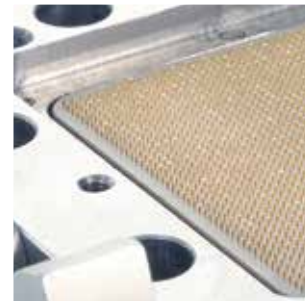


CONTACT PROBES

FOR FINE PITCHES
FOR LOW HEIGHTS
AND FOR DIRECT SOLDERING



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Contact probes for fine pitches, low heights and for direct soldering

For many years FEINMETALL is a worldwide leading provider of contact probes for various applications. Based on long-term experience and a strong customer focus we have consistently set high standards in developing innovative and practical contacting solutions.

Fine pitch probes

are used for applications with small distances between the test points (centers smaller than 1,27 mm / 50 mil). Because of these small distances it is not possible to use regular receptacles or to solder connection wires. Therefore, most fine pitch probes are designed with double plunger in order to use them as an interface between DUT and test system.

Battery contacts

are compact contact probes, often with a short travel. They are well suitable as battery or charge contacts, but also in many products (non-test purposes) that demand a reliable, low wear, releasable electrical connections.

Short travel probes

are used whenever the available height in a test fixture is limited. They are an ideal supplement to the standard ICT/FCT probes e.g. for contacting components at higher levels. The maximum travel of these probes is usually less than 3,0 mm, compared to standard probes the overall length and projection height is shorter.

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

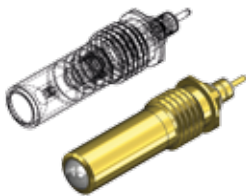
Competence

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!








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Note:

The contact probes shown in this catalogue are used for small centers or limited available space. 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.

BASICS

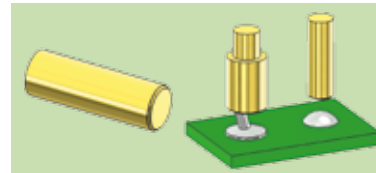
Overview of Tip Styles for Fine Pitch Probes, Battery Contacts and Short Travel Probes

					
01	02	03	05	06	07
Conical Shaft 90°	Conical Head 90°	Conical Shaft 60°	Concave	Serrated Head	Hexagonal Head 90°
					
11	12	15	16	17	18
Spherical Shaft	Spherical Head	Triangular Head 45°	Flat Shaft	Flat Head	Conical Shaft 30°
					
29	30	34	71	72	
4-Point Crown Shaft	Triangular Shaft 45°	Rigid Needle Head 15°	Half Moon	Half Crown	

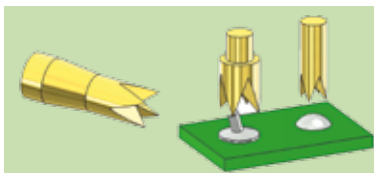
Typical Tip Styles and Applications



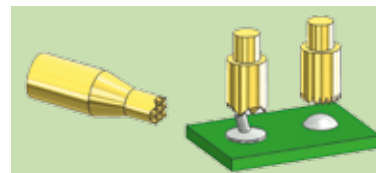
Spherical (11, 12)
For testing clean contact surfaces, does not leave marks or scratches.



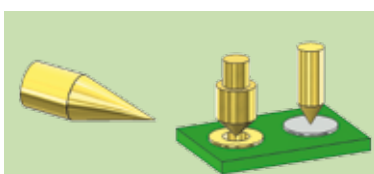
Flat (16, 17)
Suitable for solder pads and contact pins.



4-Point Crown (29)
For pad surfaces and soldered pins. The sharp edges penetrate flux residues and oxide layers.



Serrated (06)
Universal tip style for wires, contact pins and wire wrap posts, even for bent component leads.



Conical (01, 02, 03, 18, 34)
Universal tip style with different angles of 30°, 60° or 90° for contacting solder pads and holes.



Hexagonal (07)
For testing vias, contact surfaces and pads. The sharp edges can penetrate contaminations and oxide layers.

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 positions that are difficult to access, it can be helpful to use pneumatic contact probes, operated by compressed air.

Push Back Probes

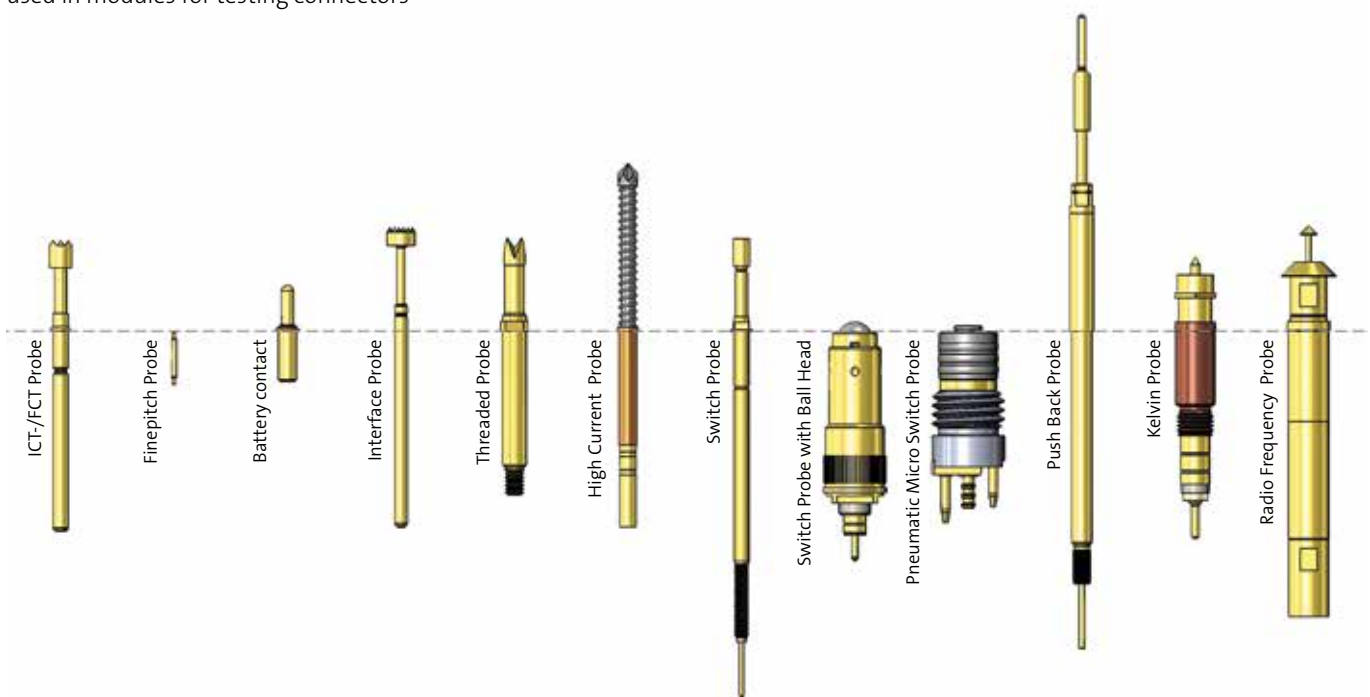
During the push back test of connectors the tight seat of the connector elements is verified. For this application contact probes with very high spring forces are used.

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.

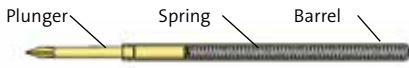
Radio Frequency Probes

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.



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.

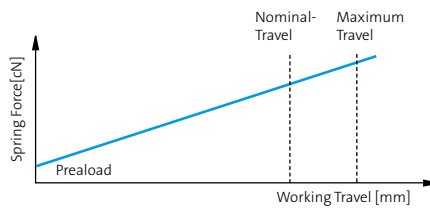
Spring

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 side the spring force needs to ensure the quality of the electrical contact and the penetration of contaminations or oxide layers. On the other hand side 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 the contacts without problems. Due to manufacturing processes and material variances all spring forces have a tolerance of $\pm 20\%$.



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 is typically leading through the plunger, the barrel and the receptacle. A secondary current flow is leading 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 e.g. 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 (turned) 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

BASICS

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.

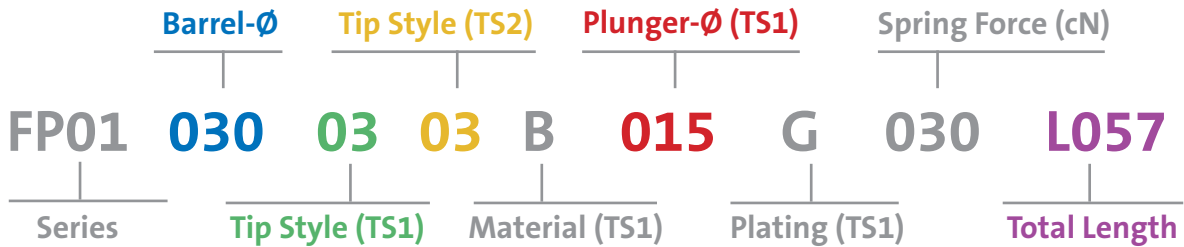
Multiplex

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.



FINE PITCH PROBES

FPXX Order code for the new series in the product range
Fine Pitch probes



Depending on the mounting type the probes have either two spring loaded plungers or only one at the DUT side (see picture below).

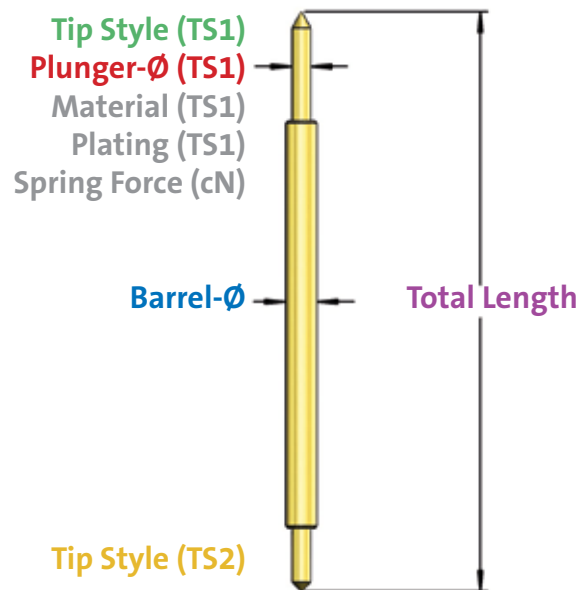
FP01: Both probe sides are spring-loaded

FP02: Each one side fixed and spring-loaded

Probe series are defined by the details of series, barrel- \emptyset and total length.

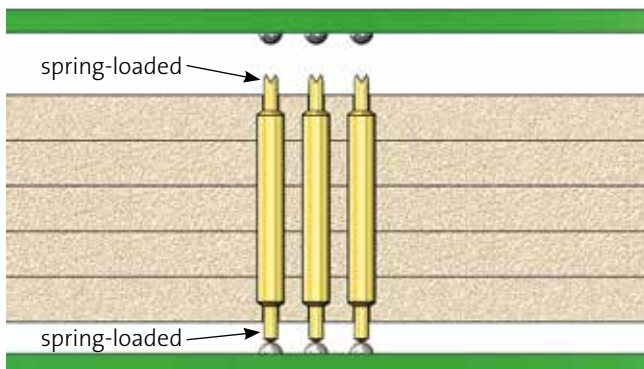
For example:

FP01 - 030 - L057

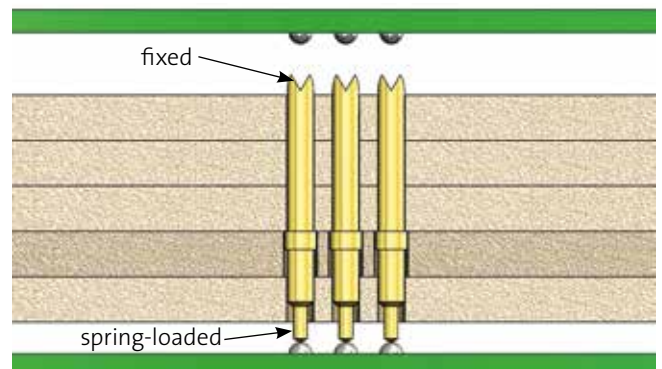


The material and plating of „Tip Style TS2“ is standard and always the same for all versions within a probe series.

Mounting example FP01



Mounting example FP02





Fine Pitch Probes

Fine pitch probes are extremely thin spring contact probes for the use in centers of 0,3 mm to 1 mm. In most cases fine pitch probes are not mounted in separate receptacles, but they are mounted in sandwich design blocks connecting a DUT with a PCB. Typical applications are contacting PCBs with very small structures and building up test sockets.

FP01-020-L037	13
FP01-026-L072	14
FP01-030-L032	15
FP01-030-L057	16
FP01-035-L069	17
FP01-038-L030	18
FP01-059-L087	19
F238	20
F239	20
F206	21
F209	21
F680	22
F109	23
F252	24

FINE PITCH PROBES

Application Range for Fine Pitch Probes

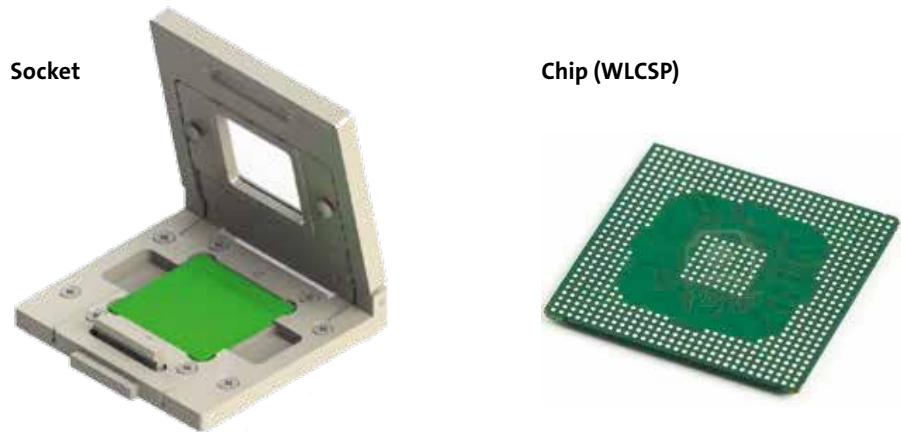
Fine pitch probes are mainly used for different applications within semiconductor component tests, like e.g. front-end and back-end tests including burn-in test which is an electrical and thermic stress test for semiconductor components.

Different component tests:

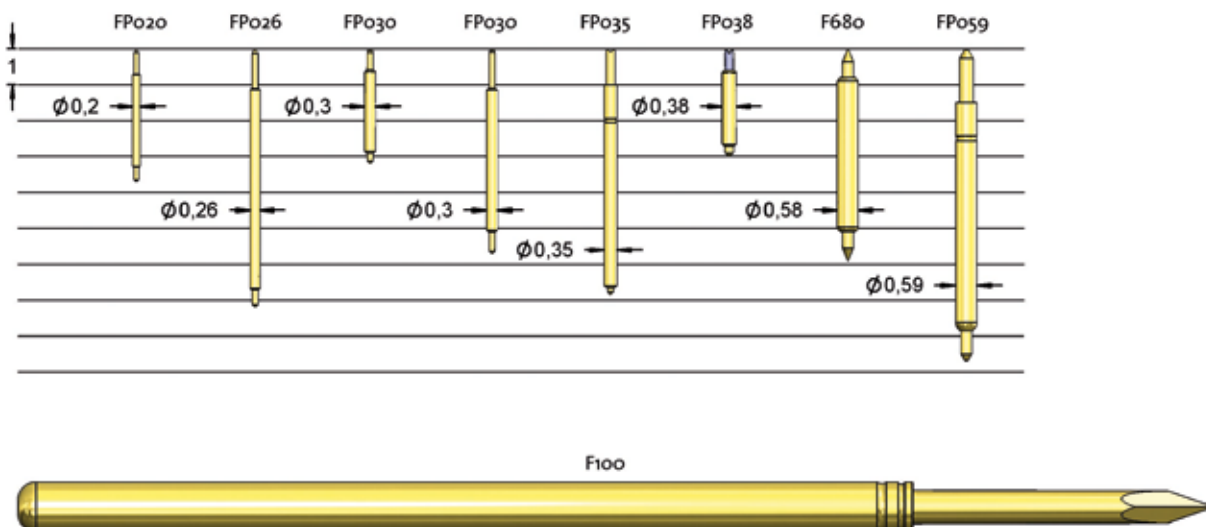
- BGA (Ball Grid Array)
- LGA (Land Grid Array)
- QFP (Quad Flat Package)
- QFN (Quad Flat No Leads Package)
- WLCSP (Wafer Level Chip Scale Package)

Series	Center	Version
FP01-020-L037	0,30 mm / 12 mil	Double plunger probe
FP01-026-L072	0,35 mm / 14 mil	Double plunger probe
FP01-030-L032	0,40 mm / 16 mil	Double plunger probe
FP01-030-L057	0,40 mm / 16 mil	Double plunger probe
FP01-035-L069	0,50 mm / 20 mil	Double plunger probe
FP01-038-L030	0,50 mm / 20 mil	Double plunger probe
FP01-059-L087	0,75 mm / 30 mil	Double plunger probe
<hr/>		
F238	0,50 mm / 20 mil	Double plunger probe
F239	0,50 mm / 20 mil	Double plunger probe
F209	0,70 mm / 28 mil	Double plunger probe
F206	0,70 mm / 28 mil	Double plunger probe
F680	0,75 mm / 30 mil	Double plunger probe
F109	1,00 mm / 40 mil	Probe with receptacle
F252	1,00 mm / 40 mil	Double plunger probe

For testing components, fine pitch probes are commonly used for test heads and test sockets. They serve as interface between DUT and test set-up.



Size comparison between F100 vs. fine pitch probes



FINE PITCH PROBES

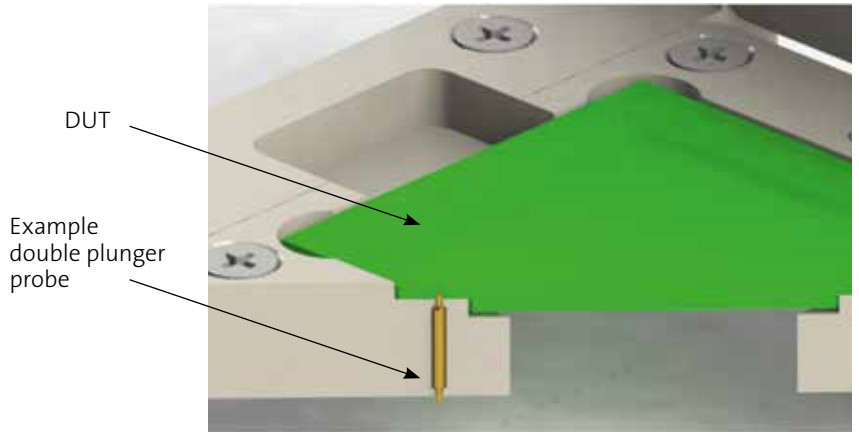
Mounting of Fine Pitch Probes

Double plunger probes can be used for interfaces without soldering. For this purpose the probes are inserted directly into corresponding bores in the guiding plates. In such a setup the different guiding plates have different drill hole diameters to hold the probe in its position but still allow a movement within the guiding material.

