof with Continuous Plunger

Centers (mm/mil)	2,20 / 87
Current	5,0 A
R typ	50 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
PT	30	150

Travel (mm)

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

Materials and Plating

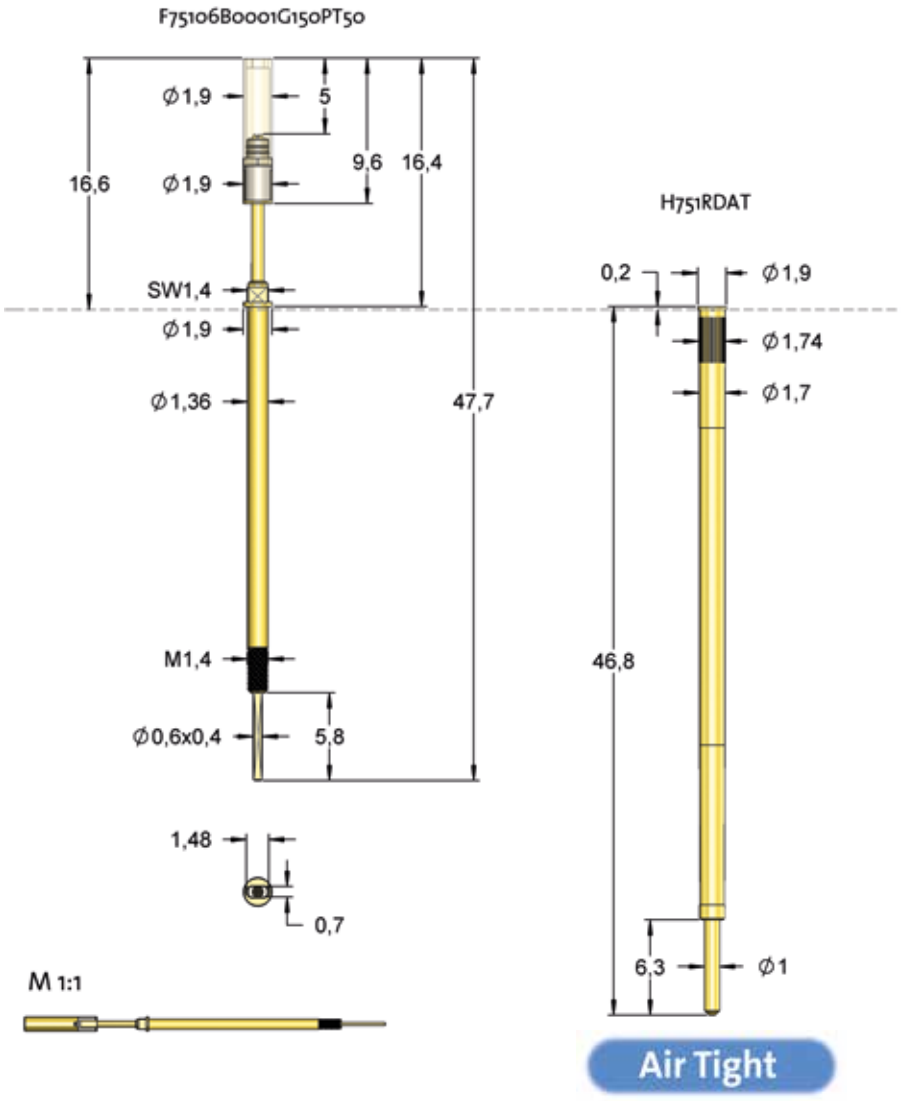
Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacles	Brass, gold plated

Accessories

Alignment tool receptacle	FAWZ751
Screw-in tool probe	FWZ731 (T)

Drill Size (mm)

H751RDAT	1,70 - 1,72



Further details of version **F75106B0001G150PT50** (slot 0,7 x 1,48 mm) with twist proof insulation cap see applications on page 83.
The permissible leakage rate for construction of an airtight module is 5 cm³ / min.

Series			Number		Spring Force (cN)	
F751	06	B	0001	G	150	PT50
	Tip Style	Material		Plating		Version

Material: B = BeCu
Number: see table
Plating: G = Gold plated
Version: PT = Twist proof insulated cap
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	0,70	PT50

F752

Probe 100 mil
Twist Proof, Plug-In

Centers (mm/mil)	2,54 / 100
Current	3,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
L	50	150
L	50	300
S	50	150

Travel (mm)

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

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

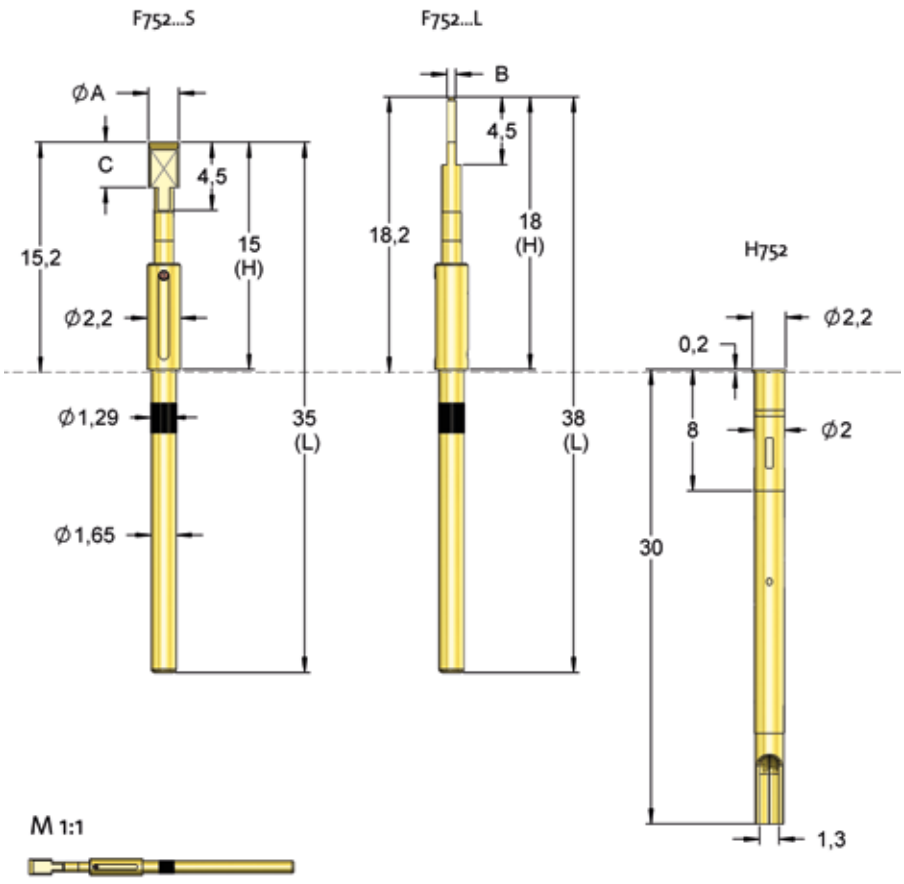
Insertion tool receptacle	FEWZ-772E0

Drill Size (mm)

F752 without receptacle	1,66 -1,70
H752	1,99 - 2,00

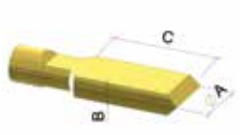
Projection Height (mm)

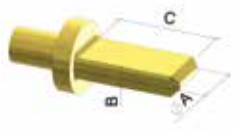
H752 with F752...S	15,2
H752 with F752...L	18,2



Series			Number		Spring Force (cN)	
F752	**84**	**S**	**0001**	**L**	**150**	**L**
	Tip Style	Material		Plating		Version

Material: S = Steel
Number: see table
Plating: L = Longtime gold plated
Version: S = Short version, L =Long version
Receptacle: Order code according drawing





Order code	Number	Ø A	B	C	H	L	Version
F75284S0005L150L	84	1,50	0,50	6,00	18,00	38,00	L
F75284S0002L150L	84	2,00	0,50	3,00	18,00	38,00	L
F75284S0004L150L	84	2,00	0,50	6,00	18,00	38,00	L
F75284S0004L300L	84	2,00	0,50	6,00	18,00	38,00	L
F75284S0001L150L	84	2,00	0,58	3,00	18,00	38,00	L
F75284S0003L150S	84	2,00	1,00	3,00	15,00	35,00	S
F75284S0007L150S	84	3,00	0,58	3,00	15,00	35,00	S
F75289S0001L150L	89	1,50	0,50	1,60	18,00	38,00	L

F756

Threaded Probe 100 mil Twist Proof with Continuous Plunger

Centers (mm/mil)	2,54 / 100
Current	5,0 A
R typ	30 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	60	150
Standard	100	300

Travel (mm)

Version	Nominal	Maximum
Standard	4,0	4,4
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
Receptacles	Brass, gold plated

Accessories

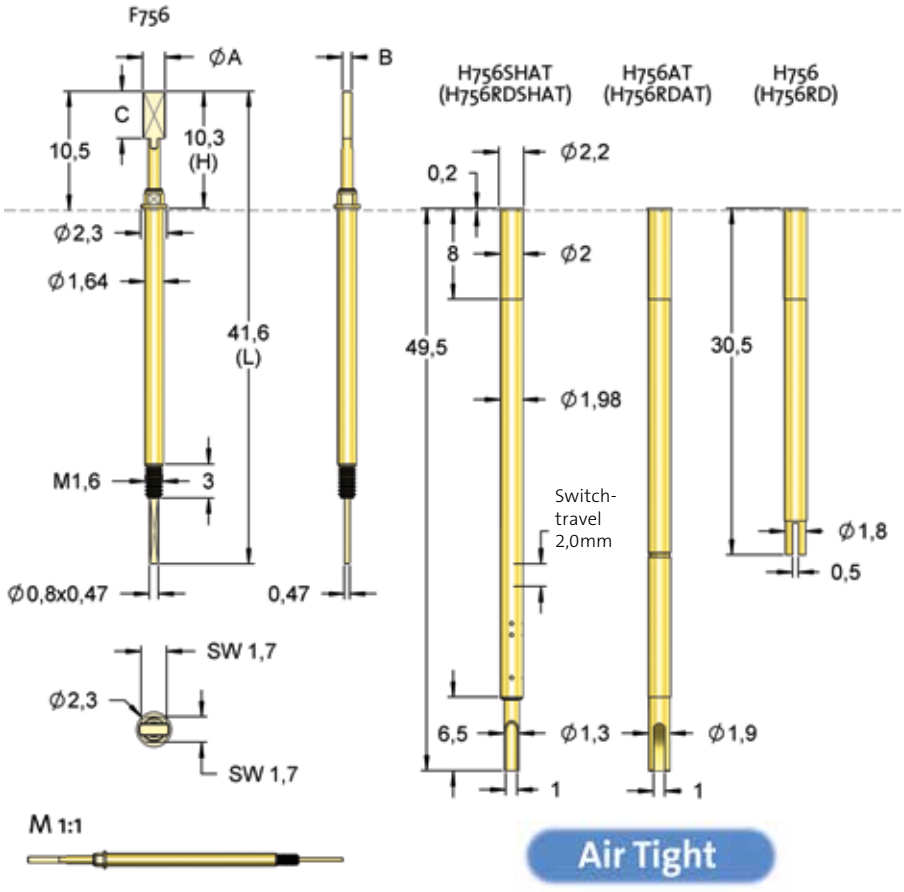
Alignment tool receptacle	FAWZ756
Screw-in tool probe	FWZ732 (T)

Drill Size (mm)

H756...	1,99 - 2,00

Projection Height (mm)

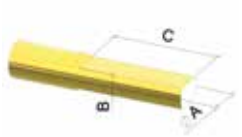
H756... with F756	10,5

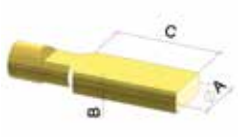


Further details of version **F75684B0007G080PT** with twist proof insulation cap see applications on page 83.
The permissible leakage rate for construction of an airtight module is 5 cm³ / min.

Series			Number		Spring Force (cN)	
F756	**84**	**B**	**0001**	**G**	**150**	
	Tip Style	Material		Plating		Version

Material: B = BeCu
Number: see table
Plating: G = Gold plated
Version: PT = Twist proof insulated cap
Receptacle: Order code according drawing





Order code	Number	Ø A	B	C	H	L	Version	Screw-in tool
F75682B0001G150	82	1,10	0,45	5,00	10,30	41,60	-	FWZ732; FWZ732T
F75684B0001G150	84	1,50	0,50	4,15	10,30	41,60	-	FWZ732; FWZ732T
F75684B0001G300	84	1,50	0,50	4,15	10,30	41,60	-	FWZ732; FWZ732T
F75684B0004G150	84	1,50	1,00	4,15	10,30	41,60	-	FWZ732; FWZ732T
F75684B0004G300	84	1,50	1,00	4,15	10,30	41,60	-	FWZ732; FWZ732T
F75684B0003G150	84	2,00	0,80	4,15	10,30	41,60	-	FWZ732; FWZ732T
F75684B0003G300	84	2,00	0,80	4,15	10,30	41,60	-	FWZ732; FWZ732T
F75684B0006G300	84	2,00	0,80	4,15	10,30	41,60	-	FWZ732; FWZ732T

F760

Threaded Probe 138 mil Twist Proof with Continuous Plunger

Centers (mm/mil)	3,50 / 138
Current	10,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
L	50	150
L	80	300
S	50	150
S	80	300

Travel (mm)

Version	Nominal	Maximum
L	4,0	5,0
S	4,0	5,0
Thread (M)		2,5
Wrench Size		2,6
Pointing Accuracy		±0,08 mm

Materials and Plating

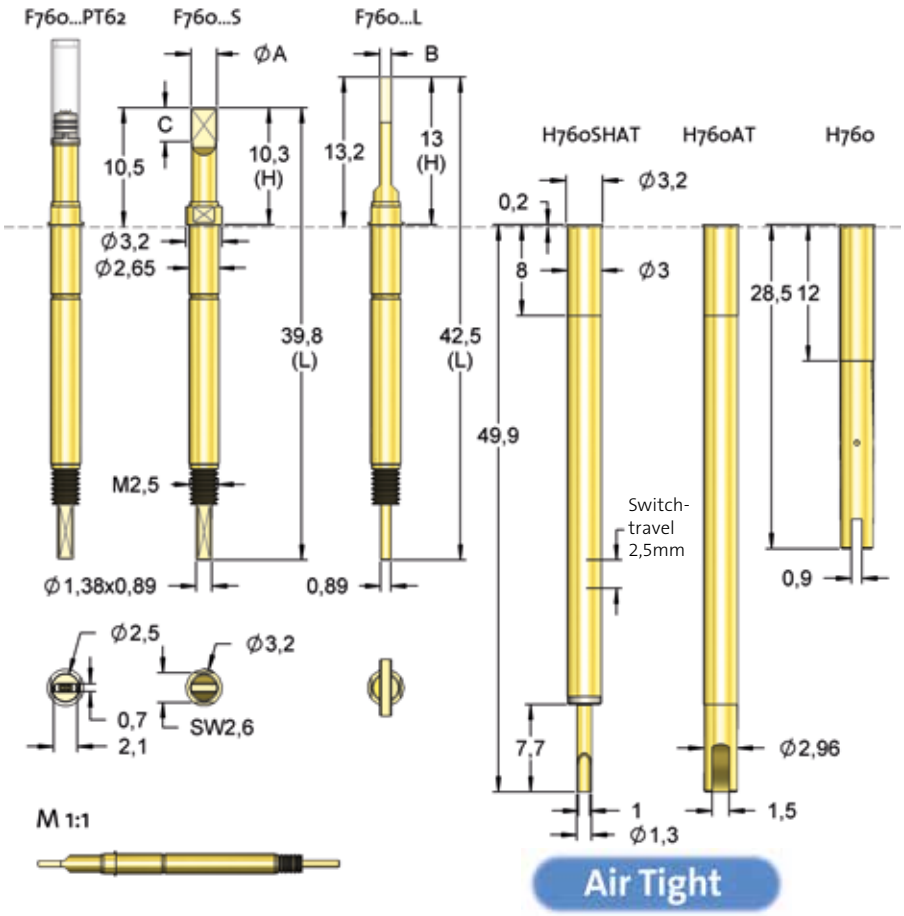
Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	Brass, gold plated

Projection Height (mm)

H760... with F760S	10,5
H760... with F760L	13,2

Series			Number		Spring Force (cN)	
F760	**81**	**B**	**0001**	**G**	**150**	**S**
	Tip Style	Material		Plating		Version

Material: B = BeCu
Number: see table
Plating: G = Gold plated
Version: S = Short version, L =Long version, PT = Twist proof insulated cap
Receptacle: Order code according drawing



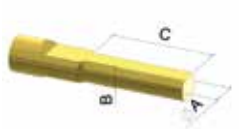
Further details of version **F76006B0001G300PT62** (slot 0,7 x 2,1 mm) with twist proof insulation cap see applications on page 83.
The permissible leakage rate for construction of an airtight module is 5 cm³ / min.

