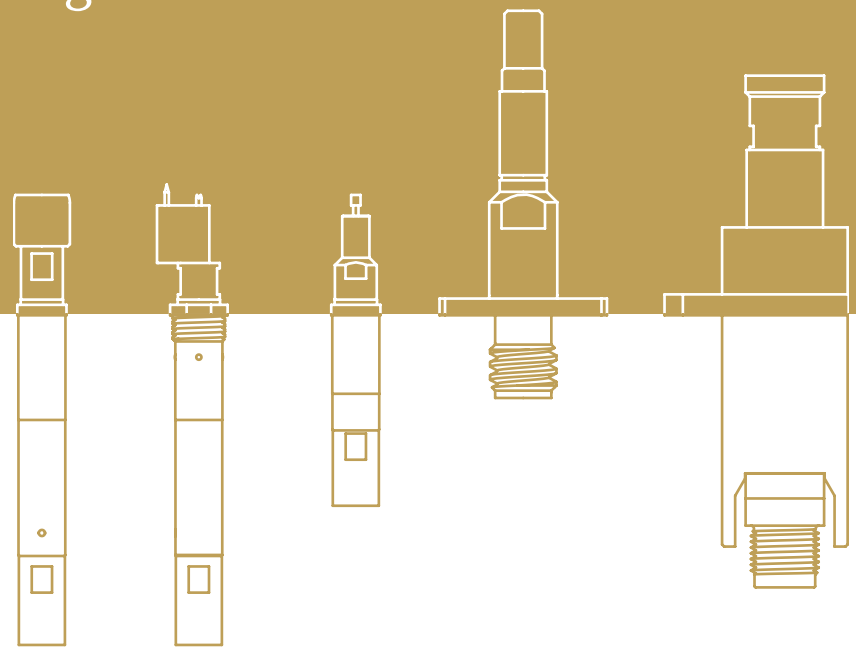
ingun®

Test Probes · Test Fixtures

IN TESTING SOLUTIONS No.1 IN DER PRÜFTECHNIK

RF-Probes

Plug Connector, Miniature Switch and PCB Contacting



Catalogue 6.0

Competent in your field

Telecommunications

Information Electronics

Consumer Electronics

Automotive

Engineering

Tests and Measurements

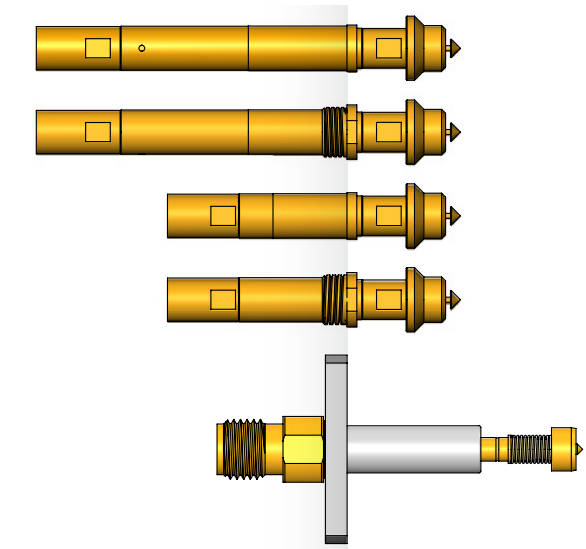
Aviation and Space Technology

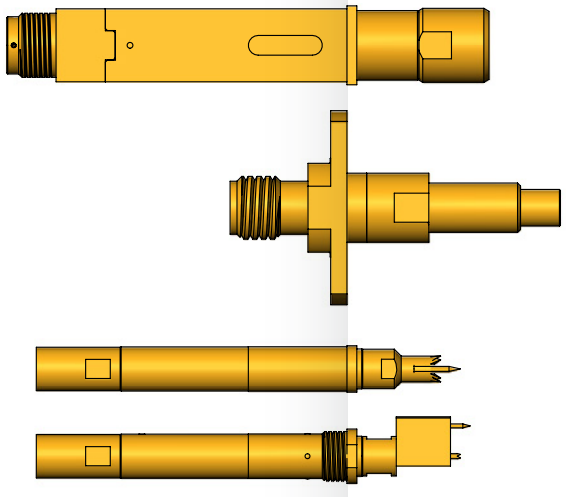
INGUN spring-loaded test probes are used by our customers in various industries, and enable a precise, accurately repeatable test of electronic assemblies to guarantee product quality and customer satisfaction.

As the leading company in testing, INGUN has the largest range of spring-loaded test probes worldwide. There is no doubt a spring-loaded test probe for your application too. If not, contact us for your customised contacting solution in renowned INGUN quality – Made in Germany.

INGUN RF test probes

Quality – Made in Germany





Plug connector contacting	Analogue	MMBX / MMCX / MBX / MCX
		mini SMB / SMB / SMC
		SMP / SMP-L / SSMP / SMP-MAX / P-SMP
		SMA / PC3.5 / QMA
		BMA / BNC / 1.0/2.3
		N / FME / 7/16
		U.FL / W.FL / W.FL2 / X.FL / HSC / JSC / KSC / LSC
		Reverse SMA / TNC
		IEC / F (75 Ω)
		mini-FAKRA / FAKRA / GT13 / GT16
	Digital Automotive / Digital	Digital automotive: HSD / H-MTD / MX series / US-Car 30 / MateNet
		Digital: USB-Series / RJ series / HS Autolink / SATA / HDMI / TAE
Miniature switch contacting		MM8430 / MM8130 / MM8030 MS-156 / MS-180 / Pico II, PN 1551372-1
PCB contacting		PCB test point PCB test point lateral
		Coaxial dipole probe
Accessories		Receptacles (KS) / cable plug assembly / tools / inner conductor / technical details & dimensions

INGUN – Quality through Precision

A family business with persuasive know-how

The family business, located in Constance at the Lake of Constance, has produced and sold test probes and test fixtures all over the world since 1971, and in that time developed into the number 1 company in testing technology.

INGUN products are manufactured exclusively at the German site under the slogan *Made in Germany* and delivered worldwide from there. With their high precision and established know-how, INGUN would like to continue to shape the future together with you.

Your competent partner since 1971

The path to success

1971

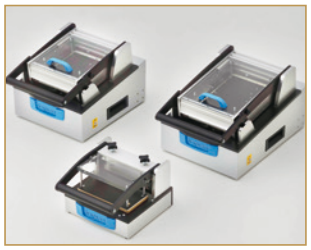
- "INGenieur UNion" (INGUN) – in English engineer union – founded in Konstanz by Werner H. Heilmann as a trading company for electronic components
- Wolfgang Karl joins the company
- 7 employees

1976

- INGUN launches their first radio frequency probe - GKS-HF 408 - in May 1976

1979

- Introduction of the first vacuum test fixture manufactured in Germany at the Productronica trade fair in Munich



1995

- Fully automatic assembly of test probes
- Certification in accordance with DIN EN ISO 9001
- 108 employees

2005

- Introduction of counterfeit protection for spring-loaded test probes
- Represented worldwide in 28 countries
- 145 employees

2007

- Wolfgang Karl is appointed to board of directors
- His son, Armin Karl, takes over management

2021

- 50 years of INGUN
- Represented worldwide with over 40 locations
- 23 subsidiaries
- Over 400 employees

Worldwide in Contact

Your reliable partner worldwide

INGUN co-operates with agencies worldwide and is represented all over the world with 16 of their own subsidiaries. Many of their current agencies have worked together with the test equipment specialist since the company was founded.

Your local contact partner

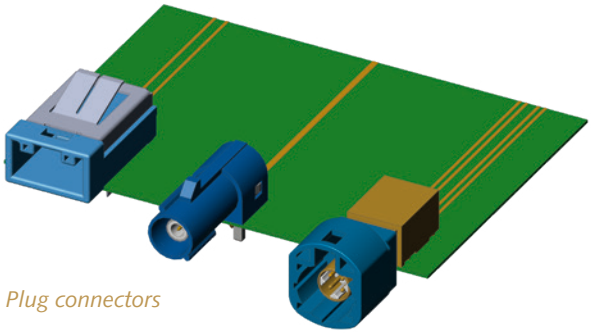
Only those who understand their customers can offer the best products and services. The INGUN group can be reached via one of their many subsidiaries and agencies worldwide – one of which is guaranteed to be near you.

Find your local INGUN contact person today at: www.ingun.com/contact

Solutions for your application

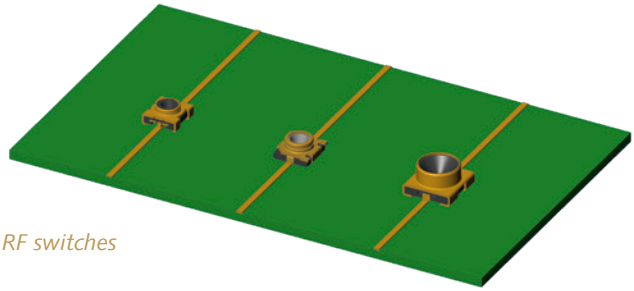
INGUN offers a suitable test solution for every industry and application. This includes plug connectors, RF switches, or layouts on the PCB.

Plug connectors are used in various ways to connect RF components, such as cable or PC board modules. In the automotive industry, for example, FAKRA or HSD plug connectors are used to transmit audio and video signals. U.FL connectors are used in, among others, radio modules.



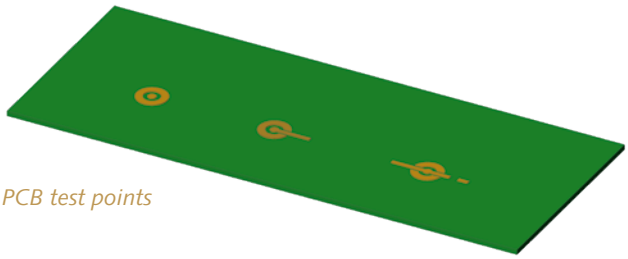
Plug connectors

RF switches are used to test RF signals supplied by either chip antenna or PCB antenna.



RF switches

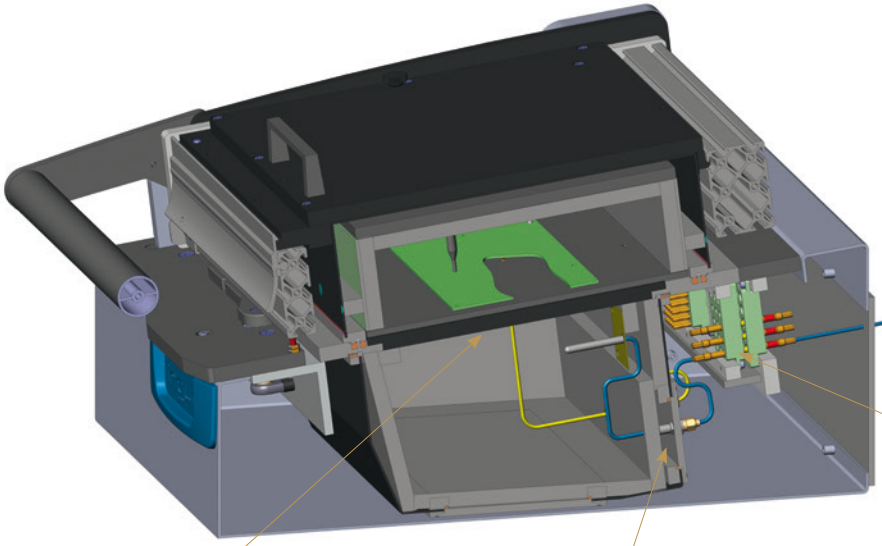
PCB test points are structured so that they can be contacted by RF signals directly on the PCB. Depending on the nature of the PCB and application, these are designed differently.



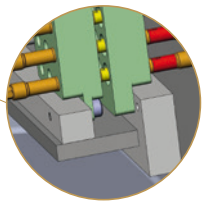
PCB test points

Solutions for your application

From test point to test system: INGUN has the ideal compatible test solution. Additionally, INGUN offers either the complete RF test fixture with RF test probes, interfaces, shielding chamber and completing cabling, or as modular solutions.

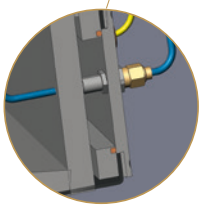


connection to the measurement device



RF test fixtures and accessories: shielding chamber, interfaces, and much more, can be found in the current test fixture catalogue

For further information about RF test probes for plug connectors, RF switches, and PCB layouts, please see the overview on pages 8 and 9

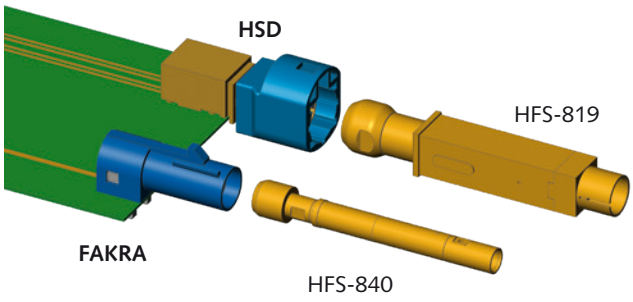


For further information about RF cables and plug connectors, please see page 180

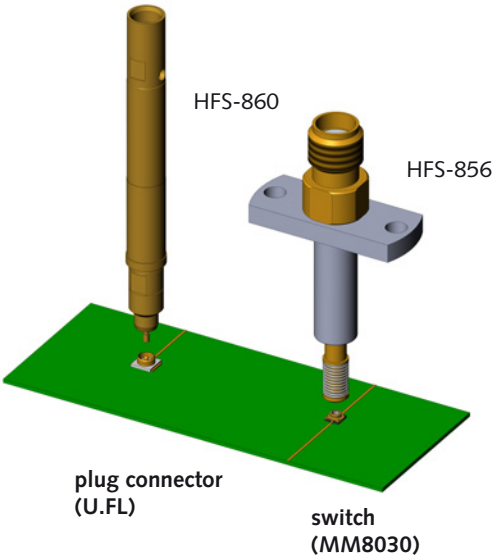
Request our test fixture catalogue or go to our website www.ingun.com

Plug connector and miniature switch contacting

Plug connectors and miniature switches are used in various products and applications, such as communication electronics and consumer electronics. Other plug connectors, however, are used for the transmission of signals in the automotive industry.