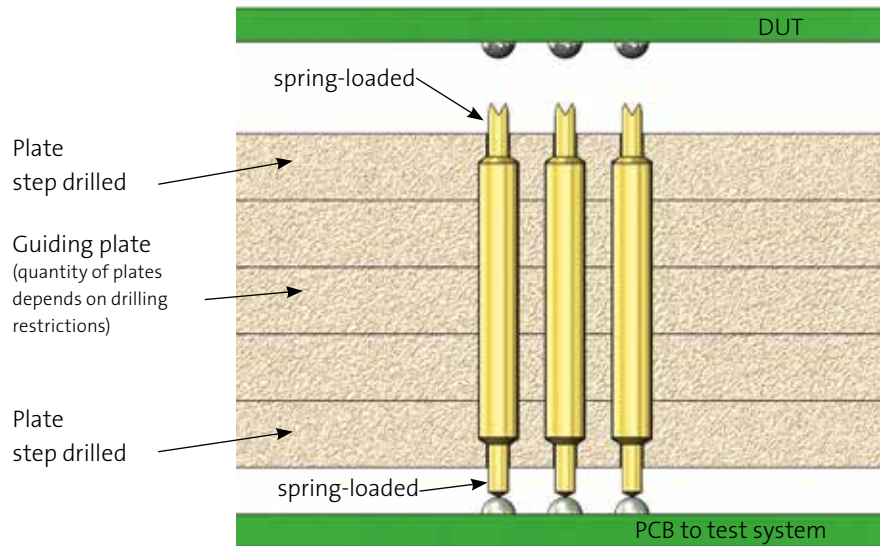
Fine pitch probes are spring contact probes in centers < 1.27 mm / 50 mil.

In these centers direct soldering of probes as well as using receptacles with larger diameters is not possible any more. Therefore most fine pitch probes are used in sandwich design blocks connecting a DUT with a PCB.

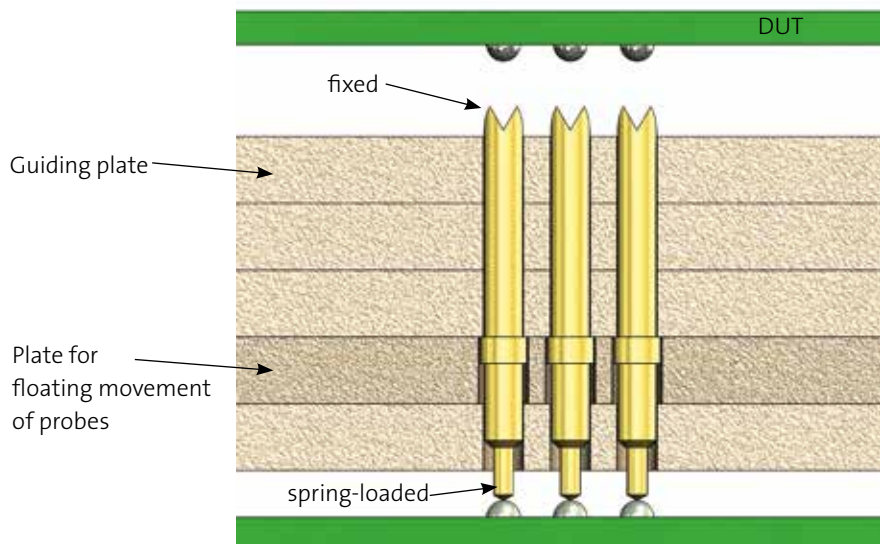
Application socket



Mounting example FP01



Mounting example FP02



Even if only one side is spring loaded the floating movement of the probe within the guiding material allows a travel of the probe tips on both sides.

Overview

Series	Order Code	Barrel-Ø [mm]	TS1	TS2	Material TS1	TS1-Ø [mm]	Plating TS1	Spring Force [cN]	Length [mm]	Page
FP01-020-L037	FP01 020 0301 B 012 G 017 L037	0,20	03	01	B	0,12	G	17	3,70	13
	FP01 020 2901 B 012 G 017 L037	0,20	29	01	B	0,12	G	17	3,70	13
FP01-026-L072	FP01 026 0301 B 015 G 025 L072	0,26	03	01	B	0,15	G	25	7,20	14
	FP01 026 2901 B 015 G 025 L072	0,26	29	01	B	0,15	G	25	7,20	14
FP01-030-L032	FP01 030 0301 B 016 G 022 L032	0,30	03	01	B	0,16	G	22	3,20	15
	FP01 030 2901 B 016 G 022 L032	0,30	29	01	B	0,16	G	22	3,20	15
	FP01 030 2901 P 016 U 018 L032 H	0,30	29	01	P	0,16	U	18	3,20	15
	FP01 030 2901 P 016 U 022 L032	0,30	29	01	P	0,16	U	22	3,20	15
FP01-030-L057	FP01 030 0301 B 015 G 030 L057	0,30	03	01	B	0,15	G	30	5,70	16
	FP01 030 2901 B 015 G 030 L057	0,30	29	01	B	0,15	G	30	5,70	16
	FP01 030 2901 P 015 U 030 L057	0,30	29	01	P	0,15	U	30	5,70	16
	FP01 030 2901 P 015 U 030 L057 H	0,30	29	01	P	0,15	U	30	5,70	16
FP01-035-L069	FP01 035 0301 B 025 G 020 L069	0,35	03	01	B	0,25	G	20	6,80	17
	FP01 035 1601 B 025 G 020 L068 H	0,35	16	01	B	0,25	G	20	6,80	17
	FP01 035 2901 B 025 G 020 L068 H	0,35	29	01	B	0,25	G	20	6,80	17
FP01-038-L030	FP01 038 2901 P 022 U 025 L030	0,38	29	01	P	0,22	U	25	3,00	18
FP01-059-L087	FP01 059 0303 S 038 L 035 L087	0,59	03	03	S	0,38	L	35	8,70	19
	FP01 059 2903 S 038 L 035 L087	0,59	29	03	S	0,38	L	35	8,70	19
F238	F23801B027L050	0,38	01	01	B	0,27	L	50	24,3	20
	F23811B027L050	0,38	11	11	B	0,27	L	50	24,3	20
	F23830B027L050	0,38	30	30	B	0,27	L	50	24,3	20
F239	F23901B027L050	0,38	01	-	B	0,27	L	50	20,3	20
F209	F20901B035G050	0,51	01	01	B	0,35	G	50	16,6	21
F206	F20601S036L050	0,51	01	01	S	0,36	L	50	24,3	21
F680	F68003B030G020	0,58	03	29	B	0,30	G	20	5,90	22
	F68003B030G020HS1	0,58	03	03	B	0,30	G	20	5,90	22
	F68003B030G060HS1	0,58	03	03	B	0,30	G	60	5,90	22
	F68003B030G060S1	0,58	03	03	B	0,30	G	60	5,90	22
	F68016B030G040	0,58	16	29	B	0,30	G	40	5,90	22
	F68029B030G040	0,58	29	29	B	0,30	G	40	5,90	22
	F68029B030R050NM	0,58	29	29	B	0,30	R	50	5,90	22
F109	F10901B034G050	0,48	01	-	B	0,34	G	50	15,8	23
	F10901B034G050H	0,48	01	-	B	0,34	G	50	15,8	23
	F10918B034G050	0,48	18	-	B	0,34	G	50	15,8	23
F252	F25201S035L085	0,68	01	01	S	0,35	L	85	24,5	24
	F25211S035L085	0,68	11	11	S	0,35	L	85	24,5	24
	F25218S036L085	0,68	18	18	S	0,36	L	85	24,5	24

TS = Tip Style

FINE PITCH PROBES

FP01-020-L037

Fine Pitch Probe
Double Plunger Probe

NEW

Centers (mm/mil)	0,30 / 12
Current	0,8 A
R typ	<100 mOhm
Self Inductance	1,27 nH
Frequency at -1dB	<30 GHz
Temperature	-40°C...+120°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	7	17

Travel (mm)

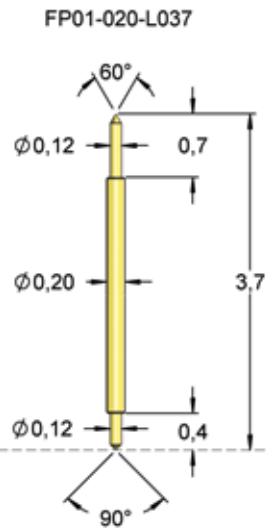
Version	Nominal	Maximum
Standard	0,40	0,55

Materials and Plating

Plunger 1	BeCu, gold plated
Plunger 2	BeCu, gold plated (standard)
Barrel	Nickel, gold plated
Spring	Music wire, gold plated

Drill Size (mm)

FP01-020-L037	0,21 - 0,23
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M 1:1

For applications like BGA, LGA, SOP, QFP, QFN-testing.
Suitable for mounting in sockets and test fixtures.

Barrel-Ø	TS2	Tip-Ø TS1	Spring Force (cN)	Version
FP01	020	03	01	B 012 G 017 L037 -
Series	TS1	Material TS1	Plating TS1	Total Length

Material TS1: B = BeCu
Tip-Ø TS1: 012 = 0,12 mm (e.g.)
Plating TS1: G = Gold plated
Total Length: L037 = 3,70 mm (e.g.)
Version: -

Tip Styles	TS1 / TS2	Material	Ø in mm	Plating	Version
	03 01	B	0,12	G	-
	29 01	B	0,12	G	-

FP01-026-L072

Fine Pitch Probe
Double Plunger Probe

NEW

Centers (mm/mil)	0,35 / 14
Current	1,5 A
R typ	<100 mOhm
Self Inductance	2,07 nH
Frequency at -1dB	<7 GHz
Temperature	-40°C...+140°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	5	25

Travel (mm)

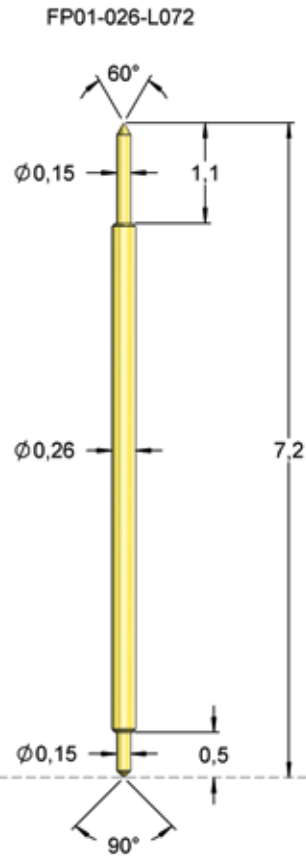
Version	Nominal	Maximum
Standard	0,80	1,00

Materials and Plating

Plunger 1	BeCu, gold plated
Plunger 2	BeCu, gold plated (standard)
Barrel	Nickel, gold plated
Spring	Stainless steel, gold plated

Drill Size (mm)

FP01-026-L072	0,25 - 0,27
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M 1:1

For applications like BGA, LGA, SOP, QFP, QFN-testing.
Suitable for mounting in sockets and test fixtures.

Barrel-Ø	TS2	Tip-Ø TS1	Spring Force (cN)	Version
FP01 026	03 01	B 015	G 025	L072 -
Series	TS1	Material TS1	Plating TS1	Total Length

Material TS1: B = BeCu
Tip-Ø TS1: 015 = 0,15 mm (e.g.)
Plating TS1: G = Gold plated
Total Length: L072 = 7,20 mm (e.g.)
Version: -

Tip Styles	TS1 / TS2	Material	Ø in mm	Plating	Version
	03 01	B	0,15	G	-
	29 01	B	0,15	G	-

FINE PITCH PROBES

FP01-030-L032

Fine Pitch Probe
Double Plunger Probe

NEW

Centers (mm/mil)	0,40 / 16
Current	1,4 A
R typ	<100 mOhm
Self Inductance	0,87 nH
Frequency at -1dB	<20 GHz
Temperature	-40°C...+120°C -50°C...+150°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	6	22
H	6	22

Travel (mm)

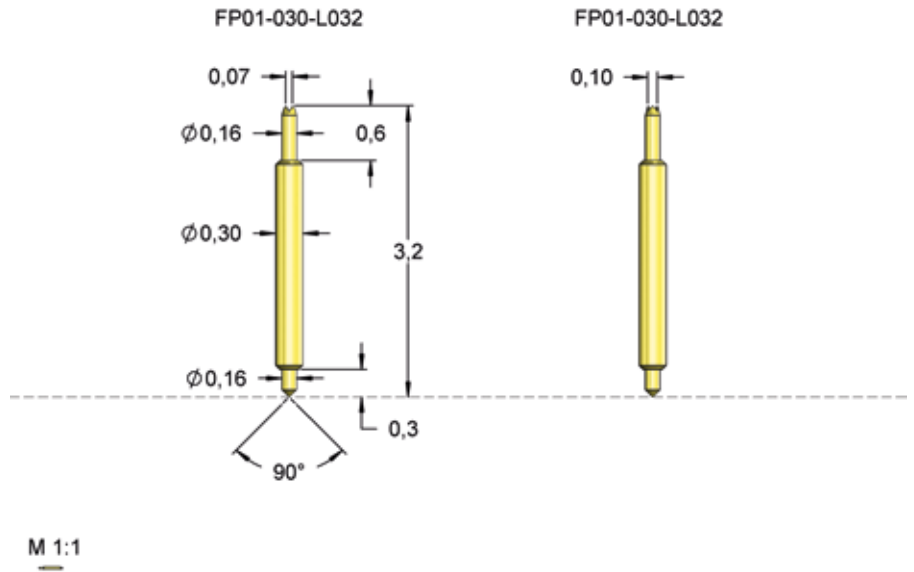
Version	Nominal	Maximum
Standard	0,45	0,60
H	0,45	0,60

Materials and Plating

Plunger 1	BeCu, gold plated; Palladium alloy, unplated
Plunger 2	BeCu, gold plated (standard)
Barrel	Nickel, gold plated
Spring	Music wire, gold plated

Drill Size (mm)

FP01-030-L032	0,31 - 0,33
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For applications like BGA, LGA, SOP, QFP, QFN-testing.
Suitable for mounting in sockets and test fixtures.

Barrel-Ø	TS2	Tip-Ø TS1	Spring Force (cN)	Version
FP01 030	29 01	B 015	G 030	L057 H
Series	TS1	Material TS1	Plating TS1	Total Length

Material TS1: B = BeCu
Tip-Ø TS1: 015 = 0,15 mm (e.g.)
Plating TS1: G = Gold plated
Total Length: L072 = 7,2 mm (e.g.)
Version: H = High temperature

Tip Styles	TS1 / TS2	Material	Ø in mm	Plating	Version
	03 01	B	0,16	G	-
	29 01	B	0,16	G	-
	29 01	P	0,16	U	-
	29 01	P	0,16	U	H

FP01-030-L057

Fine Pitch Probe
Double Plunger Probe

NEW

Centers (mm/mil)	0,40 / 16
Current	1,4 A
R typ	<100 mOhm
Self Inductance	1,61 nH
Frequency at -1dB	<13 GHz
Temperature	-40°C...+120°C -50°C...+150°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	8	30
H	8	30

Travel (mm)

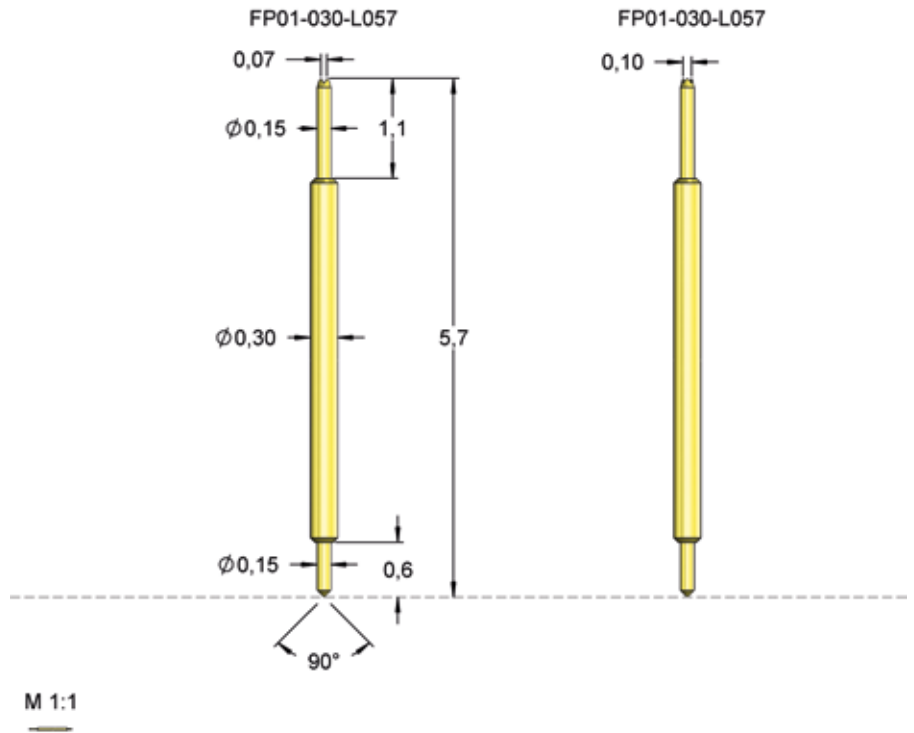
Version	Nominal	Maximum
Standard	0,65	0,80
H	0,65	0,80

Materials and Plating

Plunger 1	BeCu, gold plated; Palladium alloy, unplated
Plunger 2	BeCu, gold plated (standard)
Barrel	Nickel, gold plated
Spring	Music wire, gold plated

Drill Size (mm)

FP01-030-L057	0,31 - 0,33
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For applications like BGA, LGA, SOP, QFP, QFN-testing.
Suitable for mounting in sockets and test fixtures.