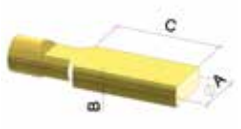
Accessories

Alignment tool receptacle	FAWZ761
Screw-in tool probe max. Tip-Ø 4,0 mm	FWZ760S1
Screw-in tool probe max. Tip-Ø 4,9 mm	FWZ760S2
Plug lock	H733VS

Drill Size (mm)

H760...	2,98 - 2,99





Order code	Number	Ø A	B	C	H	L	Version	Screw-in tool
F76081B0002G300L	81	1,50	0,60	6,00	13,00	42,50	L	FWZ760S1; FWZ760T1
F76084B0003G300L	84	2,30	0,80	3,00	13,00	42,50	L	FWZ760S1; FWZ760T1
F76084B0003G300L	84	2,30	0,80	3,00	13,00	42,50	L	FWZ760S1; FWZ760T1
F76084B0002G150L	84	2,50	0,80	4,00	13,00	42,50	L	FWZ760S1; FWZ760T1
F76084B0002G300L	84	2,50	0,80	4,00	13,00	42,50	L	FWZ760S1; FWZ760T1
F76084B0001G300L	84	2,80	0,50	6,00	13,00	42,50	L	FWZ760S1; FWZ760T1
F76084B0004G150L	84	5,00	1,00	4,00	13,00	42,50	L	FWZ760S2; FWZ760T2
F76084B0004G300L	84	5,00	1,00	4,00	13,00	42,50	L	FWZ760S2; FWZ760T2
F76081B0001G150S	81	2,00	0,80	4,15	10,30	39,80	S	FWZ760S1; FWZ760T1
F76081B0001G300S	81	2,00	0,80	4,15	10,30	39,80	S	FWZ760S1; FWZ760T1
F76084B0003G300S	84	2,30	0,80	3,00	10,30	39,80	S	FWZ760S1; FWZ760T1

F755

Threaded Probe 177 mil Twist Proof with Continuous Plunger, Spade Tip Styles

Centers (mm/mil)	4,50 / 177
Current	10,0 A
R typ	30 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Exx	70	150
Exx	90	300

Travel (mm)

Version	Nominal	Maximum
Exx	5,6	7,0
Thread (M)		2,5
Wrench Size		3,0
Pointing Accuracy		±0,10 mm

Materials and Plating

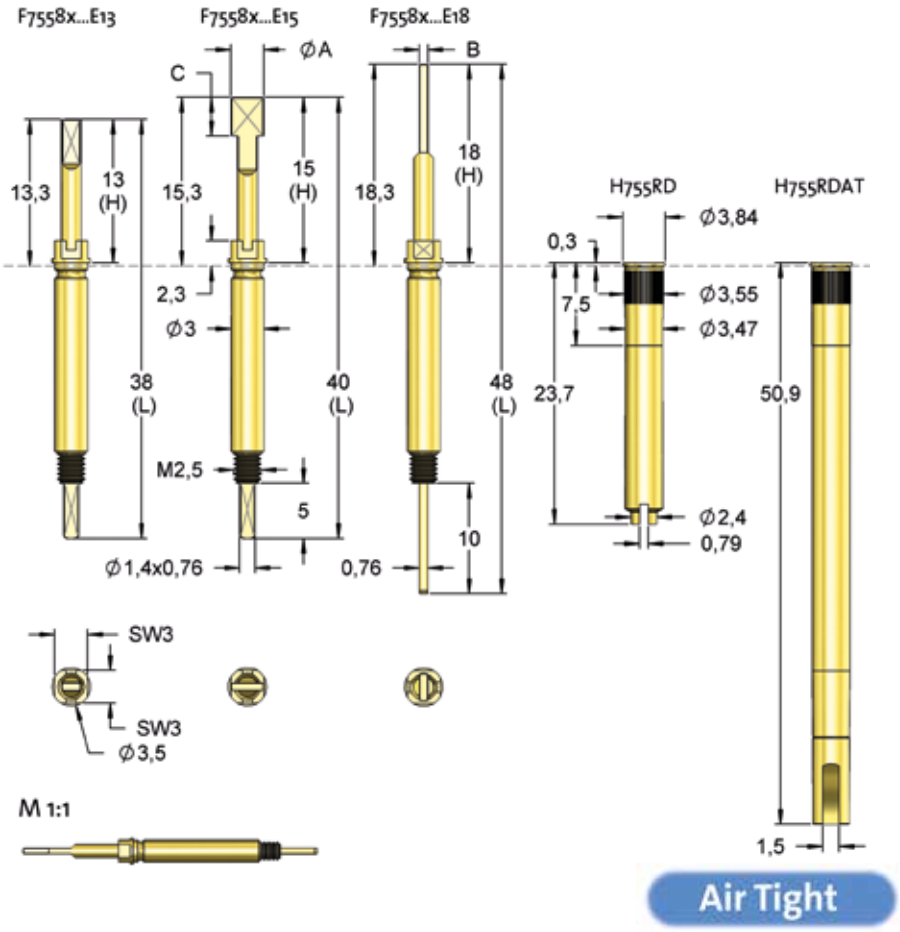
Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Stainless steel, unplated
Receptacles	Brass, gold plated

Accessories

Alignment tool receptacle	FAWZVF4
Screw-in tool probe max. Tip-Ø 4,0 mm	FWZ733; FWZ733T

Projection Height (mm)

H755RD with F755...E13	13,3
H755RD with F755...E15	15,3
H755RD with F755...E18	18,3



The permissible leakage rate for construction of an airtight module is 5 cm³ / min.

Series			Number		Spring Force (cN)	
F755	**82**	**B**	**0001**	**G**	**150**	**E13**
	Tip Style	Material		Plating		Version

Material: B = BeCu
Number: see table
Plating: G = Gold plated
Version: E13 = Projection Height 13mm
Receptacle: Order code according drawing

Drill Size (mm)

H755RD	3,48 - 3,52

Order code	Number	Ø A	B	C	H	L	Version	Screw-in tool
F75582B0002G150E13	82	1,80	0,50	4,00	13,00	38,00	E13	FWZ733; FWZ733T
F75582B0001G150E13	82	1,80	0,80	4,00	13,00	38,00	E13	FWZ733; FWZ733T
F75582B0001G300E13	82	1,80	0,80	4,00	13,00	38,00	E13	FWZ733; FWZ733T
F75584B0002G300E15	84	2,80	0,40	6,00	15,00	40,00	E15	FWZ733; FWZ733T
F75584B0001G150E15	84	3,00	0,70	3,50	15,00	40,00	E15	FWZ733; FWZ733T
F75584B0001G300E15	84	3,00	0,70	3,50	15,00	40,00	E15	FWZ733; FWZ733T
F75583B0001G150E18	83	2,50	0,80	8,00	18,00	48,00	E18	FWZ733; FWZ733T
F75583B0001G300E18	83	2,50	0,80	8,00	18,00	48,00	E18	FWZ733; FWZ733T

F755

Threaded Probe 177 mil with Continuous Plunger Round Tip Styles

Centers (mm/mil)	4,50 / 177
Current	10,0 A
R typ	30 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Exx	70	150
Exx	90	300
Exx	120	500

Travel (mm)

Version	Nominal	Maximum
Exx	5,6	7,0
Thread (M)		2,5
Wrench Size		3,0
Pointing Accuracy		±0,10 mm

Materials and Plating

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

Accessories

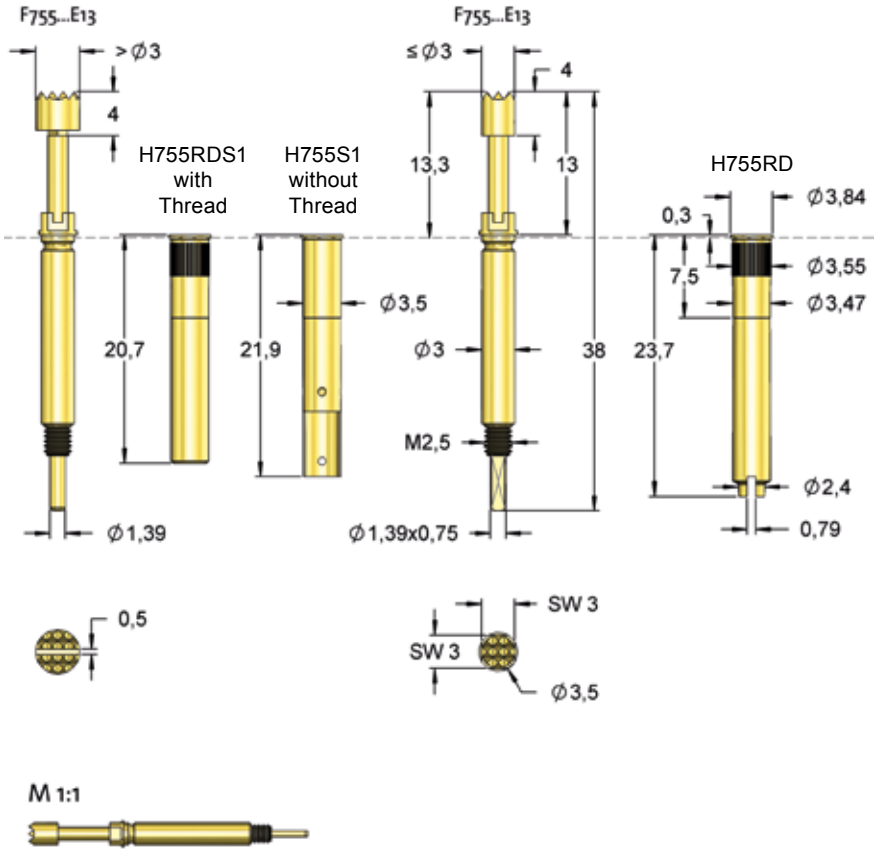
Insertion tool receptacle (not twist proof)	FEWZ-755E0
Alignment tool receptacle	FAWZVF4
Screw-in tool probe max. Tip-Ø 3,0 mm	FWZ733S1; FWZ733T1
Screw-in tool probe > Ø3,1 mm with slot	FWZ886S1

Drill Size (mm)

H755S1	3,48 - 3,49
H755RD	3,48 - 3,52

Projection Height (mm)

H755... with F755...E13	13,3
H755... with F755...E15	15,3
H755... with F755...E18	18,3



Tip styles with a diameter up to 3,0 mm are twist proof. Larger tip styles are not twist proof.

Series			Tip-Ø		Spring Force (cN)	
F755	06	B	300	G	300	E13
	Tip Style	Material		Plating		Version

Material: B = BeCu
Tip-Ø: 300 = 3,00 mm (e.g.)
Plating: G = Gold plated
Version: E13 = Projection Height 13mm
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	3,00	E13
	06	B	G	4,00	E13
	14	B	G	3,00	E13
	18	B	G	1,80	E13
	06	B	G	3,00	E15

F754

Probe 177 mil
Plug-In, Twist Proof

Centers (mm/mil)	4,50 / 177
Current	10,0 A
R typ	20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
L	30	150
L	80	300
S	30	150
S	80	300

Travel (mm)

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

Materials and Plating

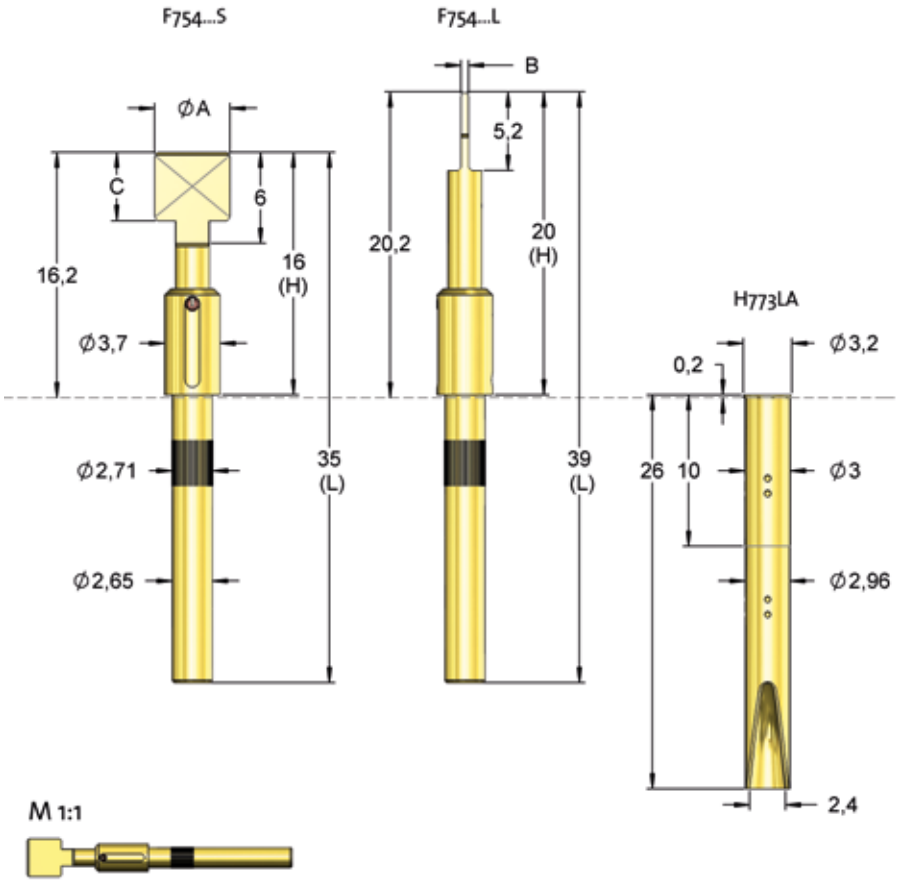
Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

Insertion tool receptacle	FEWZ-774E0

Drill Size (mm)

F754 without Receptacle	2,66 - 2,70
H773LA	2,98 - 2,99



Series			Number		Spring Force (cN)	
F754	82	B	0001	N	150	L
	Tip Style	Material		Plating		Version

Material: B = BeCu
Number: see table
Plating: G = Gold plated, N = Nickel plated
Version: S = Short version, L =Long version
Receptacle: Order code according drawing

Order code	Number	Ø A	B	C	H	L	Version
F75482B0001N150L	82	2,25	2,25	6,00	20,00	39,00	L
F75484B0004G150L	84	4,00	0,65	3,00	20,00	39,00	L
F75484B0005G300L	84	5,00	0,40	4,50	20,00	39,00	L
F75484B0003G150L	84	5,00	0,50	3,00	20,00	39,00	L
F75484B0003G300L	84	5,00	0,50	3,00	20,00	39,00	L
F75484B0002G150S	84	4,00	1,00	3,00	16,00	35,00	S
F75484B0002G300S	84	4,00	1,00	3,00	16,00	35,00	S
F75484B0005G300S	84	5,00	0,40	4,50	16,00	35,00	S
F75484B0001G150S	84	5,00	1,00	3,00	16,00	35,00	S
F75484B0001G300S	84	5,00	1,00	3,00	16,00	35,00	S
F75484B0006G300S	84	5,00	1,00	4,50	16,00	35,00	S

Push Back Probes

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

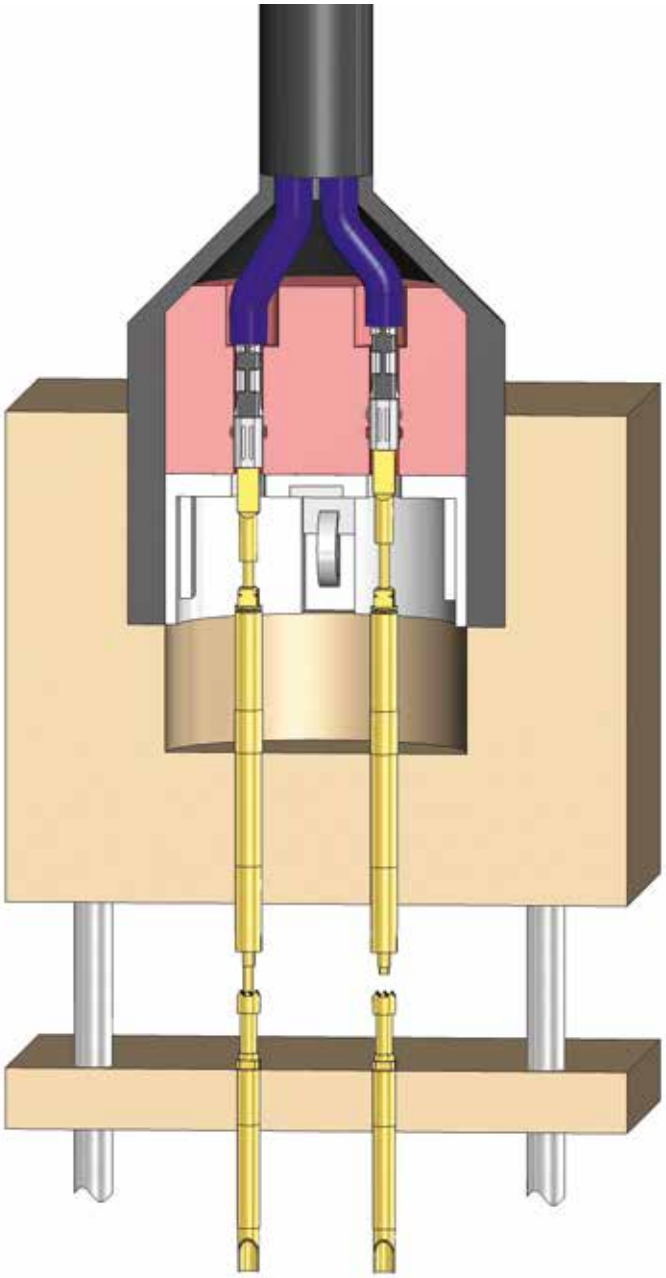
Push Back Test of Connectors

Push back probes are used to verify and qualify the correct mounting and locking of terminals in connectors and to make sure that they cannot be pushed out of their housings.

For these applications contact probes with very high spring forces and pre-defined projection heights are used. Depending on the centers the spring forces have values between 5 N and 25 N.

Very commonly push back tests require twist proof probes with spade tip styles (series VF100, VF3, VF4).

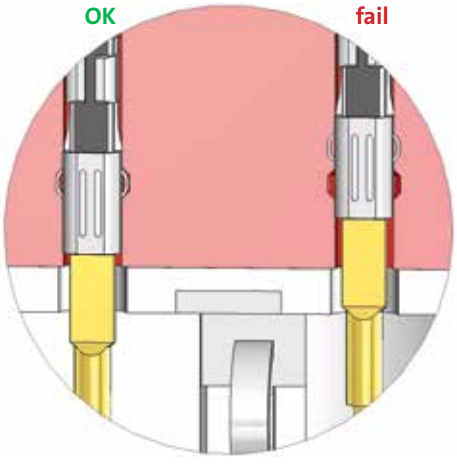
Push back probes are also available with round tip styles without twist proof design (series V03, V04).