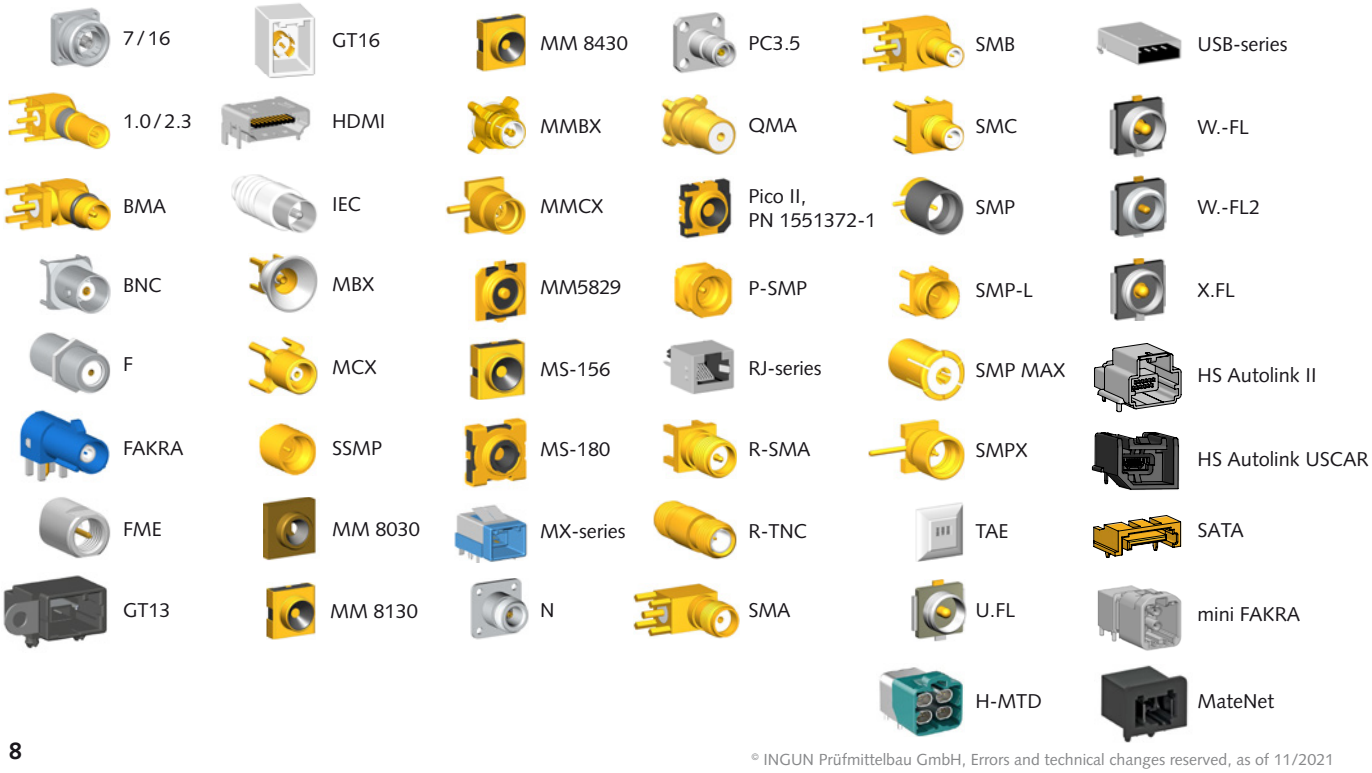


Example of automotive plug connectors



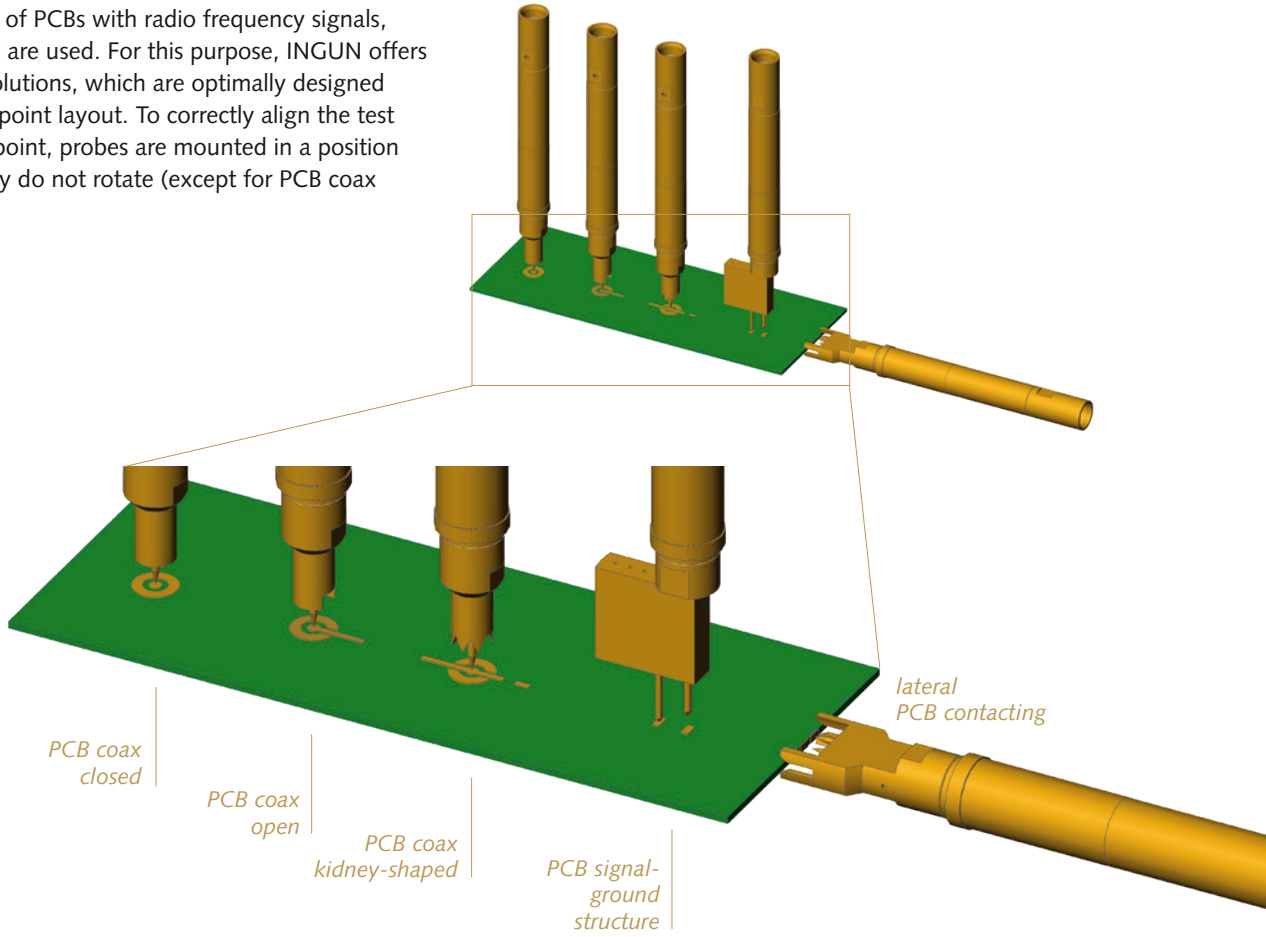
Example of plug connectors from communication and consumer electronics

INGUN RF test probes are available for the following plug connectors and miniature switches:



PCB contacting

To test the quality of PCBs with radio frequency signals, various test points are used. For this purpose, INGUN offers a variety of test solutions, which are optimally designed based on the test point layout. To correctly align the test probe to the test point, probes are mounted in a position which ensures they do not rotate (except for PCB coax closed).



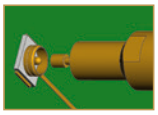
INGUN RF test probes are available for the following PCB test points:

	PCB: PCB layout with different levels
	PCB coax closed: PCB layout with closed ground/ring and signal guiding to inner side (multi-layer)
	PCB coax open: PCB layout with open ground ring and signal guiding to outer side
	PCB coax kidney: PCB layout with kidney-shaped ground/ring and continuous signal guiding to outer side
	PCB side: lateral PCB contacting

Can't see your test solution?
Then speak to us! INGUN are happy to develop and produce your custom-made RF test probe.

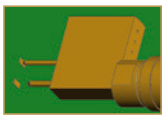
Probe versions and application advice

In order to optimally fulfiill a range of test requirements, various versions of RF test probes are available. Selection criteria include the test point to be contacted, frequency and/or data rate, installation area (space available), as well as ambient conditions.



E.g. U.FL

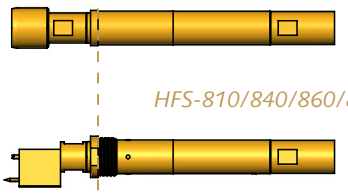
Coaxial test points
Rotationally symmetrical RF test probes are used using coaxial test points (e.g., SMA, U.FL, miniature switches) and the contact tip is optimally designed based on the connector.



E.g. PCB signal-ground structure

Position orientated test points
To ensure contacting of position orientated test points (E.g., PCB signal-ground), non-rotating RF test probes are used.

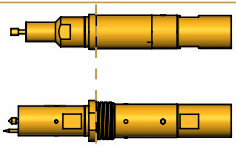
Standard HFS



HFS-810/840/860/865

There are standard RF probes for coaxial and position-orientated test points in various frequency ranges. The RF probes are either pressed or screwed into the receptacle. With position-oriented test points, the RF probe is aligned accordingly. To balance out the mounting tolerances of coaxial test points, receptacles with fixed or free-moving mounts are available. Plug connectors, e.g. MCX, MMPX, SMPM are used to connect the probes to the test set-up.

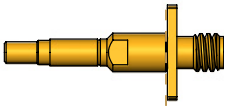
Short HFS



HFS-410/440

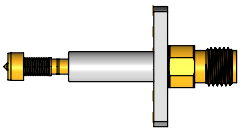
Short RF probes are designed for applications, which do not allow standard RF probes to be used due to limited available space.

Flange HFS

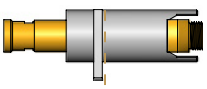


HFS-822

RF test probes with fixed flanges are designed to enable a contacting process without cable movement. Thus, optimal signal transmission is ensured.



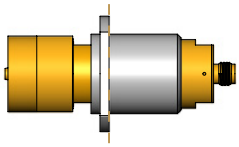
HFS-856



HFS-819

RF test probes with flange and freely moving (floating) contact tips enable optimal alignment to the test point and ensure reliable, repeatable measurement quality. Mounting tolerances are balanced out and side forces as a result of misalignment in the contacting process are consequently avoided.

Diverse HFS



HFS-864

In addition to the classic RF probes, INGUN offers more test probes for dipole measurement (Kelvin measurement), PIM-stable power transmission, as well as the following probes: DPS-215, DPS-465, HFS-010, HFS-110, HFS-409, HFS-864.

Assembly and connection

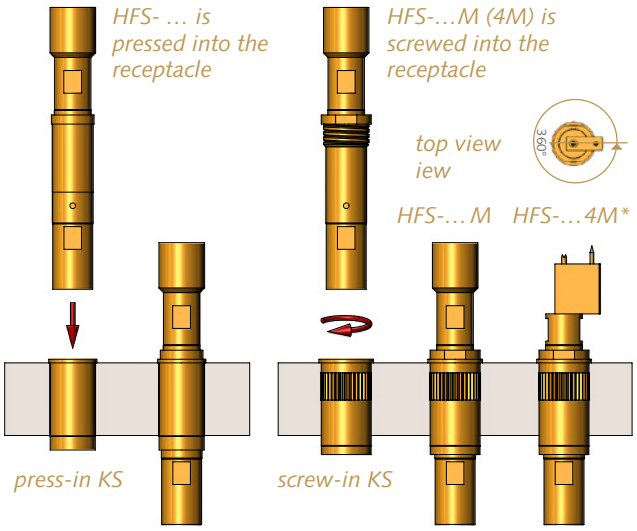
Assembly

Depending on the customer application, the RF probes can be pressed or screwed into the receptacle.
(Nominal screw-in torque 10-20 Ncm)

For position orientated test points (E.g., PCB ground-signal-ground) RF probes are aligned in the receptacle accordingly and are held in position by crimping points.

* With the screw-in version HFS-…4M, the RF probe is screwed in fully and then turned anti-clockwise to the required position.

In addition, there are various alignments for the receptacle with floating mount to compensate for the mounting tolerances (possible misalignment in the contacting process). For a comprehensive overview of the receptacles available, please see page 192.



Connection

The various RF series have different connections for pre-wired RF cables.

Quick coupling connector MCX is used as the interface for the HFS-410/440/810/840/860 series. A MMPX™ input interface is used in the HFS-865 series (12 GHz). HFS-822/823/852/856 (with flange) are connected via a SMA connector.

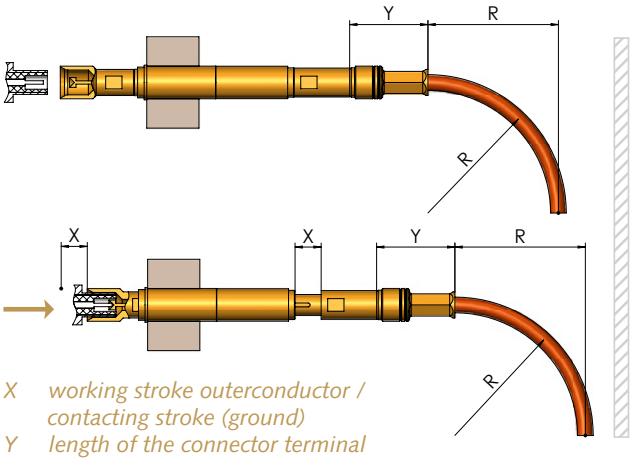
For a complete overview of RF cable plug assemblies available, see page 196 - 199

Installation instructions

To maintain the minimum bending radius of the RF cable, care should be taken when installing the probe to ensure that the cable assembly reaches "X".

For applications with limited space, cable plug assemblies with angular plugs are available, see page 180 onwards.

In addition, side forces during the contacting process should be avoided. This could occur through possible misalignment in the contacting process, or incorrectly laid RF cables. Side forces can lead to reduced performance of, or even damage to, the RF test probes and cables.



X working stroke outerconductor / contacting stroke (ground)
Y length of the connector terminal
R minimum bending radius (dynamic)

Choosing the right test probe

From test point to RF test probe:

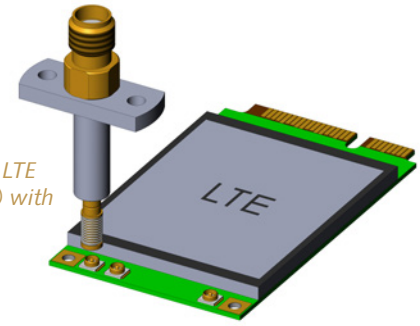
The prerequisite to performing precise and accurately-repeatable RF measurements is selecting the correct RF test probe, as well as ensuring correct installtion and connection. The following steps should help with RF test probe selection:

1	2	3	4	5
What kind of unit is to be tested? – Plug connector – Miniature switch – PCB test point	What is the name of the connector, or the geometry of the test point?	What is the maximum frequency to be transmitted at which return loss?	Which choice of RF probe version does the installation area (available space) allow for?	How should the probe be installed and connected (RF cable)?