Barrel-Ø	TS2	Tip-Ø TS1	Spring Force (cN)	Version
FP01 030	29 01	B 015	G 030	L057 H
Series	TS1	Material TS1	Plating TS1	Total Length

Material TS1: B = BeCu, P = Palladium
Tip-Ø TS1: 015 = 0,15 mm (e.g.)
Plating TS1: G = Gold plated, U = Unplated
Total Length: L057 = 5,70 mm (e.g.)
Version: H = High temperature

Tip Styles	TS1 / TS2	Material	Ø in mm	Plating	Version
	03 01	B	0,15	G	-
	29 01	B	0,15	G	-
	29 01	P	0,15	U	-
	29 01	P	0,15	U	H

FINE PITCH PROBES

FP01-035-L069

Fine Pitch Probe
Double Plunger Probe

NEW

Centers (mm/mil)	0,50 / 20
Current	2,0 A
R typ	<60 mOhm
Temperature	-42°C...+135°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	8	20
H	8	20

Travel (mm)

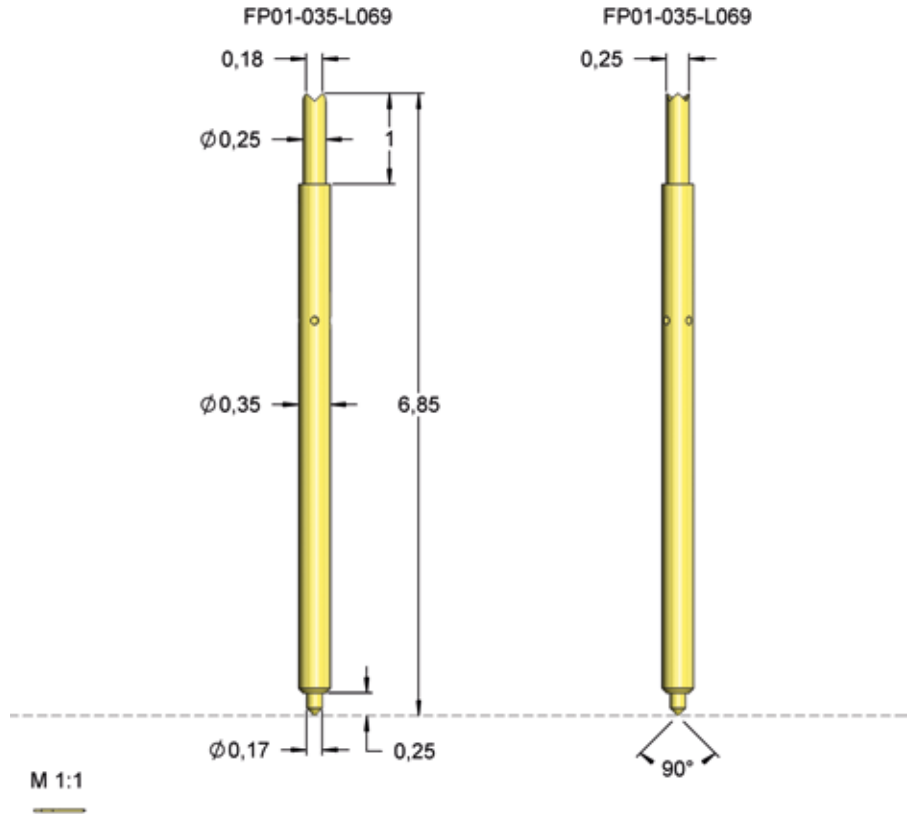
Version	Nominal	Maximum
Standard	0,65	0,75
H	0,65	0,75

Materials and Plating

Plunger 1	BeCu, gold plated
Plunger 2	BeCu, gold plated (standard)
Barrel	Nickel, gold plated
Spring	Music wire, gold plated

Drill Size (mm)

FP01-035-L069	0,36 - 0,38
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For applications like BGA, LGA, SOP, QFP, QFN-testing.
Suitable for mounting in sockets and test fixtures.

Barrel-Ø	TS2	Tip-Ø TS1	Spring Force (cN)	Version
FP01 035	03 01	B 025	G 020	L069 -

Series	TS1	Material TS1	Plating TS1	Total Length
Material TS1:	B = BeCu			
Tip-Ø TS1:	025 = 0,25 mm (e.g.)			
Plating TS1:	G = Gold plated			
Total Length:	L069 = 6,9 mm (e.g.)			
Version:	-			

Tip Styles	TS1 / TS2	Material	Ø in mm	Plating	Version
	03 01	B	0,25	G	-
	16 01	B	0,25	G	H
	29 01	B	0,25	G	H

FP01-038-L030

Fine Pitch Probe
Double Plunger Probe

NEW

Centers (mm/mil)	0,50 / 20
Current	1,1 A
R typ	<100 mOhm
Self Inductance	0,81 nH
Frequency at -1dB	<20 GHz
Temperature	-40°C...+120°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	15	25

Travel (mm)

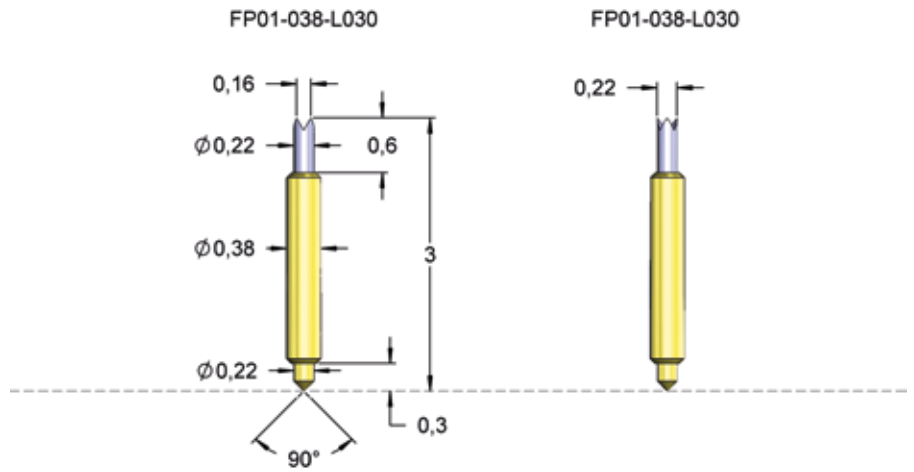
Version	Nominal	Maximum
Standard	0,40	0,55

Materials and Plating

Plunger 1	Palladium alloy, unplated
Plunger 2	BeCu, gold plated (standard)
Barrel	Nickel, gold plated
Spring	Music wire, gold plated

Drill Size (mm)

FP01-038-L030	0,39 - 0,41
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M 1:1

For applications like BGA, LGA, SOP, QFP, QFN-testing.
Suitable for mounting in sockets and test fixtures.

Barrel-Ø	TS2	Tip-Ø TS1	Spring Force (cN)	Version
FP01 038	29 01	P 022	U 025	L030 -
Series	TS1	Material TS1	Plating TS1	Total Length

Material TS1: P = Palladium alloy
Tip-Ø TS1: 022 = 0,22 mm (e.g.)
Plating TS1: U = Unplated
Total Length: L030 = 3,00 mm (e.g.)
Version: -

Tip Styles	TS1 / TS2	Material	Ø in mm	Plating	Version
	29 01	P	0,22	U	-

FINE PITCH PROBES

FP01-059-L087

Fine Pitch Probe
Double Plunger Probe

NEW

Centers (mm/mil)	0,75 / 30
Current	0,5 A
R typ	<50 mOhm
Temperature	-50°C...+150°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	35

Travel (mm)

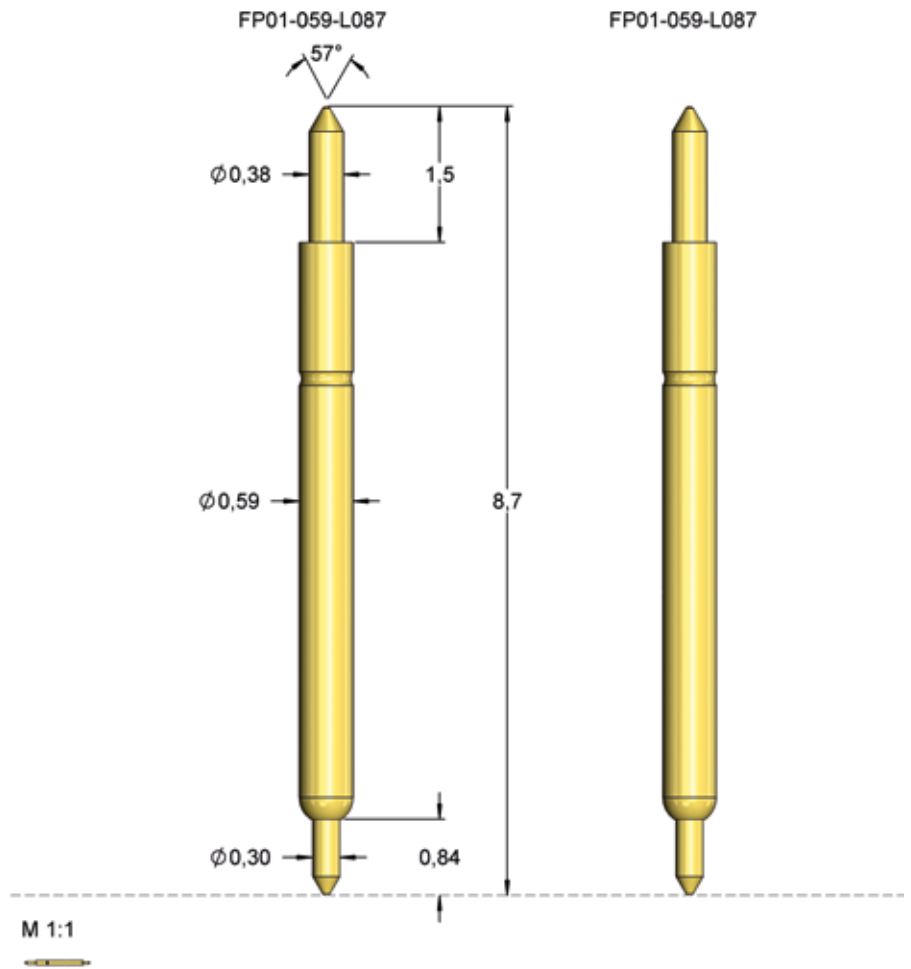
Version	Nominal	Maximum
Standard	0,75	1,0

Materials and Plating

Plunger 1	Steel, gold plated
Plunger 2	BeCu, gold plated (standard)
Barrel	Bronze, gold plated
Spring	Stainless steel, gold plated

Drill Size (mm)

FP01-059-L087	0,60 - 0,63
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For applications like BGA, LGA, SOP, QFP, QFN-testing.
Suitable for mounting in sockets and test fixtures.

Barrel-Ø	TS2	Tip-Ø TS1	Spring Force (cN)	Version
FP01 059 03 03	S	038	G 035	L087 -
Series	TS1	Material TS1	Plating TS1	Total Length

Material TS1: S = Steel
Tip-Ø TS1: 038 = 0,38 mm (e.g.)
Plating TS1: G = Gold plated
Total Length: L087 = 8,7 mm (e.g.)
Version: -

Tip Styles	TS1 / TS2	Material	Ø in mm	Plating	Version
	03 03	S	0,38	G	-
	29 03	S	0,38	G	-

F238

Fine Pitch Probe Double Plunger Probe

Centers (mm/mil)	0,50 / 20
Current	1,0 A
R typ	<350 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	50

Travel (mm)

Version	Nominal	Maximum
Standard	2,0	2,5

Materials and Plating

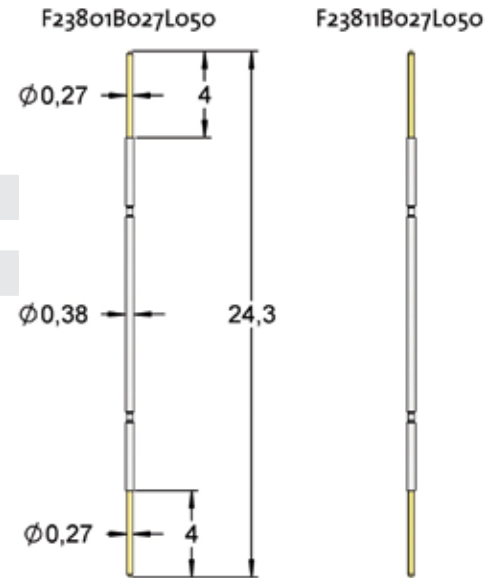
Plunger	BeCu, longtime gold plated
Barrel	Stainless steel, unplated
Spring	Music wire, gold plated

Drill Size (mm)

F238	0,38 - 0,40
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Series	Tip-Ø TS1	Spring Force (cN)
F238 01 B 027 L 050		
TS1	Material	Plating
		Total Length

Material: B = BeCu
Tip-Ø: 027 = 0,27 mm (e.g.)
Plating: L = Longtime gold plated



For applications like BGA, LGA, SOP, QFP, QFN-testing.
Suitable for mounting in sockets and test fixtures.

Tip Style	Number	Material	Ø in mm	Plating	Version
	01	B	0,27	L	-
	11	B	0,27	L	-
	30	B	0,27	L	-

F239

Fine Pitch Probe with Connecting Element

Centers (mm/mil)	0,50 / 20
Current	1,0 A
R typ	<350 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	50

Travel (mm)

Version	Nominal	Maximum
Standard	2,0	2,5

Materials and Plating

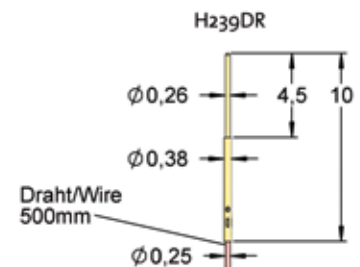
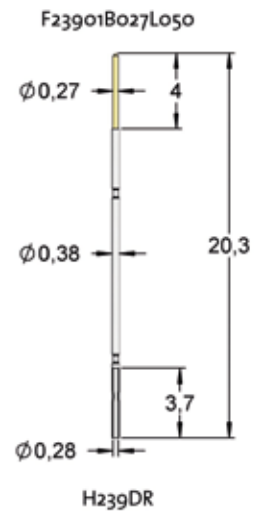
Plunger	BeCu, longtime gold plated
Barrel	Stainless steel, unplated
Spring	Music wire, gold plated
Connecting element	BeCu, gold plated

Drill Size (mm)

F238	0,38 - 0,40
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Series	Tip-Ø TS1	Spring Force (cN)
F239 01 B 027 L 050		
TS1	Material	Plating
		Total Length

Material: B = BeCu
Tip-Ø: 027 = 0,27 mm (e.g.)
Plating: L = Longtime gold plated



For applications like BGA, LGA, SOP, QFP, QFN-testing.
Suitable for mounting in sockets and test fixtures.

Tip Style	Number	Material	Ø in mm	Plating	Version
	01	B	0,27	L	-

FINE PITCH PROBES

F209

Fine Pitch Probe Double Plunger Probe

Centers (mm/mil)	0,70 / 28
Current	1,0 A
R typ	<70 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	50

Travel (mm)

Version	Nominal	Maximum
Standard	2,0	2,5

Materials and Plating

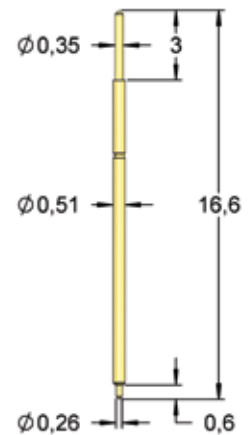
Plunger	BeCu, gold plated
Barrel	Bronze, gold plated
Spring	Music wire, silver plated

Drill Size (mm)


F209	0,51 - 0,53
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Series	Tip-Ø TS1	Spring Force (cN)
F209 01	B 035	G 050
TS1	Material	Plating
		Total Length

Material: B = BeCu
Tip-Ø: 035 = 0,35 mm (e.g.)
Plating: G = Gold plated



For applications like BGA, LGA, SOP, QFP, QFN-testing.
 Suitable for mounting in sockets and test fixtures.

Tip Style	Number	Material	Ø in mm	Plating	Version
	01	B	0,35	G	-

F206

Fine Pitch Probe Double Plunger Probe

Centers (mm/mil)	0,70 / 28
Current	1,0 A
R typ	<70 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	50

Travel (mm)

Version	Nominal	Maximum
Standard	2,0	2,5

Materials and Plating

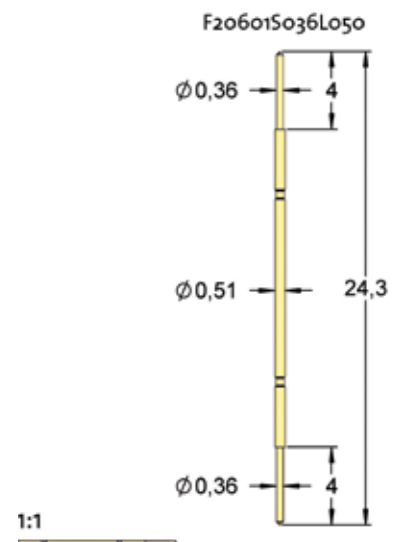
Plunger	BeCu, gold plated
Barrel	Bronze, gold plated
Spring	Music wire, silver plated

Drill Size (mm)

F209	0,51 - 0,53
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Series	Tip-Ø TS1	Spring Force (cN)
F206 01	S 036	L 050
TS1	Material	Plating
		Total Length

Material: S = Steel
Tip-Ø: 036 = 0,36 mm (e.g.)
Plating: L = Longtime gold plated



For applications like BGA, LGA, SOP, QFP, QFN-testing.
 Suitable for mounting in sockets and test fixtures.

Tip Style	Number	Material	Ø in mm	Plating	Version
	01	S	0,36	L	-

FINE PITCH PROBES

F680

Fine Pitch Probe Double Plunger Probe

Centers (mm/mil)	0,75 / 30
Current	0,5 A
R typ	<50 mOhm
Temperature	-20°C...+80°C -40°C...+200°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	20
Standard	20	40
NM	10	50
HS1	10	20
HS1	45	60

Travel (mm)

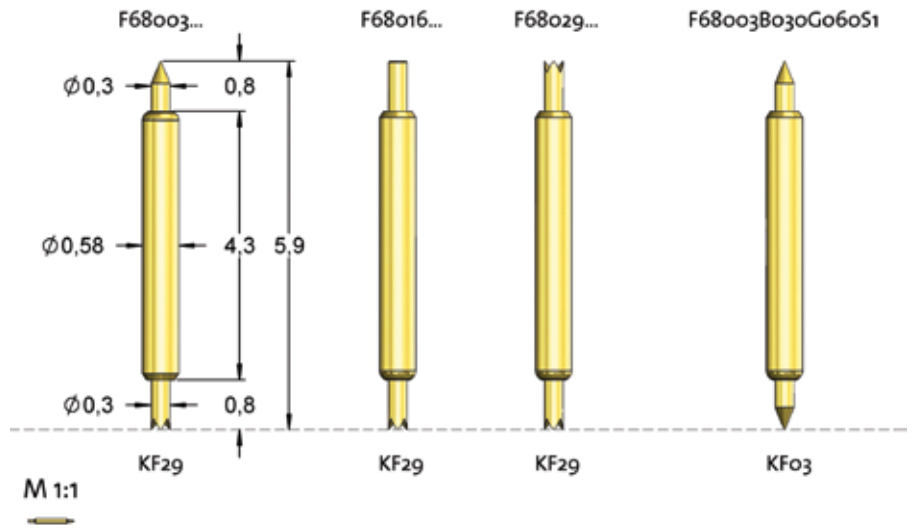
Version	Nominal	Maximum
Standard	0,5	1,0
NM	0,5	0,7
S1	0,5	0,6

Materials and Plating

Plunger	BeCu, gold plated; BeCu, rhodanized
Barrel	Bronze, gold plated Bronze, rhodanized (NM)
Spring	BeCu, unplated (NM) Music wire, silver plated Stainless steel, silver plated (H)

Drill Size (mm)

F680	0,59 - 0,62
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For applications like BGA, LGA, SOP, QFP, QFN-testing.
Suitable for mounting in sockets and test fixtures.



Version **F68029B030R050NM** is made exclusively of **non-magnetic** materials.