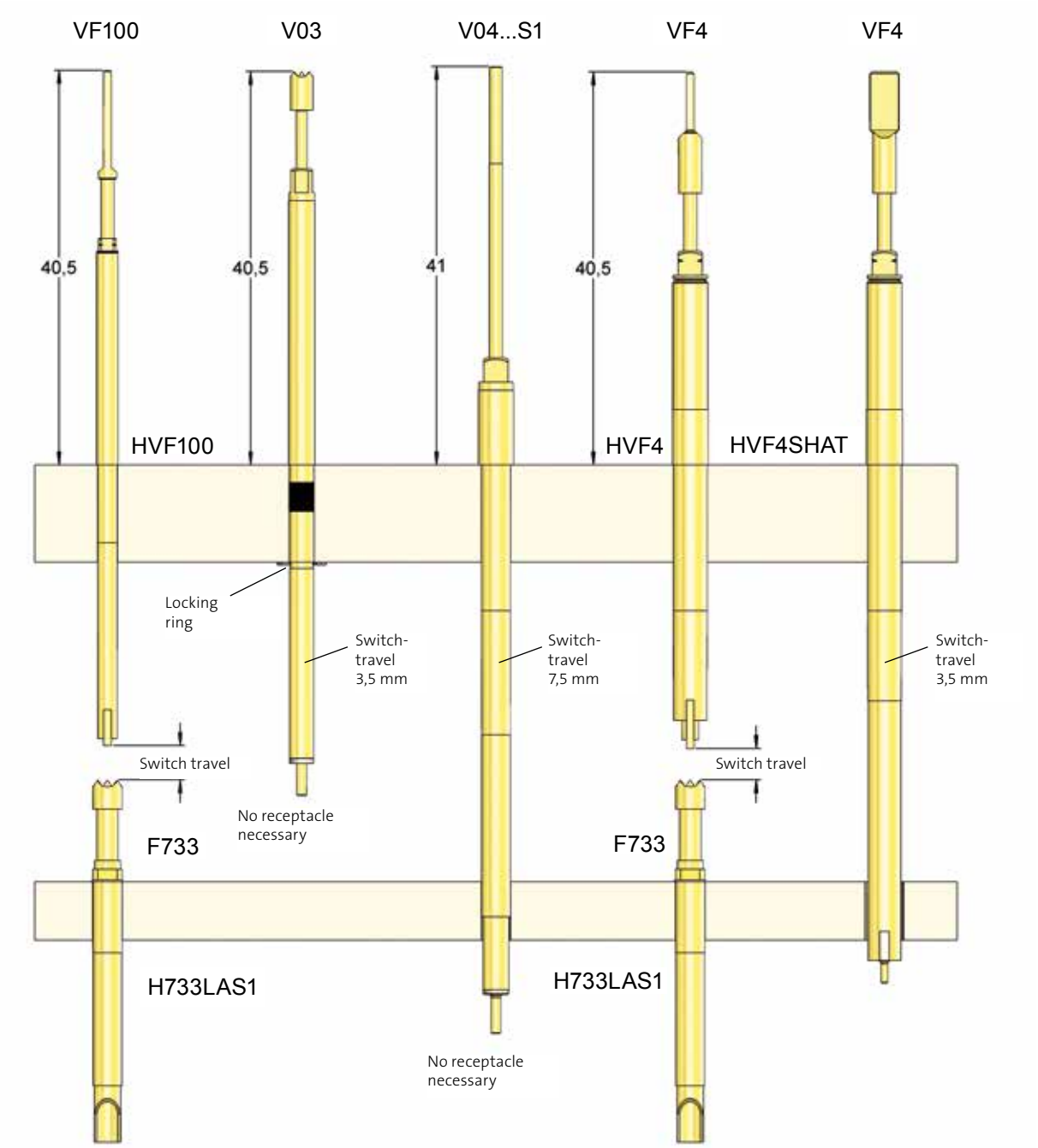
Details of Contacting Procedure

During the test procedure not only the electrical continuity is tested, but also the correct mounting of the connector. Without a push back test the result could be OK even if the connector is not locked properly.

The detection of the correct mounting of the connector is based on a switch function of the push back probe. This switch function can be realized either by using a switch receptacle or by using an additional probe in a second level.



Typical Combinations of Push Back Probes



Threaded Probes for Push Back Tests of Connectors

Push back probes are used for testing wire harnesses and connectors. FEINMETALL offers a great variety of tip styles and spring forces as well as further features, for example receptacles for building up airtight modules as well as push back probes that can be mounted without receptacle. .

Selection of Variable and Fix Switch Points

The modular design of FEINMETALL push back probes enables a separate exchange of switch elements and push back probes. This is a great economical advantage. The illustration shows different combinations of probes at different levels.

Note
In case of connecting several probes in series the resulting spring force is the sum of the single spring forces.

VF100

Push Back Probe 100 mil Round Tip Styles

Centers (mm/mil)	2,54 / 100
Current	5,0 A
Current (Switch Receptacle)	1,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	80	500
Standard	80	1000
Standard	120	1500

Travel (mm)

Version	Nominal	Maximum
Standard	5,0	5,5
Thread (M)		2,0x0,25
Wrench Size		1,8
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

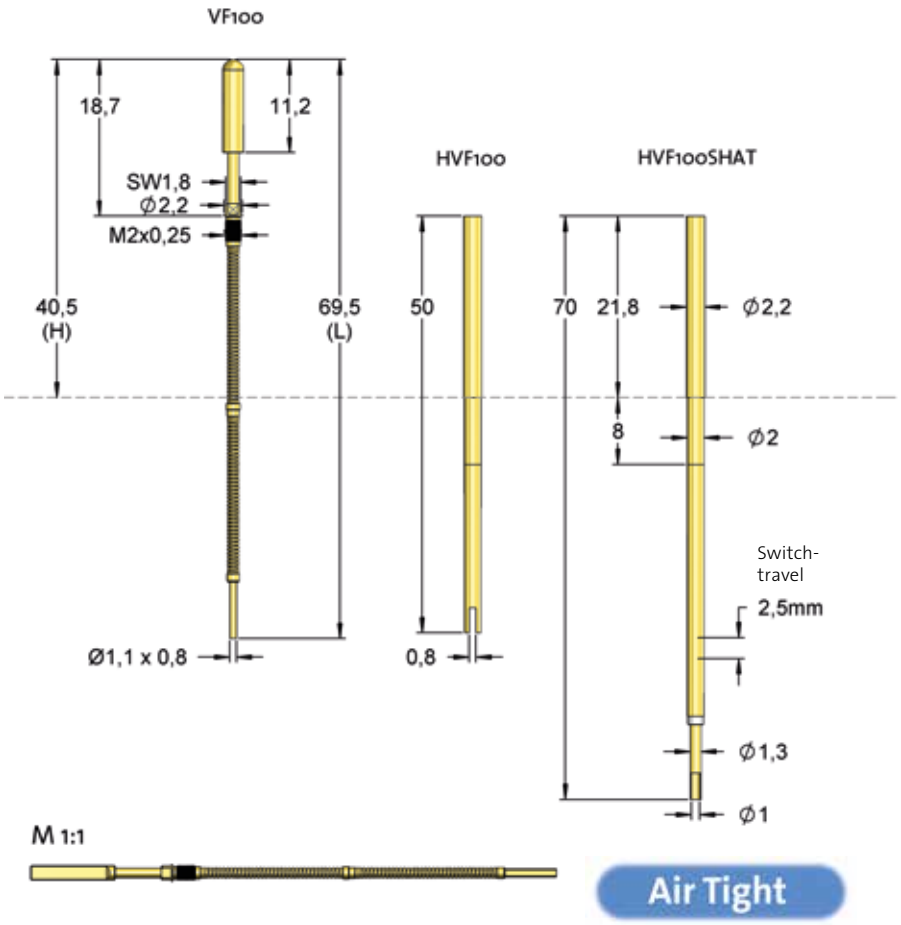
Alignment tool receptacle	FAWZVF100
Screw-in tool probe max. Tip-Ø 2,0 mm	FWZVF100; FWZVF100T
Screw-in tool probe max. Tip-Ø 2,7 mm	FWZVF100S1; FWZVF100T1

Drill Size (mm)

HVF100...	1,99 - 2,00

Projection Height (mm)

HVF100... with VF100	40,5



The permissible leakage rate for the construction of airtight modules is 5 cm³ / min.

Series			Tip-Ø		Spring Force (cN)
VF100	05	B	190	G	15
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 190 = 1,90 mm (e.g.)
Plating: G = Gold plated
Version: L = Long version
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	B	G	1,90	-
	05	B	G	2,20	-
	11	B	G	1,20	-
	12	B	G	2,50	-
	17	B	G	1,50	-
	17	B	G	1,80	-

VF100

Push Back Probe 100 mil Spade Tip Styles

Centers (mm/mil)	2,54 / 100
Current	5,0 A
Current (Switch Receptacle)	1,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	80	500
Standard	80	1000
Standard	120	1500

Travel (mm)

Version	Nominal	Maximum
Standard	5,0	5,5
Thread (M)		2,0x0,25
Wrench Size		1,8
Pointing Accuracy		±0,10 mm

Materials and Plating

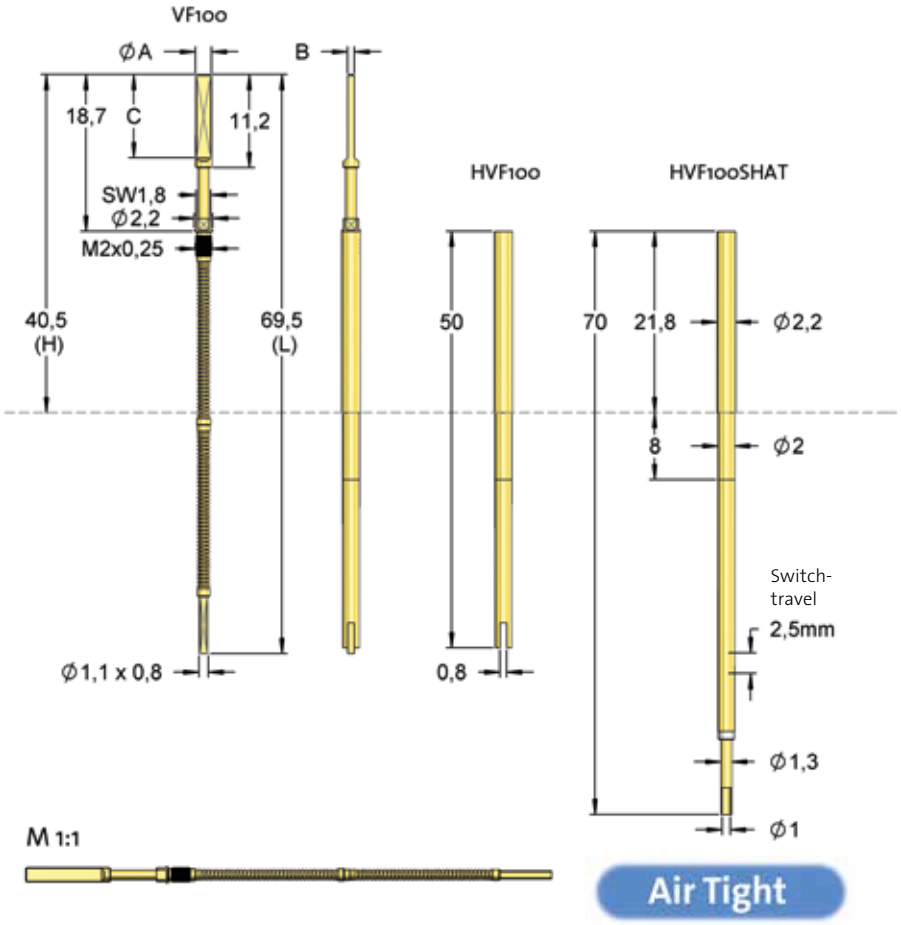
Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

Alignment tool receptacle	FAWZVF100
Screw-in tool probe max. Tip-Ø 2,0 mm	FWZVF100; FWZVF100T
Screw-in tool probe max. Tip-Ø 2,7 mm	FWZVF100S1; FWZVF100T1

Projection Height (mm)

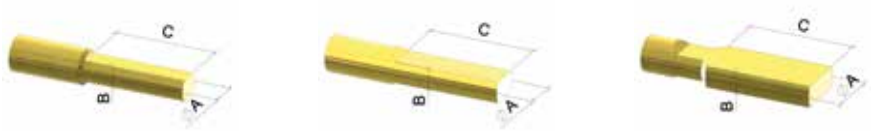
HVF100... with VF100	40,5



The permissible leakage rate for the construction of airtight modules is 5 cm³ / min.

Drill Size (mm)

HVF100...	1,99 - 2,00



Order Code	Number	Ø A	B	C	H	L	Version	Screw-in tool
VF10080B0001G10	80	1,60	0,50	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10080B0001G15	80	1,60	0,50	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10082B0003G05	82	1,90	0,50	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10082B0003G10	82	1,90	0,50	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10082B0003G15	82	1,90	0,50	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10082B0004G10	82	1,90	0,80	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10082B0004G15	82	1,90	0,80	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10082S0001L10	82	1,90	0,30	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10082S0001L15	82	1,90	0,30	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10082S0002L10	82	1,90	0,36	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10082S0002L15	82	1,90	0,36	10,00	40,50	69,50	-	FWZVF100; FWZVF100T
VF10084B0001G10	84	2,50	0,80	3,00	40,50	69,50	-	FWZVF100S1; FWZVF100T1
VF10084B0001G15	84	2,50	0,80	3,00	40,50	69,50	-	FWZVF100S1; FWZVF100T1

VF3

Push Back Probe 118 mil
Round Tip Styles

Centers (mm/mil)	3,00 / 118
Current	8,0 A
Current (Switch Receptacle)	1,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	100	500
Standard	200	1000
Standard	300	1500

Travel (mm)

Version	Nominal	Maximum
Standard	5,0	5,5
Thread (M)		2,0x0,2
Wrench Size		2,2
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

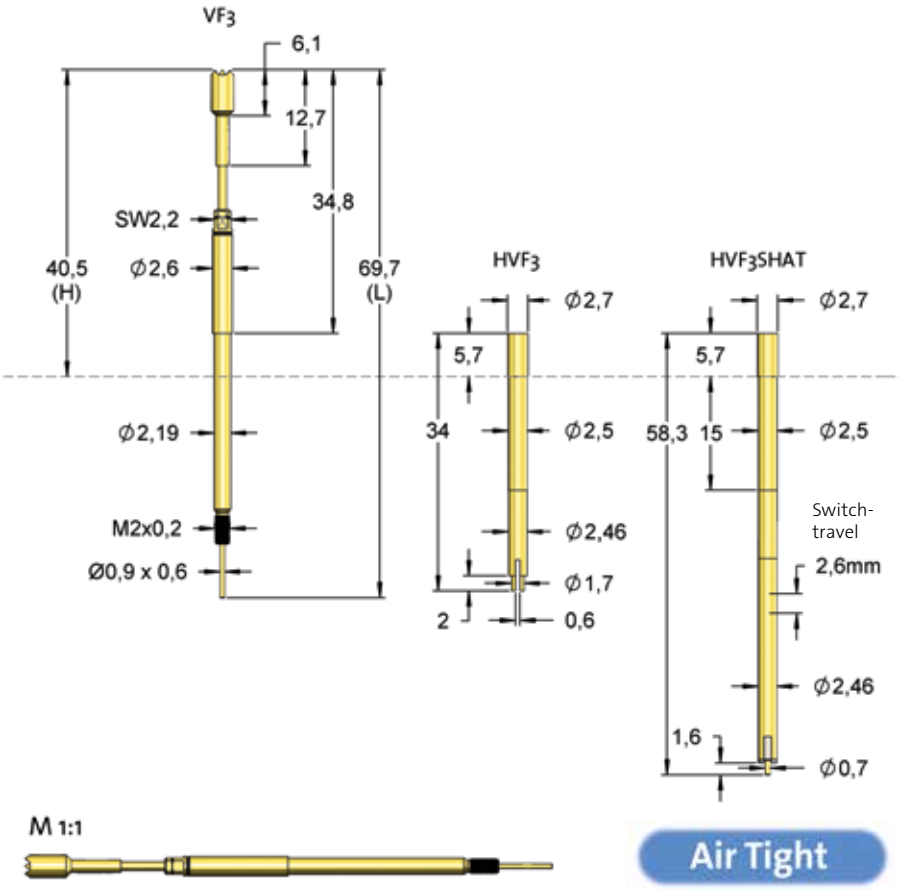
Alignment tool receptacle	FAWZVF3
Screw-in tool probe max. Tip-Ø 2,3 mm	FWZVF3S4; FWZVF3T4
Screw-in tool probe max. Tip-Ø 2,7 mm	FWZVF3; FWZVF3T
Screw-in tool probe max. Tip-Ø 4,0 mm	FWZVF3S3; FWZVF3T3

Drill Size (mm)

HVF3...	2,48 - 2,49

Projection Height (mm)

HVF3... with VF3	40,5



The permissible leakage rate for the construction of airtight modules is 5 cm³ / min.