Selection example

The RF signal should be tested to ensure the quality of a LTE radio module:

1. Type of unit to be tested: plug connector
2. Plug connector: U.FL
3. Frequency: 1800 MHz
4. RF probe version: HFS-890 or flange probe HFS-856 recommended for best signal quality
5. Connection option – 2 versions
   1. HFS-890 with SMPM cable connection, assembly in receptacle with fixed or freely moving mounting (to balance out the misalignment via mounting tolerances)
   2. HFS-856 with SMA cable connection, installed with freely moving flange.



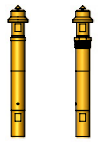
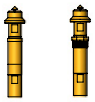
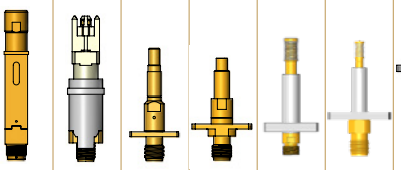
Contacting of LTE module (U.FL) with HFS-856

Icons are included in the page headings for easy navigation between the index and product pages.

Icons

	Signal conductor male: connector with signal conductor/inner conductor designed as connector/pin
	Signal conductor female: connector with signal conductor/inner conductor designed as female
	PCB: PCB layout with different levels
	PCB coax closed: PCB layout with closed ground/ring and signal guiding to inner side (multilayer)
	PCB coax open: PCB layout with open ground ring and signal guiding to outer side
	PCB coax kidney: PCB layout with kidney-shaped ground/ring and continuous signal guiding to outer side
	PCB side: lateral PCB contacting
	Switch: contacting of switch connectors
	Digital: connector for digital/differential signal transfer

Choosing the right test probe

		Standard RF test probes: pressed in / screwed in					Short RF test probes: pressed in / screwed in		Flange RF test probes: fixed flange / floating flange						RF test probes misc.	Page
	RF test probe series	HFS-810	HFS-840	HFS-860	HFS-865	HFS-890	HFS-410	HFS-440	HFS-819	HFS-821	HFS-822	HFS-823	HFS-852	HFS-856	see below	
	Frequency or Gbit/s	2 GHz	4 GHz	6 GHz	12 GHz	18 GHz	2 GHz	4 GHz	Gbit/s	Gbit/s	6 GHz	8 GHz	12 GHz	12 GHz	see page	
	Cable movement during contact	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes	yes	see page	
	Image															
Plug connectors	1.0/2.3		x													69
	7/16														HFS-864	76
	BMA	x	x													65
	BNC	x	x													67
	F														HFS-409	96
	FAKRA	x	x			x	x	x							DPS-465	103
	mini-FAKRA														HFS-807 DPS-465	99
	FME		x													75
	GT13	x	x													109
	GT16		x													111
	HDMI														PS-HDMI	130
	H-MTD														HFS-802	120
	HSD								x							115
	IEC														HFS-409	95
	MBX		x								x					31
	MateNet															121
	MCX	x	x	x												34
	SSMP			x												50
	MM5829										x					88
	MMBX		x		x											27
	MMCX	x	x				x									29
	MX-Serie									x						121
	N	x		x												73
	PC3.5				x											60
	P-SMP										x					52
	QMA			x												61
	RJ-Serie														PS-RJ	131
	R-SMA			x												91
	R-TNC		x					x								92
	SMA	x	x			x		x						x		55
	SMB	x	x				x	x								40
	mini-SMB														HFS-858	39
	SMC		x													43
	SMP		x											x		47
	SSMP			x												50
	SMP-L										x					49
	SMP-MAX										x					51
	TAE														PS-TAE	130
	U.FL	x	x	x		x	x	x			x		x	x		79
	USB-Serie									x					PS-USB	130
	W.-FL			x										x		86
	W.-FL2			x										x		86
	X.FL			x										x		86
RF switches	MM8030, MM8130, MM8430			x	x	x						x		x		137
	MS-156, MS-180			x										x		143
	Pico II, PN 1551372-1											x				146
PCB	Dipole probes / Kelvin measurement														HFS-010, HFS-110 DPS-215, DPS-465	169
	PCB-koax-closed	x	x					x								150
	PCB-koax-kidney	x	x	x				x								155
	PCB-koax-open	x	x	x				x								152
	PCB-GSG / PCB-GGSGG	x	x												HFS-836	161
	PCB-SG	x	x												HFS-837	158
	PCB-Side	x	x					x								167

All RF test probes available from INGUN are listed in the table above. The optimal test solution can be selected based on the test point (plug connection, RF switch or PCB layout) and the frequency required.

Product numbers

The logical composition of the INGUN parts numbers allows easy identification and recognition of radio frequency test probes. The individual numbers define series, material, tip style, diameter and spring force. Within the respective pages of the catalogue various possible combinations, special designations, and type versions are described.

INGUN RF product number

HFS	-	810	3	08	180	A	53	42	BX	M
1		2	3	4	5	6	7	8	9	10

1 Type of product
HFS radio frequency test probe

2 Series

DPS-215	dipole probe	----
DPS-465	dipole probe	----
HFS-010	dipole probe	----
HFS-110	dipole probe	----
HFS-409	F / IEC	1,5 GHz
HFS-410	short version	2 GHz
HFS-440	short version	4 GHz
HFS-810	standard	2 GHz
HFS-819	digital	Gbit/s
HFS-821	digital	Gbit/s
HFS-822	flange	6 GHz
HFS-823	flange	6 GHz
HFS-836	flange	4 GHz
HFS-837	flange	12 GHz
HFS-840	standard	4 GHz
HFS-852	flange	6 GHz
HFS-856	flange	6 GHz
HFS-856	flange	12 GHz
HFS-858	PCB 75Ω	1 GHz
HFS-860	standard	6 GHz
HFS-864	7/16	7,5 GHz
HFS-865	standard	12 GHz

3 Material of inner conductor contacting tip
2 steel **3** beryllium copper

4 Inner conductor tip style

01	30° needle tip	**08**	90° conical
03	inverse cone	**13**	30° rounded tip
04	4-point crown	**53**	inverse cone: special length
05	bullet-nosed	**55**	bullet-nosed: special length
06	serrated	**58**	90° conical: special length
07	90° 3-edged chisel		

5 Inner conductor tip diameter (1/100 mm)
Example:
180 1.8 mm (tip-ø of inner conductor)

6 Surface
A INGUN hard gold

7 Spring force (dN)
Sum of spring force of inner and outer conductor
Example:
53 1.3 N inner conductor + 4.0 N outer conductor

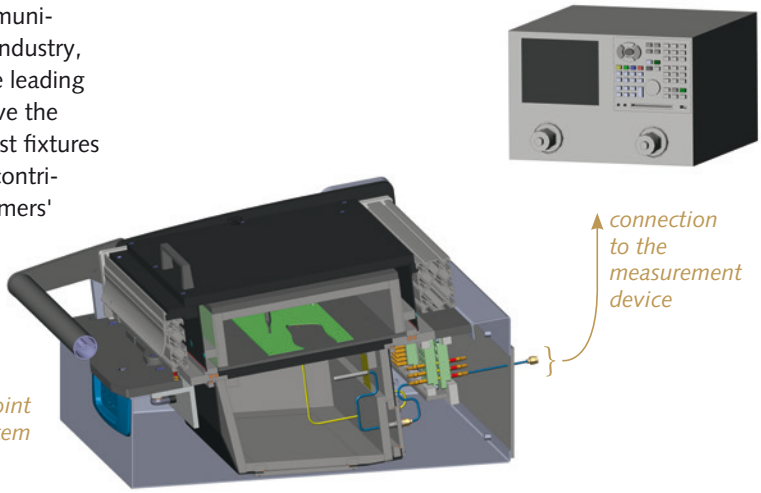
8 Outer conductor
02 flat
06 serrated
14 self-cleaning 4-point crown
29 ground tips
40 lamellae
42 centering: inner side of plug connector
43 centering: outer side of plug connector

9 Special designations

10 Type
– press-in version
M screw-in version
4M screw-in version, adjustable

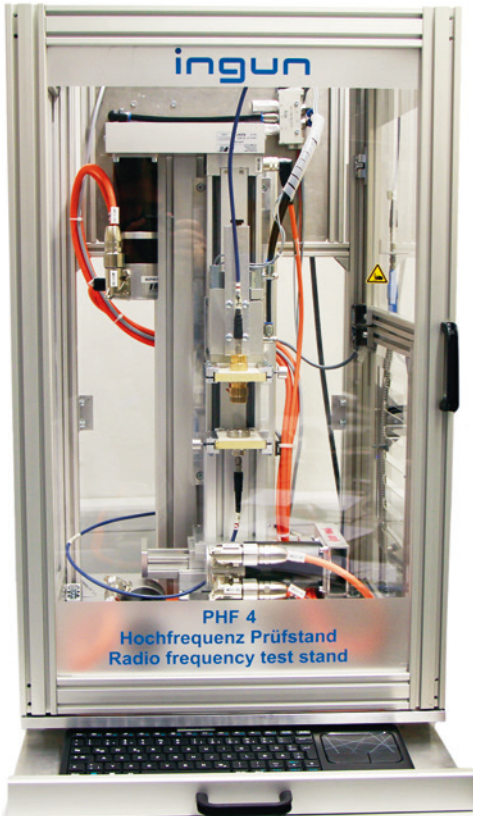
High measuring accuracy and long service life

Quality through precision – we have developed, manufactured, and distributed products for the telecommunication, consumer electronics, and the automotive industry, among others, under this motto since 1971. As the leading company in test equipment manufacturing, we have the largest range of radio frequency test probes and test fixtures worldwide. INGUN RF products are an important contribution to the quality assurance of our global customers' products.



connection to the measurement device

RF fixture, from test point to test system



RF endurance test stand PHF4 performs a combination of mechanical and electrical life cycle tests

Quality through Precision – Made in Germany

A high degree of measurement accuracy, repeatability, and long service lives are vital properties for RF products. To ensure this essential consistent product quality of the innovative RF test probes, INGUN operates its own RF laboratory. Here, production conditions can be optimally regulated, and electrical as well as mechanical tests can be performed. The recording of S-parameter, VSWR graph, and Smith chart are part of the standard measurement. Furthermore, the RF performance of the RF test probes under defined angular and coaxial misalignment can be determined.

For both standard RF probes or customer-specific solutions, the RF test probes from INGUN are developed and manufactured in accordance with the highest quality standards.

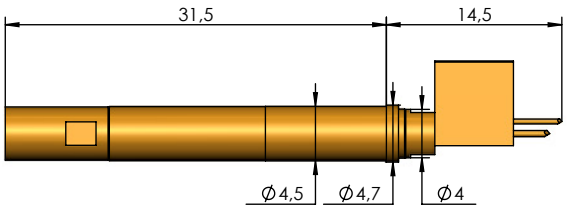
Decades of experience, innovative expertise, and close contact to our customers are our strengths. Try us out for your optimal test solution!

Made in Germany quality. INGUN has been DIN EN ISO 9001 certified since 1995

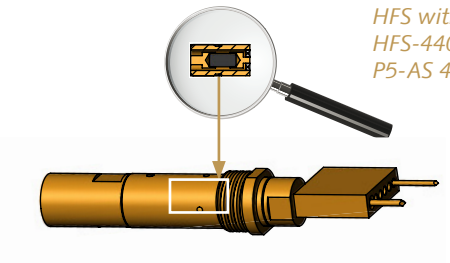
Integrated technologies

High impedance tip – RF test probes with integrated filter

Measurement using RF test probes typically takes place in series with the device under test (DUT). The test solution is therefore a part of the signal path. To ensure minimal return loss, the test solution must have the same impedance as the device under test (e.g. 50 Ω). If the measurement, however, takes place in a closed part of the signal path, it must be guaranteed that this path is not affected by the test solution. In the case of measurement using a standard test solution, 50% of the energy would be lost. This is due to the test solution being parallel to the test object (DUT). To avoid this, INGUN has developed a specialised test probe which enables a high-resistance signal pick-up, and therefore does not affect the signal path.

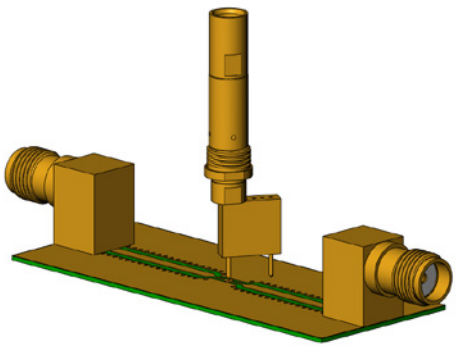


HFS-840 007 051 A 4807 P1-AS with integrated filter



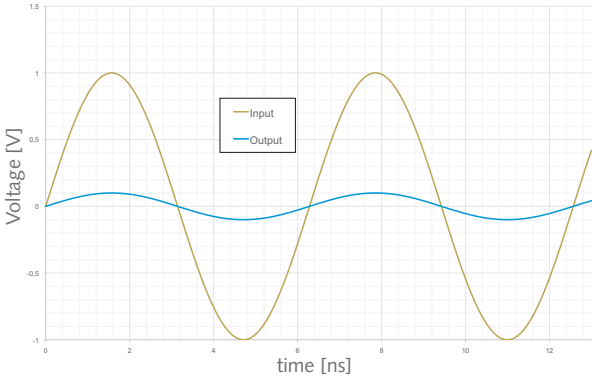
HFS with integrated filter e.g. HFS-440 007 051 A 4807 P5-AS 4M

A three-port measurement is performed to specify this measurement solution, where port 1 and port 2 are connected to the test object (DUT) and port 3 is connected to the RF test probe.



Example of test set-up with three-port measurement

As the measurement shows, the DUT is only slightly affected by the test probe. The amount of power lost is at least 20 dB less. This is equal to a voltage reduction of 1/10, for example, for a measurement with an oscilloscope. Parasitic coupling is significantly reduced using a short ground connection. This test solution is particularly suitable for automated test on DUTs using an oscilloscope.



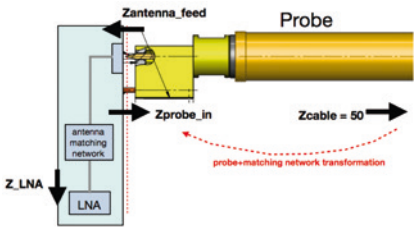
1/10 scaling factor of RF test probe is clear as shown in time domain

More information about RF test probes with an integrated filter and a grid size of 1-5 mm are available upon request, contact us today.