Series	Tip-Ø TS1	Spring Force (cN)
F680 03 B 030 G 060 S1		
TS1	Material	Plating
		Version

Material: B = BeCu
Tip-Ø: 030 = 0,30 mm (e.g.)
Plating: G = Gold plated, R = Rhodanized
Version: NM = non magnetic, S1 = Special version, H = High temperature

Tip Style	Number	Material	Ø in mm	Plating	Version
	03	B	0,30	G	-
	03	B	0,30	G	HS1
	16	B	0,30	G	-
	29	B	0,30	G	-
	29	B	0,30	R	NM

FINE PITCH PROBES

F109

Fine Pitch Probe with Receptacle

Centers (mm/mil)	1,00 / 39
Current	1,0 A
R typ	<65 mOhm
Temperature	-20°C...+80°C -40°C...+200°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	50
H	17	50

Travel (mm)

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

Materials and Plating

Plunger	see Tip Style
Barrel	Nickel silver, gold plated
Spring	Music wire, silver plated Stainless steel, gold plated (H)
Receptacle	Bronze, gold plated

Accessories

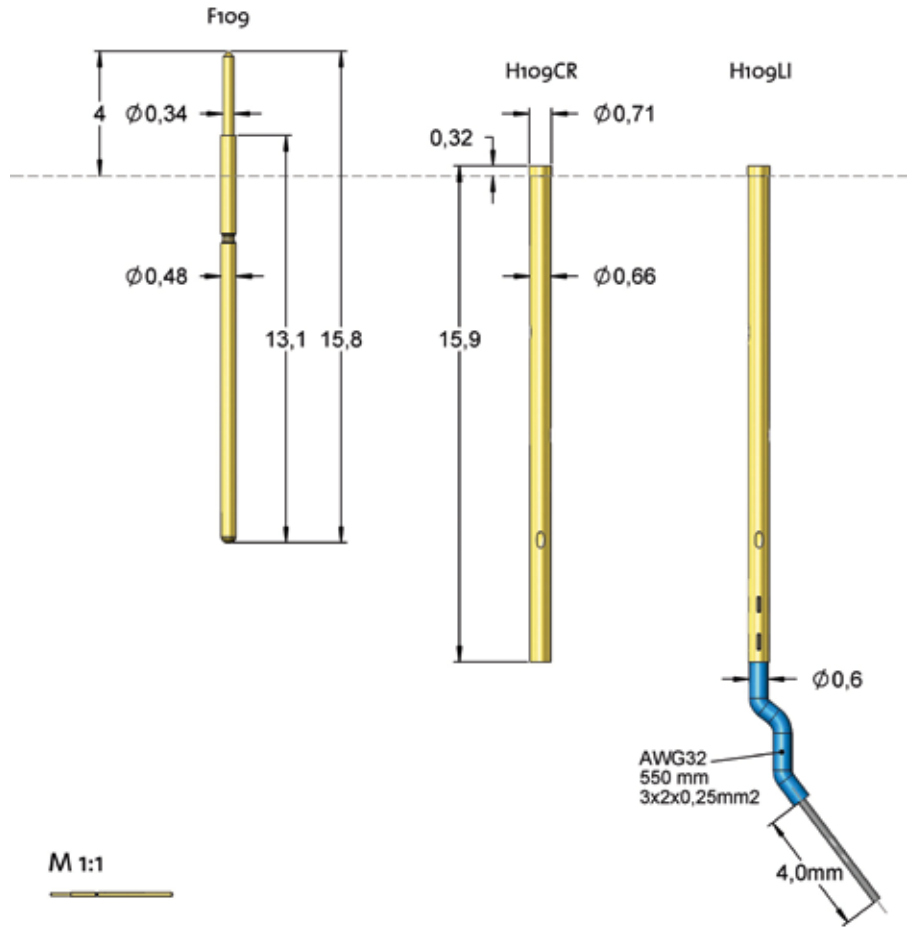
Insertion tool receptacle	FEWZ-109E0
Insertion tool probe	FDWZ-050

Drill Size (mm)

F109 with receptacle H109...	0,66 - 0,68
F109 without receptacle	0,49 - 0,51

Projection Height (mm)

F109 with receptacle H109...	4,0
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For fine pitch component test or board test with very small centers.

Series	Tip-Ø TS1	Spring Force (cN)
F109 01 B 034 G 050 H		
TS1	Material	Plating
	Version	

Material:	B = BeCu
Tip-Ø:	034 = 0,34 mm (e.g.)
Plating:	G = Gold plated
Version:	H = High temperature
Receptacle:	Order Code according drawing

Tip Style	Number	Material	Ø in mm	Plating	Version
	01	B	0,34	G	-
	01	B	0,34	G	H
	18	B	0,34	G	-

FINE PITCH PROBES

F252

Fine Pitch Probe Double Plunger Probe

Centers (mm/mil)	1,00 / 39
Current	1,5 A
R typ	<75 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	30	85

Travel (mm)

Version	Nominal	Maximum
Standard	2,0	2,5

Materials and Plating

Plunger	see Tip Style
Barrel	Bronze, silver plated
Spring	Music wire, silver plated

Accessories

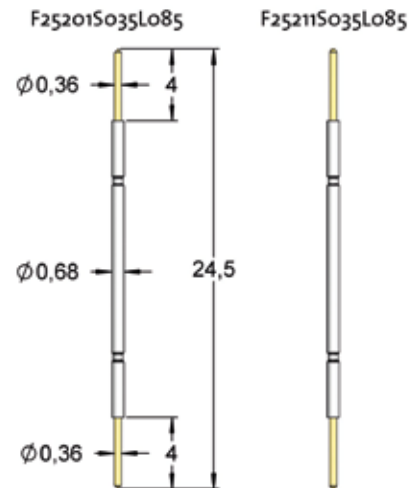
Insertion tool receptacle	FEWZ-109E0
Insertion tool probe	FDWZ-050

Drill Size (mm)

F252	0,69 - 0,71
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Projection Height (mm)

F109 with receptacle H109...	4,0
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M 1:1



For fine pitch component test or board test with very small centers.

Series	Tip-Ø TS1	Spring Force (cN)
F252 01	S 036	L 085
TS1	Material	Plating
		Version

Material: S = Steel
Tip-Ø: 036 = 0,36 mm (e.g.)
Plating: L = Longtime gold plated

Tip Style	Number	Material	Ø in mm	Plating	Version
	01	S	0,36	L	-
	11	S	0,36	L	-
	18	S	0,36	L	-



Battery and Charging Contacts

Battery and charging contacts are compact and direct solderable contact probes. Their application range is extremely versatile and reaches far beyond pure test applications. Wherever detachable electrical connections are required, they can be a smart solution. Typical applications are charging accumulator cells or cordless devices, contacts for signal transmission between pluggable parts or switch contacts. These probes are also frequently used in the medical industry or in general products e.g. in the furniture and lighting industry.

F697	26
F709	27
F708	28
F704	29
F706	30
F702	31
F705	32
F713	33
F650	34
F651	35
F671	38-40
F672	41-42
F673	43
F674	44

BATTERY CONTACTS

F697

Battery Contact 50 mil Solder Tight

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

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	30

Travel (mm)

Version	Nominal	Maximum
Standard	1,0	1,3
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Bronze, silver plated
Spring	Music wire, silver plated
Receptacle	-

Accessories

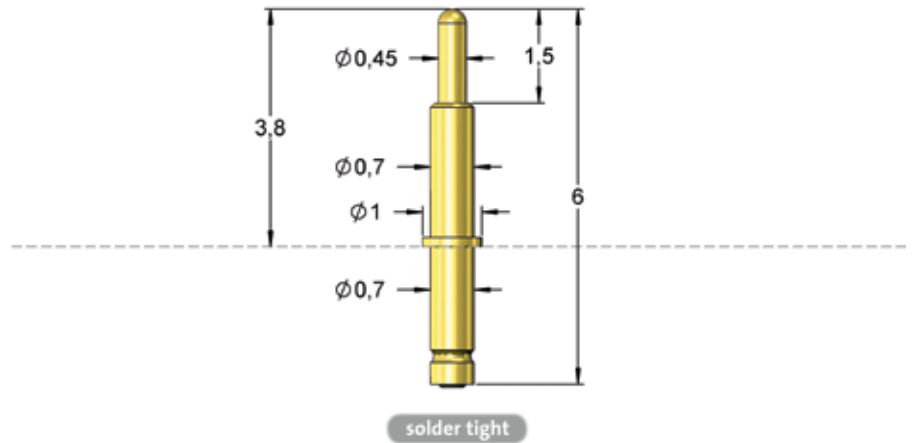
Insertion tool probe	FDWZ-050
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Drill Size (mm)

F697	0,68 - 0,70
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Projection Height (mm)

F697	3,8
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M 1:1



The F69711B045G030 can also be ordered for automatic assembly as taped components, with the order code 1860S235.

Design with standard plunger



Series	Tip-Ø	Spring Force (cN)
F697 11 B 045 G 030		
Tip Style	Material	Plating
Version		

Material: B = BeCu
Tip-Ø: 045 = 0,45 mm (e.g.)
Plating: G = Gold plated

Tip Style	Number	Material	Ø in mm	Plating	Version
	11	B	0,45	G	-

BATTERY CONTACTS

F709

Battery Contact 67 mil

Centers (mm/mil)	1,70 / 67
Current	5,0 A
R typ	<100 mOhm
Temperature	-20°C...+80°C, -40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	40
H	10	20
ST	10	20

Travel (mm)

Version	Nominal	Maximum
Standard	1,0	1,2
H	1,0	1,2
ST	1,0	1,2
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Brass, gold plated
Spring	Music wire, silver plated, Stainless steel, unplated
Receptacle	Bronze, gold plated

Accessories

Spacer 0,5 mm	H709DS/05
Insertion tool probe	FDWZ-050

Drill Size (mm)

F709	0,89 - 0,91
H709	1,12 - 1,14

Projection Height (mm)

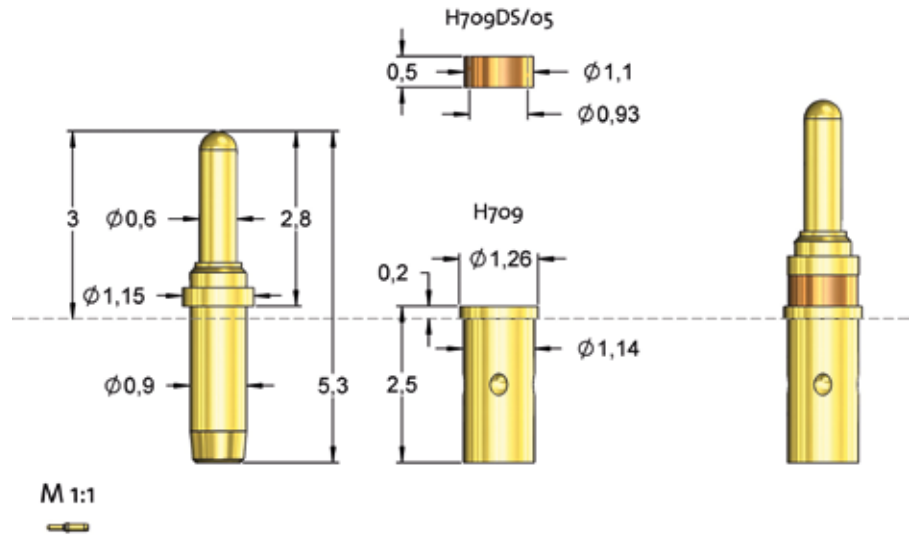
F709 in H709	3,0
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Design with drill hole plunger



Series	Tip-Ø	Spring Force (cN)
F709	11	B 060 G 040 ST
Tip Style	Material	Plating

Material:	B = BeCu
Tip-Ø:	060 = 0,60 mm (e.g.)
Plating:	G = Gold plated
Version:	H = High temperature, ST = Solder tight high temperature version
Receptacle:	Order code according drawing



The soldered version (ST) can also be used for automatic assembly.

Tip Style	Number	Material	Ø in mm	Plating	Version
	11	B	0,60	G	-
	11	B	0,60	G	H
	11	B	0,60	G	ST

F708

Battery Contact 87 mil Solder Tight

Centers (mm/mil)	2,20 / 87
Current	8,0 A
R typ	<100 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	20	80
Standard	25	100

Travel (mm)

Version	Nominal	Maximum
Standard	1,0	1,2
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Accessories

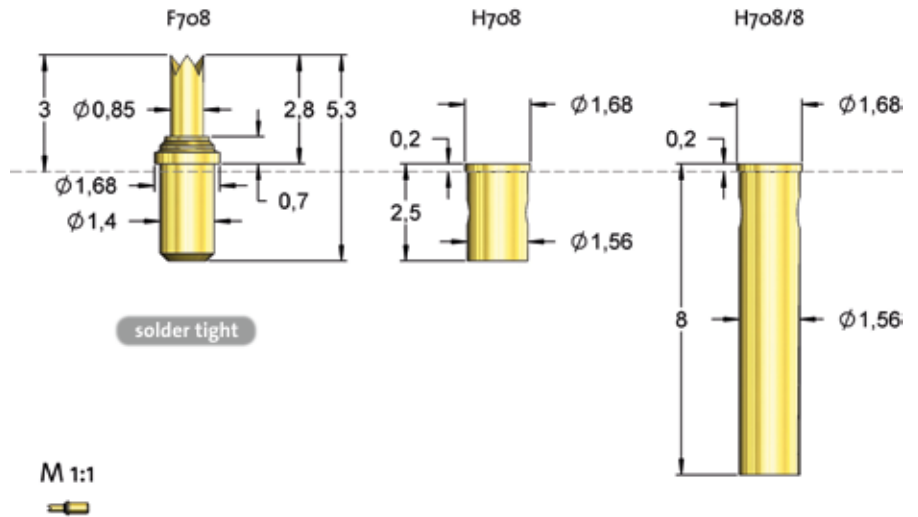
Insertion tool probe	FDWZ-075
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Drill Size (mm)

F708	1,38 - 1,40
H708...	1,54 - 1,55

Projection Height (mm)

F708 in H708...	3,0
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Can also be used for automatic assembly.

Design with drill hole plunger



Series	Tip-Ø	Spring Force (cN)
F708 11 B 085 G 080		
Tip Style	Material	Plating
Version		

Material:	B = BeCu, S = Steel
Tip-Ø:	085 = 0,85 mm (e.g.)
Plating:	G = Gold plated, L = Longtime gold plated
Receptacle:	Order code according drawing

Tip Style	Number	Material	Ø in mm	Plating	Version
	11	B	0,85	G	-
	29	B	0,85	G	-

BATTERY CONTACTS

F704

Battery Contact 87 mil Solder Tight

Centers (mm/mil)	2,20 / 87
Current	8,0 A
R typ	<100 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	20	60

Travel (mm)

Version	Nominal	Maximum
Standard	1,5	2,2
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Accessories

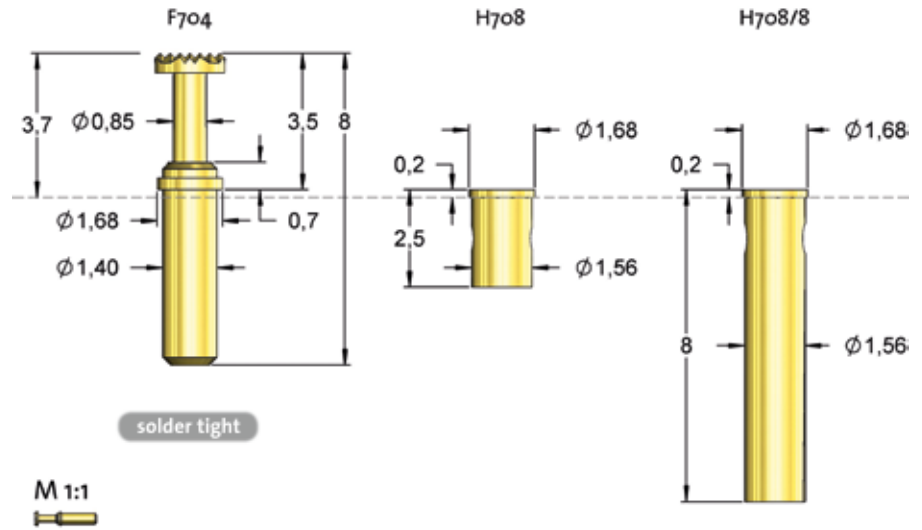
Insertion tool probe	FDWZ-075
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Drill Size (mm)

F704	1,39 - 1,41
H708...	1,54 - 1,55

Projection Height (mm)

F704 in H708...	3,7
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Can also be used for automatic assembly.

Design with drill hole plunger



Series	Tip-Ø	Spring Force (cN)
F704 06 B 180 G 060		
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	Ø in mm	Plating	Version
	06	B	1,80	G	-

BATTERY CONTACTS

F706

Battery Contact 118 mil Solder Tight

Centers (mm/mil)	3,00 / 118
Current	9,0 A
R typ	<100 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	70	150
Standard	80	200

Travel (mm)

Version	Nominal	Maximum
Standard	1,0	1,2
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Accessories

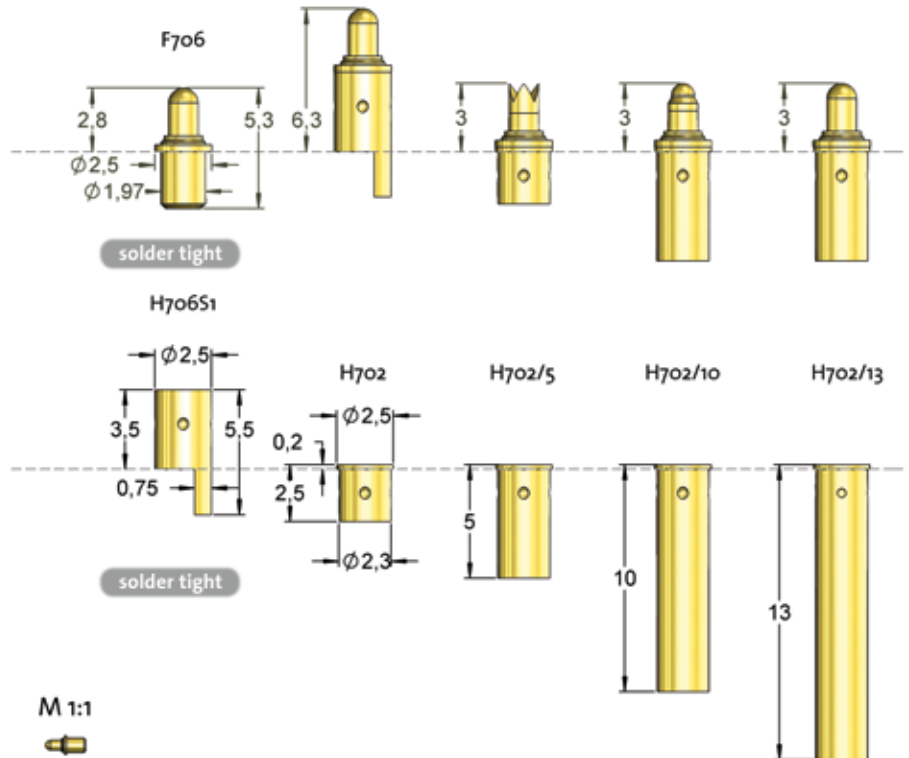
Insertion tool receptacle	FEWZ-702E0
Insertion tool probe	FDWZ-100

Drill Size (mm)

F706	1,97 - 2,00
H702...	2,28 - 2,29

Projection Height (mm)

F706 in H702...	3,0
F706 in H706S1	6,3



Can also be used for automatic assembly.