Series			Tip-Ø		Spring Force (cN)	
VF3	05	B	190	G	15	
	Tip Style	Material		Plating		Version

Material: B = BeCu
Tip-Ø: 190 = 1,90 mm (e.g.)
Plating: G = Gold plated
Version: L = Long version
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	B	G	1,90	-
	05	B	G	2,20	-
	05	B	G	3,00	-
	06	B	G	2,70	-
	06	B	G	3,00	-
	12	B	G	2,30	-
	17	B	G	1,50	-
	17	B	G	1,80	-
	17	B	G	2,30	-
	17	B	G	3,00	-

VF3

Push Back Probe 118 mil Spade Tip Styles

Centers (mm/mil)	3,00 / 118
Current	8,0 A
Current (Switch Receptacle)	1,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

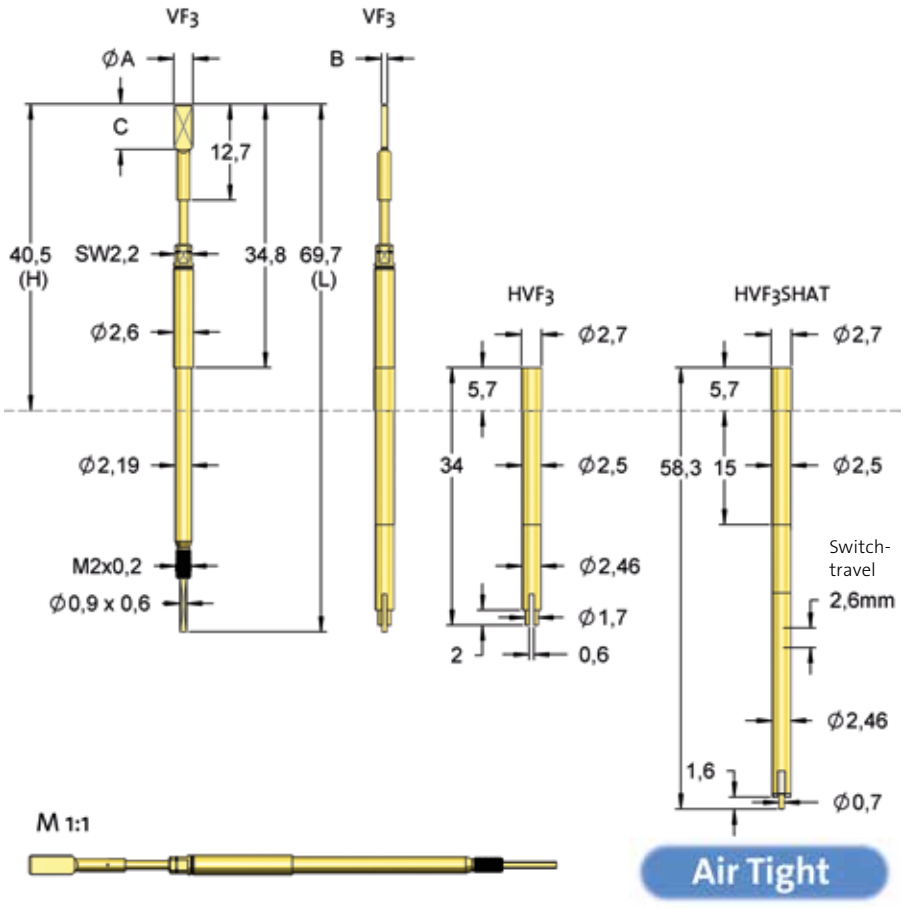
Version	Preload	Nominal
Standard	100	500
Standard	200	1000
Standard	300	1500

Travel (mm)

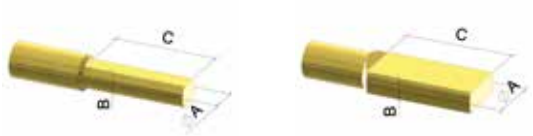
Version	Nominal	Maximum
Standard	5,0	5,5
Thread (M)		2,0x0,2
Wrench Size		2,2
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated



The permissible leakage rate for the construction of airtight modules is 5 cm³ / min.



Order Code	Number	Ø A	B	C	H	L	Version	Screw-in tool
VF380B0002G10	80	1,40	0,50	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF380B0002G15	80	1,40	0,50	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF380B0001G10	80	1,60	0,50	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF380B0001G15	80	1,60	0,50	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0004G10	83	1,90	0,50	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0004G15	83	1,90	0,50	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0005G10	83	1,90	0,80	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0005G15	83	1,90	0,80	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0007G15	83	2,20	1,20	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0002G15	83	2,50	0,50	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0001G10	83	2,50	0,80	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0001G15	83	2,50	0,80	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0003G15	83	2,50	1,50	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0008G10	83	2,70	0,80	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0008G15	83	2,70	0,80	6,00	40,50	69,70	-	FWZVF3; FWZVF3T
VF383B0004G15L	83	1,90	0,50	12,00	46,50	75,70	L	FWZVF3; FWZVF3T
VF383B0009G15L	83	2,10	0,70	12,00	46,50	75,70	L	FWZVF3; FWZVF3T
VF383B0010G15	83	2,70	0,80	10,00	44,50	73,70	S1	FWZVF3; FWZVF3T
VF383B0006G15	83	4,00	0,60	10,00	44,50	73,70	S1	FWZVF3S3; FWZVF3T3

V03

Push Back Probe 118 mil
Plug-In with Switch Function

Centers (mm/mil)	3,00 / 118
Current	8,0 A
Current (Switch)	1,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	300	1500

Travel (mm)

Version	Nominal	Maximum
Standard	5,0	6,0
Switch Travel (mm)		3,5
Wrench Size		2,2
Pointing Accuracy		±0,10 mm

Materials and Plating

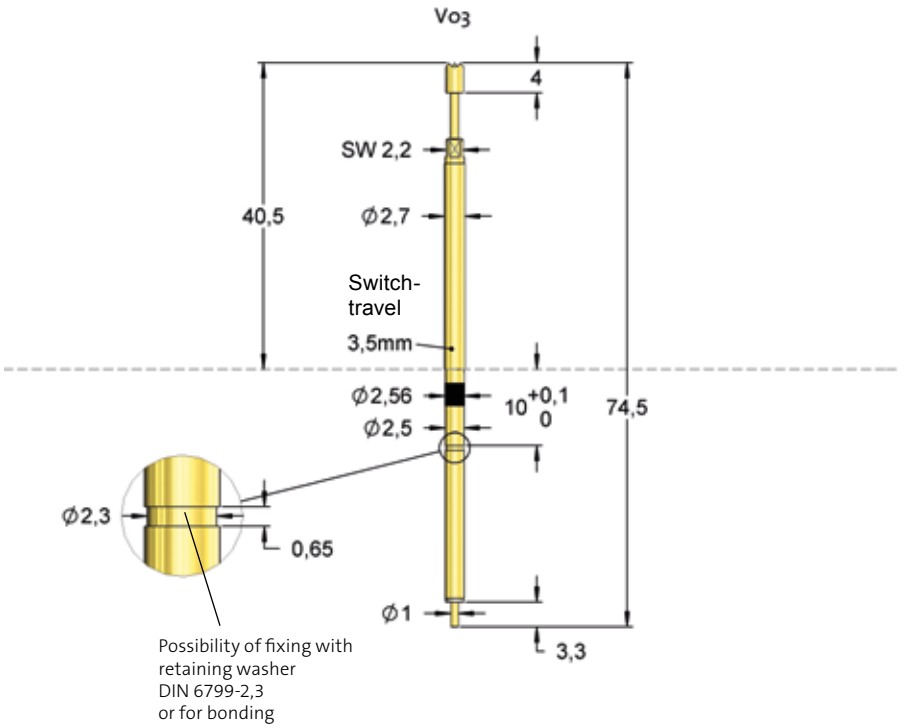
Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	-

Drill Size (mm)

V03	2,50 - 2,52

Projection Height (mm)

V03	40,5



Series			Tip-Ø		Spring Force (cN)
V03	06	B	230	G	15
	Tip Style	Material		Plating	Version

Material: B = BeCu
Tip-Ø: 230 = 2,3 mm (e.g.)
Plating: G = Gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	2,30	-
	17	B	G	2,30	-

V04

Push Back Probe 157 mil
Plug-In with Switch Function

Centers (mm/mil)	4,00 / 157
Current	8,0 A
Current (Switch)	1,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	150	600
Standard	200	900
Standard	400	1500
E33	400	1500
S1	600	1500

Travel (mm)

Version	Nominal	Maximum
Standard	9,5	10,0
E33	9,5	10,0
S1	9,5	10,0
Switch Travel (mm)		7,5
Switch Travel (mm)		3,0 (S1)
Wrench Size		2,5
Pointing Accuracy		±0,10 mm

Materials and Plating

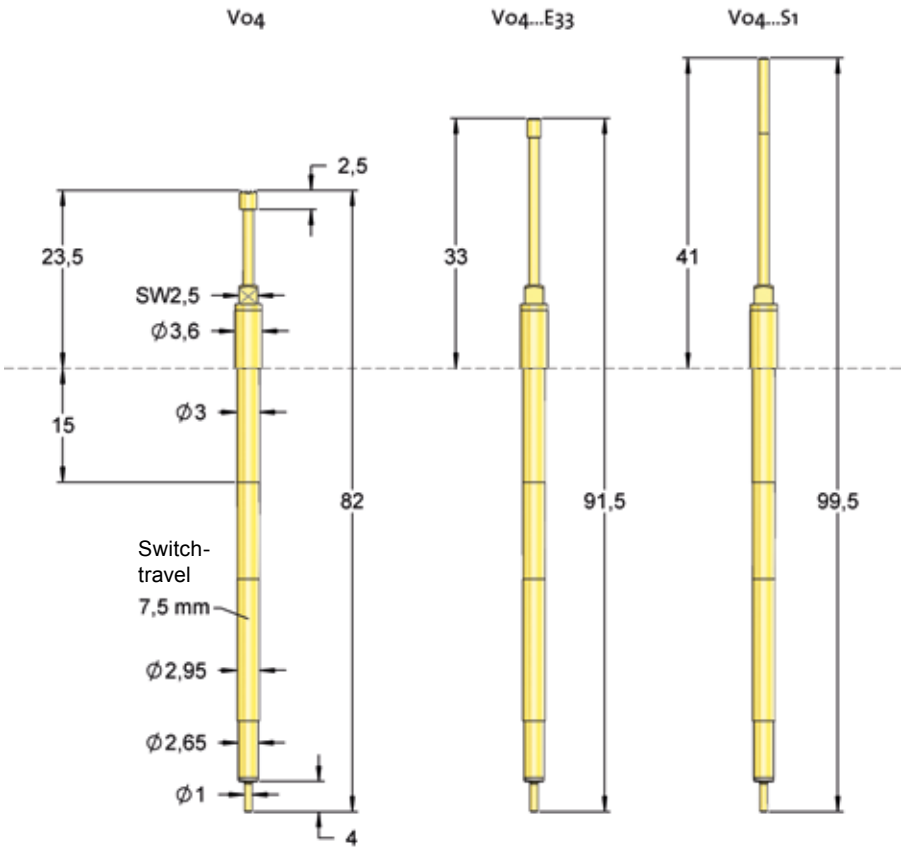
Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, silver plated
Receptacles	-

Drill Size (mm)

V04	2,98 - 2,99

Projection Height (mm)

V04	23,5
V04...E33	33,0
V04...S1	41,0



Series		Tip Style	Material	Tip-Ø	Plating	Spring Force (cN)	Version
V04	06		B	180	G	15	

Material: B = BeCu
Tip-Ø: 180 = 1,80 mm (e.g.)
Plating: G = Gold plated
Version: Exx = deviating projection height
S1 = Special version
Receptacle: Order code according drawing

Tip Style	Number	Material	Plating	Ø in mm	Version
	06	B	G	1,80	-
	06	B	G	2,30	-
	06	B	G	3,00	-
	17	B	G	1,40	-
	17	B	G	1,80	E33
	16	B	G	1,30	S1

VF4

Push Back Probe 157 mil
Round Tip Styles

Centers (mm/mil)	4,00 / 157
Current	10,0 A
Current (Switch Receptacle)	1,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	80	300
Standard	100	500
Standard	300	1000
Standard	300	1500
Standard	300	2000
Standard	300	2500

Travel (mm)

Version	Nominal	Maximum
Standard	5,0	5,5
Thread (M)		2,5x0,35
Wrench Size		2,5
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

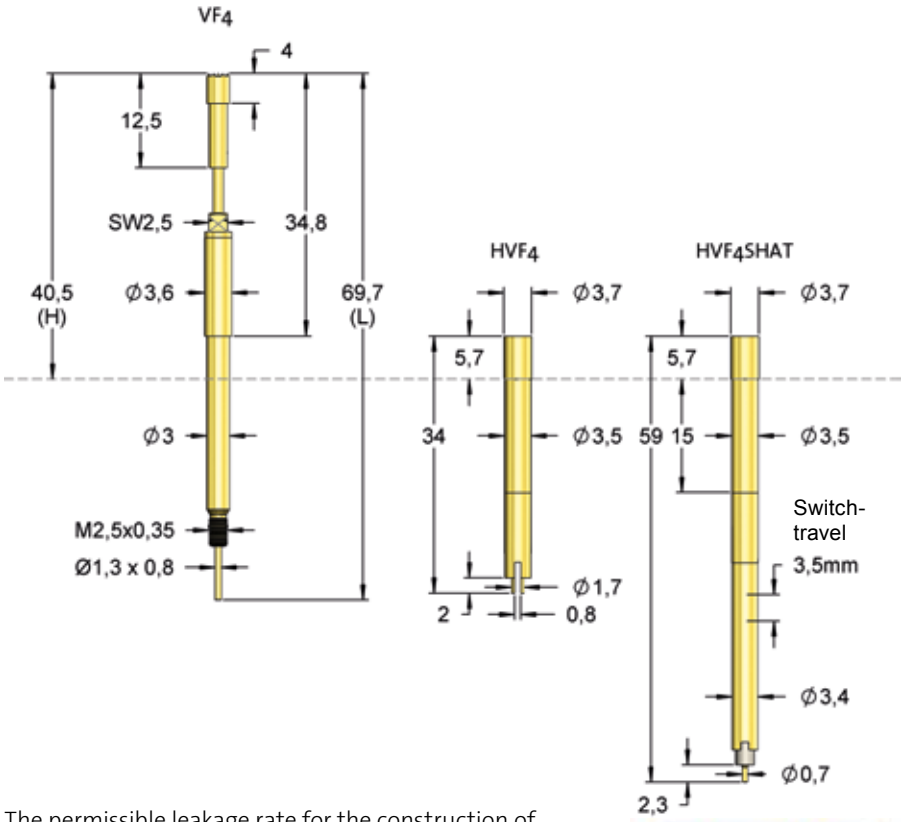
Alignment tool receptacle	FAWZVF4
Screw-in tool probe	FWZVF4S1 (T1) max. Ø3,1 mm
Screw-in tool probe	FWZVF4 (T) max. Ø4,0 mm

Drill Size (mm)

HVF4...	3,48 - 3,49

Projection Height (mm)

HVF4... with VF4	40,5



The permissible leakage rate for the construction of airtight modules is 5 cm³ / min.

Air Tight

Tip Style	Number	Material	Plating	Ø in mm	Version
	05	B	G	2,30	-
	05	B	G	3,00	-
	05	B	G	4,00	-
	06	B	G	2,40	-
	06	B	G	3,00	-
	06	B	G	4,00	-
	06	B	G	4,80	-
	11	B	G	1,80	-
	11	B	G	2,00	-
	11	B	G	2,30	-
	11	B	G	3,00	-
	11	B	G	3,70	-
	16	B	G	1,00	-
	16	B	G	1,40	-
	16	B	G	1,80	-
	16	B	G	2,00	-
	16	B	G	2,30	-
	17	B	G	3,00	-
	17	B	G	4,00	-
	50	B	G	3,00	-

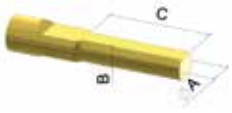
Series		Tip Style	Material	Tip-Ø	Plating	Spring Force (cN)	Version
VF4	05		B	230	G	15	

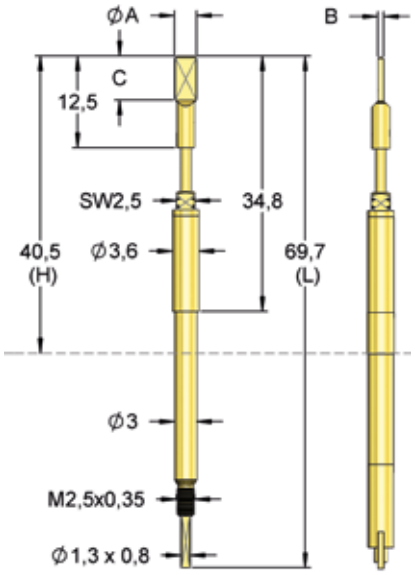
Material: B = BeCu,
Tip-Ø: 230 = 2,30 mm (e.g.)
Plating: G = Gold plated,
Receptacle: Order code according drawing

VF4

Push Back Probe 157 mil
Spade Tip Styles

Centers (mm/mil)	4,00 / 157
Current	10,0 A
Current (Switch Receptacle)	1,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C





Order Code	Number	Ø A	B	C	H	L	Version	Screw-in tool
VF481B0001G10	81	2,00	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF481B0001G15	81	2,00	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0009G15	83	2,20	1,30	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0008G20	83	2,25	1,40	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0003G05	83	2,25	1,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0003G10	83	2,25	1,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0003G15	83	2,25	1,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0003G20	83	2,25	1,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0003G25	83	2,25	1,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0005G03	83	2,25	1,80	5,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0005G10	83	2,25	1,80	5,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0005G15	83	2,25	1,80	5,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0005G20	83	2,25	1,80	5,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0005G25	83	2,25	1,80	5,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0006G15	83	2,50	0,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0006G20	83	2,50	0,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0006G25	83	2,50	0,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0001G05	83	2,50	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0001G10	83	2,50	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0001G15	83	2,50	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0001G20	83	2,50	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0001G25	83	2,50	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0002G03	83	3,00	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0002G05	83	3,00	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0002G10	83	3,00	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0002G15	83	3,00	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0002G20	83	3,00	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0002G25	83	3,00	0,80	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0004G05	83	3,00	1,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0004G10	83	3,00	1,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0004G15	83	3,00	1,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0004G20	83	3,00	1,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1
VF483B0004G25	83	3,00	1,60	6,00	40,50	69,70	-	FWZVF4S1; FWZVF4T1

VF4

NEW

Push Back Probe 157 mil, Elastic Tip Style

Centers (mm/mil)	4,00 / 157
Current	10,0 A
Current (Switch Receptacle)	1,0 A
R typ	30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	300	1500

Travel (mm)

Version	Nominal	Maximum
Standard	5,0	5,5
Thread (M)		2,5x0,35
Wrench Size		2,5
Pointing Accuracy		±0,10 mm

Materials and Plating

Plunger	see Tip Style
Barrel	Brass, gold plated
Spring	Music wire, gold plated
Receptacles	Brass, gold plated