RF test probes with narrow band matching network

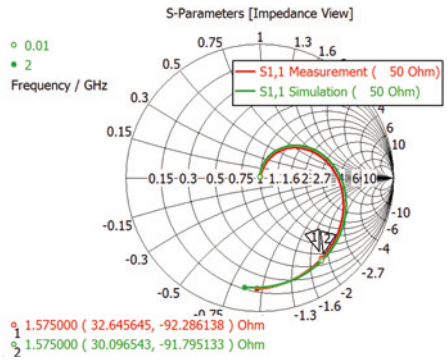
There are applications where the RF test points have complex resistances (Z) made up of a real part (R) and an imaginary part (X) (Z = R + jX). In order to be able to connect the test system, a transformation of the complex resistance should occur to achieve an impedance of 50 Ω without an imaginary part. An example should clarify this:

To measure a signal at the feeding point of a GPS antenna, a RF probe picks up the signal and feeds it into the test system. The complex resistance would be Z_{ant} = 30 Ω + j90 Ω for the centre frequency of the frequency range 1.575 GHz to 1.6 GHz.



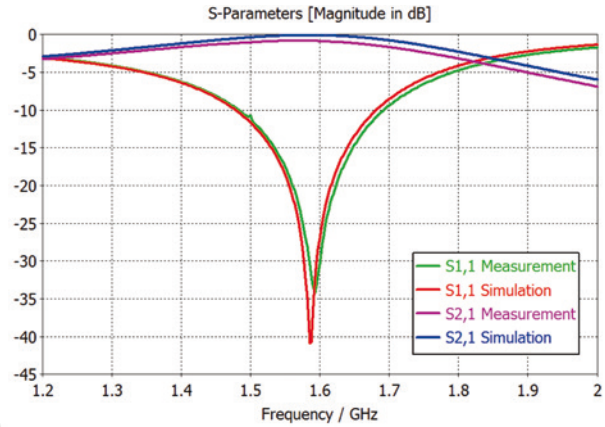
Example for the use of a RF test probe with narrow band matching network

If the electrical characteristics of the test solution in use are also known, the signal can be electrically influenced in this way to enable the transformation to an impedance of 50 Ω. This, however, is only valid for a very narrow frequency range.



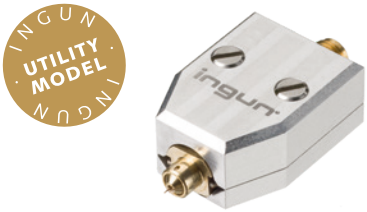
Comparision of simulation and measurement: The transformation shown in the Smith chart

Can't see your test solution? Then speak to us! INGUN are happy to develop and produce your custom-made RF test probe.



Comparison of simulation and measurement: a very good return loss determines the center frequency of the application for a narrow band frequency range

INGUN is able to perform this transformation within the test solution. In this case, a RF test probe which integrates a narrow band matching network is used.



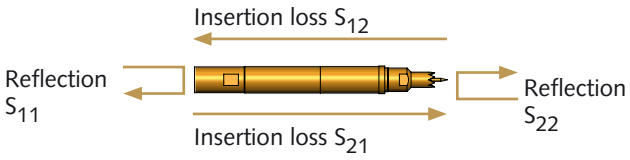
RF test probe with narrow band matching network

In the same way, test probes which influence the characteristics of transmission as desired can also be developed. The test probe can, for example, have filter characteristics. A wide-band transformation can also be performed.

RF products from INGUN

An introduction to RF technology

For an INGUN radio frequency test probe to be able to achieve optimal performance, the radio frequency properties must be precisely determined. In order to understand why some measurements are a vital, we invite you to explore the world of the theory behind the product for a few minutes.



Scatter parameter determination

The properties of an electrical network can be determined at low frequencies by determining the current and voltage ratios. As the frequency rises, it is increasingly difficult to be able to measure U and I directly. Instead, the wave characteristics on the ports of the DUT are determined in order to determine those properties. These are the so-called scattering parameters, or S-parameters for short.

Radio frequency test probes or cable assemblies form the input and output interface for each port in the electrical network. This is known as a two-port network. For example, a cable plug assembly is connected to the input interface with a power P1 (incident wave), in this way a part is again directly reflected in the feeding system. This reflection cannot be prevented, but minimised. The level of attenuation of the reflected wave in comparison to the incident wave is called return loss and corresponds to the S-parameter S_{11} (input) or S_{22} (output).

A further part of the wave feeds into the network and is attenuated as it travels through the system. The S-Parameter S_{21} or S_{12} describes this transmission process. The parameter is also known as insertion loss.

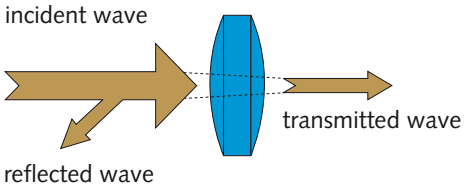
To fully describe the properties of a two-port RF network, there are a total of four S-parameters, each of which are determined according to magnitude and phase: $S_{xy,value}$ and $S_{xy,phase}$ (with x,y = 1…2). The reciprocity principle, however, applies to linear passive components in good proximity.

$$S_{21} \approx S_{12} \quad (1)$$

This facilitates the precise measurement of radio frequency probe characteristics. It can be assumed that it makes no difference whether the signals should be picked up or fed in. For both cases it is irrelevant, due to reciprocity, in which direction the signal is transmitted because the attenuation levels are the same in both cases.

Light wave analogy

To get a better idea of what is meant by reflection and transmission parameters, one can compare the behaviour of the incident and reflected electromagnetic waves with light waves hitting a lens. A part of the energy from the incident waves is reflected when the light hits, while the remaining part is transmitted. The S-parameter can be derived from the ratios of the reflected part to the approaching waves and the transmitted part compared with the incident waves.



Notations

Standing wave ratio (SWR)

Manufacturers sometimes provide the progression of the standing wave ratio of a frequency rather than the return loss. This can be calculated from the return loss and is a further notation.

The following applies:

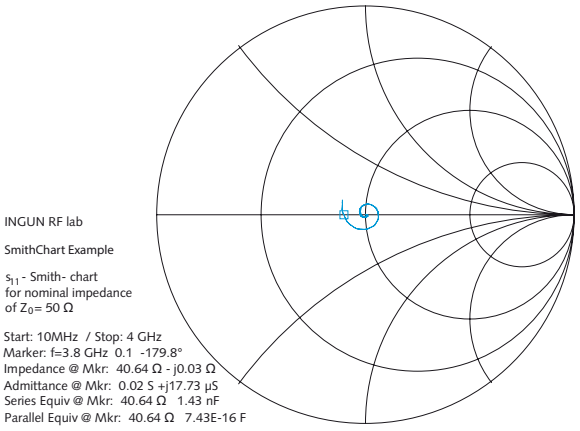
$$VSWR = \frac{1 + 10^{-\frac{RL'}{20}}}{1 - 10^{-\frac{RL'}{20}}} \quad (2)$$

Analogue can be calculated using the standing wave ratio of the return loss:

$$RL' = -20\ dB \cdot \log\left(\frac{VSWR - 1}{VSWR + 1}\right) \quad (3)$$

Reflection behaviour

Alongside the notations described, the signal reflection characteristics can also be shown in a so-called Smith chart. The progression of the return loss according to magnitude and phase is also shown. This is particularly suitable for determining correction values and being able to provide complex impedance and admittance values (e.g. equivalent circuit diagrams, simulations, etc.)



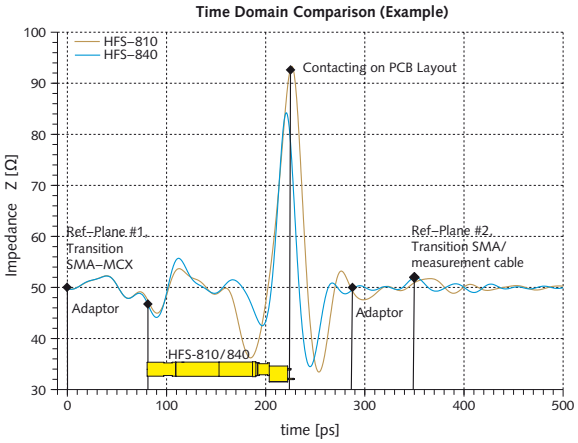
Time domain reflectometry (TDR)

TDR stands for time domain reflectometry. For this type of measurement an ultra-short impulse is generated using a suitable measurement device, such as a sampling scope with TDR module. As the impulse runs through the device under test (DUT), impedance variations or other reflection disturbances develop, and these can be shown and evaluated.

The respective points in time in the following formula are used to calculate the impedance from the reflection coefficient.

$$Z_L = Z_O \cdot \frac{(1 + \rho)}{(1 - \rho)}$$

The impedance progression is determined by the transmission of the resulting impedance over time. The electrical length of the DUT can be taken directly from this notation, however its mechanical length cannot, because the propagation velocity of the impulse depends on the materials used. The measurement resolution achieved correlates to the duration of the impulse. If short impulses are used, very small measurement objects can also be measured relatively accurately.



Impedance progression of sample of a RF test probe TDR measurement

Eye diagram

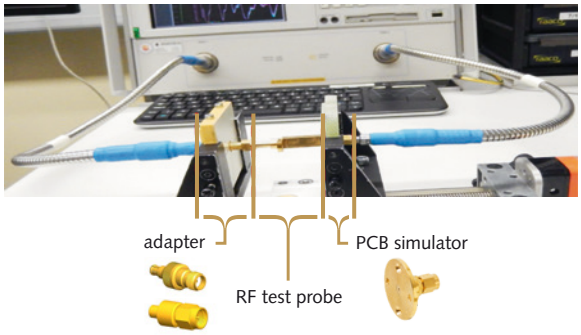
The eye diagram is generated using multiple overlap from individual bits of a transmitted signal. To achieve higher accuracy, the sample used should be as long as possible. Information such as jitter, and loss of the transmission channel can be read from the eye diagram. The so-called eye mask also specifies the minimum requirement of the transmission medium.

Specification of RF test probes

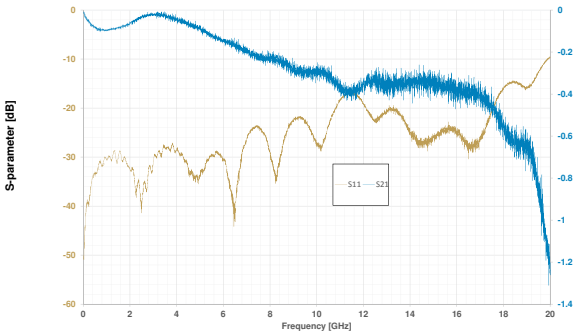
Specification of coaxial (analogue) RF test probes

Test solutions for the measurement of analogue signals are normally specified in the frequency domain using so-called S-parameters, which are measured using a Vector Network Analyser (VNA). INGUN uses a 20 GHz 2-port VNA. Because VNA test cables are used, which have either a PC3.5 or SMA interface (the reference plane in this case), various measurement and calibration adapters are also used to connect the test solution.

As these adapters are added after the calibration in the signal path, they inevitably influence the measurement results. For that reason, it is essential to be aware of the influence of the adapter during the specification of the test solution. To be able to correct the magnitude and the phase shift, the so-called port expansion feature is used. INGUN also uses its self-developed SOLT calibration kits in combination with the de-embedding function.



The chart of the individual S-parameters can be derived easily from the s2p files (Touchstone format) generated.

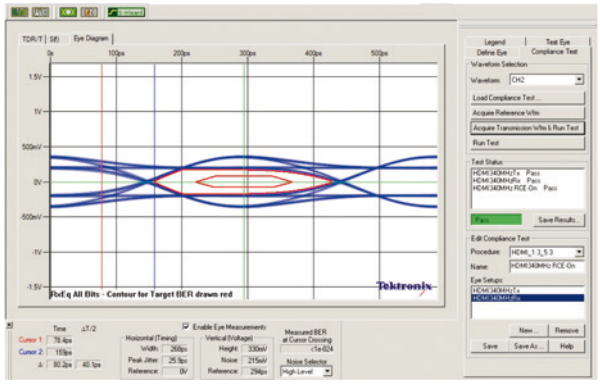


Typical return and insertion loss of a RF test probe

Specification of test probes for digital data transmission

INGUN has a wide range of digital RF test probes. Classic, analogue test solutions can be fully described using the S-parameter. By contrast, there are other criteria for digital test solutions. These are dependent on the transmission standards used. For example, to be able to specify the test solution for the transmission of USB 3.0 signals, the test specification demands, among other things, the specification of differential impedance and insertion loss, jitter, crosstalk, and many more.

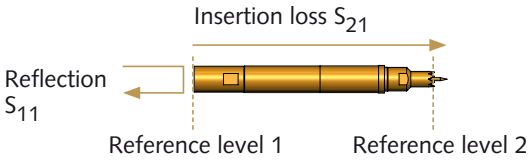
However, one of the most important criterion during specification is signal integrity of the entire signal path, which is shown in a so-called eye diagram. Matching the resulting eye diagram with the eye mask, provided by the transmission standard, reveals whether the transmission path meets the minimum requirements with regard to its electrical properties.



The INGUN laboratory has the the appropriate measurement equipment and software to perform specification of digital test probes. Using time domain analyses, measurements to determine the differential impedance can also be performed.

S-parameter charts for RF test probes

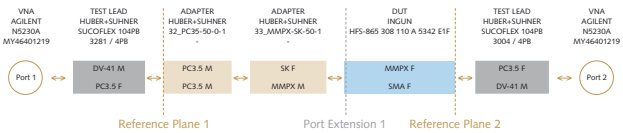
If a RF test probe is part of a signal path that needs to be characterised, its precise characteristics of transmission must be known. The electrical properties of the test probe required with its reference plane 1 on its input interface, and reference plane 2 on the contact point in the working stroke are described using the S-parameter.