Design with drill hole plunger



Series	Tip-Ø	Spring Force (cN)
F706 11 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	Ø in mm	Plating	Version
	11	B	1,00	G	-
	11	B	1,30	G	-
	29	B	1,30	G	-

BATTERY CONTACTS

F702

Battery Contact 118 mil Solder Tight

Centers (mm/mil)	3,00 / 118
Current	9,0 A
R typ	<100 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	15
Standard	10	30
Standard	40	130
Standard	75	200

Travel (mm)

Version	Nominal	Maximum
Standard	1,5	2,2
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Accessories

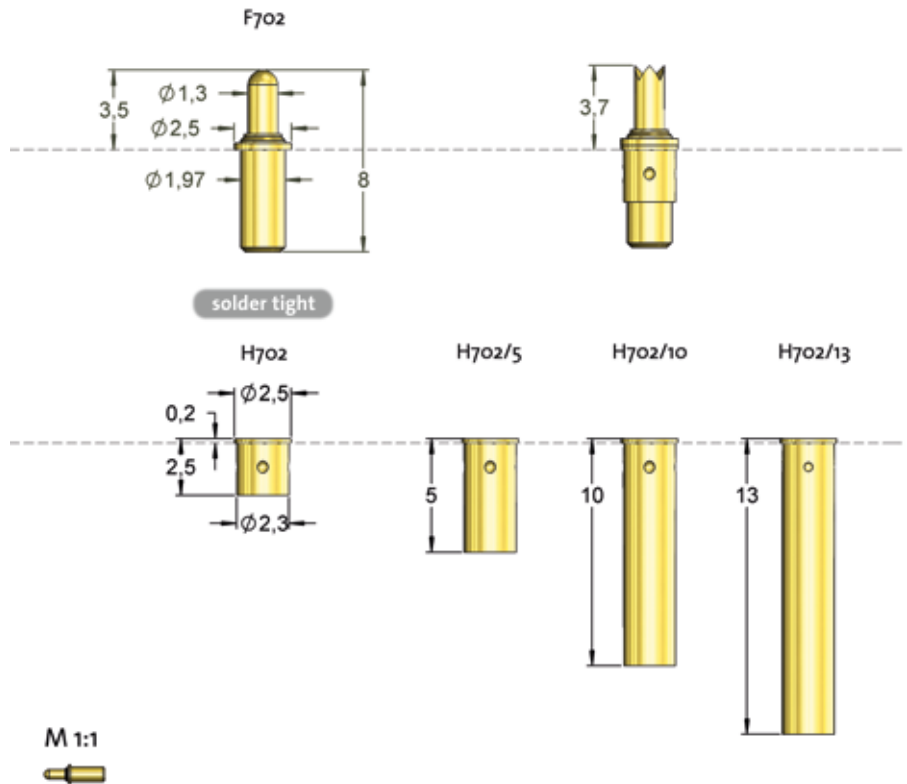
Insertion tool receptacle	FEWZ-702E0
Insertion tool probe	FDWZ-100

Drill Size (mm)

F706	1,96 - 1,98
H702...	2,28 - 2,29

Projection Height (mm)

F706 in H702...	3,7
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Can also be used for automatic assembly.

Design with drill hole plunger



Series	Tip-Ø	Spring Force (cN)
F702 11 B 130 G 130		
Tip Style	Material	Plating
Version		

Material:	B = BeCu, S = Steel
Tip-Ø:	130 = 1,30 mm (e.g.)
Plating:	G = Gold plated, L = Longtime gold plated
Receptacle:	Order code according drawing

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

F705

Battery Contact 118 mil Solder Tight

Centers (mm/mil)	3,00 / 118
Current	9,0 A
R typ	<100 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	30	50
Standard	80	130
Standard	75	200
CR	80	130
LA	80	130
LA	75	200
LI	80	130

Travel (mm)

Version	Nominal	Maximum
Standard	1,5	3,0
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Accessories

Insertion tool receptacle	FEWZ-702E0
Insertion tool probe	FDWZ-100

Drill Size (mm)

F705	1,96 - 1,98
H702...	2,28 - 2,29

Projection Height (mm)

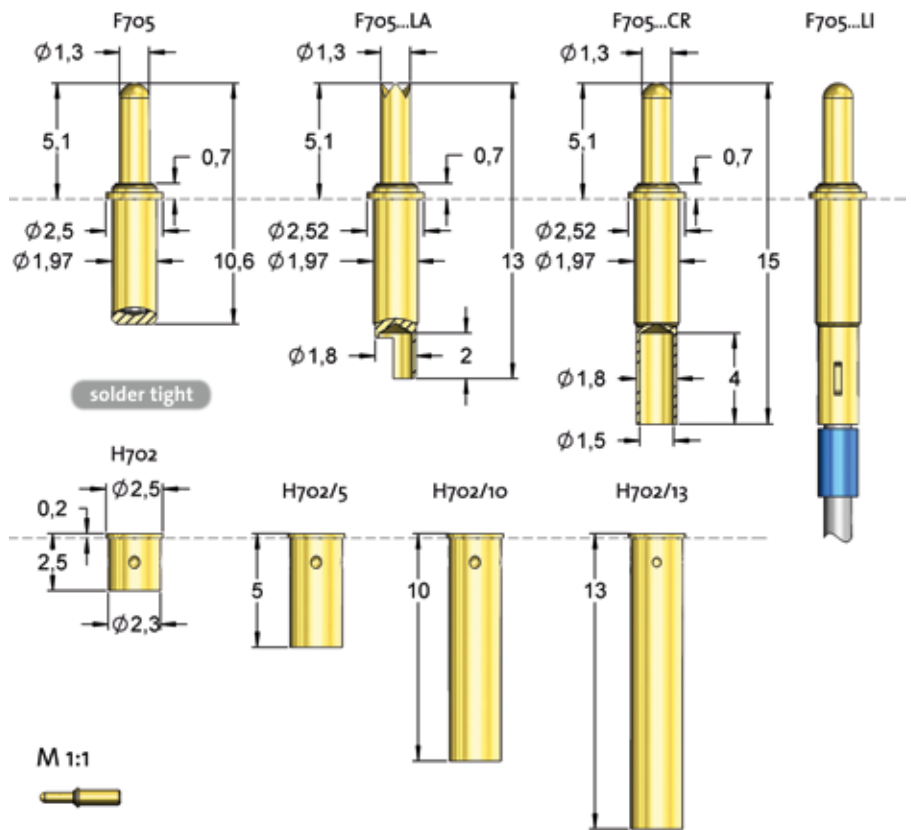
F705 in H702...	5,3
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Design with drill hole plunger



Series	Tip-Ø	Spring Force (cN)
F705	11	130
	B	G
		CR
	Tip Style	Material
		Plating
		Version

Material:	B = BeCu
Tip-Ø:	130 = 1,30 mm (e.g.)
Plating:	G = Gold plated
Version:	CR = Crimp Version, LA = Solder Version, LI = with Strand
Receptacle:	Order code according drawing



The version F705...LI with 550mm blue flexible wire (AWG18) is available.
Conductor cross-section: 0,90mm².

Tip Style	Number	Material	Ø in mm	Plating	Version
	11	B	1,30	G	-
	29	B	1,30	G	-
	11	B	1,30	G	CR
	29	B	1,30	G	CR
	11	B	1,30	G	LA
	29	B	1,30	G	LA
	11	B	1,30	G	LI

BATTERY CONTACTS

F713

Battery Contact 157 mil Solder Tight

Centers (mm/mil)	4,00 / 157
Current	10,0 A
R typ	<100 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
Pointing Accuracy		±0,10 mm

Materials and Plating

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

Accessories

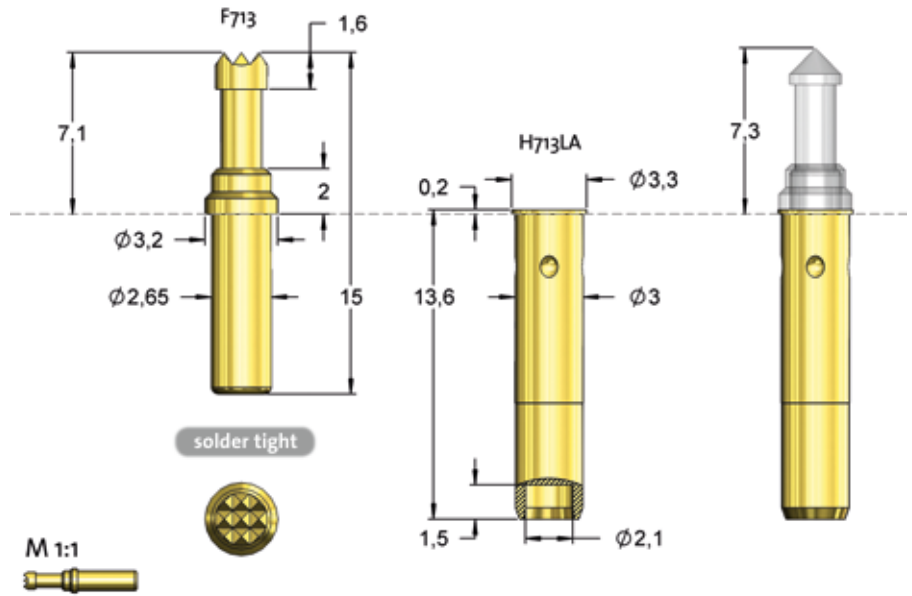
Insertion tool receptacle	FEWZ-702E0
Insertion tool probe	FDWZ-100

Drill Size (mm)

H713LA	2,98 - 2,99
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Projection Height (mm)

F713 in H713LA	7,3
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The F71312E230U150 with plunger made of stainless steel has different electrical values. Information for a suitable threaded version is available, see F723.

Design with standard plunger



Series	Tip-Ø	Spring Force (cN)
F713	02	B 230 G 080
Tip Style	Material	Plating
		Version

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

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

F650

Battery Contact 256 mil Solder Tight, Robust Version

Centers (mm/mil)	6,50 / 256
Current	10,0 A
R typ	<30 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	50	150

Travel (mm)

Version	Nominal	Maximum
Standard	3,2	5,0
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Accessories

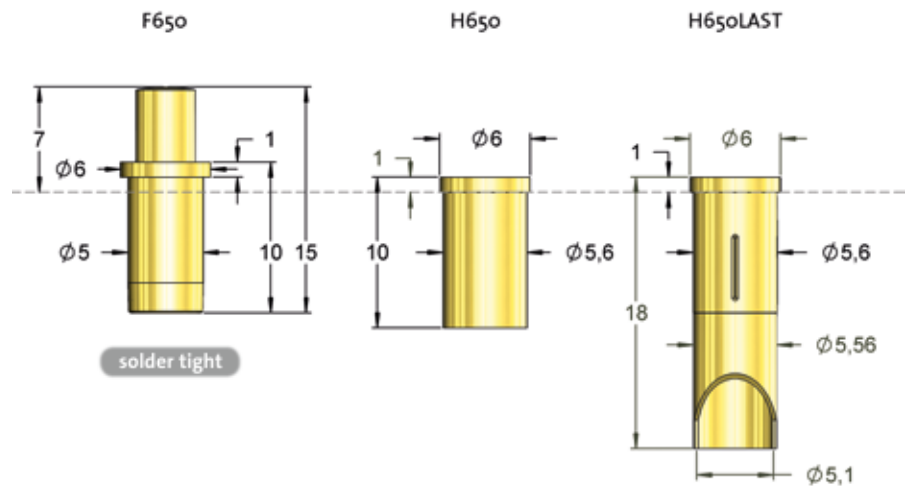
Insertion tool probe	FDWZ-650
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Drill Size (mm)

F650	4,98 - 5,01
H650...	5,57 - 5,60

Projection Height (mm)

F650 in H650...	7,0
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Design with standard plunger



Series	Tip-Ø	Spring Force (cN)
F650	11	M 400 G 150
Tip Style	Material	Plating
		Version

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

Tip Style	Number	Material	Ø in mm	Plating	Version
	11	M	4,00	G	-

BATTERY CONTACTS

F651

Battery Contact 256 mil Solder Tight, Robust Version

Centers (mm/mil)	6,50 / 256
Current	10,0 A
R typ	<30 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	160	500

Travel (mm)

Version	Nominal	Maximum
Standard	4,8	7,0
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Accessories

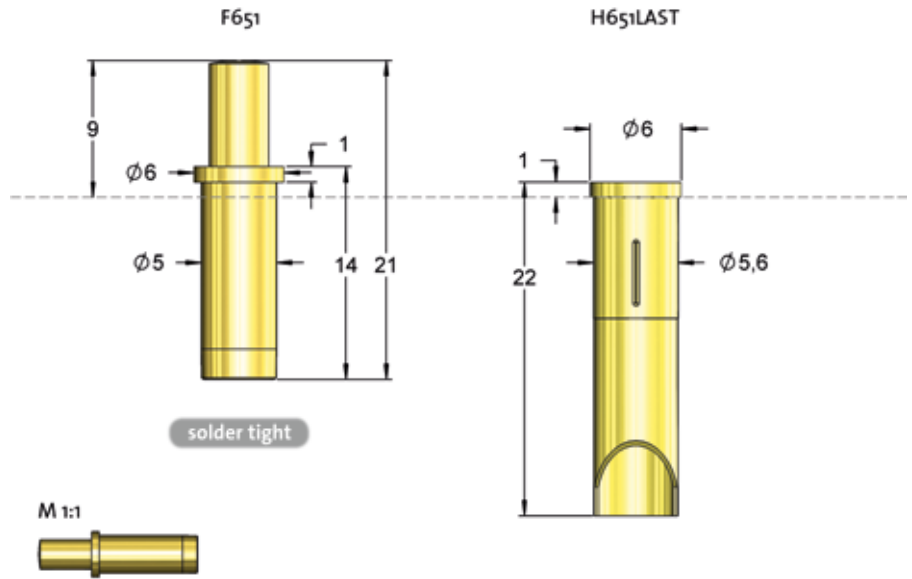
Insertion tool probe	FDWZ-650
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Drill Size (mm)

F650	4,98 - 5,01
H650...	5,57 - 5,60

Projection Height (mm)

F651 in H651...	9,0
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Design with standard plunger



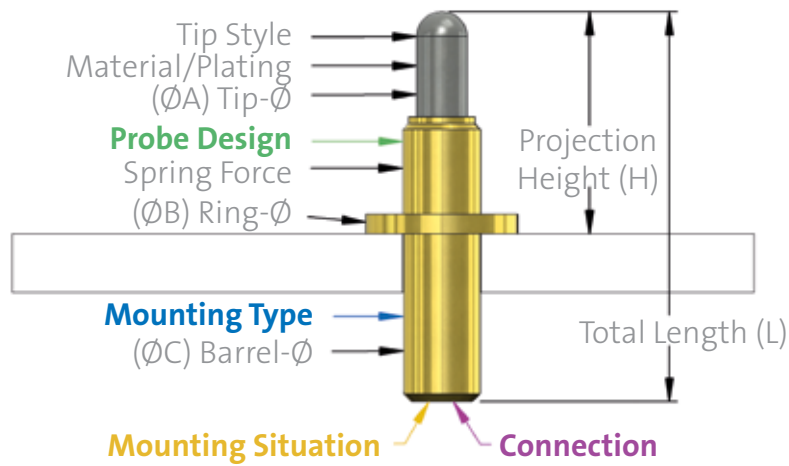
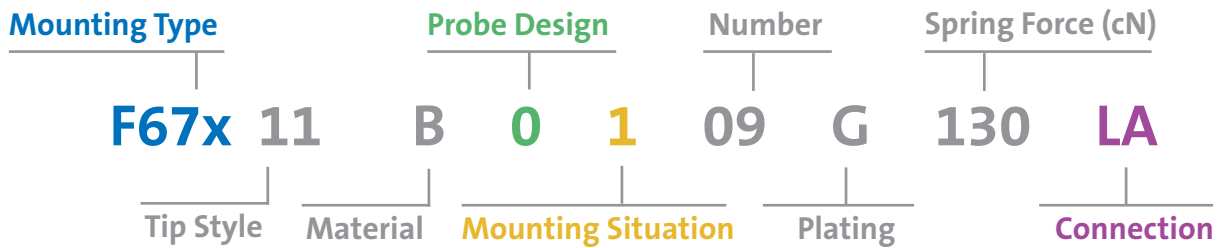
Series	Tip-Ø	Spring Force (cN)
F651	11	500
	M	G
Tip Style	Material	Plating
		Version

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

Tip Style	Number	Material	Ø in mm	Plating	Version
	11	M	4,00	G	-

BATTERY CONTACTS

F67x Order codes for battery contacts of this series



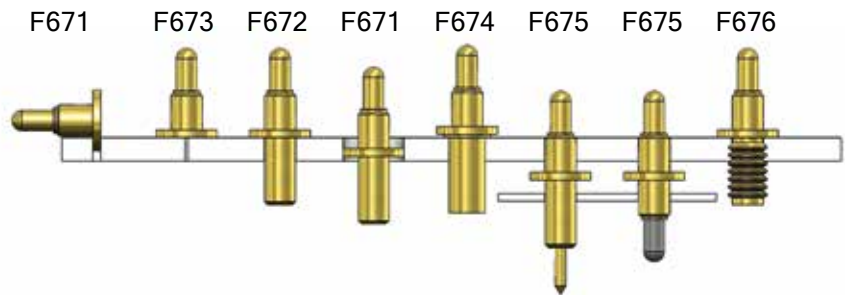
Order Code	Tip Style	Ø A	Ø B	Ø C	H	L	Nominaltravel	Temp.	Current	R typ
F67111B0109G130	11	1,30	4,40	1,97	8,50	8,50	1,50	-40°...+200°C	8,0	100
F67111B1004G230	11	0,80	2,20	1,70	11,20	13,60	2,00	-20°...+80°C	5,0	30
F67111B1005G450	11	0,80	2,20	1,70	11,60	14,10	1,50	-20°...+80°C	5,0	30
F67111B1006G450	11	0,80	2,20	1,70	11,30	14,60	1,50	-20°...+80°C	5,0	30
F67111M1007G200	11	2,80	5,00	4,00	2,50	13,50	1,50	-40°...+200°C	5,0	20
F67111M1007U150	11	2,80	5,00	4,00	2,50	13,50	1,50	-20°...+80°C	5,0	100
F67211B0001G170	11	1,30	3,90	1,97	5,70	10,00	1,70	-40°...+200°C	9,0	100
F67211B0002G250	11	1,30	3,90	1,97	7,80	9,00	1,70	-40°...+200°C	9,0	100
F67211B0003G040	11	1,30	3,90	1,97	10,00	15,00	1,70	-40°...+200°C	9,0	100
F67211B0004G020	11	1,30	2,60	2,15	3,50	9,00	1,00	-40°...+200°C	5,0	20
F67211B0004G150	11	1,30	2,60	2,15	3,50	9,00	1,00	-40°...+200°C	5,0	20
F67211B1005G040	11	1,30	3,00	2,03	4,50	6,50	0,40	-40°...+200°C	9,0	100
F67211B2008G020	11	1,30	2,53	1,97	2,70	7,40	0,60	-40°...+200°C	10,0	30
F67311B2001G065	11	0,90	3,00	1,50	5,70	5,70	1,00	-40°...+200°C	8,0	20
F67429B0001G130LA	29	1,30	2,52	1,97	3,50	11,40	1,50	-40°...+200°C	9,0	100

Further versions available on our homepage.