Accessories

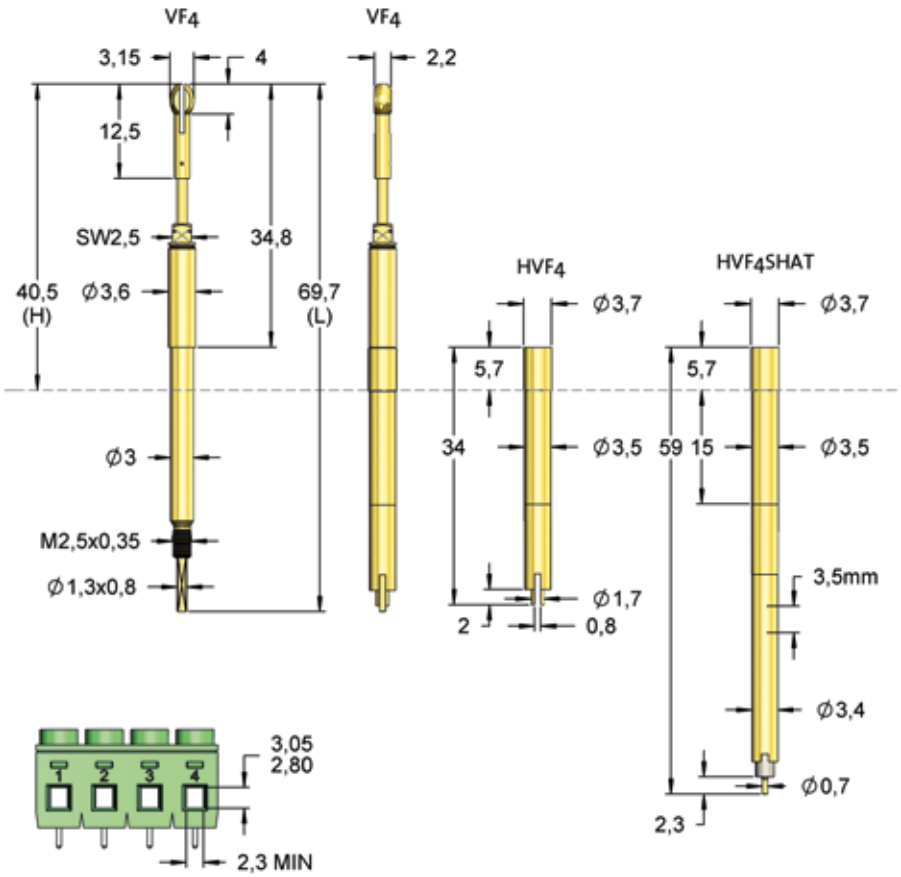
Alignment tool receptacle	FAWZVF4
Screw-in tool probe	FWZVF4 (T) max. Ø4,0 mm

Drill Size (mm)

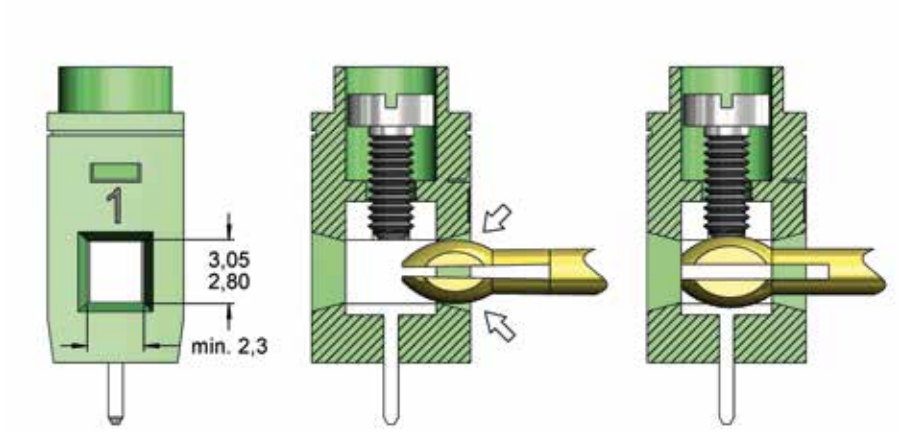
HVF4...	3,48 - 3,49

Projection Height (mm)

HVF4... with VF4	40,5



The elastic twist proof tip style 22 has been developed for contacting PCB-connectors. This tip styles makes sure that the contact elements within the connector cavity are contacted reliably. This tip style is currently available for connector MSTB 2,5/2-ST-5,08.



Order Code	Number	Ø A	B	C	H	L	Version	Screw-in tool
VF422B0001G15	22	3,15	2,20	4,00	40,50	69,70	-	FWZVF4; FWZVF4T

Coaxial Probes

A typical application for coaxially designed contact probes is 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).

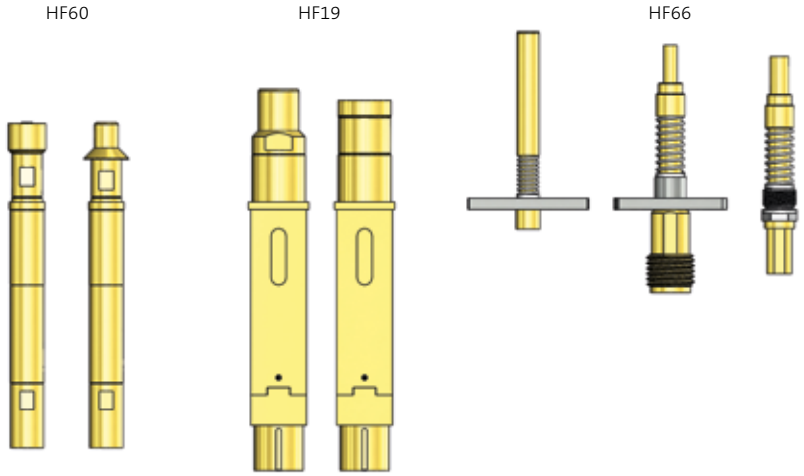
Another application for specially designed coaxial probes is contacting of RF connectors or sockets. In this case the inner conductor carries the signal whereas the outer conductor serves as a shielding (RF probes).

Overview

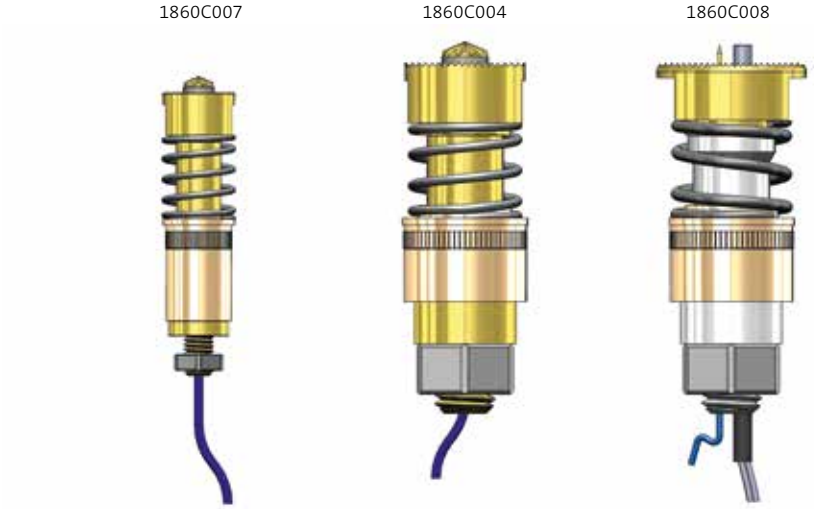
Types of Coaxial Probes

For Kelvin measurement
For measuring very low resistances by the Kelvin method (4-wire measurement) coaxially build contact probes can be used by feeding the current by the outer conductor and measuring the voltage by the inner conductor. The figure shows different series of available Kelvin probes.

For RF applications
In many test applications like contacting RF sockets, signals with high frequencies need to be transmitted. For this contact coaxially designed RF probes can be used. In this case the inner conductor carries the signal and the outer conductor is used as shielding (same principle as coaxial cables). This leads to low electro-magnetic radiation and interference.



For high current applications
These coaxially designed high current probes have been developed for measuring the inner resistance of applications with very high currents, e.g. for charging and discharging of accumulator cells and batteries.



COAXIAL PROBES

For more detailed information on the probes see separate catalog for high current- and coaxial probes or on our homepage.

Series	Status	Code	Barrel- Ø [mm]	Length [mm]	Center [mm/mil]	Category
Coaxial Probes for 4-Wire Measurement (Kelvin Method)						
F805			1,42	31,00	2,20 / 87	Coaxial Probe / Kelvin Probe
F810			1,78	34,00	2,54 / 100	Coaxial Probe / Kelvin Probe
F822			4,30	30,00-35,30	5,50 / 217	Coaxial Probe / Kelvin Probe
F830			3,40	36,00	4,00 / 157	Coaxial Probe / Kelvin Probe
F832			4,30	31,00-33,50	5,50 / 217	Coaxial Probe / Kelvin Probe
F840			5,50	38,35	7,00 / 276	Coaxial Probe / Kelvin Probe
F835			2,65	44,80	3,50 / 138	Coaxial Probe / Kelvin Probe
Coaxial Probes for Radio Frequency Applications						
HF19		HF19-0001 HSD-M 2 P H819AE2-3	7,40	48,90	12,00 / 472	Coaxial Probe / RF Probe
		HF19-0002 HSD-F 2 P H819AE2-3	7,40	50,30	12,00 / 472	Coaxial Probe / RF Probe
	NEW	HF19-0003 HSD-M 3 P HSD	7,40	50,00	12,00 / 472	Coaxial Probe / RF Probe
HF60		HF60-0001 SMA-F 8 P MCX	4,50	43,00	6,50 / 256	Coaxial Probe / RF Probe
		HF60-0002 U.FL-M 5 P MCX	4,50	43,00	6,00 / 236	Coaxial Probe / RF Probe
		HF60-0003 SMC-M 5 P MCX	4,50	43,00	6,00 / 236	Coaxial Probe / RF Probe
		HF60-0004 SMB-M 5 P MCX	4,50	44,35	6,00 / 236	Coaxial Probe / RF Probe
		HF60-0005 SMB-F 6 P MCX	4,50	43,00	6,50 / 256	Coaxial Probe / RF Probe
		HF60-0006 FAKRA-M 5 P MCX	4,50	44,80	6,00 / 236	Coaxial Probe / RF Probe
		HF60-0007 RF-M 5 P MCX	4,50	43,00	6,00 / 236	Coaxial Probe / RF Probe
	NEW	HF60-0008 PCB-coax-open 4 P MCX	4,50	43,00	6,00 / 236	Coaxial Probe / RF Probe
	NEW	HF60-0009 GSG 4 P MCX 135	4,50	44,00	6,00 / 236	Coaxial Probe / RF Probe
	NEW	HF60-0010 PCB-coax-open 4 P MCX	4,50	43,00	6,00 / 236	Coaxial Probe / RF Probe
	NEW	HF60-0011 BMA-M 5 P MCX	4,50	43,00	6,50 / 256	Coaxial Probe / RF Probe
HF66	NEW	HF66-0001 SWJ 6 F M-SMP	-	28,20	4,50 / 177	Coaxial Probe / RF Probe
	NEW	HF66-0002 JSC 6 S M-SMP	-	38,20	4,50 / 177	Coaxial Probe / RF Probe
	NEW	HF66-0003 KSC 6 F SMA	-	32,70	7,00 / 276	Coaxial Probe / RF Probe
	NEW	HF66-0004 LSC 6 F M-SMP	-	24,10	4,50 / 177	Coaxial Probe / RF Probe
	NEW	HF66-0005 KSC 6 F M-SMP	-	29,30	4,50 / 177	Coaxial Probe / RF Probe
	NEW	HF66-0006 HSC 6 S M-SMP	-	33,20	4,50 / 177	Coaxial Probe / RF Probe
	NEW	HF66-0007 SWG 6 F SMA	-	35,00	7,00 / 276	Coaxial Probe / RF Probe
	NEW	HF66-0008 HSC 6 F SMA	-	32,80	7,00 / 276	Coaxial Probe / RF Probe
	NEW	HF66-0009 SWH 6 S M-SMP	-	29,50	5,00 / 197	Coaxial Probe / RF Probe
	NEW	HF66-0010 JSC 6 S M-SMP	-	28,70	5,00 / 197	Coaxial Probe / RF Probe
	NEW	HF66-0011 LSC 6 F SMA	-	32,70	7,00 / 276	Coaxial Probe / RF Probe
	NEW	HF66-0012 JSC 6 F SMA	-	32,80	7,00 / 276	Coaxial Probe / RF Probe
	NEW	HF66-0013 SW-D/F/G 6 F SMA	-	34,90	10,00 / 394	Coaxial Probe / RF Probe
	NEW	HF66-0014 MHF/U.FL 6 F M-SMP	-	26,10	7,00 / 276	Coaxial Probe / RF Probe
HF05	NEW	HF05-0001 GSG 6 F M-SMP 050	-	26,0	5,00 / 197	Coaxial Probe / RF Probe
	NEW	HF05-0002 GSG 6 F M-SMP 050	-	26,0	5,00 / 197	Coaxial Probe / RF Probe
Coaxial Probes for High Current Applications						
		1860C004	20,50	61,80	25,00 / 984	Coaxial Probe / High Current Probe
		1860C007	11,05	47,00	14,00 / 551	Coaxial Probe / High Current Probe
	NEW	1860C008	20,50	61,30	25,00 / 984	Coaxial Probe / High Current Probe
	NEW	F349...C	5,80	52,10	8,00 / 315	Coaxial Probe / High Current Probe

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

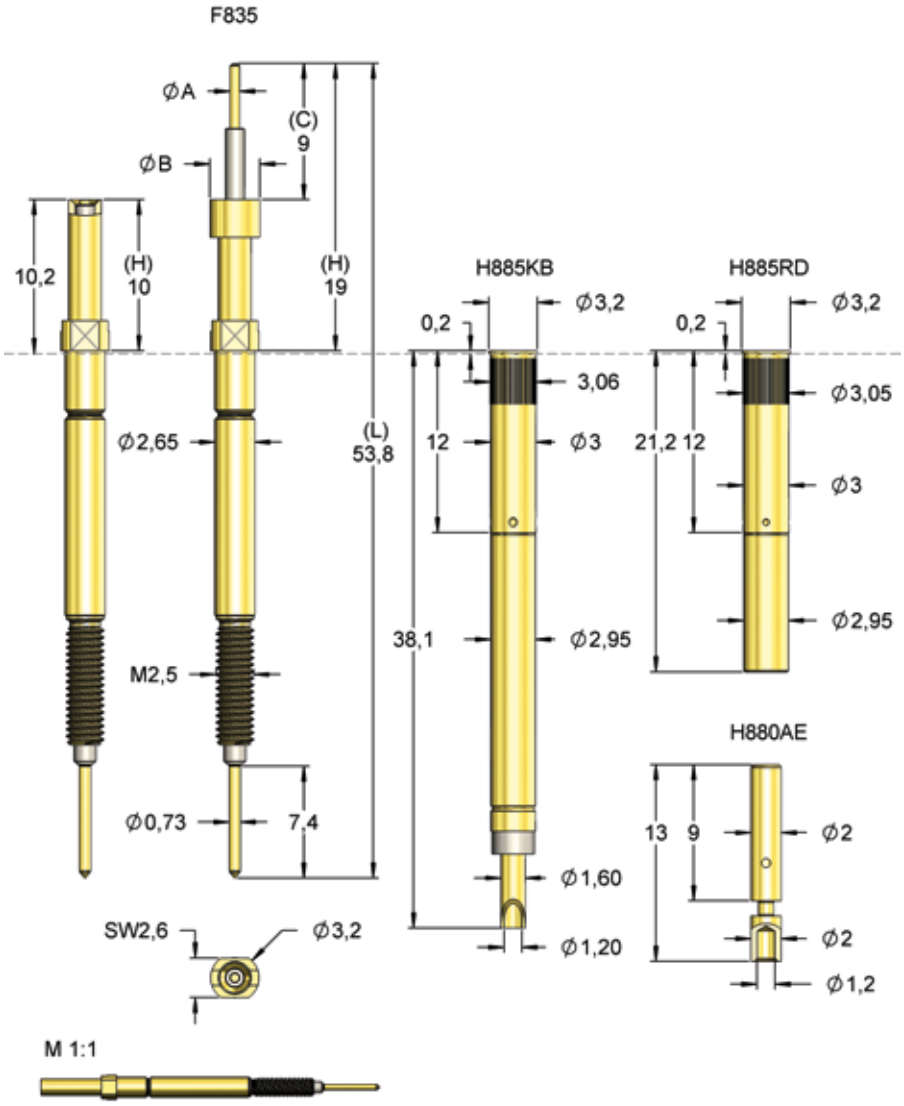
Insertion tool receptacle	FEWZ-774E0

Drill Size (mm)

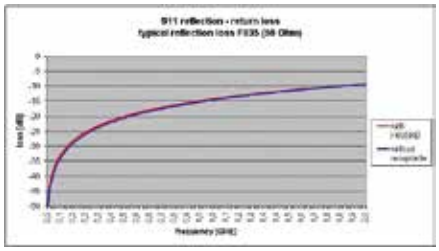
Receptacle without knurl	2,98 - 2,99
Receptacle with knurl	3,00 - 3,02

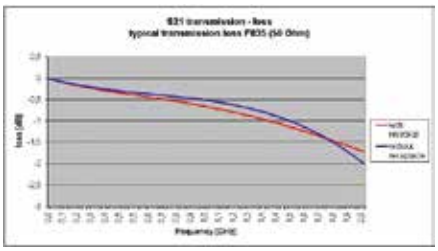
Projection Height (mm)