INGUN provides accompanying charts, also as digital s2p files in Touchstone format. These refer to the typical characteristics of transmission of the corresponding RF test probe. Please contact us if you require support with the characterisation of your signal path.

connection for MMPX™-plug

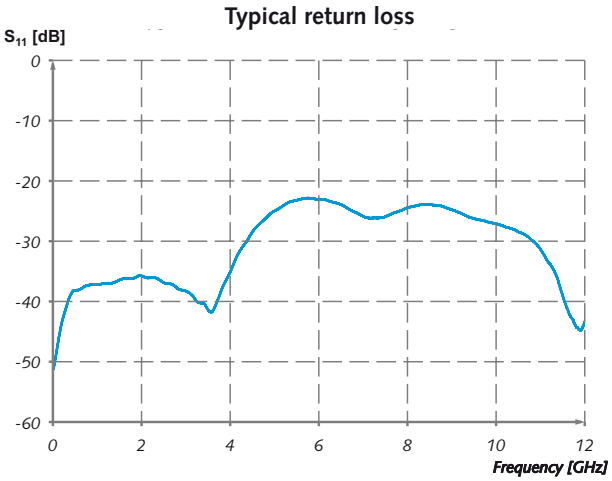
INGUN test set-up

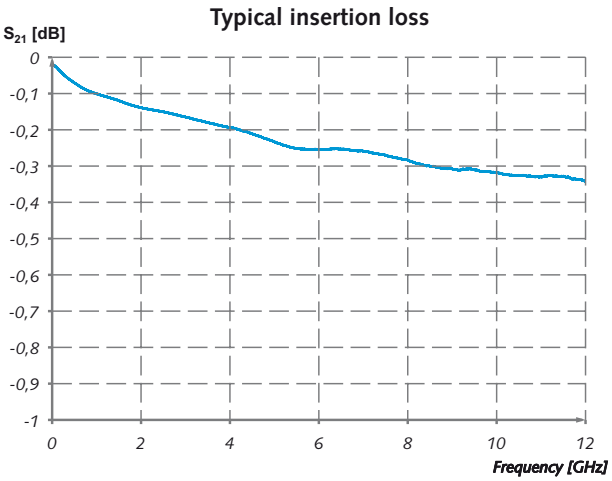


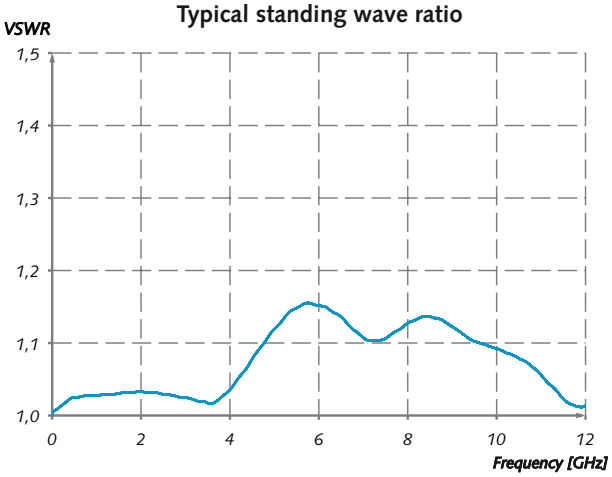
Schematic illustration of measurement set-up

Further S-parameter charts or s2p files in Touchstone format available upon request.

Typical characteristics of transmission HFS-865 308 110 A 5342 E1F







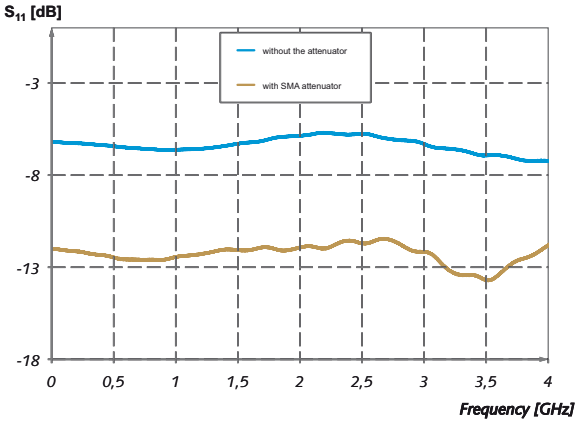
In-line attenuator for RF test probes

In-line attenuator for RF test probes

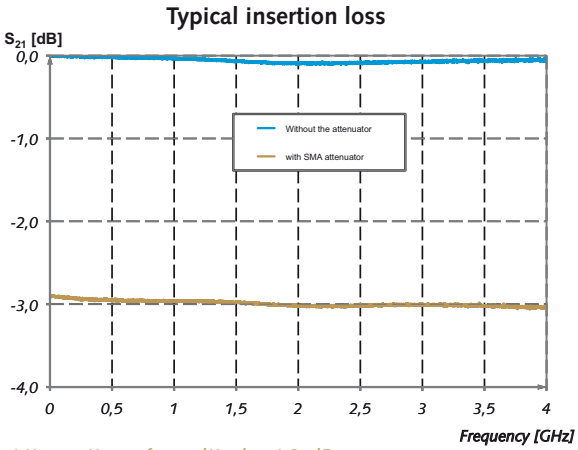
To artificially improve the return loss, so-called in-line attenuators can be used. These reduce the amplitude of the measurement signal. However, this factor is often less important than the fact that a reflected signal runs through an attenuator twice, therefore the return loss is theoretically improved twice as much as the attenuation values.

INGUN offers standard 50 Ω attenuators with 3 dB and 2 Watt load capacity, as well as optional MCX or SMA connection interfaces. Further attenuation values available upon request.

For more information and ordering numbers, see page 183.



Measurement example: improvement of return loss at c. 6 dB when using a 3 dB in-line attenuator



Attenuation of amplitude at 3 dB

HFS test set / PCB simulator

It is often difficult to characterise the entire signal path, including test probes, when RF test probes which are designed to contact PCBs are used. The PCB used must not be part of the measurement and should, in this case, be substituted. Therefore, INGUN has developed a RF test set especially for simulating the test point on the PCB. The set consists of two SMA adapters, two grounding plates and a connecting sleeve for the single "back-to-back" measurement.

The set enables:

– Precise measurement by accounting for the calibration of the test probe, and omitting this from the measurement.
– Quick and easy error detection, in case this is required.

General information

Structure of the INGUN RF probes

Base Materials

The choice of the base materials is dependent on the demands placed on each individual component.

BeCu (beryllium copper) provides a good compromise between brass and steel: The high percentage of copper makes it an ideal electrical conductor and the small percentage of beryllium allows the base material to be hardened (up to 435 HV). This optimises the durability and aggressiveness of the plunger tip.

Steel is used for practically all aggressive tip styles. It provides a high level of hardness and sharpness of the plunger tips. This ensures durability and reliable contacting.

Brass is sometimes used for passive tip styles and for machined barrels. The high percentage of copper makes it an ideal electrical conductor. Brass, however, is too soft for aggressive tip styles.

New silver (NiAg) and bronze are mainly used for receptacles and test probe barrels. These materials have a high tensile strength, which is ideal for ensuring long service life of test probes. Furthermore, these materials provide a good elasticity of the crimp points on the receptacles.

Spring steel of the highest possible quality is used for the manufacturing of the springs. High-alloyed spring steels (i.e. stainless steel) are used for high and low temperature ranges.

Plating Material

INGUN hard-gold is used.

Hard gold: This speciaised gold-plating was developed specifically for RF probes and boasts very good chemical durability. Hardness 150 – 200 HV. It is especially effective for protection against tarnishing and corrosion.

In the case of all plating materials, the very low specific resistance values guarantee the best contacting reliability.

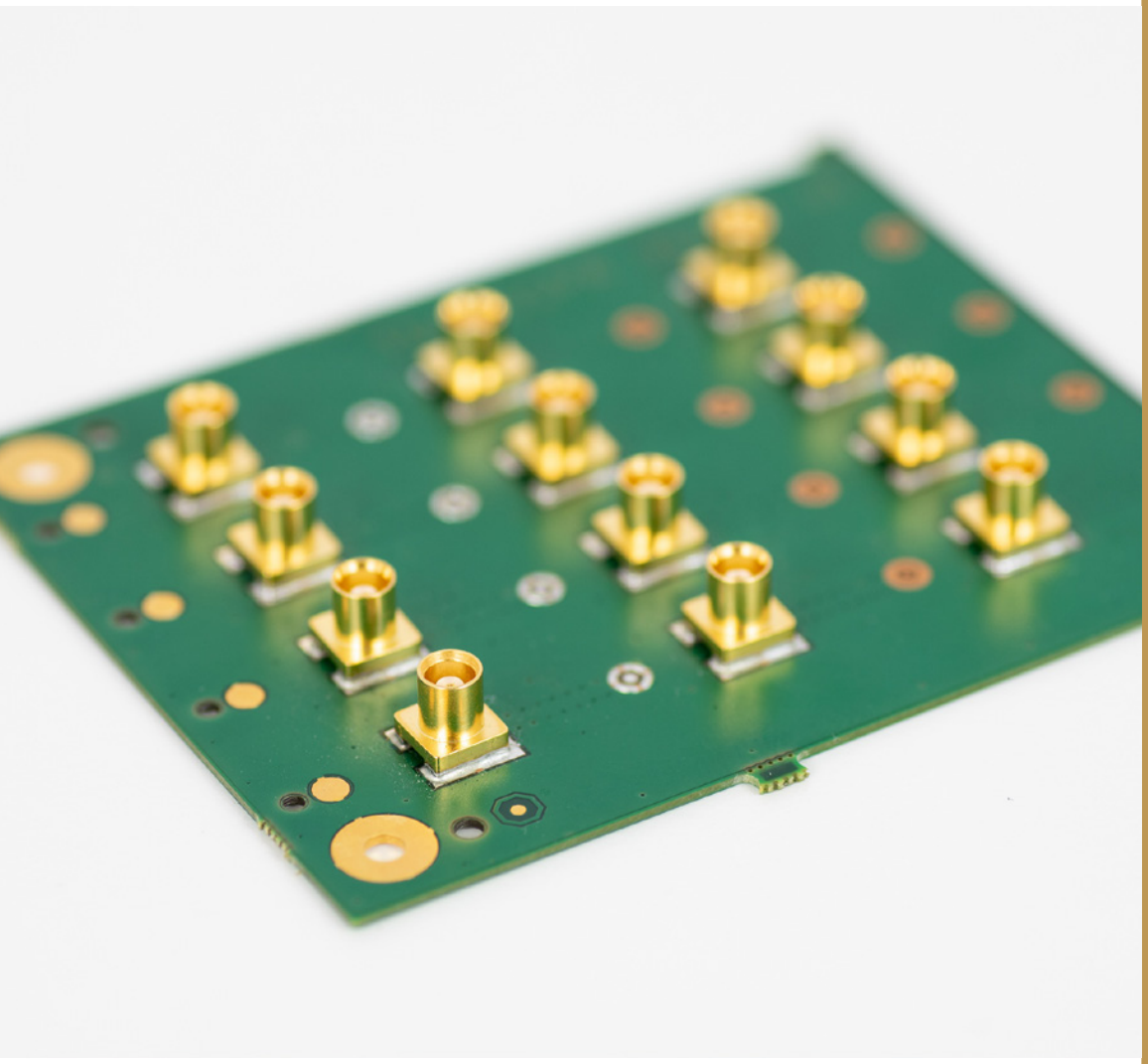
EU Environmental Legislation

Numerous European Environmental Legislation Acts aim to ensure a high level of protection of human health and the environment. This legislation is always observed as part of the business decisions and actions taken by INGUN Prüfmittelbau GmbH.

INGUN has prepared official statements for the most important of the current European Environmental Legislation Acts, up-to-date versions of which are available on our website: www.ingun.com/company

INGUN Environment Compliance Statement	**REACH** EU ordinance 1907/2006	**RoHS** EU directive 2002/95/EC	**ACPEIP** "China-RoHS"
DMF EU directive 2009/251/EC	**PFOS** EU directive 2006/122/EC	**UL-certification** UL 94	**Conflict Minerals** Dodd-Frank Act
radioactively contaminated stainless steel	**PAK** ZEK 01.2-08		

Contents



MMBX

Signal conductor female

MMCX

Signal conductor female

MBX

Signal conductor male

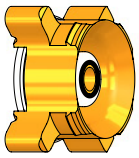
Signal conductor female

MCX

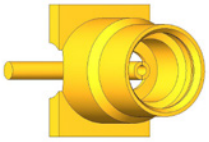
Signal conductor female

MMBX / MMCX / MBX / MCX plug connectors

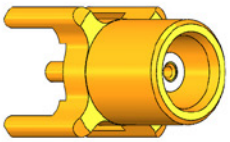
MMBX signal conductor female



MMCX signal conductor female

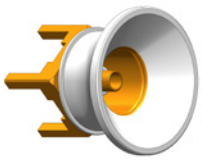


MCX signal conductor female

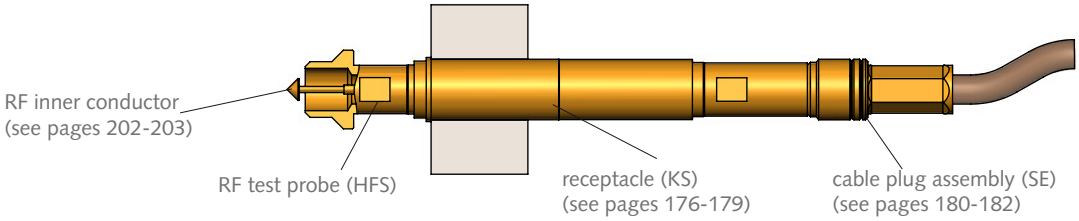


MBX signal conductor male

MBX signal conductor female

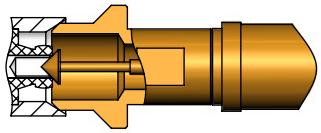


Dimensions featured in the accessories section, see page 186.

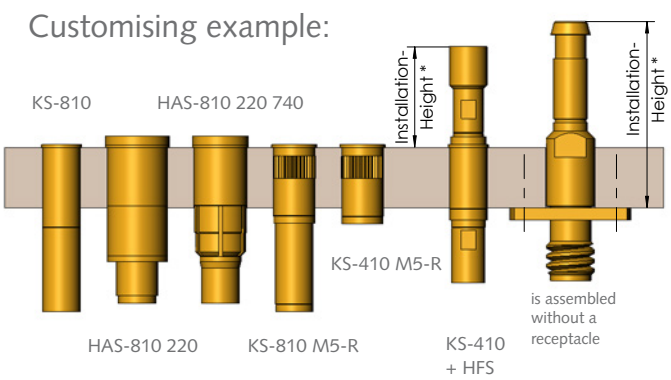


Contacting example MMBX:

Contacting of MMBX signal conductor female
HFS-840 308 110 A 80 42 BX



Customising example:



Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)	Without KS
Version		* Installation height of HFS in KS		
MMBX signal conductor female	...BX / ... BX M	11.9 mm	13.0 mm	---
	... BXF / ... BXF M	10.3 mm	11.4 mm	---
MMCX signal conductor female	... Z / ... Z M	11.1 mm	12.2 mm	---
MBX signal conductor male	... MBXF	---	---	28.5 mm
MBX signal conductor female	... MBX /... MBX M	12.4 mm	13.l5 mm	---
MCX signal conductor female	... X / ... X M	12.9 mm	14.0 mm	---
	(HFS-860) ... X / ... XM	11.9 mm	13.0 mm	---
	...X4/...X4M	11.8 mm	12.9 mm	---

Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

Electrical data

HFS-810 / 810 M **HFS-840 / 840 M**	
HFS-410 / 410 M **HFS-440 / 440 M**	
HFS-822 **HFS-860 / 860 M** **HFS-865**	
Frequency range with HFS-810/410:	up to 2 GHz
Frequency range with HFS-840/440:	up to 4 GHz
Frequency range with HFS-860:	up to 6 GHz
Frequency range with HFS-865:	up to 12 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical:	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance:	50 Ω

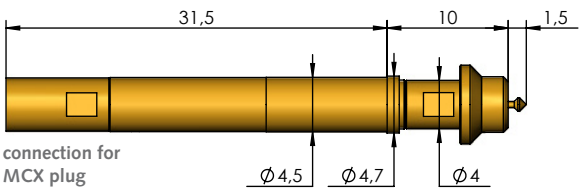
Operating temperature range

–40 up to +80° C

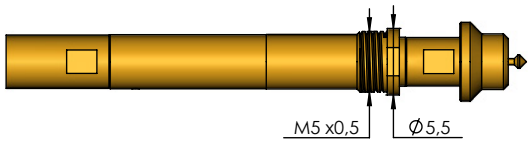
MMBX signal conductor ◎ female

Series:

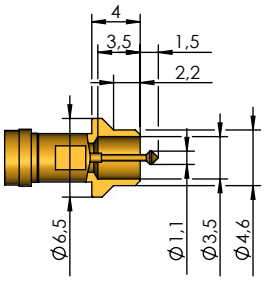
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 308 110 A **xx** 42 BX
HFS-840 308 110 A **xx** 42 BX M

Note:

Centring range: ± 0.5 mm

Spring force value

For the order description, "xx" must be replaced by the specific value.
The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M
Spring force of inner conductor at working stroke (N)	2.0
Spring force of outer conductor at working stroke (N)	6.0
Designation for ordering	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

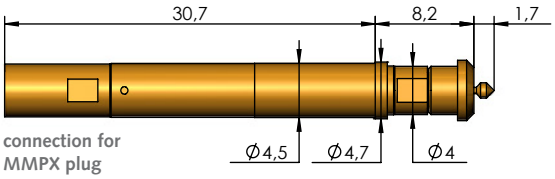
◎ MMBX signal conductor female

up to 12 GHz
(50 Ω)

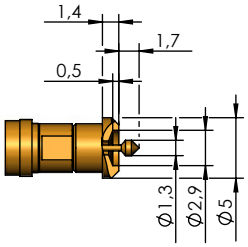
HFS-865

Series:

HFS-865 ...