BATTERY CONTACTS

Mounting Type:

- (F671) pressed-in
- (F672) soldered in
- (F673) soldered on
- (F674) in receptacle mounted
- (F675) floating mounted
- (F676) screwed-in



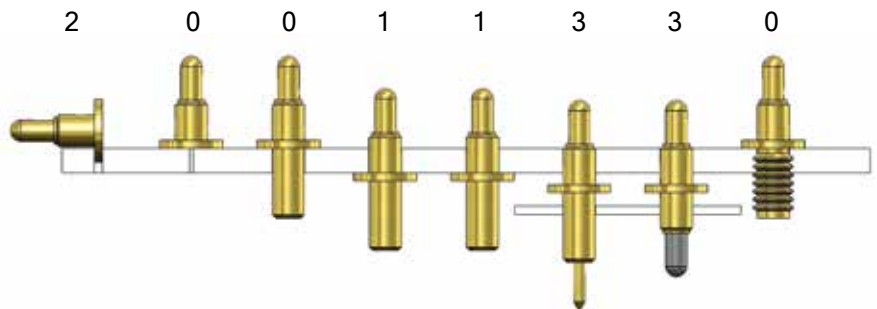
Probe Design:

- (0) drill hole plunger
- (1) standard plunger
- (2) bias design
- (3) bias-ball design
- (4) split plunger design



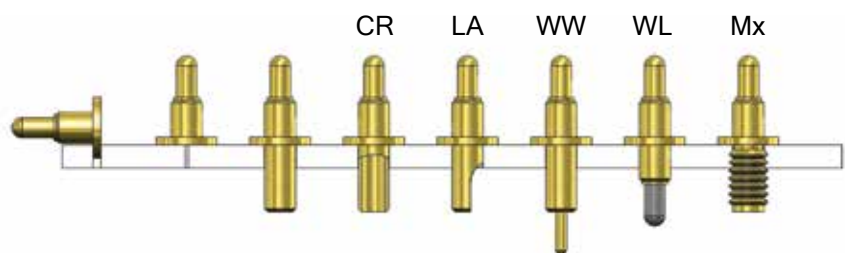
Mounting Situation:

- (0) mounted from top
- (1) mounted from bottom
- (2) mounted in horizontal direction
- (3) floating mounted



Connection:

- (LA) with solder connection
- (CR) with crimp connection
- (WL) with round pin
- (WW) with wire-wrap connection
- (WL) wireless connection
- (Mx) with thread
- without pin



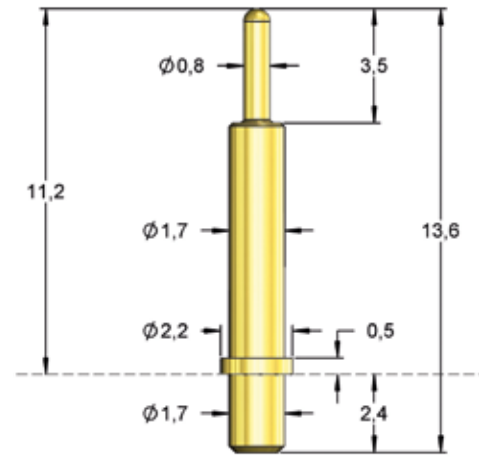
BATTERY CONTACTS

F67111B1004G230

Battery Contact for Pressing-in

Centers (mm/mil)	2,70 / 106
Current	5,0 A
R typ	<30 mOhm
Temperature	-20°C...+80°C

Design with standard plunger



Spring Force (cN $\pm 20\%$)

Version	Preload	Nominal
Standard	60	230

Travel (mm)

Version	Nominal	Maximum
Standard	2,0	3,5

Materials and Plating

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

Drill Size (mm)

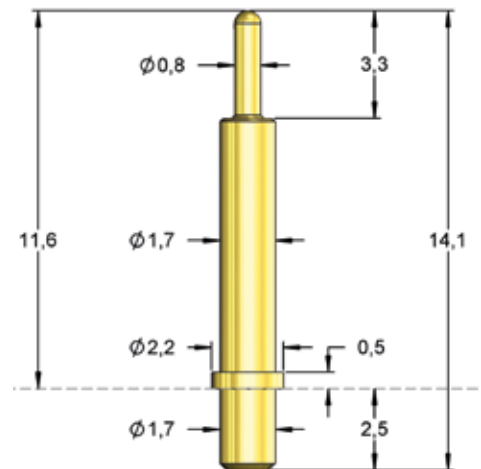
F67111B1004G230	1,68 - 1,70
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F67111B1005G450

Battery Contact for Pressing-in

Centers (mm/mil)	2,70 / 106
Current	5,0 A
R typ	<30 mOhm
Temperature	-20°C...+80°C

Design with standard plunger



Spring Force (cN $\pm 20\%$)

Version	Preload	Nominal
Standard	130	450

Travel (mm)

Version	Nominal	Maximum
Standard	1,5	3,0

Materials and Plating

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

Drill Size (mm)

F67111B1005G450	1,68 - 1,70
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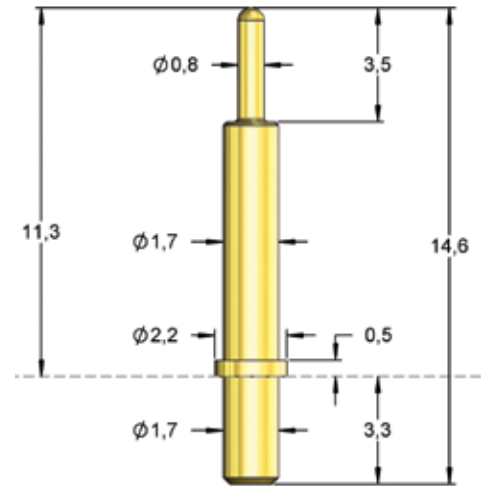
BATTERY CONTACTS

F67111B1006G450

Battery Contact for Pressing-in

Centers (mm/mil)	2,70 / 106
Current	5,0 A
R typ	<30 mOhm
Temperature	-20°C...+80°C

Design with standard plunger



Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	130	450

Travel (mm)

Version	Nominal	Maximum
Standard	1,5	3,0

Materials and Plating

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

Drill Size (mm)

F67111B1006G450	1,68 - 1,70
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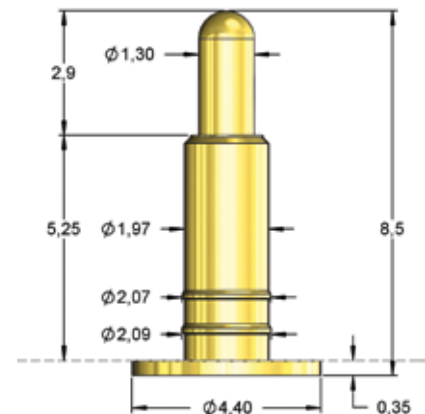
F67111B0109G130

Battery Contact for Pressing-in

NEW

Centers (mm/mil)	5,00 / 197
Current	8,0 A
R typ	<100 mOhm
Temperature	-40°C...+200°C (H)

Design with drill hole plunger



Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	40	130

Also well suitable for direct soldering
on a PCB.

Travel (mm)

Version	Nominal	Maximum
Standard	1,5	2,2

Materials and Plating

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

Drill Size (mm)

F67111B0109G130	2,00 - 2,05
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BATTERY CONTACTS

F67111M1007G200

**Battery Contact 106 mil
for Pressing-in
with Continuous Plunger**

Centers (mm/mil)	5,50 / 216
Current	5,0 A
R typ	<20 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	150	200

Travel (mm)

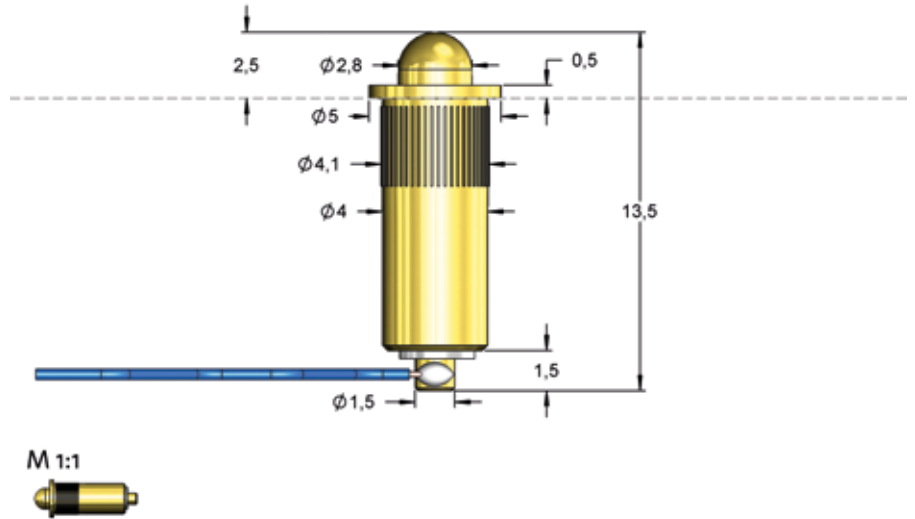
Version	Nominal	Maximum
Standard	1,5	2,0

Materials and Plating

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

Drill Size (mm)

F67111M1007G200	4,01 - 4,08
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F67111M1007U150

**Battery Contact 106 mil
for Pressing-in
with Continuous Plunger**

Centers (mm/mil)	5,50 / 216
Current	5,0 A
R typ	<20 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	100	150

Travel (mm)

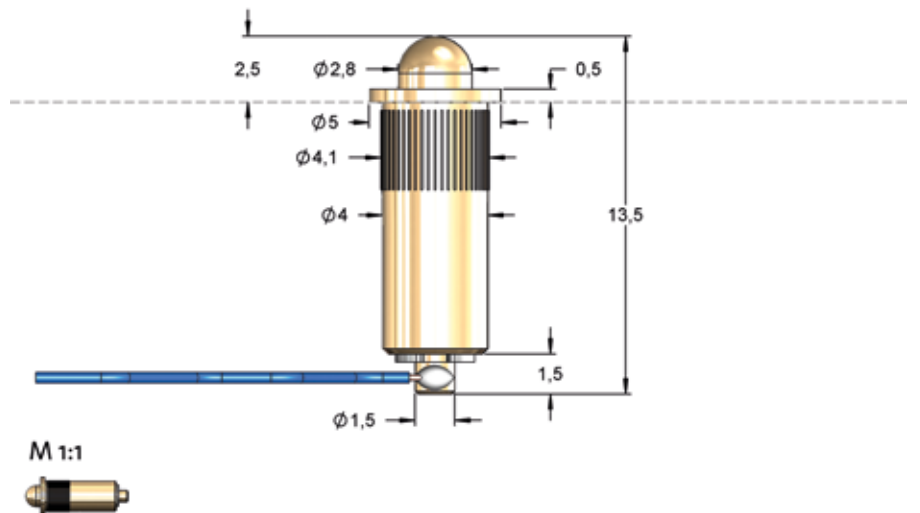
Version	Nominal	Maximum
Standard	1,5	2,0

Materials and Plating

Plunger	Brass, unplated
Barrel	Brass, unplated
Spring	Stainless steel, unplated

Drill Size (mm)

F67111M1007U150	4,01 - 4,08
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BATTERY CONTACTS

F67211B2008G020 NEW

Battery Contact for Direct Soldering on PCBs

Centers (mm/mil)	3,00 / 118
Current	5,0 A
R typ	<30 mOhm
Temperature	-40°C...+200°C (H)

With Bias Design



Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	20

Travel (mm)

Version	Nominal	Maximum
Standard	0,6	1,0

Materials and Plating

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

Drill Size (mm)

Equal barrel-Ø	1,96 - 1,97
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F67211B1005G040 NEW

Battery Contact for Direct Soldering on PCBs

Centers (mm/mil)	3,18 / 125
Current	9,0 A
R typ	<100 mOhm
Temperature	-40°C...+200°C (H)

Design with standard plunger



Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	25	40

Travel (mm)

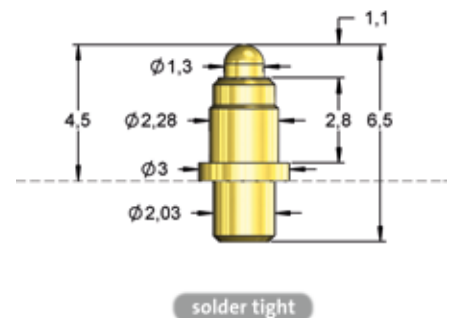
Version	Nominal	Maximum
Standard	0,4	1,0

Materials and Plating

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

Drill Size (mm)

Equal barrel-Ø	2,02 - 2,03
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F67211B0004G020 / F67211B0004G150

Battery Contact for Direct Soldering on PCBs with 20cN or 150cN

Centers (mm/mil)	3,18 / 125
Current	5,0 A
R typ	<30 mOhm
Temperature	-40°C...+200°C (H)

Design with drill hole plunger



Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	20
Standard	70	150

Travel (mm)

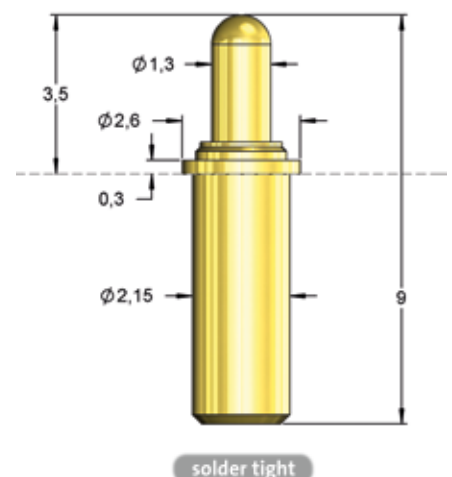
Version	Nominal	Maximum
Standard	1,0	2,8

Materials and Plating

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

Drill Size (mm)

Equal barrel-Ø	2,14 - 2,15
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BATTERY CONTACTS

F67211B0001G170

Battery Contact for Direct Soldering on PCBs

Centers (mm/mil)	4,50 / 177
Current	9,0 A
R typ	<30 mOhm
Temperature	-40°C...+200°C (H)

Design with drill hole plunger



Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	80	170

Travel (mm)

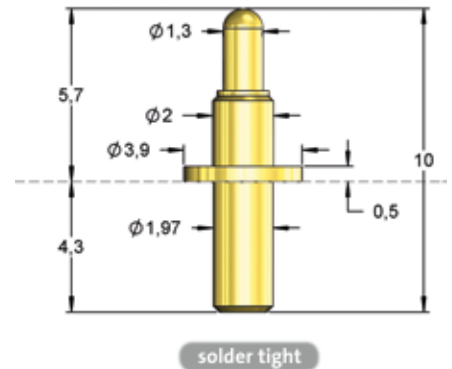
Version	Nominal	Maximum
Standard	1,7	2,5

Materials and Plating

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

Drill Size (mm)

Equal barrel-Ø	1,96 - 1,97
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F67211B0002G250

Battery Contact for Direct Soldering on PCBs

Centers (mm/mil)	4,50 / 177
Current	9,0 A
R typ	<30 mOhm
Temperature	-40°C...+200°C (H)

Design with drill hole plunger



Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	70	250

Travel (mm)

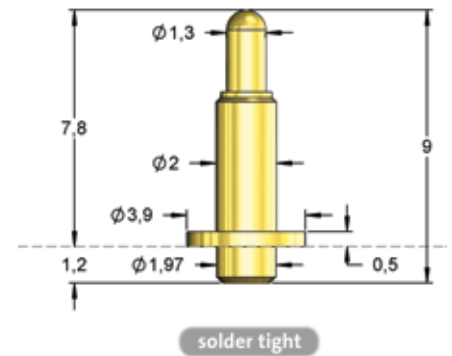
Version	Nominal	Maximum
Standard	1,7	2,5

Materials and Plating

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

Drill Size (mm)

Equal barrel-Ø	1,96 - 1,97
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F67211B0003G040

Battery Contact for Direct Soldering on PCBs

Centers (mm/mil)	4,50 / 177
Current	9,0 A
R typ	<30 mOhm
Temperature	-40°C...+200°C (H)

Design with drill hole plunger



Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	20	40

Travel (mm)

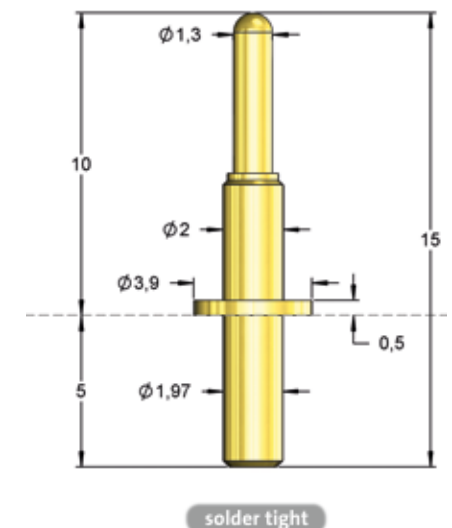
Version	Nominal	Maximum
Standard	1,7	2,5

Materials and Plating

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

Drill Size (mm)

Equal barrel-Ø	1,96 - 1,97
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BATTERY CONTACTS

F67311B2001G065

Battery Contact for Direct Soldering on PCBs

Centers (mm/mil)	3,50 / 138
Current	8,0 A
R typ	<20 mOhm
Temperature	-40°C...+200°C (H)

This probe can also be mounted through a bore. The collar serves as a stop.

With Bias Design



Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	10	65

Travel (mm)

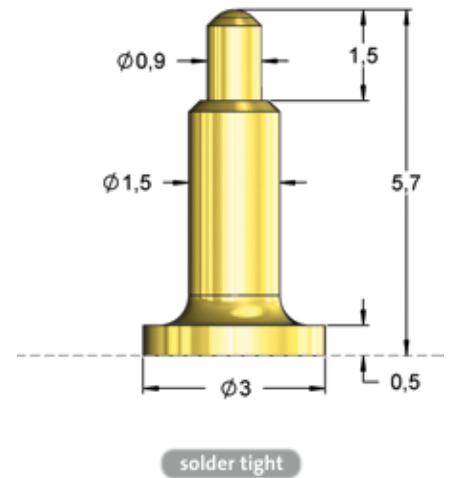
Version	Nominal	Maximum
Standard	1,0	1,5

Materials and Plating

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

Drill Size (mm)

Equal barrel-Ø 1,5	1,51 - 1,53
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F67311M0002G030

Battery Contact for Direct Soldering on PCBs

NEW

Centers (mm/mil)	1,90 / 75
Current	2,0 A
R typ	<20 mOhm
Temperature	-40°C...+200°C (H)

This probe can also be mounted through a bore. The collar serves as a stop.