H885... with 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

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

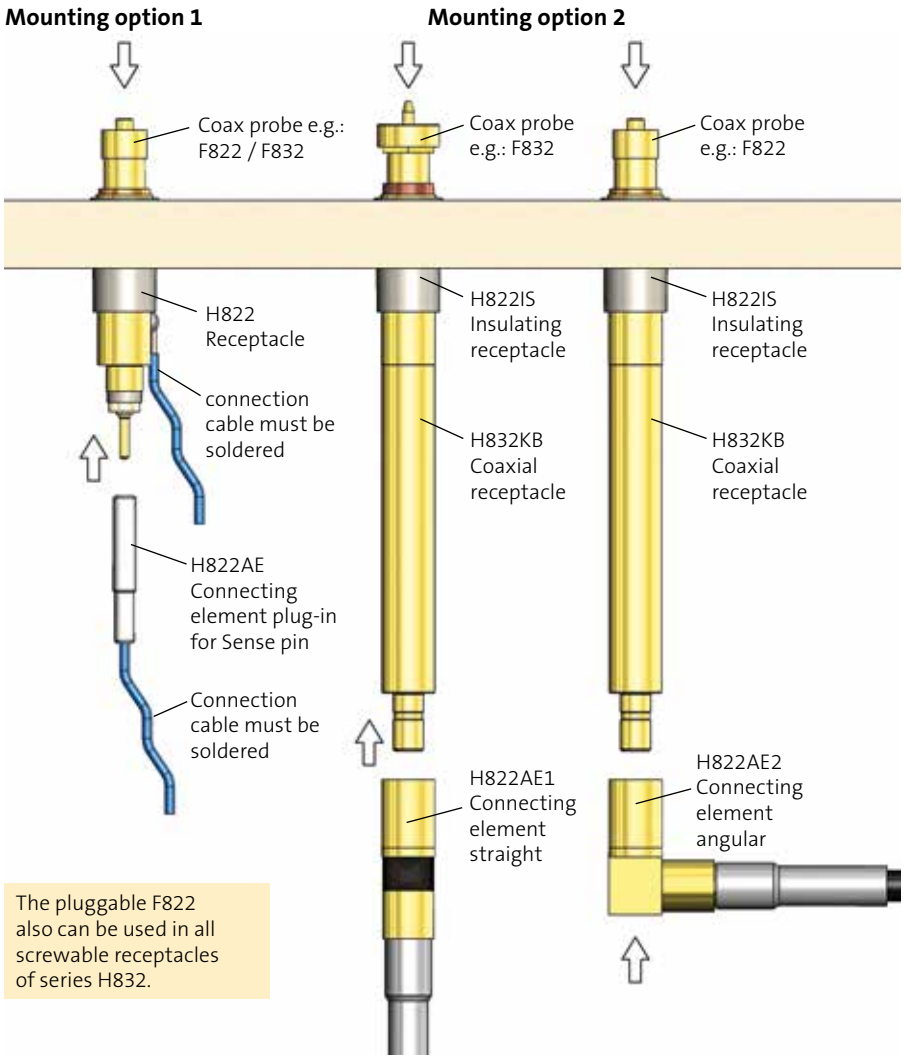
Order code: H822AE1
Connection element with pre-assembled
coaxial cable RG 174 and **straight**
SSMB Mini connector
Impedance: 50 Ohm
Standard length: **600 mm**

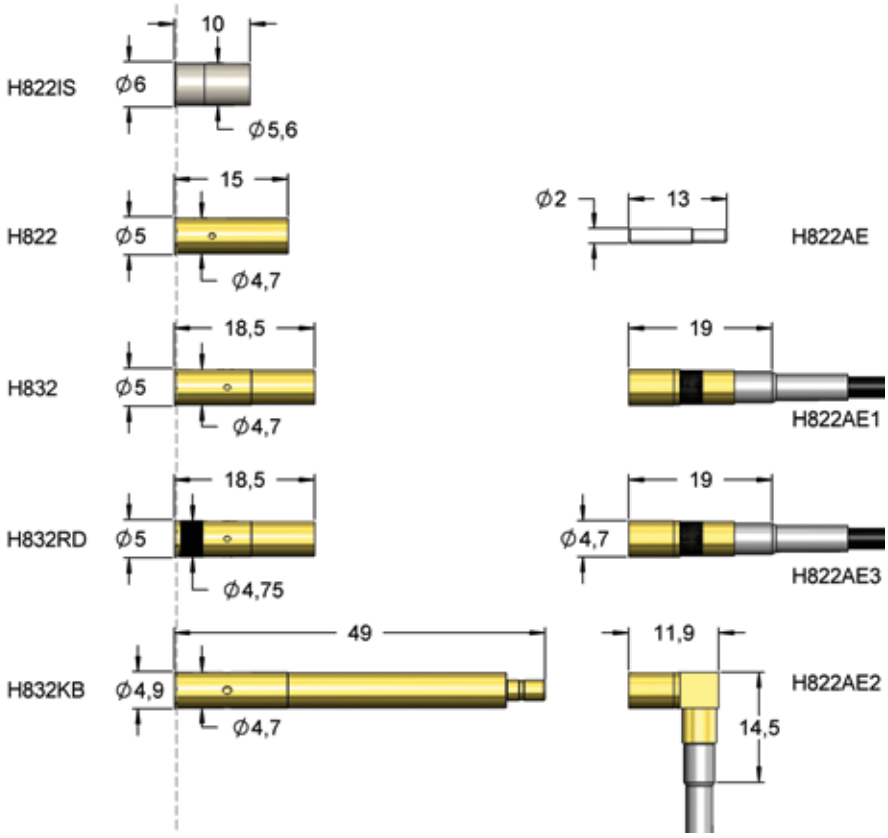
Order code: H822AE2
Connection element with pre-assembled
coaxial cable RG 174 and **angled**
SSMB Mini connector
Impedance: 50 Ohm
Standard length: **600 mm**

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





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)

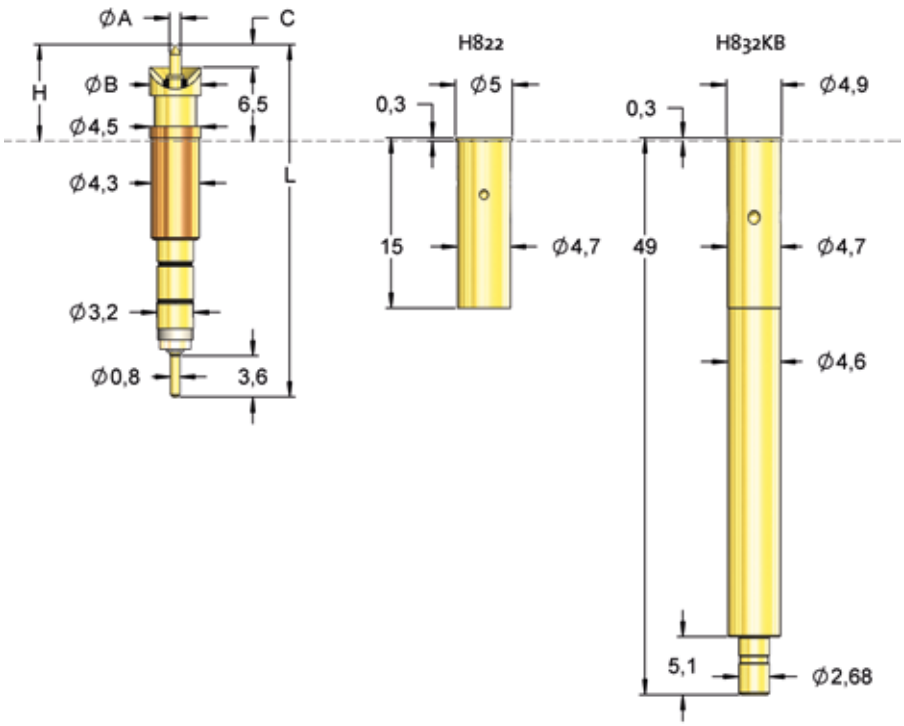
	Nominal	Maximum
Internal Cont.	3,0	3,5
Circular Cont.	2,0	2,6

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)

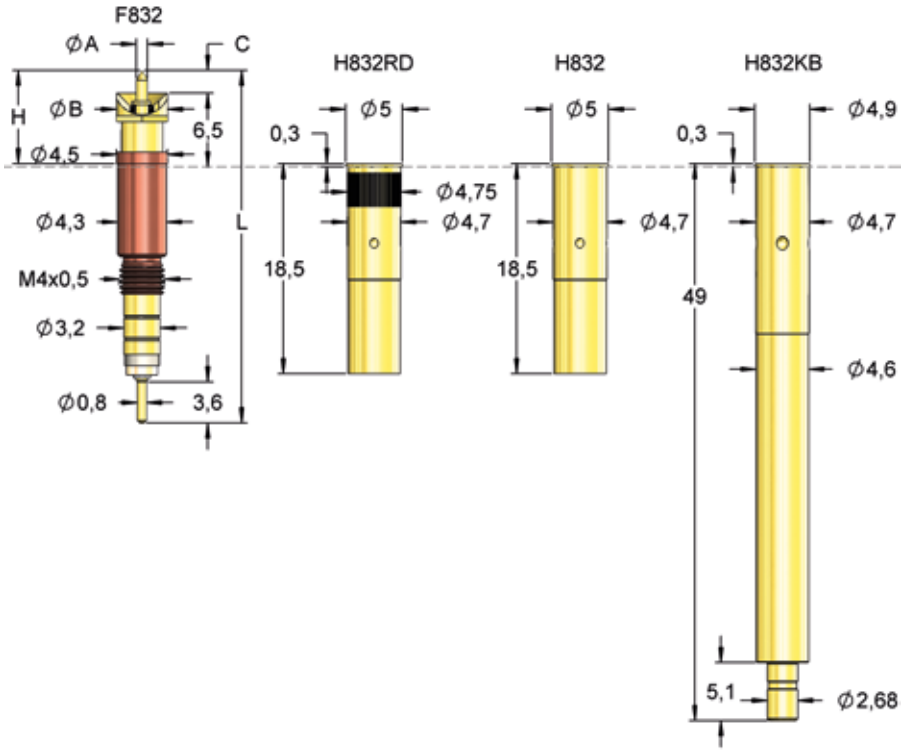
H8x2... with F822	H + 0,3

Order Code	Sense Pin	Number	Ø A	Ø B	C	H	L	Version	Comment
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	IK	Fakra Contacting
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	Fakra Contacting

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 contact	Stainless steel, unplated
Spring Circular contact	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 sleeve	5,56 - 5,57

Projection Height (mm)

H832... with F832	H + 0,3

* deviating from standard, depending on diameter.

Order Code	Sense Pin	Number	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

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.

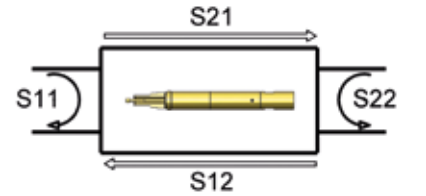
Two-Port Network

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%.

HF60

Coaxial Probes up to 8 GHz for Contacting Standard RF Connectors

SMA (Female):			HF60-0001 SMA-F 8 P MCX
BMA (Male):			HF60-0011 BMA-M 5 P MCX
SMB (Male):			HF60-0004 SMB-M 5 P MCX
SMB (Female):			HF60-0005 SMB-F 6 P MCX
SMC (Male):			HF60-0003 SMC-M 5 P MCX
U.FL (Male):			HF60-0002 U.FL-M 5 P MCX
Micro RF (Male):			HF60-0007 RF-M 5 P MCX

For contacting of common coaxial connectors (e.g. sub-miniature type A, B, C) different RF probes are available.
For the complete RF contact probe portfolio see catalogue “High Current Probes and Coaxial Probes”

HF60-0006 FAKRA-M 5 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	5,0 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 contact	Music wire, gold plated
Spring Circular contact	Stainless steel, unplated
Receptacle	Brass, gold plated

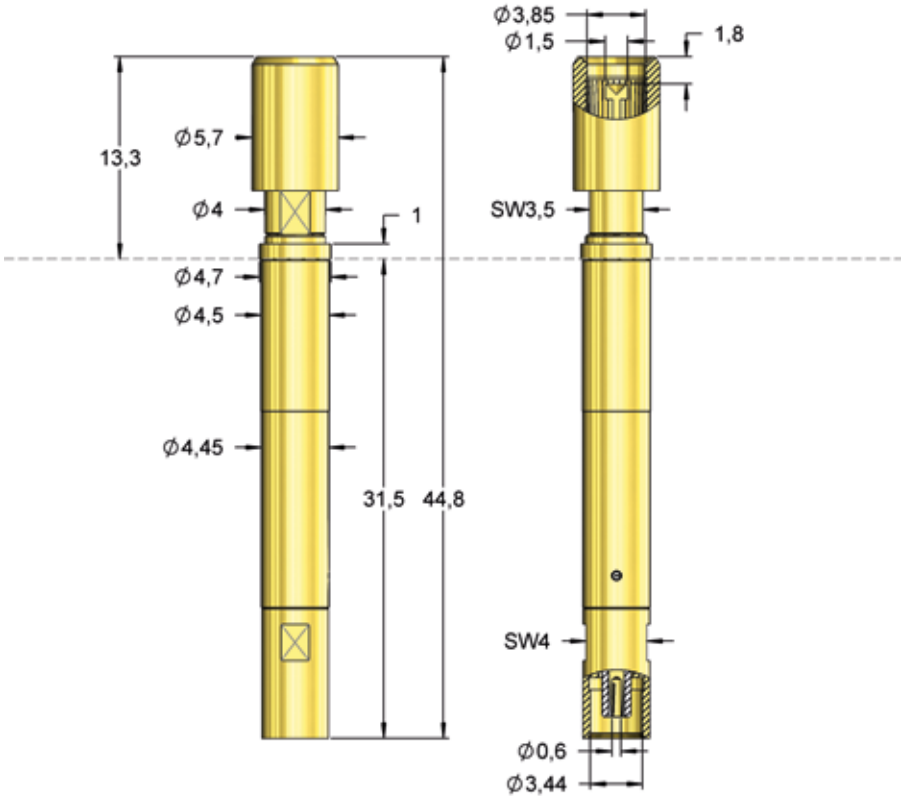
Accessories

Insertion tool receptacle	FEWZ-772E0
Insertion tool probe	FDWZ-100
Receptacle standard	H860
Receptacle floating mounted	H860FL
Cable 700mm up to 3 GHz	H860AE1, H860AE3, H860AE4
Cable 700mm up to 10 GHz	H860AE2

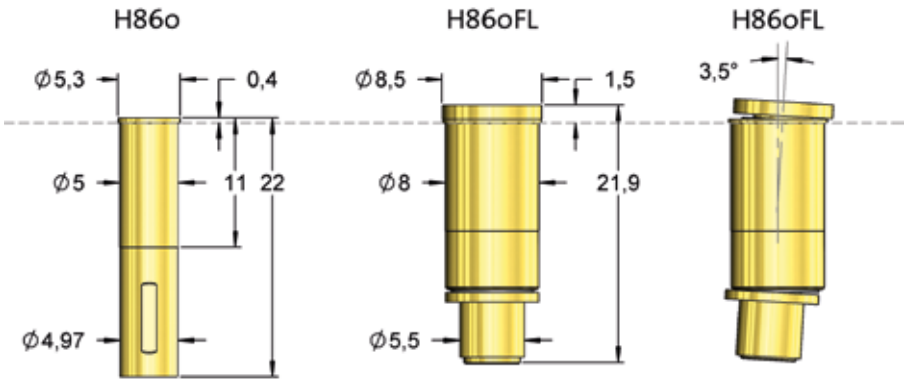
Drill Size (mm)

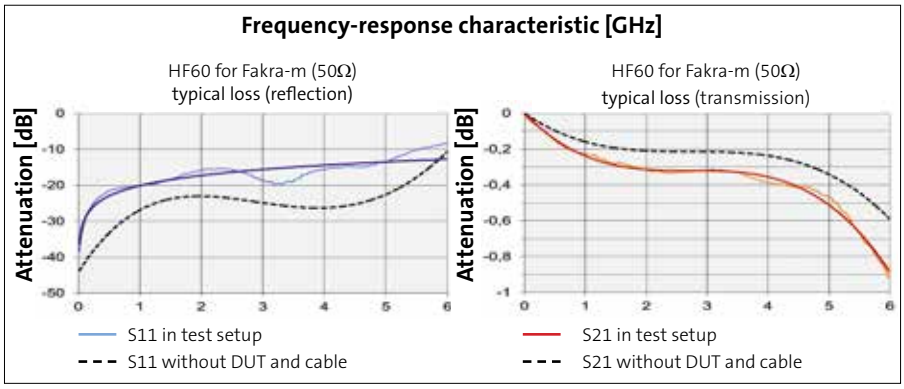
H860	4,99 - 5,00
H860FL	7,99 - 8,01

Fakra-Male



For contacting Fakra-Male connectors.