Available
tip styles:



Ordering description:

HFS-865 308 127 A **xx** 42 BXF

Note:

Centring range: ± 0.3 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-865
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**53**

Mechanical data

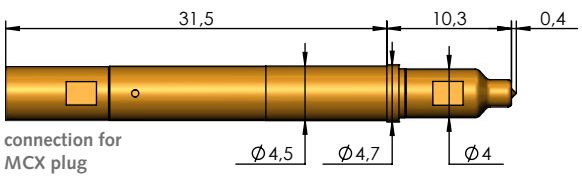
HFS-865

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	1.0 mm
Maximum stroke:	5.0 mm	1.5 mm

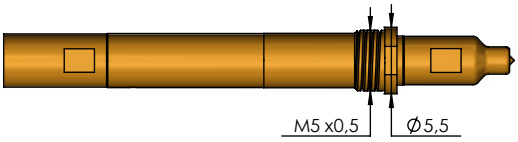
MMCX signal conductor ◎ female

Series:

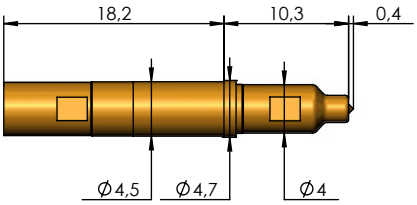
HFS-810 ...



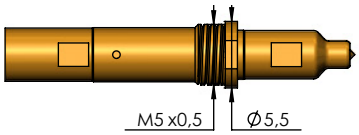
HFS-810 ... M (*)



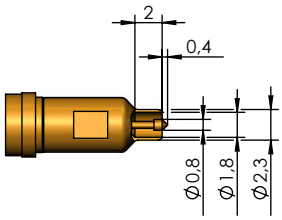
HFS-410 ...



HFS-410 ... M (*)



Available tip styles:



Ordering description:

HFS-810 358 080 A **xx** 42 Z
HFS-810 358 080 A **xx** 42 Z M
HFS-410 358 080 A **xx** 42 Z
HFS-410 358 080 A **xx** 42 Z M

Note:
Version with pre-centring on the inner side of the plug connector's outer conductor.

Centring range: ± 0.4 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-810 HFS-810 M		HFS-410 HFS-410 M
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	4.0
Designation for ordering	**53**	**80**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-810 and HFS-810 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	1.2 mm
Maximum stroke:	5.0 mm	2.9 mm

Mechanical data
HFS-410 and HFS-410 M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	1.2 mm
Maximum stroke:	3.0 mm	2.2 mm

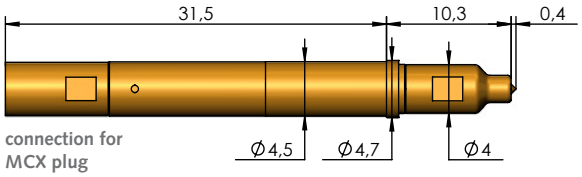
◎ MMCX signal conductor female

up to 4 GHz (50 Ω)

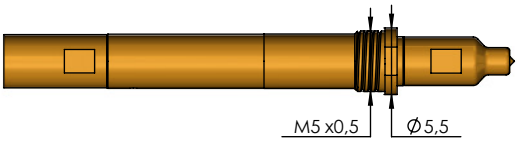
HFS-840 / HFS-840 M

Series:

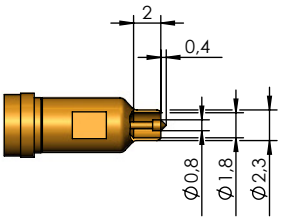
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 358 080 A **xx** 42 Z
HFS-840 358 080 A **xx** 42 Z M

Note:
Version with pre-centring on the inner side of the plug connector's outer conductor.

Centring range: ± 0.4 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

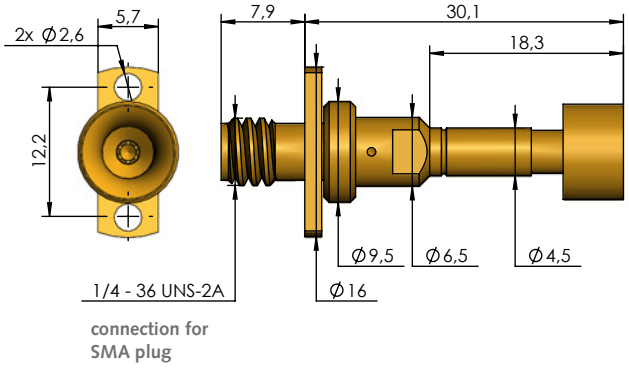
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	1.2 mm
Maximum stroke:	5.0 mm	2.9 mm

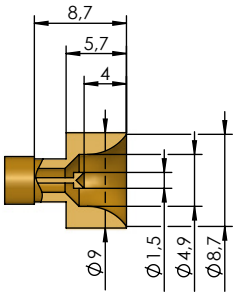
MBX signal conductor ⊙ male

Series:

HFS-822 ...



Available tip styles:



Ordering description:

HFS-822 303 150 A **xx** 43 MBXF

Note:
Version with flange connection. No movement of the connection during stroke movement.

Centring range: ± 1.8 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

Note:
The RF test probes in the HFS-822 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

	HFS-822
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**50**

Mechanical data

HFS-822

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

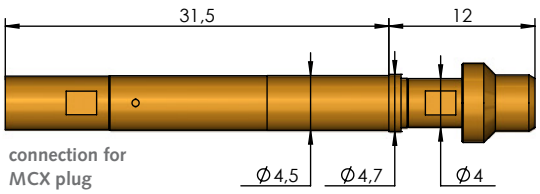
◎ MBX signal conductor female

up to 4 GHz (50 Ω)

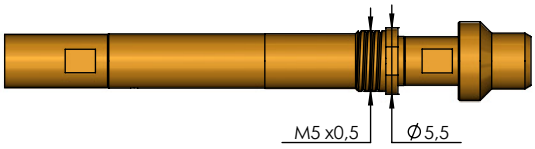
HFS-840 / HFS-840 M

Series:

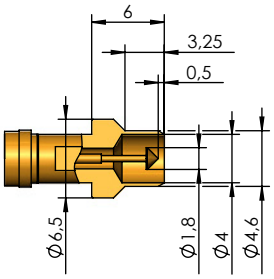
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 308 180 A **xx** 42 MBX
HFS-840 308 180 A **xx** 42 MBX M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.4 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**53**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

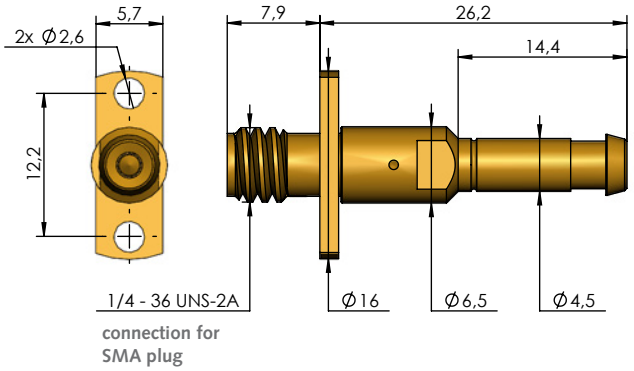
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

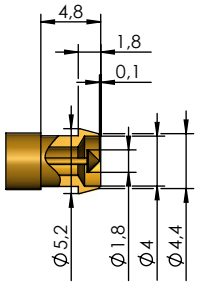
MBX signal conductor ◎ female

Series:

HFS-822 ...



Available tip styles:



Ordering description:

HFS-822 308 180 A **xx** 42 MBX2

Note:
Version with flange connection. No movement of the connection during stroke movement.

Centring range: ± 0.3 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

Note:
The RF test probes in the HFS-822 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

	HFS-822
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**50**

Mechanical data

HFS-822

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

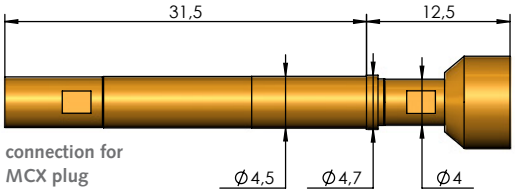
◎ MCX signal conductor female

up to 2 GHz (50 Ω)

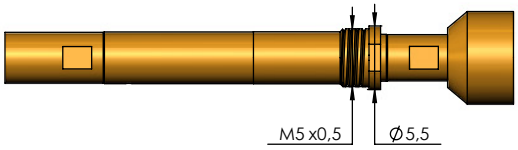
HFS-810 / HFS-810 M

Series:

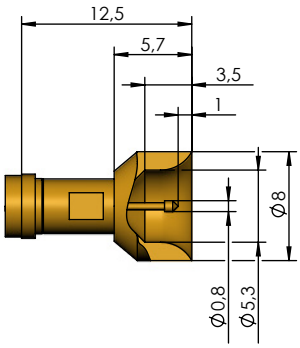
HFS-810 ...

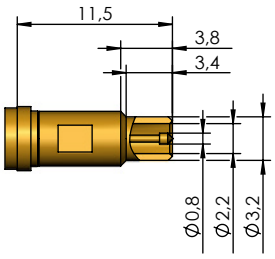


-810 ... M (*)



Available tip styles:





Ordering description:

HFS-810 308 080 A **xx** 43 X
HFS-810 308 080 A **xx** 43 X M

Note: Version with enlarged centering range. Outer conductor centers itself from the outer side on the connector.

Centring range: ± 1.4 mm

HFS-810 308 080 A **xx** 42 X4
HFS-810 308 080 A **xx** 42 X4 M

Note: Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.6 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-810 HFS-810 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

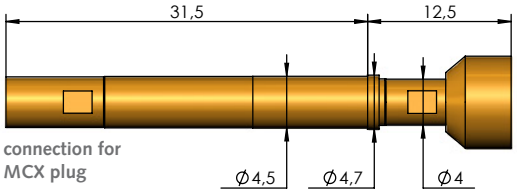
HFS-810 and HFS-810 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

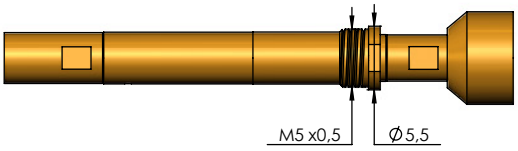
MCX signal conductor ◎ female

Series:

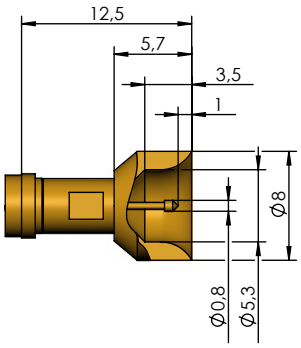
HFS-840 ...

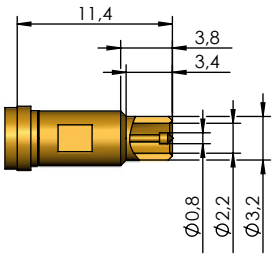


HFS-840 ... M (*)



Available tip styles:





Ordering description:

HFS-840 308 080 A **xx** 43 X
HFS-840 308 080 A **xx** 43 X M

Note: Version with enlarged centering range. Outer conductor centers itself from the outer side on the connector.

Centring range: ± 1.4 mm

HFS-840 308 080 A **xx** 42 X4
HFS-840 308 080 A **xx** 42 X4 M

Note: Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.6 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

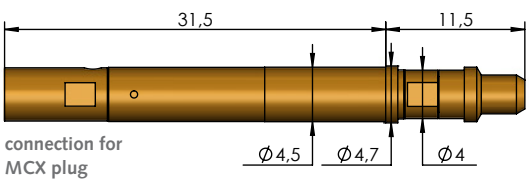
◎ MCX signal conductor female

up to 6 GHz (50 Ω)

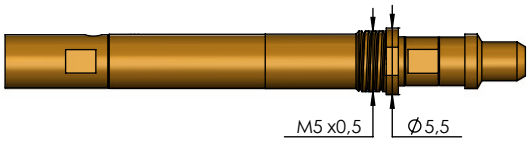
HFS-860 / HFS-860 M

Series:

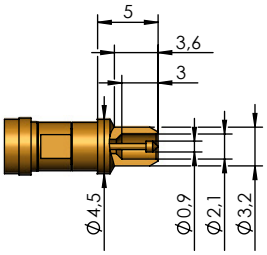
HFS-860 ...