Design with drill hole plunger



Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	25	30

Travel (mm)

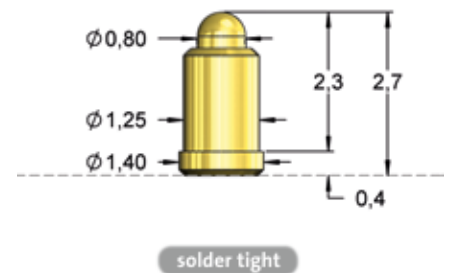
Version	Nominal	Maximum
Standard	0,15	0,60

Materials and Plating

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

Drill Size (mm)

Equal barrel-Ø 1,25	1,23 - 1,25
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BATTERY CONTACTS

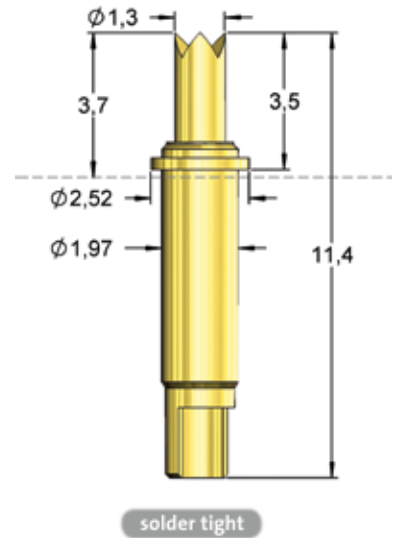
F67429B0001G130LA

Battery Contact with Receptacle

NEW

Centers (mm/mil)	3,00 / 118
Current	9,0 A
R typ	<20 mOhm
Temperature	-40°C...+200°C (H)

Design with drill hole plunger



Spring Force (cN ±20%)

Version	Preload	Nominal
LA	80	130

Travel (mm)

Version	Nominal	Maximum
LA	1,5	2,2
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Accessories

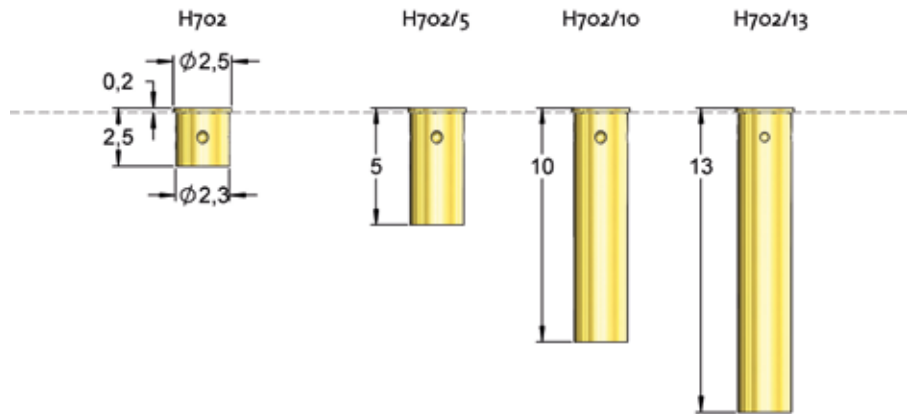
Insertion tool receptacle	FEWZ-702E0
Insertion tool probe	FDWZ-100

Drill Size (mm)

equates barrel-Ø	1,96 - 1,98
H702...	2,28 - 2,29

Projection Height (mm)

Probe in H702...	3,7
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Short Travel Probes

Short travel probes are spring contact probes with a nominal travel of 3.0 mm and less. The spring and also the total length of the probe can be shorter compared to standard probes. Typical applications are test fixtures with limited space or single contact points with a limited projection height.

F665...S1	46
F665	47
F605	48
F670	49
F693	49
F620	50
F699	50
F630	51
F692	51

SHORT TRAVEL PROBES

F665...S1

Short Travel Probe 50 mil for Interfaces

Centers (mm/mil)	1,27 / 50
Current	4,0 A
R typ	<20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
S1	25	60

Travel (mm)

Version	Nominal	Maximum
S1	0,6	1,1
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	BeCu, gold plated
Barrel	Bronze, gold plated
Spring	Stainless steel, gold plated
Receptacle	Bronze, gold plated

Accessories

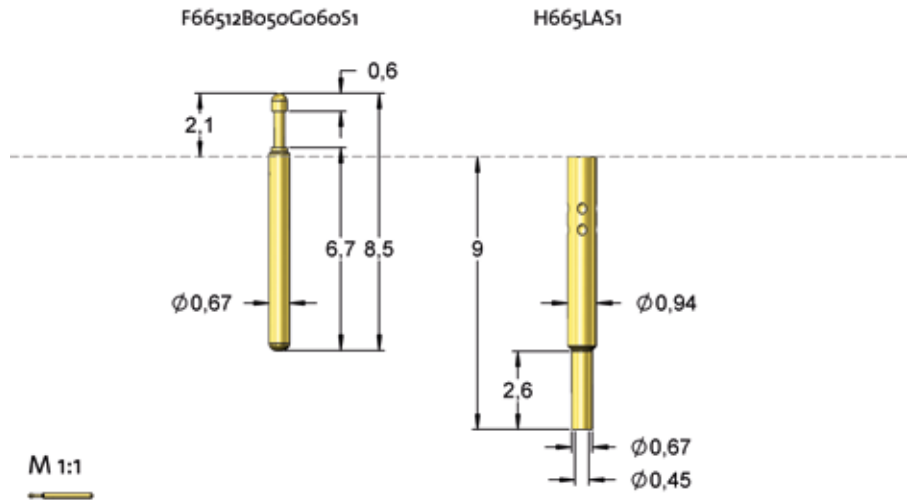
Insertion tool receptacle	FEWZ-511E0
Insertion tool probe	FDWZ-050

Drill Size (mm)

H605WW	0,93 - 0,94
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Projection Height (mm)


F665...S1 in H665LAS1	2,1
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Suitable for a reliable signal transmission in interfaces. The probe is designed with a bias ball.

Series	Tip-Ø	Spring Force (cN)
F665	12	B 050 G 060 S1
Tip Style	Material	Plating

Material: B = BeCu
Tip-Ø: 050 = 0,50 mm (e.g.)
Plating: G = Gold plated
Version: S1 = Special version (see drawing)
Receptacle: Order code according drawing

Tip Style	Number	Material	Ø in mm	Plating	Version
	12	B	0,50	G	S1

SHORT TRAVEL PROBES

F665

Short Travel Probe 50 mil

Centers (mm/mil)	1,27 / 50
Current	4,0 A
R typ	<70 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	30	75

Travel (mm)

Version	Nominal	Maximum
Standard	0,8	1,2
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Accessories

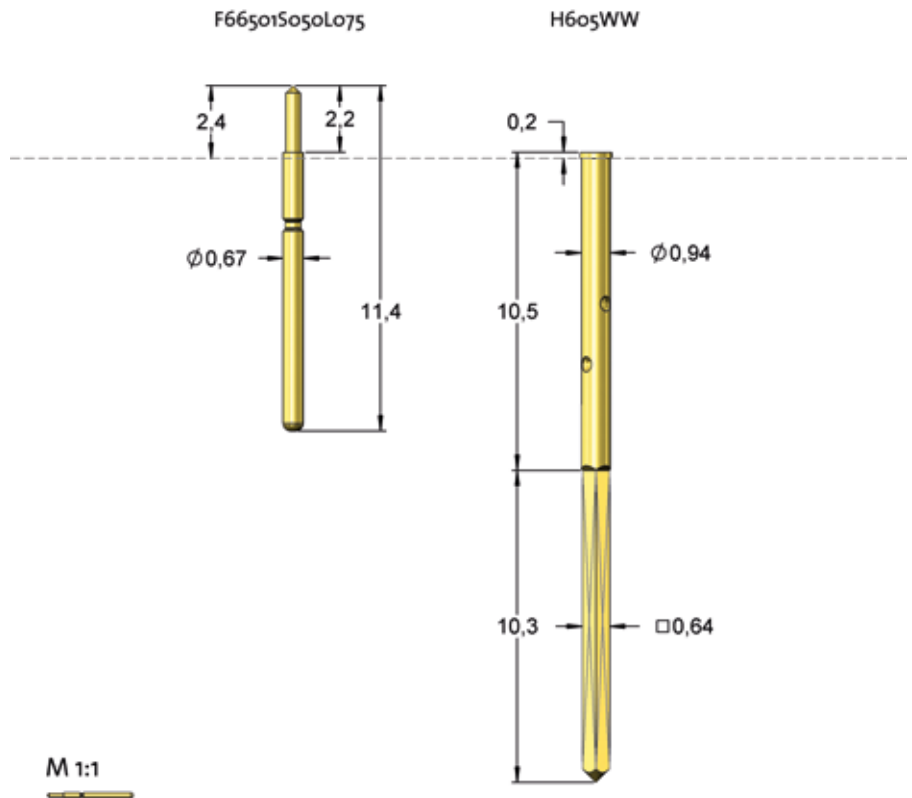
Insertion tool receptacle	FEWZ-511E0
Insertion tool probe	FDWZ-050

Drill Size (mm)

H605WW	0,92 - 0,94
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Projection Height (mm)

F665 in H605WW	2,4
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See also alternative / additional series F111 (16.5 mm) and F511 (24.7 mm) with the same center but different length.

Series	Tip-Ø	Spring Force (cN)
F665 01 S 050 L 075		
Tip Style	Material	Plating
Version		

Material: S = Steel
Tip-Ø: 050 = 0,50 mm (e.g.)
Plating: L = Longtime gold plated
Receptacle: Order code according drawing

Tip Style	Number	Material	Ø in mm	Plating	Version
	01	S	0,50	L	-

SHORT TRAVEL PROBES

F605

Short Travel Probe 50 mil

Centers (mm/mil)	1,27 / 50
Current	4,0 A
R typ	<70 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	30	75

Travel (mm)

Version	Nominal	Maximum
Standard	0,8	1,2
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Accessories

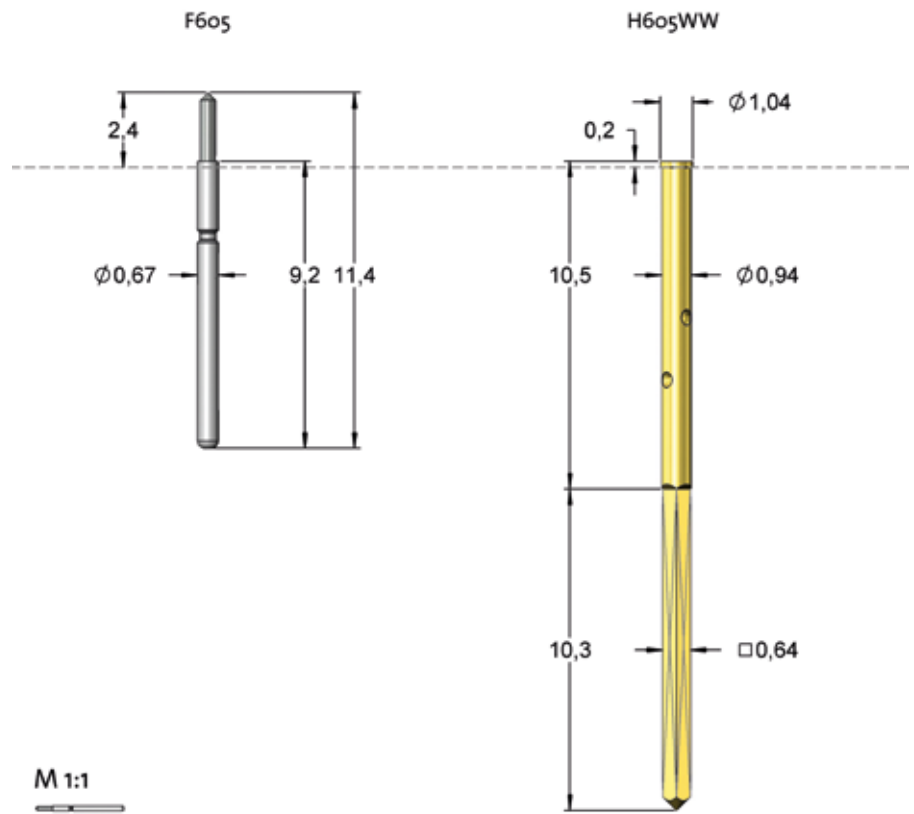
Insertion tool receptacle	FEWZ-511E0
Insertion tool probe	FDWZ-050

Drill Size (mm)

H605WW	0,94 - 0,96
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Projection Height (mm)

F605 in H605WW	2,4
----------------	-----



See also alternative / additional series F111 (16.5 mm) and F511 (24.7 mm) with the same center but different length.

Series	Tip-Ø	Spring Force (cN)
F605	01	S 050 L 075
	Tip Style	Material Plating Version

Material:	S = Steel
Tip-Ø:	050 = 0,50 mm (e.g.)
Plating:	L = Longtime gold plated, N = Nickel
Receptacle:	Order code according drawing

Tip Style	Number	Material	Ø in mm	Plating	Version
	01	S	0,50	L	-
	01	S	0,50	N	-
	05	S	1,00	L	-
	07	S	1,00	L	-
	11	S	0,50	L	-

SHORT TRAVEL PROBES

F670

Short Travel Probe 100 mil

Centers (mm/mil)	2,54 / 100
Current	8,0 A
R typ	<20 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	40	85
Standard	95	185

Travel (mm)

Version	Nominal	Maximum
Standard	0,8	1,2
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Drill Size (mm)

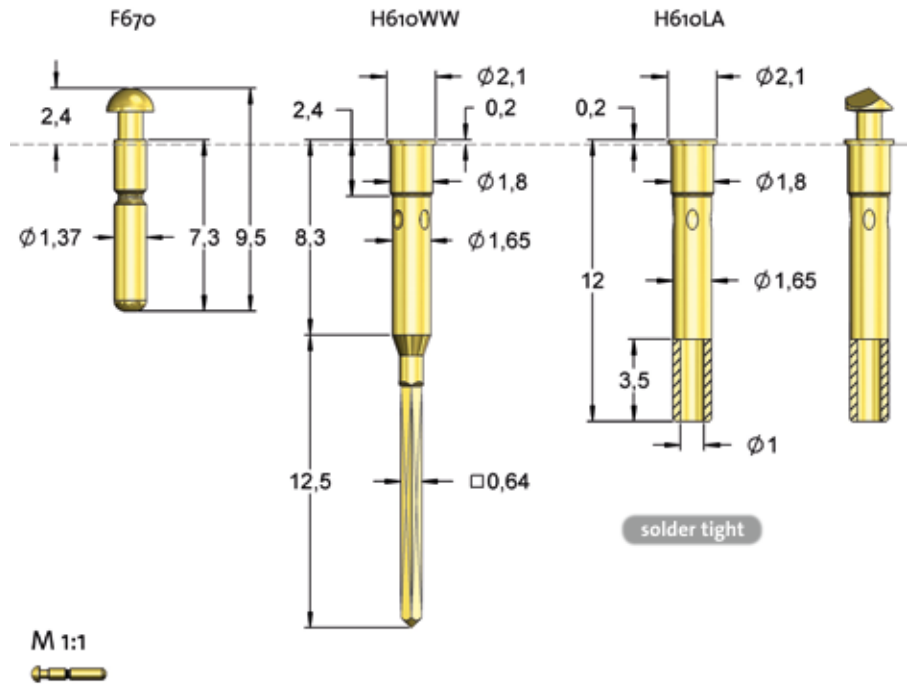
H610...	1,78 - 1,79
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Projection Height (mm)

F670 in H610...	2,4
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Series	Tip-Ø	Spring Force (cN)
F670	11	B 105
		G 085
	Tip Style	Material
		Plating
		Version

Material: B = BeCu
Tip-Ø: 105 = 1,05mm (z.B.)
Plating: G = Gold plated
Receptacle: Order Code according drawing



Tip Style	Number	Material	Ø in mm	Plating	Version
	06	B	2,00	G	-
	11	B	1,05	G	-
	12	B	2,00	G	-
	15	B	2,00	G	-

F69311B105R085

Short Travel Probe 100 mil

Centers (mm/mil)	2,54 / 100
Current	8,0 A
R typ	<30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	40	85

Travel (mm)

Version	Nominal	Maximum
Standard	0,8	1,2
Pointing Accuracy		±0,08 mm

Materials and Plating

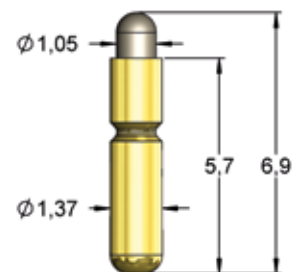
Plunger	BeCu, rhodanized
Barrel	Bronze, gold plated
Spring	Music wire, silver plated

M 1:1



Drill Size (mm)

F699...	1,63 - 1,65
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SHORT TRAVEL PROBES

F620

Short Travel Probe 100 mil

Centers (mm/mil)	2,54 / 100
Current	8,0 A
R typ	<30 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	40	75
Standard	50	130

Travel (mm)

Version	Nominal	Maximum
Standard	1,3	1,6
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Drill Size (mm)

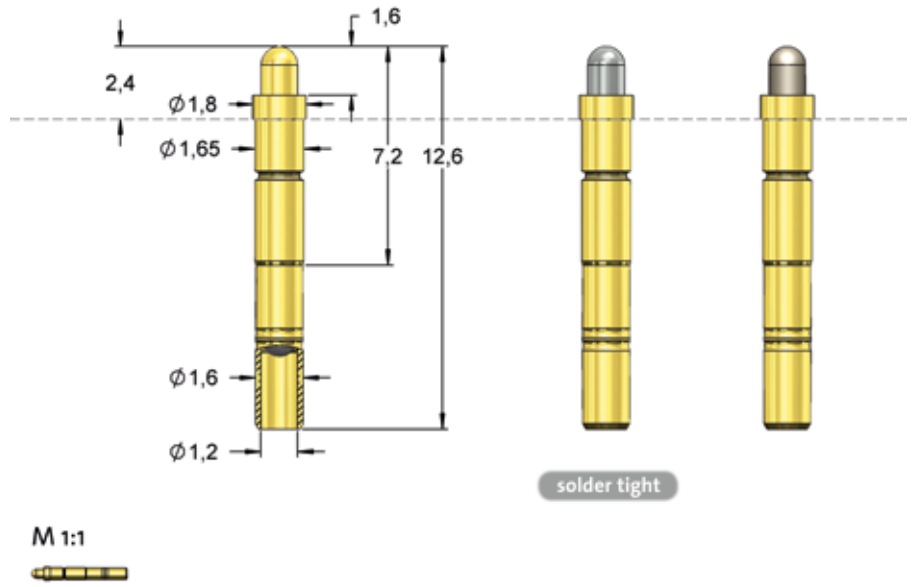
F620...	1,63 - 1,65
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Projection Height (mm)

F620...	2,4
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Series	Tip-Ø	Spring Force (cN)
F620	11 S 120 L 130	
Tip Style	Material	Plating
		Version

Material: S = Steel
Tip-Ø: 120 = 1,20 mm (e.g.)
Plating: L = Longtime gold plated, N = Nickel, R = Rhodanized
Receptacle: Order code according drawing



Tip Style	Number	Material	Ø in mm	Plating	Version
	01	S	1,20	L	-
	11	S	1,20	L	-
	11	S	1,20	N	-
	11	S	1,20	R	-

F69911S120L130

Short Travel Probe 100 mil

Centers (mm/mil)	2,54 / 100
Current	8,0 A
R typ	<30 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	50	130

Travel (mm)

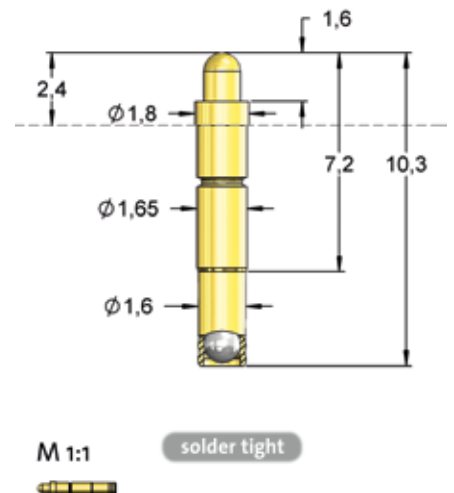
Version	Nominal	Maximum
Standard	1,3	1,6
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	Steel, gold plated
Barrel	Bronze, gold plated
Spring	Stainless steel, unplated

Drill Size (mm)

F699...	1,63 - 1,65
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SHORT TRAVEL PROBES

F63011S120L070

Short Travel Probe 100 mil

Centers (mm/mil)	2,54 / 100
Current	8,0 A
R typ	<30 mOhm
Temperature	-20°C...+80°C

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	40	70

Travel (mm)