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

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%)

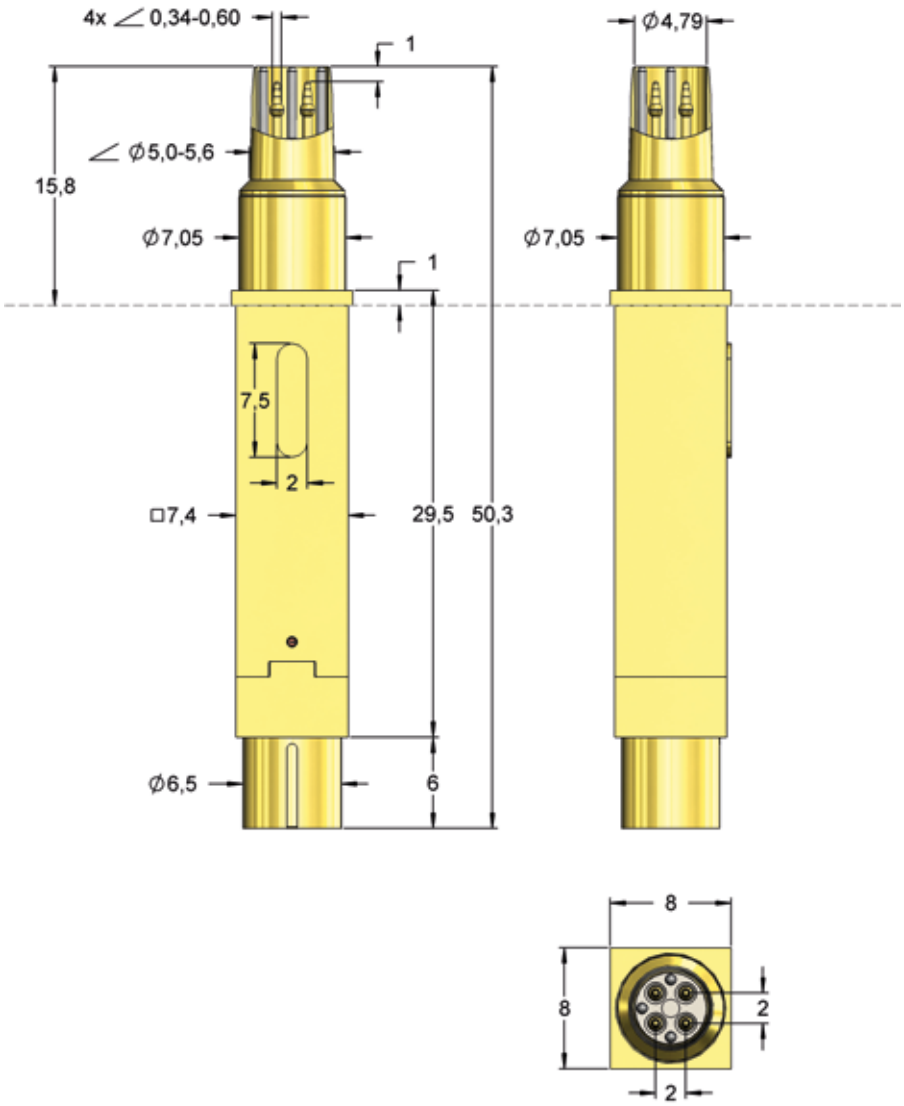
	Preload	Nominal
Total	-	2020
Internal Cont.	75	130
Circular Cont.	900	1500

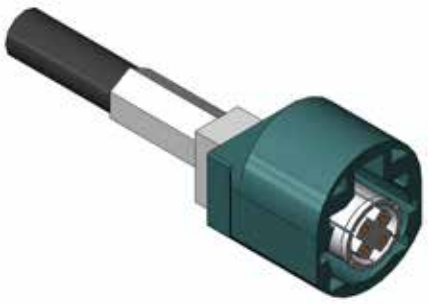
Travel (mm)

	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	-

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%)

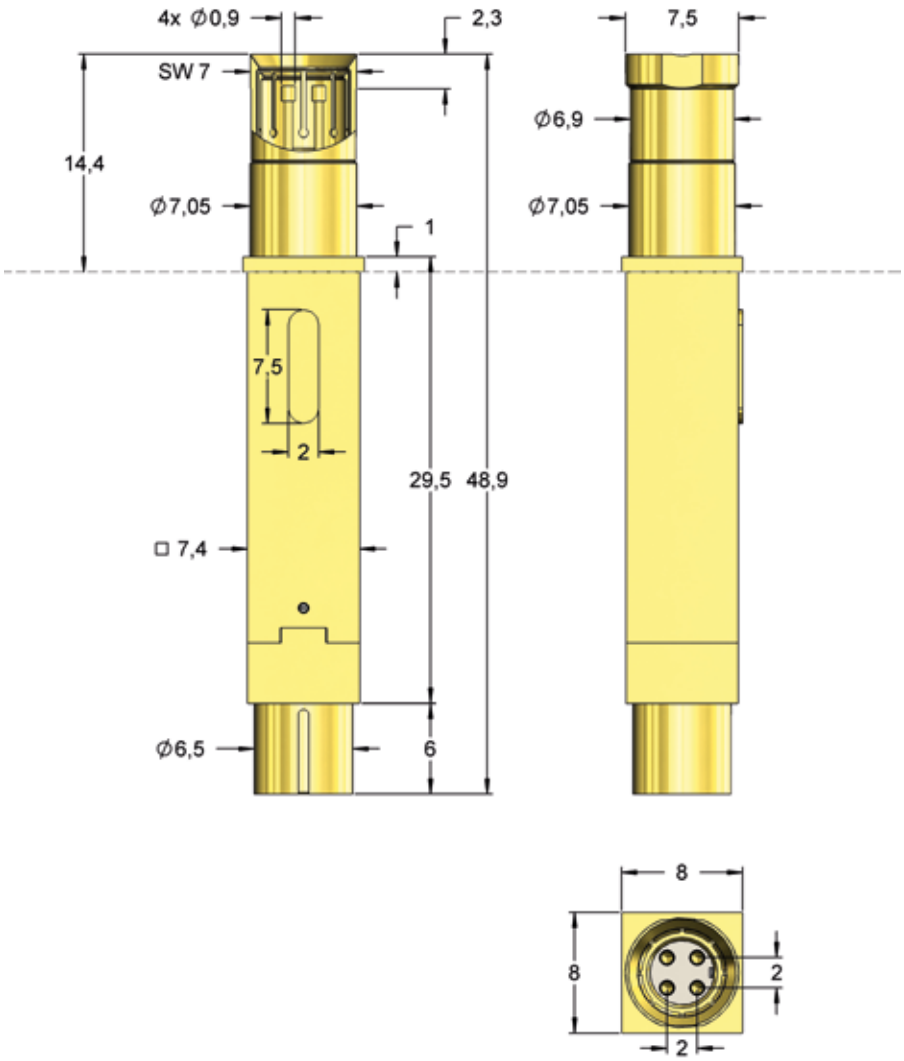
	Preload	Nominal
Total	-	1270
Internal Cont.	75	130
Circular Cont.	300	750

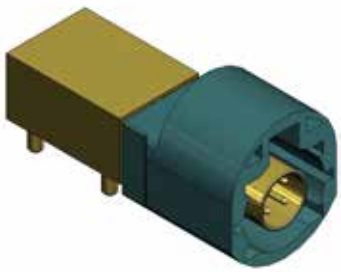
Travel (mm)

	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	-

HF19-0003 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%)

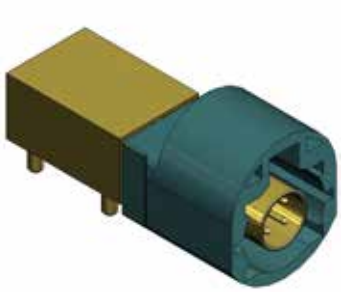
	Preload	Nominal
Total	-	2000
Internal Cont.	75	130
Circular Cont.	900	1500

Travel (mm)

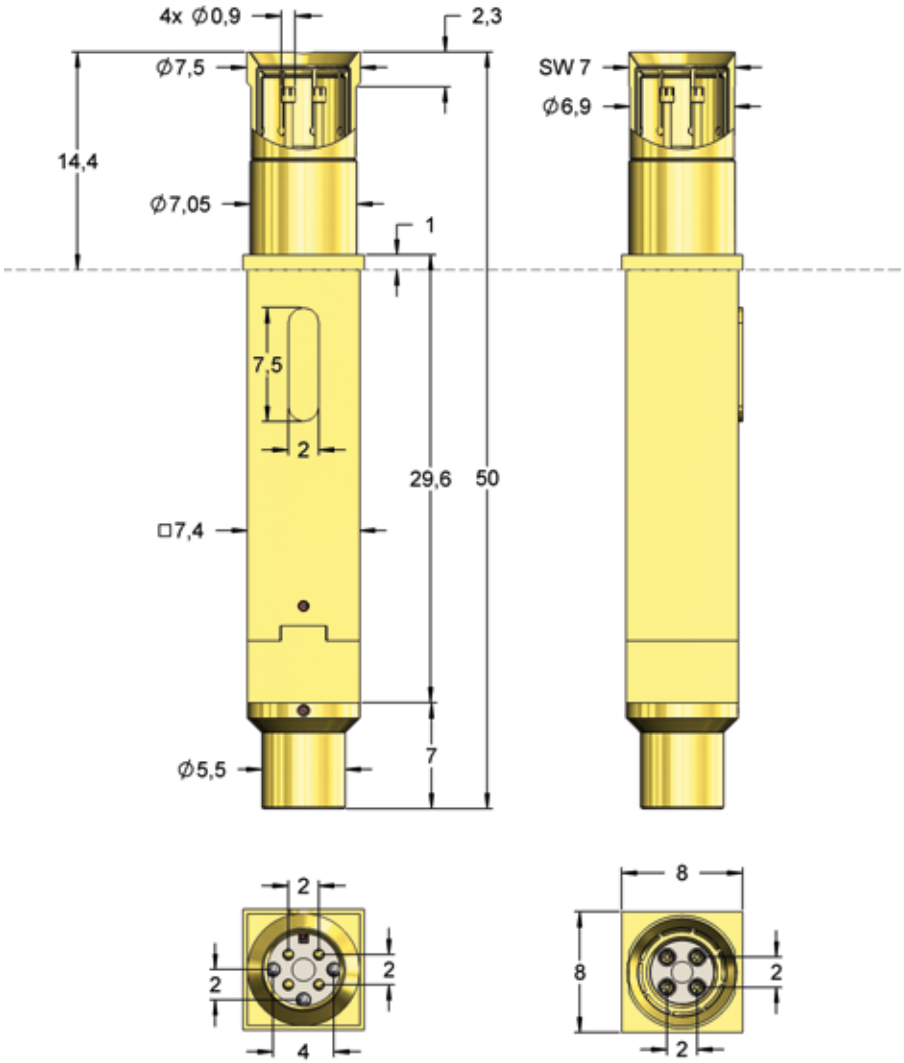
	Nominal	Maximum
Internal Cont.	2,0	3,7
Circular Cont.	5,0	6,0
Wrench Size		6,0 / 7,0

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	-

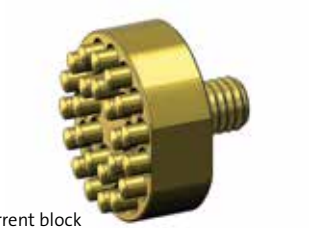
High Current Probes

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.

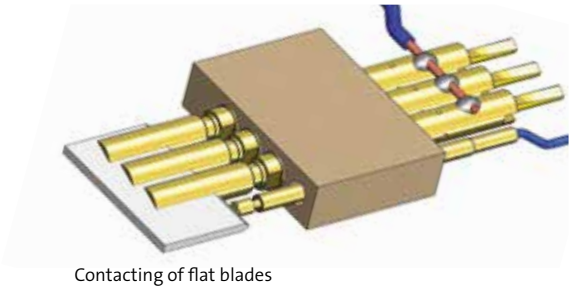
Overview

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

HIGH CURRENT PROBES

Probes for High Current Applications

Status	Series	Current	Barrel- Ø [mm]	Length [mm]	Center [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	7,70	11,50 / 453	High Current Probe
NEW	1860C009	80,0	10,00	36,40	12,00 / 472	High Current Probe
	F310	10,0	1,00	26,00	1,90 / 75	High Current Probe
	F320	12,0	1,35	32,00	2,54 / 100	High Current Probe
	F330	14,0	2,00	40,00	3,00 / 118	High Current Probe
	F340	16,0	2,40	50,00	3,50 / 138	High Current Probe
	F360...C	15,0	M2,5	4,90	3,70 / 146	High Current Probe
NEW	F566...C	35,0	3,18	36,10	4,50 / 177	High Current Probe
	F713...C	25,0	2,65	15,00	3,50 / 138	High Current Probe
	F723...C	25,0	2,65	17,10	4,00 / 157	High Current Probe
	F725...C	50,0	3,50	17,10	5,00 / 197	High Current Probe
	F732...C	20,0	1,65	35,70	2,54 / 100	High Current Probe
	F733...C	25,0	2,65	28,30	4,00 / 157	High Current Probe
NEW	F725...C	50,0	3,50	17,1	5,00 / 197	High Current Probe
	F735...C	50,0	3,50	43,10	5,00 / 197	High Current Probe
	F762...C	40,0	2,65	48,60	4,00 / 157	High Current Probe
	F772...C	20,0	1,65	32,30	2,54 / 100	High Current Probe
	F773...C	25,0	2,65	27,30	3,50 / 138	High Current Probe
	F775...C	50,0	3,50	38,50	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 [mm]	Length [mm]	Center [mm/mil]	Category
	1860C003	75,0	9,05	49,10	14,00 / 551	Coaxial High Current Probe
	1860C004	250,0	20,50	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	20,50	61,30	25,00 / 984	Coaxial High Current Probe
NEW	F349...C	100,0	5,80	52,10	7,60 / 300	Coaxial High Current Probe

For more detailed information of these probes see separate catalog for high current and coaxial probes or our homepage.

F348...C

F349...C

F566...C

F725...C

1860C009

1860C008

F348C

NEW

High Current Probe 300 mil Robust Version, Threaded

Centers (mm/mil)	7,60 / 300
Current	100,0 A
R typ	<20 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
Receptacles	Brass, silver plated

Accessories

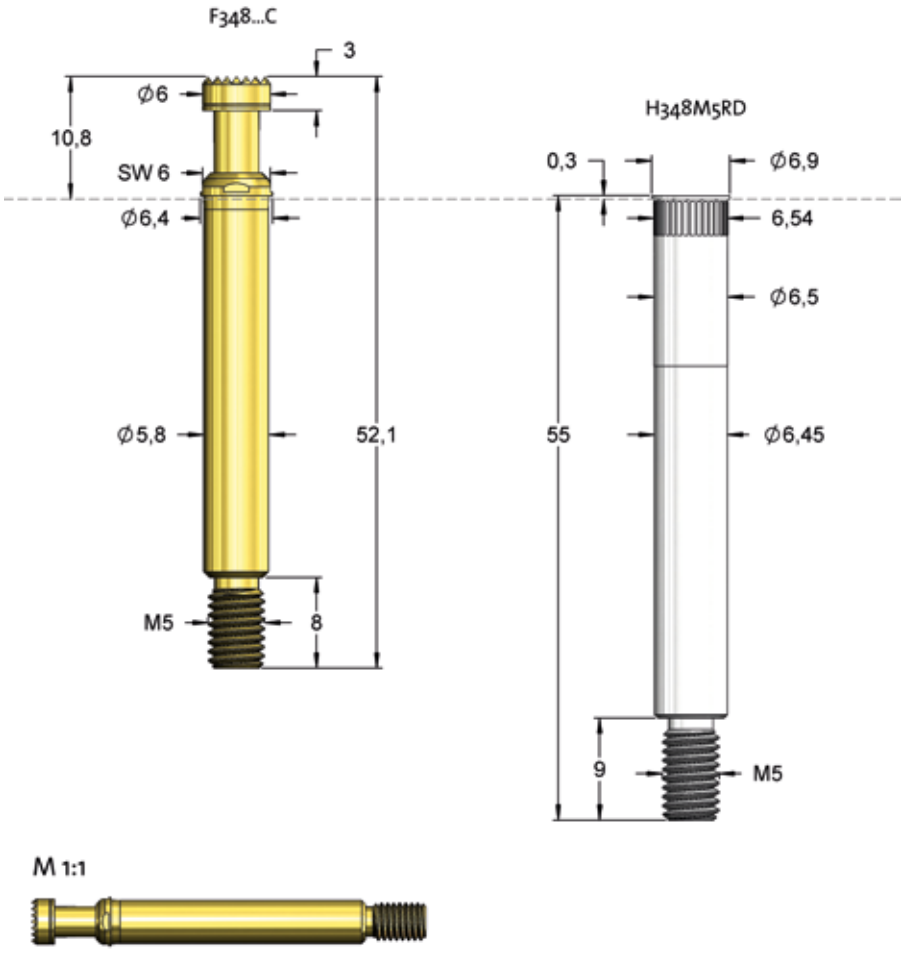
Insertion tool receptacle	FEWZ-348E0
Screw-in tool probe	FWZ348 (T)

Drill Size (mm)

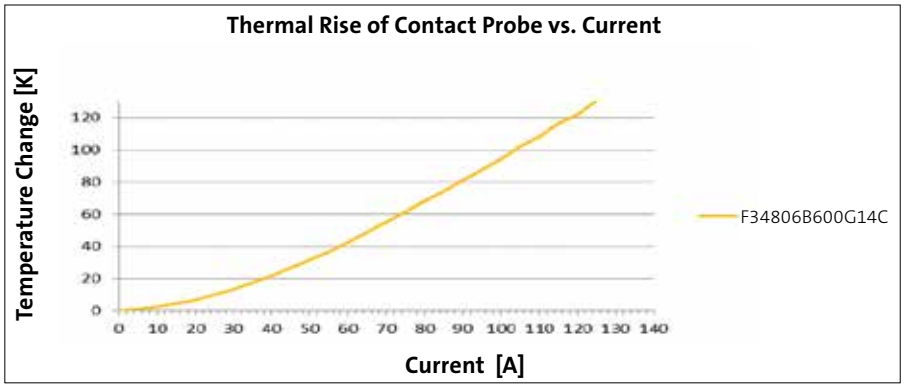
H348M5RD	6,51 - 6,53

Projection Height (mm)

H348M5RD with F348C	10,8



For testing smaller power components in centers of 300 mil. The connection should be realized by a flexible wire (recommended 16,0 mm²) and a cable lug with counter nut.