HFS-860 ... M (*)



Available tip styles:



Ordering description:

HFS-860 308 090 A **xx** 42 X
HFS-860 308 090 A **xx** 42 X M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.6 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-860 HFS-860 M
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**53**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-860 and HFS-860 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Contents

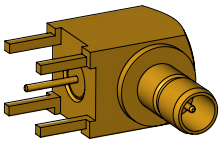
Mini-SMB

SMB

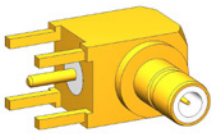
SMC

Mini SMB / SMB / SMC plug connectors

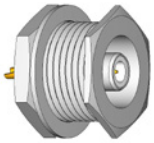
mini SMB conductor male



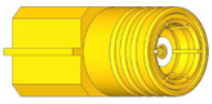
SMB signal conductor male



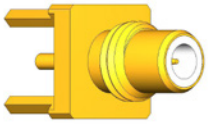
SMB signal conductor female



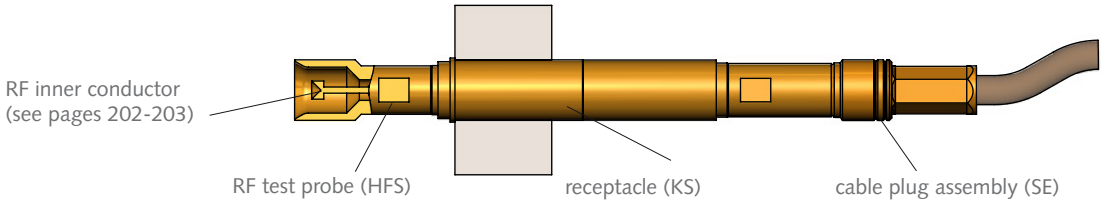
SMB signal conductor female



SMC signal conductor male

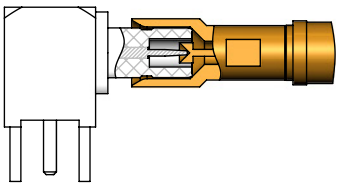


Dimensions featured in the accessories section, see page 186.

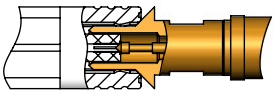


Contacting example SMB:

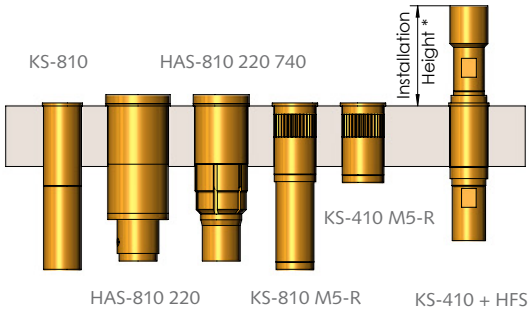
Contacting of SMB signal conductor male
HFS-810 303 150 A 5343 Y



Conacting of SMB signal conductor female
HFS-810 308 080 A 5342 ZE



Customising example:



Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)
Version		*Installation height of HFS in KS	
Mini SMB signal conductor male			
SMB signal conductor male	...Y / ... YM	13.3 mm	14.4 mm
	... Y2 / ... Y2 M		
	... F-Y14 / ... F-Y14 M		
	... Y3 / ... Y3 M		
SMB signal conductor female	... ZE / ... ZE M	11.8 mm	12.9 mm
SMC signal conductor male	... Y5 / ... Y5	12.0 mm	13.1 mm

Electrical data

HFS-810 / 810 M	HFS-840 / 840 M
HFS-410 / 410 M	HFS-440 / 440 M

Frequency range with HFS-810/410:	up to 2 GHz
Frequency range with HFS-840/440:	up to 4 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical:	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance:	50 Ω

Operating temperature range

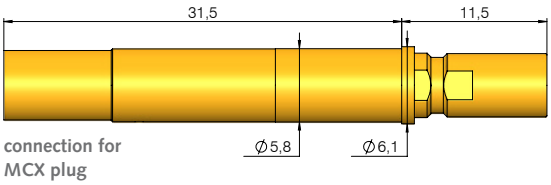
–40° up to +80° C

Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

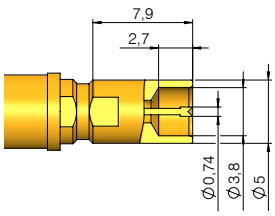
Mini-SMB signal conductor ⊙ male

Series:

HFS-858 ... MSMB



Available tip styles:



Ordering description:

HFS-858 303 074 A **53** 43 MSMB

Note:
Version with pre-centring on the inner side of the plug connector's outer contact.

Centring range: ± 0.4 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-858
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**53**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-858

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

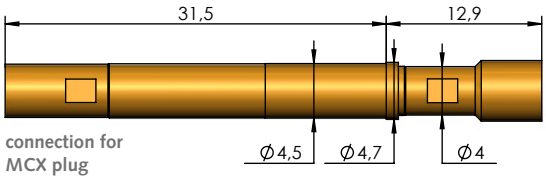
⊙ SMB signal conductor male

up to 2 GHz (50 Ω)

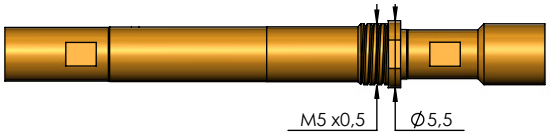
HFS-810 / HFS-810 M
HFS-410 / HFS-410 M

Series:

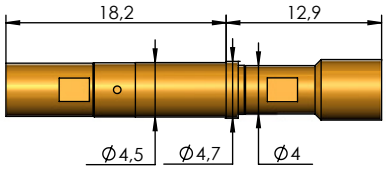
HFS-810 ...



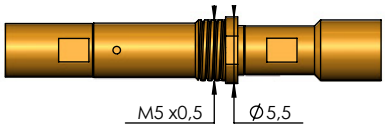
HFS-810 ... M (*)



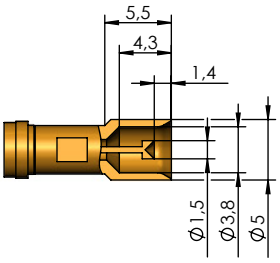
HFS-410 ...

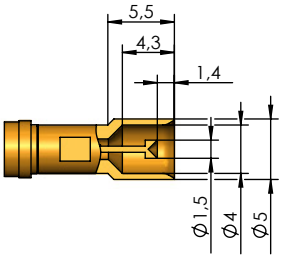


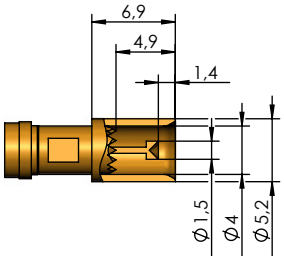
HFS-410 ... M (*)



Available tip styles:







Ordering description:

HFS-810 303 150 A **xx** 43 Y
HFS-810 303 150 A **xx** 43 Y M
HFS-410 303 150 A **xx** 43 Y
HFS-410 303 150 A **xx** 43 Y M

Note: Version with larger centring range.

Centring range: ± 0.6 mm

HFS-810 303 150 A **xx** 43 Y2
HFS-810 303 150 A **xx** 43 Y2 M
HFS-410 303 150 A **xx** 43 Y2
HFS-410 303 150 A **xx** 43 Y2 M

Note: Version with larger centring range and inner diameter of outer conductor - for applications with risk of positioning errors.

Centring range: ± 0.7 mm

HFS-810 303 150 A **xx** 43 F-Y14
HFS-810 303 150 A **xx** 43 F-Y14 M
HFS-410 303 150 A **xx** 43 F-Y14
HFS-410 303 150 A **xx** 43 F-Y14 M

Note: Outer conductor with inner serrated tip for applications where contamination may collect on connector.

Centring range: ± 0.7 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-810 HFS-810 M			HFS-410 HFS-410 M
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.3	1.0
Spring force of outer connector at working stroke (N)	4.0	6.0	8.0	4.0
Designation for ordering	**53**	**80**	**93**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-810 and HFS-810 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

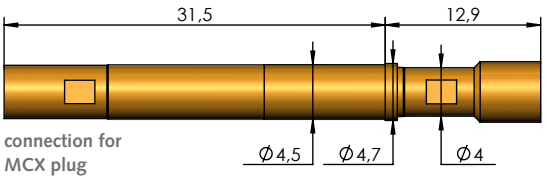
Mechanical data
HFS-410 and HFS-410 M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

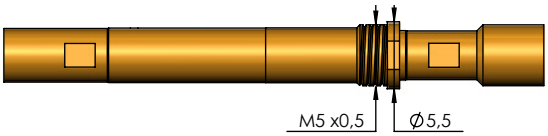
SMB signal conductor male ⊙

Series:

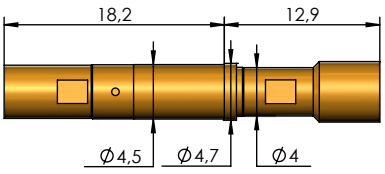
HFS-840 ...



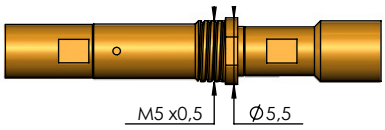
HFS-840 ... M (*)



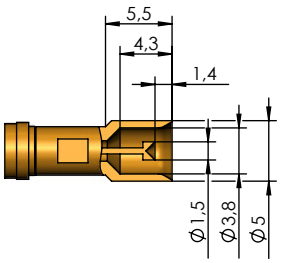
HFS-440 ...

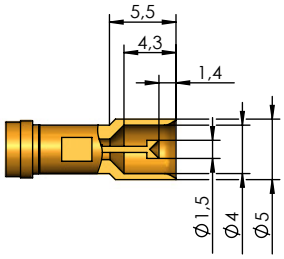


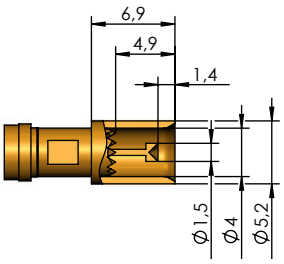
HFS-440 ... M (*)



Available tip styles:







Ordering description:

HFS-840 303 150 A **xx** 43 Y
HFS-840 303 150 A **xx** 43 Y M
HFS-440 303 150 A **xx** 43 Y
HFS-440 303 150 A **xx** 43 Y M

Note: Version with larger centring range.

Centring range: ± 0.6 mm

HFS-840 303 150 A **xx** 43 Y2
HFS-840 303 150 A **xx** 43 Y2 M
HFS-440 303 150 A **xx** 43 Y2
HFS-440 303 150 A **xx** 43 Y2 M

Note: Version with larger centring range and inner diameter of outer conductor - for applications with risk of positioning errors.

Centring range: ± 0.7 mm

HFS-840 303 150 A **xx** 43 F-Y14
HFS-840 303 150 A **xx** 43 F-Y14 M
HFS-440 303 150 A **xx** 43 F-Y14
HFS-440 303 150 A **xx** 43 F-Y14 M

Note: Outer conductor with inner serrated tip for application when connector is contaminated.

Centring range: ± 0.7 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M	HFS-440 HFS-440 M
Spring force of inner conductor at working stroke (N)	1.3	1.0
Spring force of outer connector at working stroke (N)	4.0	4.0
Designation for ordering	**53**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Mechanical data
HFS-440 and HFS-440 M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

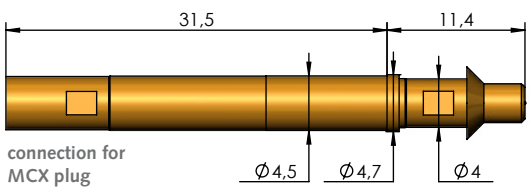
◎ SMB signal conductor female

up to 4 GHz (50 Ω)

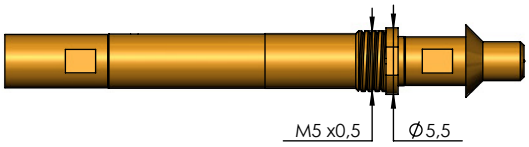
HFS-840 / HFS-840 M

Series:

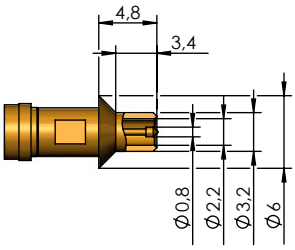
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 308 080 A **xx** 42 ZE
HFS-840 308 080 A **xx** 42 ZE M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.4 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

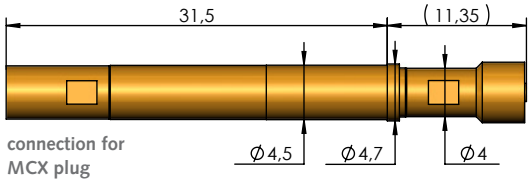
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

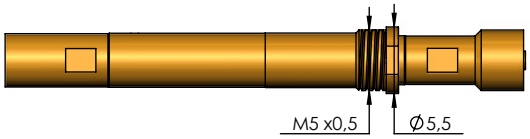
SMC signal conductor ⊙ male

Series:

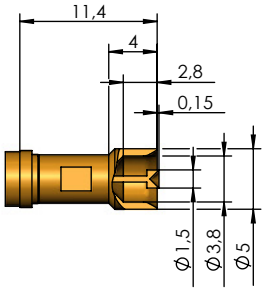
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 303 150 A **xx** 43 Y5
HFS-840 303 150 A **xx** 43 Y5 M

Note:
Not suitable for SMB contacting, because the inner conductor stroke would be too short.

Centring range: ± 0.6 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**53**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Contents

SMP / SMP-L / SSMP / SMP-MAX / P-SMP / SMPX plug connectors

Examples from Huber+Suhner:

SMP conductor male

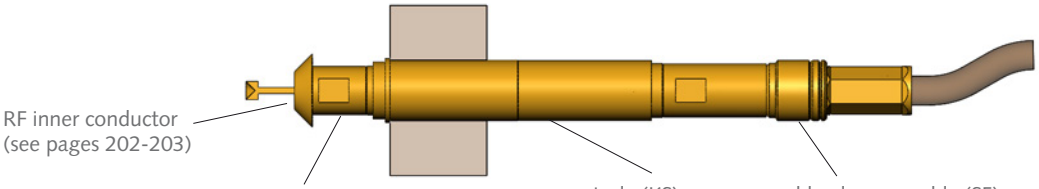
SMP-L conductor male

SSMP conductor male

SMP-MAX signal conductor male

P-SMP signal conductor male

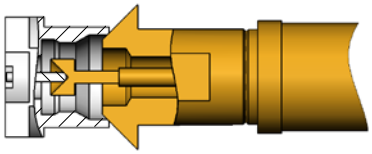
Dimensions featured in the accessories section, see page 186.