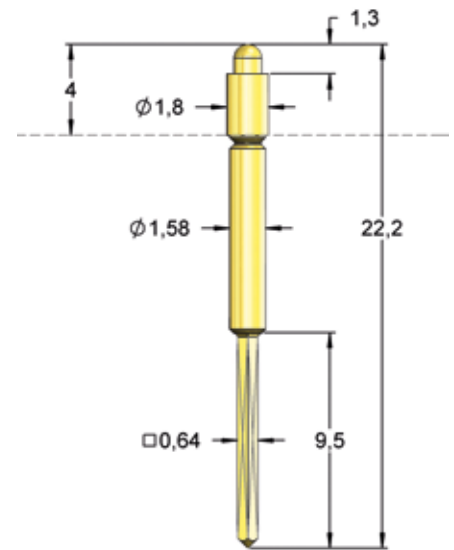
Version	Nominal	Maximum
Standard	0,9	1,3
Pointing Accuracy		±0,08 mm

Materials and Plating

Plunger	Steel, gold plated
Barrel	Brass, gold plated
Spring	Music wire, silver plated

Drill Size (mm)

F630...	1,56 - 1,58
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F69211M140G250

Short Travel Probe 100 mil

Centers (mm/mil)	2,54 / 100
Current	8,0 A
R typ	<30 mOhm
Temperature	-40°C...+200°C (H)

Spring Force (cN ±20%)

Version	Preload	Nominal
Standard	100	250

Travel (mm)

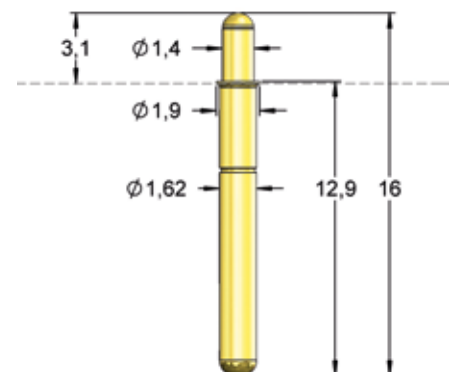
Version	Nominal	Maximum
Standard	2,8	3,0
Pointing Accuracy		±0,08 mm

Materials and Plating

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

Drill Size (mm)

F692...	1,60 - 1,62
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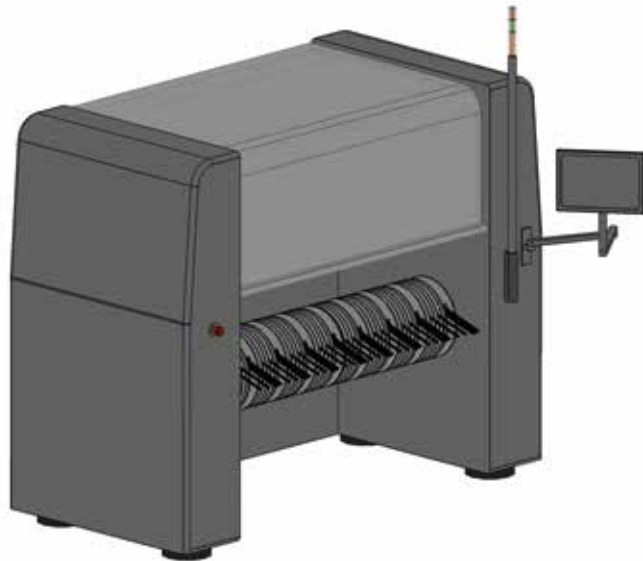


PROBES FOR AUTOMATED ASSEMBLY

Automated Assembly

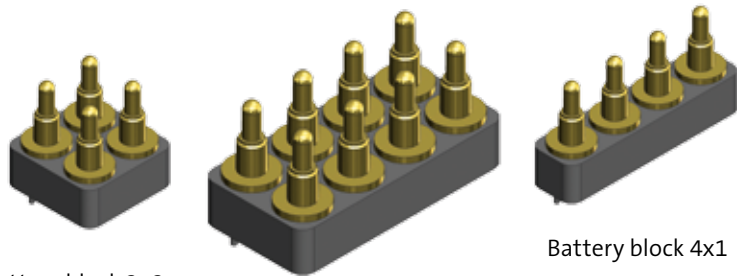
For an automated assembly in large quantities, charge contacts or short travel probes can also be delivered in block units or taped on request.

Typical applications are the automated assembly of printed circuit boards or other electronic production processes.



Contact Pins in Block Units

This solution allows cost effective and time saving assembly without the need to interrupt the production process by manual operations. Using block units also simplifies the centering and positioning of the probes.



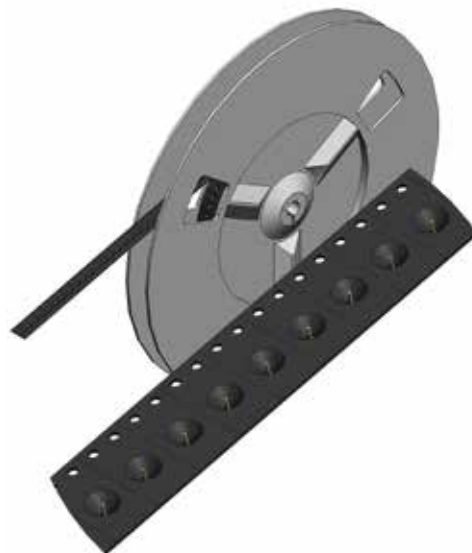
Battery block 2x2

Battery block 4x2

Battery block 4x1

Taped Contact Probes

This solution allows cost effective and time saving assembly without the need to interrupt the production process by manual operations.



PROBES FOR AUTOMATED ASSEMBLY

Carrier Tape

The pockets in the carrier tape are produced by thermoforming.

Most commonly used materials:

Polystyrene PS, polycarbonate PC, polypropylene PP, polyethylene terphthalate PET as an antistatic or conductive version (important for electronic components).

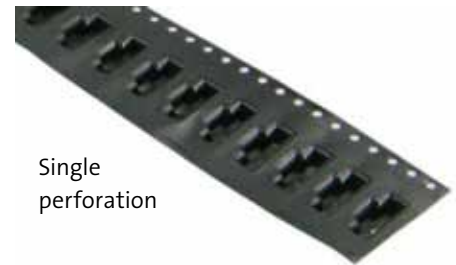
Common tape widths:

8 mm; 12 mm; 16 mm; 24 mm; 32 mm; 44 mm; 56 mm; 72 mm; 80 mm up to 200 mm

Common tape thicknesses:

0,20 mm; 0,25 mm; 0,30 mm; 0,35 mm; 0,40 mm; 0,50 mm

With a minimum tape width of 32 mm double perforations for the feeding process are possible.



Single perforation



Double perforation

Accessories

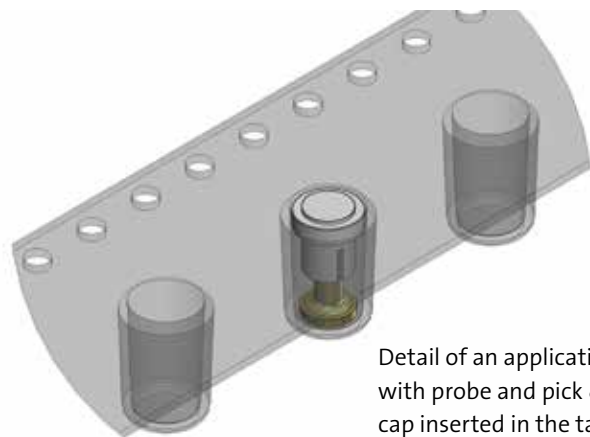
To remove components more easily from the tape pick & place caps or clips can be used. This is especially important for probes with a complex shape.



Probe with pick & place cap



Application of pick & place cap

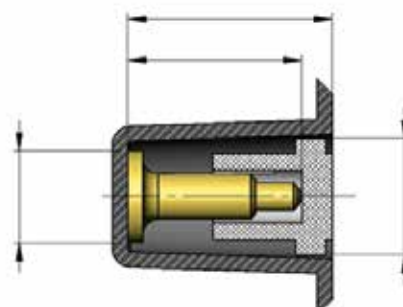


Detail of an application with probe and pick & place cap inserted in the tape

Taping Information

If a component is to be taped, the following information is necessary:

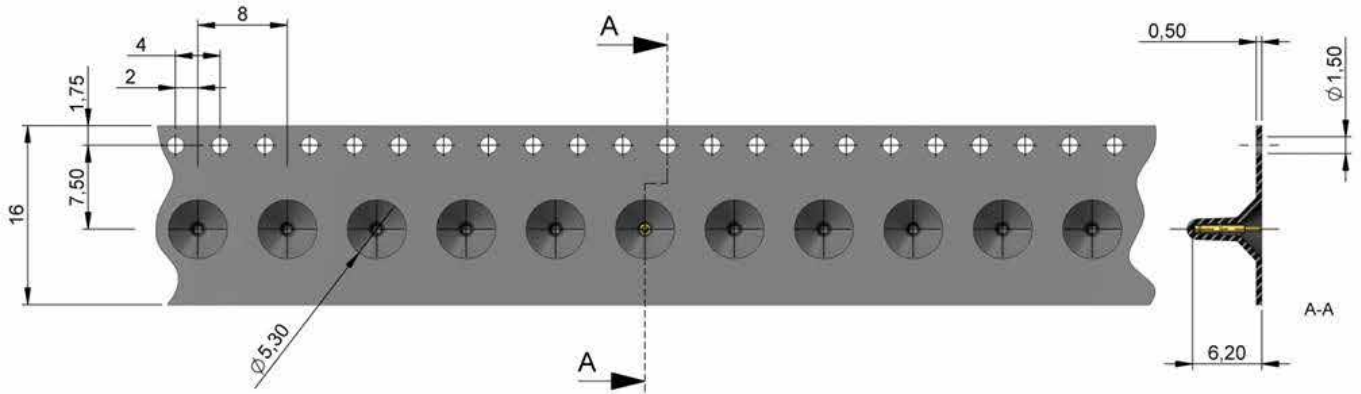
Component dimensions L/W/H, number of required probes, number of required rolls, required delivery date, packaging wishes, carrier tape material, tape width.



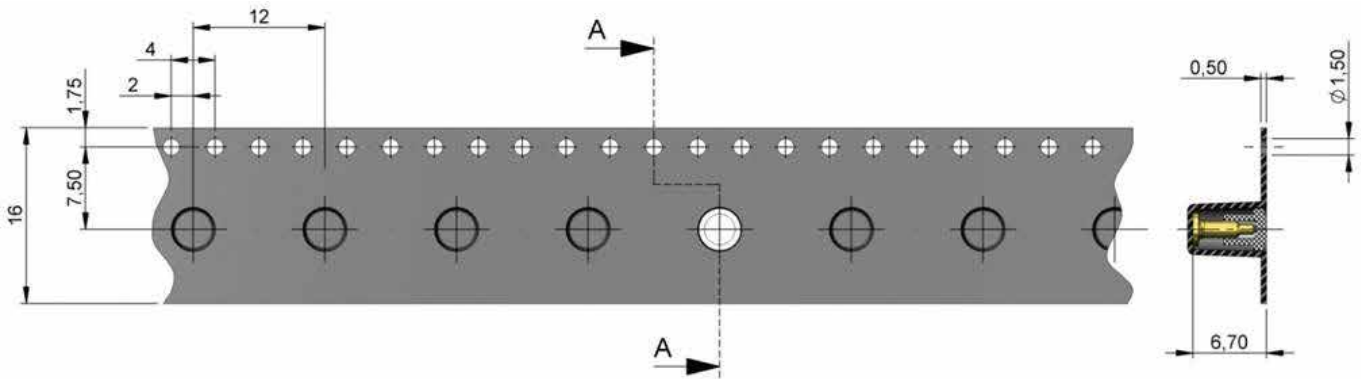
PROBES FOR AUTOMATED ASSEMBLY

The Following Tapes are Defined as a Standard

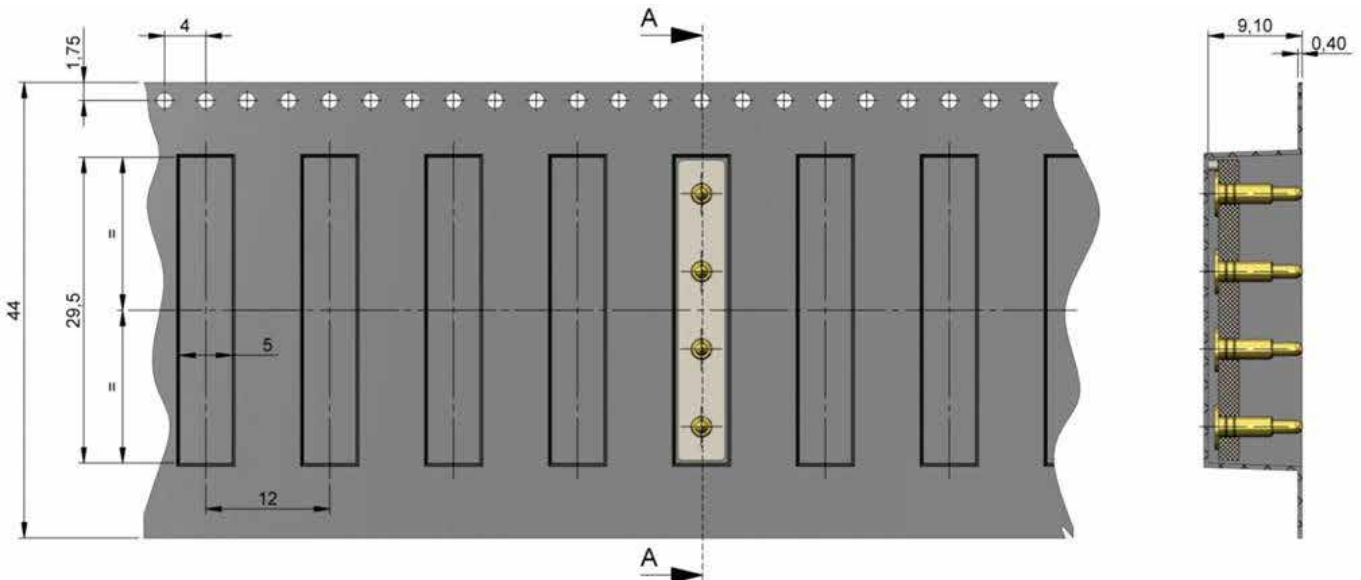
Order code tape: 1860S235
 One tape includes 500 pieces of the battery contact F69711B045G030



Order code tape: 1860S265
 One tape includes 800 pieces of the battery contact F67311B2001G065



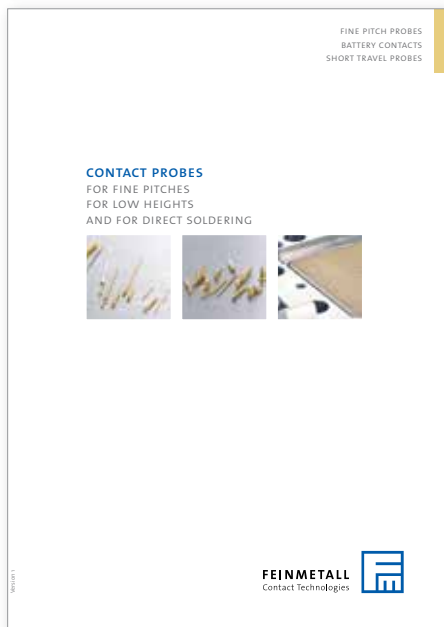
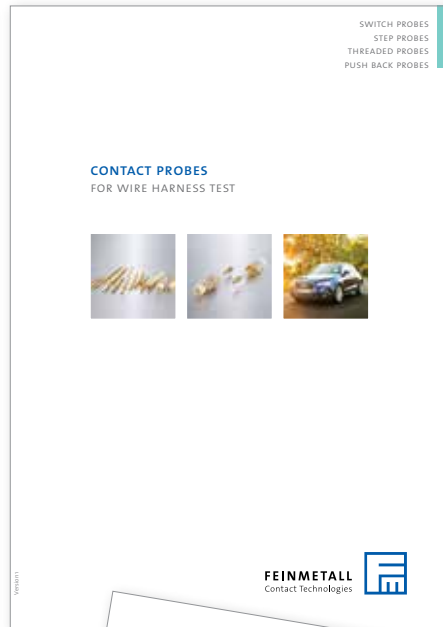
Other tapes on request



THE RIGHT CATALOGUE FOR EACH APPLICATION

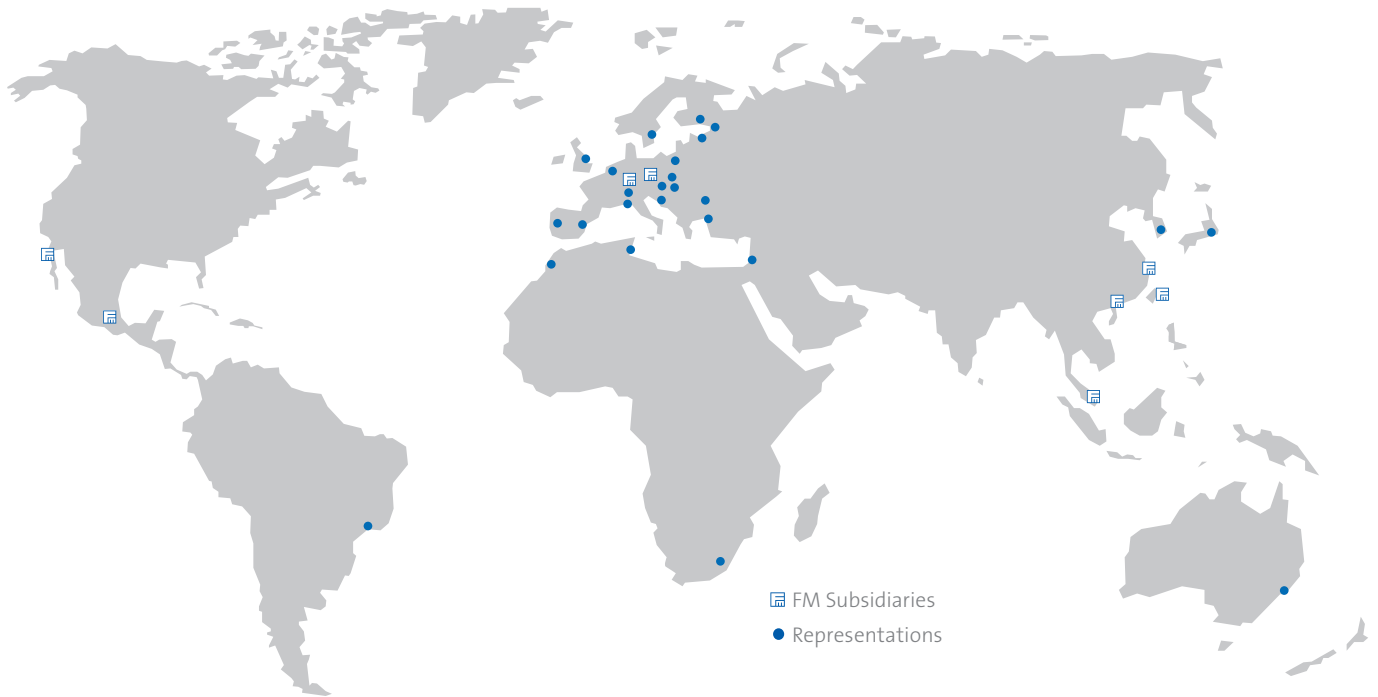
Application Specific Catalogs

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/>

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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.

Subject to change without notice

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