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

F349C

NEW

High Current Probe up to 100 A Coaxial Design, Threaded

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 contact	60	160
Circular contact	500	1400

Travel (mm)

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

Materials and Plating

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

Accessories

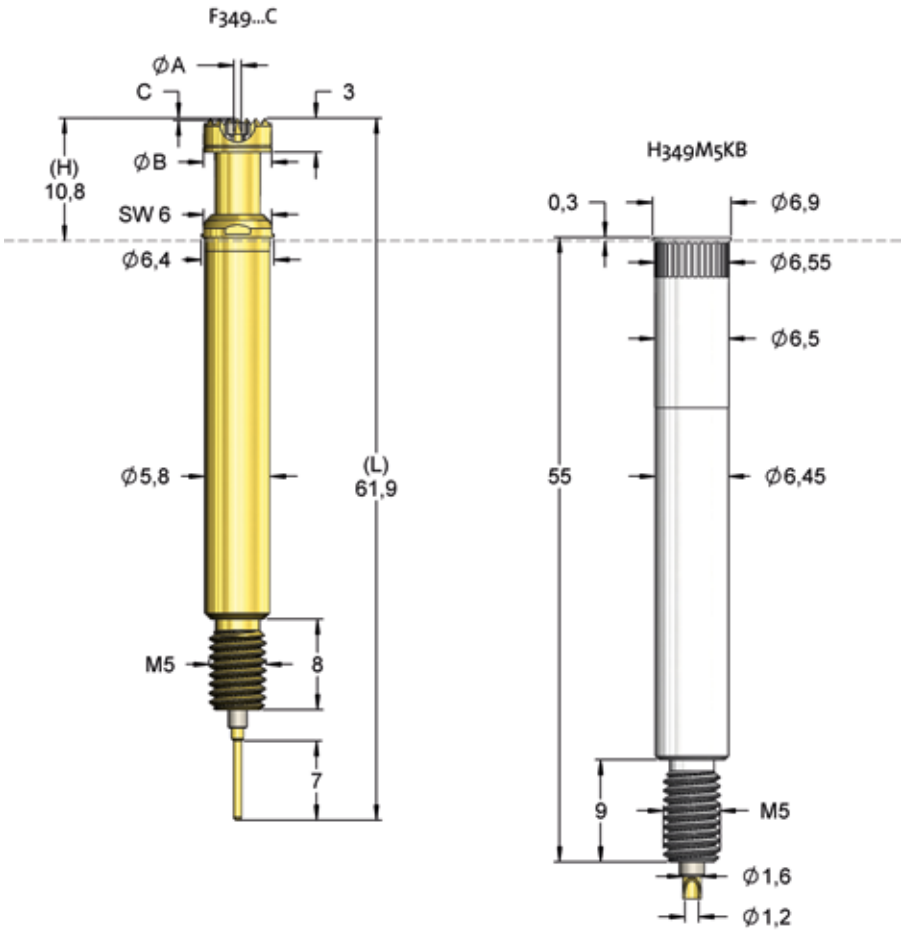
Insertion tool receptacle	FEWZ-348E0
Screw-in tool probe	FWZ348 (T)

Drill Size (mm)

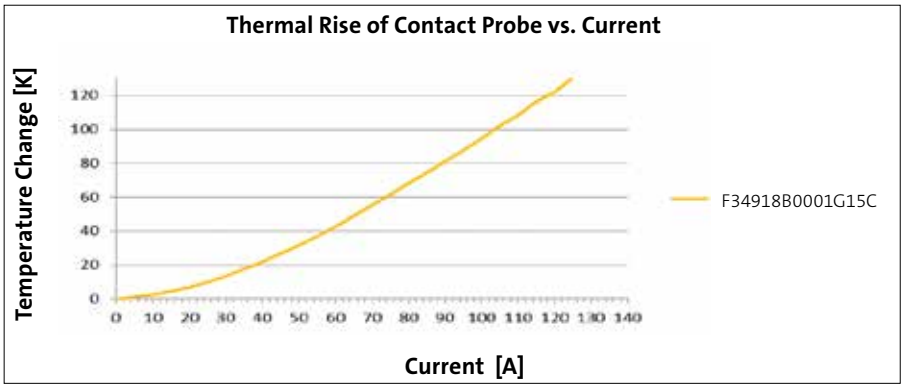
Receptacle with knurl	6,51 - 6,53

Projection Height (mm)

Receptacle with F349C	10,8



The threaded high current Kelvin probe F349C can be used for 4-wire measurements. The robust design allows contacting power components in centers of 300 mil with very low internal resistances. The circular connector allows currents up to 100 A which makes the probe ideal for rough production conditions.
The probe is mounted into the coaxial receptacle H349M5KB. The connection to the circular contact is made by the thread. The connection should be realized with a flexible wire (recommended 16,0 mm²) and a cable lug with counter nut. The inner contact needs to be soldered.



Order code	Tip Style	Number	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)

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 instance to identify inserted contact probes in existing modules or fixtures.

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.

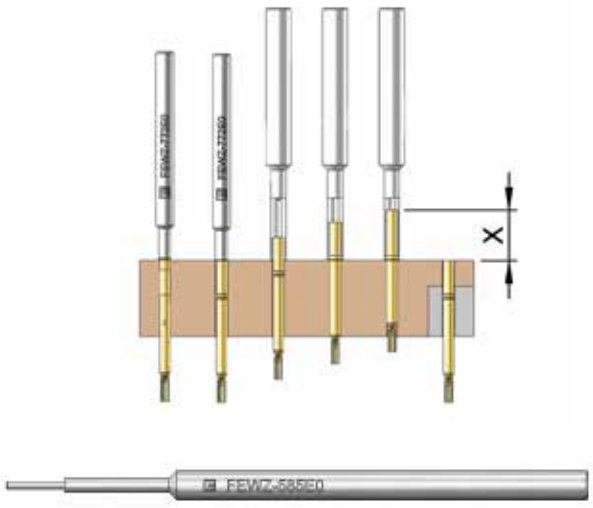
Mounting tool for twist proof receptacles

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



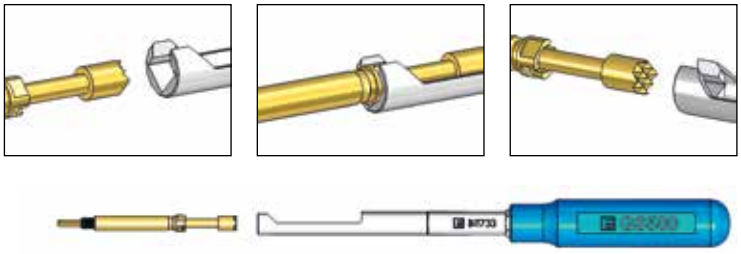
All receptacles with dead stop (collar) can be inserted with tool FEWZ-...E0. Press ring at receptacles can be used also as dead stop. The guiding pin of the tool helps to stabilize and properly mount the receptacle.

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.

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.

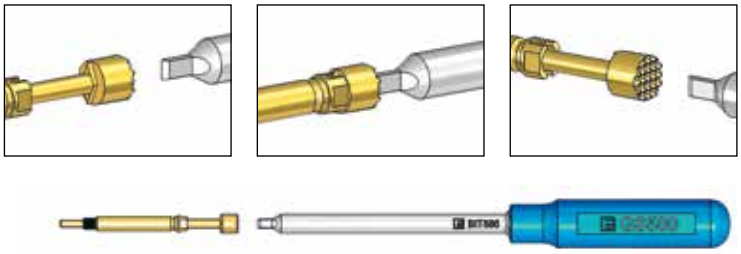


Socket Wrench

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.

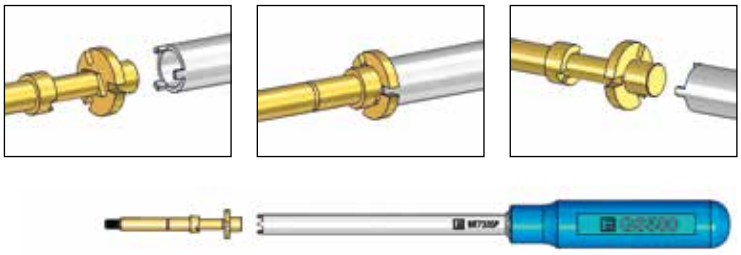
Screw driver

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

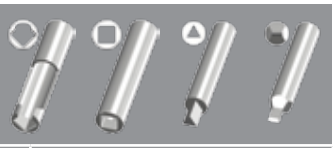
For assembly of oversized step probes FEINMETALL has developed a special tool for applications with very limited space between the probes.



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	1,9	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...

Screw-in Tools for Step Probes

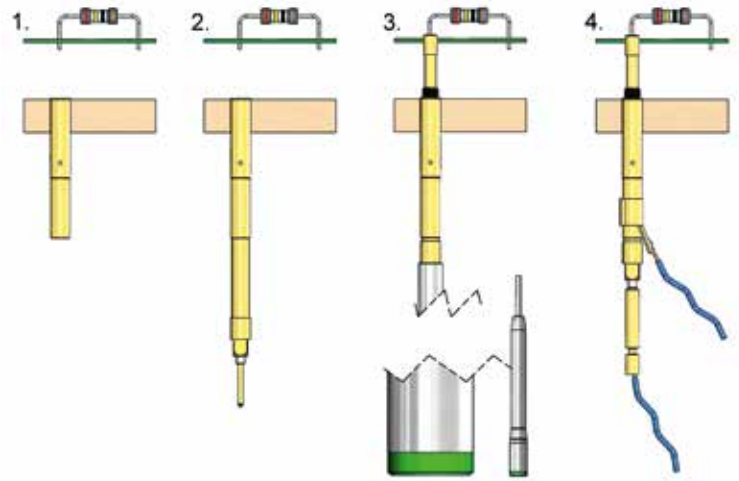
Probe	max. Tip-Ø	max. Plate-Ø	Shank-ØA	Bit type	FWZ	Handle	BIT	FWZ...T	Handle
F730...SP	0,3 - 0,9	0,4 - 1,0	1,7	Socket wrench	FWZ730	GS300	BIT730	FWZ730T	GS300T
	0,3 - 1,5	0,4 - 1,5	2,0	Hook wrench	FWZ730S1		BIT730S1	FWZ730T1	
F175...SP	0,3 - 1,5	0,4 - 1,5	2,0	Hook wrench	FWZ730S1		BIT730S1	FWZ730T1	
F731...SP	0,3 - 1,1	0,4 - 1,3	2,4	Socket wrench	FWZ731S1	GS400	BIT731S1	FWZ731T1	GS400T
	0,3 - 2,0	0,4 - 1,7	2,8	Hook wrench	FWZ731		BIT731	FWZ731T	
	0,3 - 1,0	1,8 - 3,0	1,85	3-point tool	FWZ731SP		BIT731SP	FWZ731SPT	
F732...SP	0,3 - 1,6	0,4 - 1,7	2,7	Socket wrench	FWZ732S2		BIT732S2	FWZ732T2	
	0,3 - 2,0	0,4 - 1,7	2,8	Hook wrench	FWZ732		BIT732	FWZ732T	
	0,3 - 2,7	0,4 - 1,7	3,5	Hook wrench	FWZ732S1		BIT732S1	FWZ732T1	
	0,3 - 1,5	2,1 - 6,0	2,4	3-point tool	FWZ732SP		BIT732SP	FWZ732SPT	
F732...SP1	1,51 - 2,2	2,8 - 6,0	3,1	3-point tool	FWZ732SP1		BIT732SP1	FWZ732SPT1	
F733...SP	3,31 - 6,8	3,5 - 7,0	2,4	3-point tool	FWZ732SP		BIT732SP	FWZ732SPT	
	0,3 - 2,9	0,4 - 3,0	5,0	Socket wrench	FWZ733S1	GS500	BIT733S1	FWZ733T1	GS500T
	0,3 - 3,3	3,31 - 7,0	4,2	3-point tool	FWZ733SP		BIT733SP	FWZ733SPT	
	0,3 - 3,9	0,4 - 4,0	5,0	Hook wrench	FWZ733		BIT733	FWZ733T	
F733...SP1	0,3 - 2,2	3,0 - 4,0	3,1	3-point tool	FWZ732SP1		BIT732SP1	FWZ732SPT1	
F737...SP	0,3 - 3,0	0,4 - 3,0	5,0	Socket wrench	FWZ733S1		BIT733S1	FWZ733T1	
	0,3 - 3,9	0,4 - 4,0	5,0	Hook wrench	FWZ733		BIT733	FWZ733T	

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

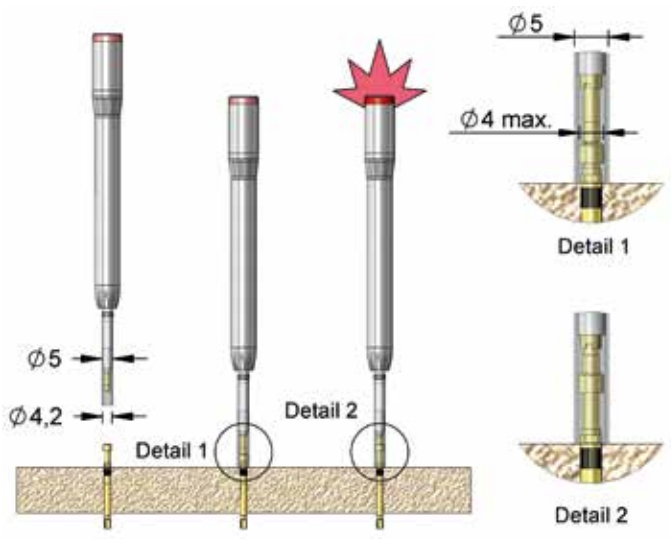
The tool FWZ...SA enables the mounting and correct positioning of switch probes before the final electrical connections are made. The exact switching position can be adjusted by help of the integrated light signal which is illuminated as soon as the switch circuit is closed.



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

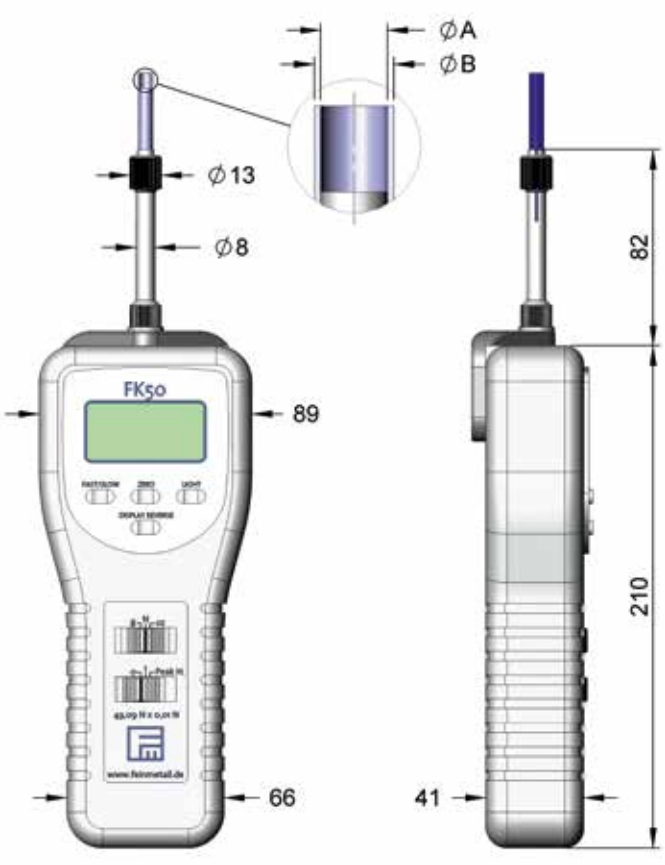
The Spring Force Gauge allows force measurement at all types of spring contact probes up to 50N. This instrument allows in a very simple way to verify if a probe is still intact and to determine the spring force of the probe. The measurement results are displayed at the instrument and the display can be electrically turned by 180° if needed, e.g. for overhead applications. For the measurement, the measuring sleeve has to be put over the probe and pushed to the mounting plate. The sleeve 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

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

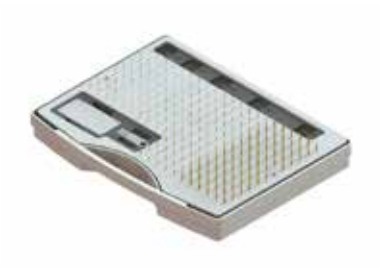
Cordless Screwdriver Set

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

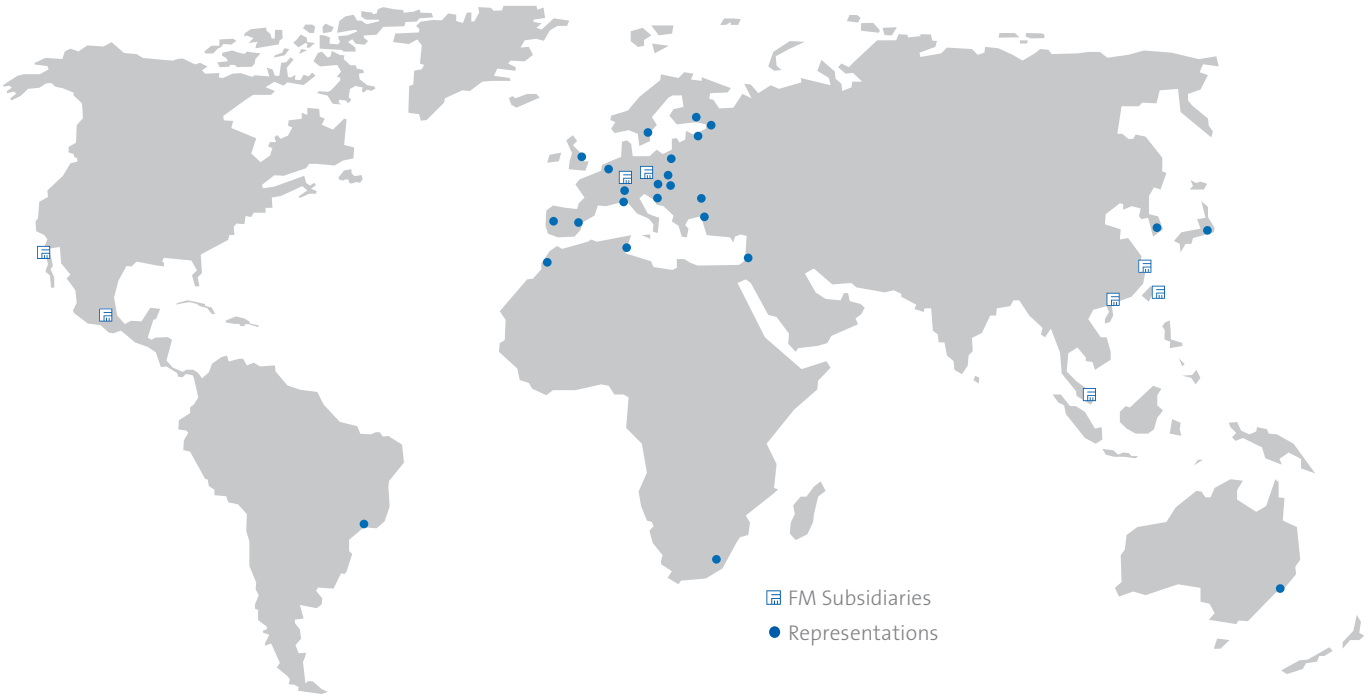


Application Specific Catalogs

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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You can find all representations worldwide on our homepage www.feinmetall.com
Our sales offices are perfectly connected to the markets and work in close cooperation with our customers. Most important for us is a high quality - regarding our products as well as regarding our customer support.

Our strengths

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

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

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