Contacting example SMP:

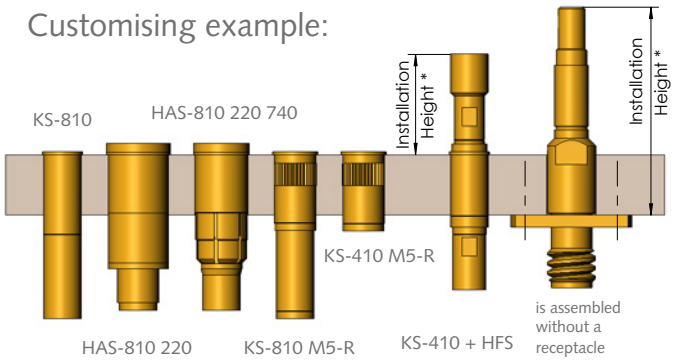
Contacting of SMP signal conductor female

HFS-810 303 150 A 5342 E



HFS-822

Customising example:



Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)	Without KS
Version		*Installation height of HFS in KS		
SMP signal conductor male	... E / ...E M	11.9 mm	13.0 mm	---
	... SMP-H	---	---	24.0 mm
SMP-L signal conductor male	...SMPL	---	---	24.0 mm
SSMP signal conductor male	... SSMP / ...SSMP M	10.9 mm	12.0 mm	---
SMP-MAX signal conductor male	... SMPM M	---	---	27.5 mm
P-SMP signal conductor male	... PSMP2	---	---	25.0 mm

Electrical data

HFS-840 / 840 M

HFS-822 **HFS-856**

HFS-860 / 860 M **HFS-865**

Frequency range with HFS-840:	up to 4 GHz
Frequency range with HFS-822/856:	up to 6 GHz
Frequency range with HFS-860:	up to 6 GHz
Frequency range with HFS-865:	up to 12 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical:	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance:	50 Ω

Operating temperature range

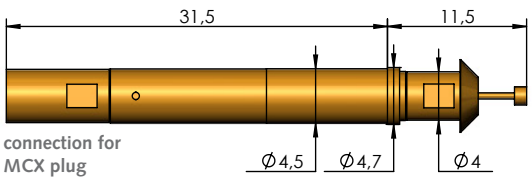
–40 up to +80° C

Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

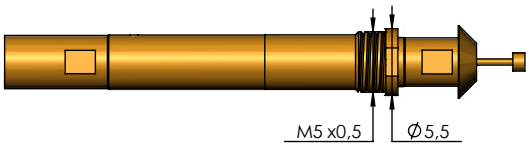
SMP signal conductor ⊙ male

Series:

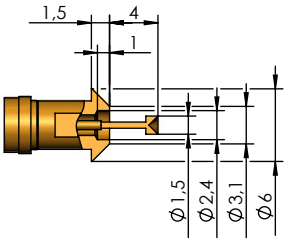
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 303 150 A **xx** 42 E
HFS-840 303 150 A **xx** 42 E M

Note:
Version with pre-centring via inner conductor.

Centring range: ± 0.4 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

SMP signal conductor male

up to 9 GHz (50 Ω)

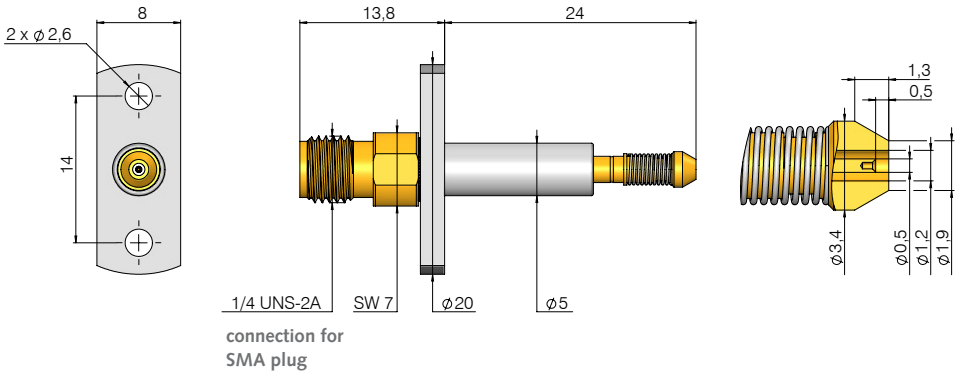
HFS-856

Series:

Available tip styles:

Ordering description:

HFS-856 ...



HFS-856 303 051 A **xx** 42 SMP-H

Note:
The HFS-856 is moveable once installed (floating) and the connector moves during the working stroke.

Compensation of radial positioning inaccuracies of the connector by up to ± 3.0°.

Centring range: ± 0.7 mm

RF performance:

	S11	VSWR
6 GHz:	-20 dB	1.25
9 GHz:	-15 dB	1.45

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-856
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**50**

Note:
The RF test probes in the HFS-852 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

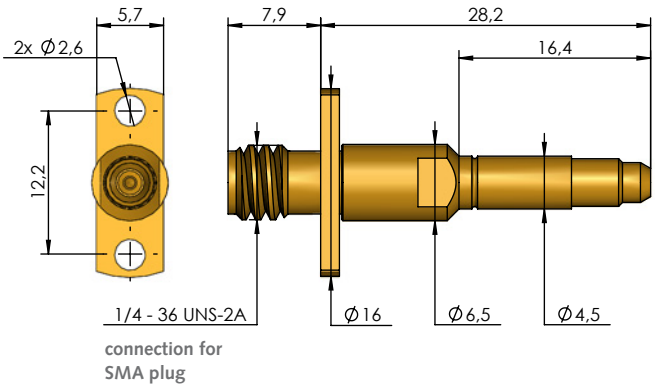
HFS-856

	Outer cond.	Inner cond.
Working stroke:	4.2 mm	1.0 mm
Maximum stroke:	5.2 mm	1.0 mm

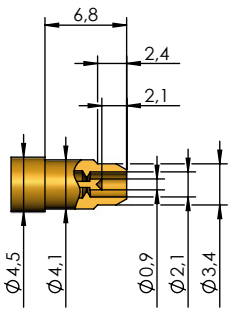
SMP-L signal conductor ⊙ male

Series:

HFS-822 ...



Available tip styles:



Ordering description:

HFS-822 303 090 A **xx** 42 SMPL

Note:
Version with flange connection. Connection does not move during stroke movement.

Centring range: ± 0.6 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-822
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**50**

Note:
The RF test probes in the HFS-822 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-822

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

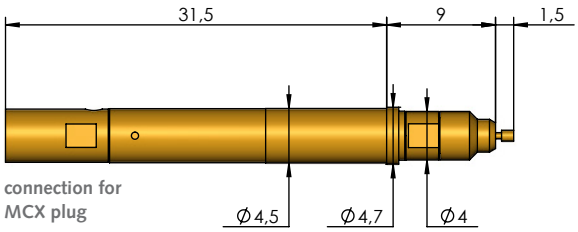
⊙ SSMP signal conductor male

up to 6 GHz (50 Ω)

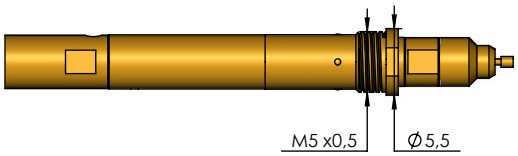
HFS-860 / HFS-860 M

Series:

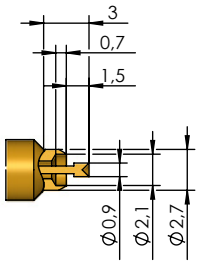
HFS-860 ...



HFS-860 ... M (*)



Available tip styles:



Ordering description:

HFS-860 303 090 A **xx** 42 SSMP
HFS-860 303 090 A **xx** 42 SSMP M

Note: Version with pre-centering on the inner side.

Centring range: ± 0.3 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-860 HFS-860 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

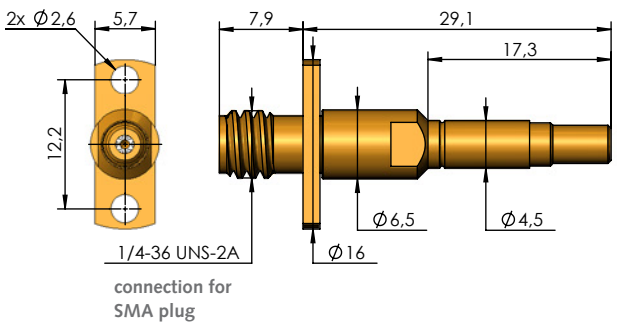
HFS-860 and HFS-860 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	1.0 mm
Maximum stroke:	5.0 mm	2.7 mm

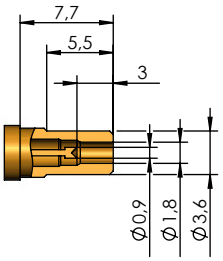
SMP-MAX signal ⊙ conductor male

Series:

HFS-822 ...



Available tip styles:



Ordering description:

HFS-822 303 090 A **xx** 42 SMPMM

Note:
Version with flange connection. Connection does not move during stroke movement. Pre-centring on the inner side of connector's outer conductor.

Centring range: ± 1.0 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-822
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**50**

Note:
The RF test probes in the HFS-822 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-822

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

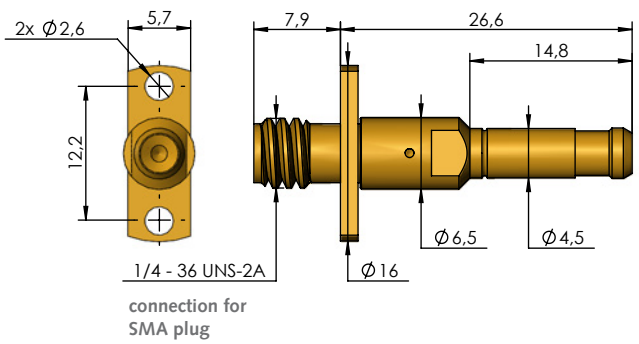
P-SMP signal conductor male

up to 6 GHz (50 Ω)

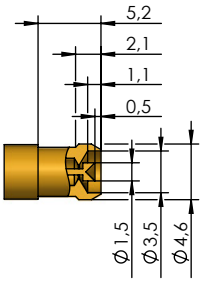
HFS-822

Series:

HFS-822 ...



Available tip styles:



Ordering description:

HFS-822 303 150 A **xx** 42 PSMP2

Note:
Version with flange connection. Connection does not move during stroke movement.

Centring range: ± 0.6 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-822
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**50**

Note:
The RF test probes in the HFS-822 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-822

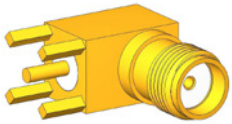
	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

Contents

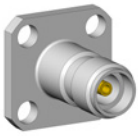
SMA / PC 3.5 / QMA plug connectors

SMA signal conductor male

SMA signal conductor female

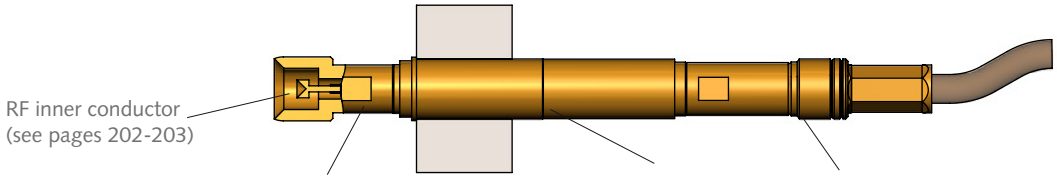


PC 3.5 signal conductor female



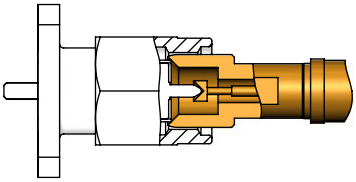
QMA signal conductor female

Dimensions featured in the accessories section, see page 186.

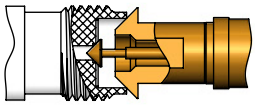


Contacting example SMA:

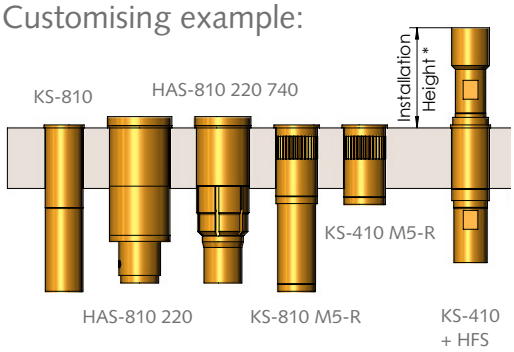
Contacting of SMA signal conductor male
HFS-840 303 150 A 5343 E3



Contacting of SMA signal conductor female
HFS-840 308 180 A 8042 E



Customising example:



Electrical data

HFS-810 / 810 M	**HFS-840 / 840 M**
HFS-410 / 410 M	**HFS-440 / 440 M**
HFS-860 / 860 M	**HFS-865 / 822**
Frequency range with HFS-810/410:	up to 2 GHz
Frequency range with HFS-840/440:	up to 4 GHz
Frequency range with HFS-860:	up to 6 GHz
Frequency range with HFS-865:	up to 12 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical:	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance:	50 Ω

Operating temperature range

–40 up to +80° C

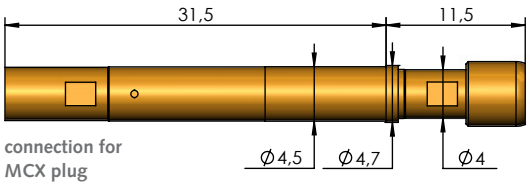
Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)
Version		*Installation height of HFS in KS	
SMA signal conductor male	... E3 / ...E3 M	11.9 mm	13.0 mm
SMA signal conductor female	...42E / ... 42E M	11.9 mm	13.0 mm
	...43E / ... 43E M	14.1 mm	15.2 mm
	(HFS-860)... E / ... E M	14.1 mm	15.2 mm
	... E1F / ... E1F M	12.2 mm	13.3 mm
	(HFS-890)... E / ... E M	13.6 mm	14.7 mm
PC 3.5 signal conductor female	... E2F	12.2 mm	13.3 mm
QMA signal conductor female	... QMA / ... QMA M	18.3 mm	19.4 mm

Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

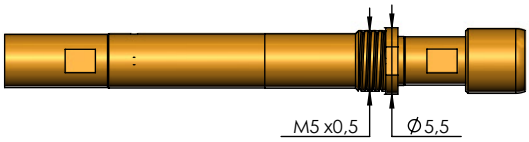
SMA signal conductor ⊙ male

Series:

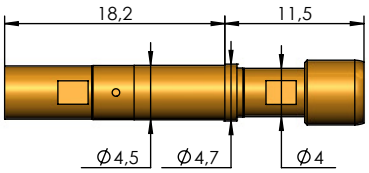
HFS-840 ...



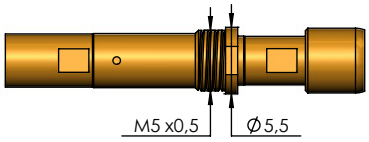
HFS-840 ... M (*)



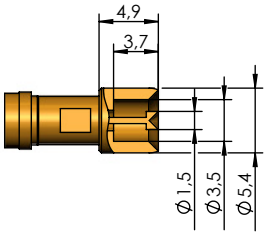
HFS-440 ...



HFS-440 ... M (*)



Available tip styles:



Ordering description:

HFS-840 303 150 A **xx** 43 E3
HFS-840 303 150 A **xx** 43 E3 M
HFS-440 303 150 A **xx** 43 E3
HFS-440 303 150 A **xx** 43 E3 M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.4 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M		HFS-440 HFS-440 M
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	4.0
Designation for ordering	**53**	**80**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Mechanical data
HFS-440 and HFS-440 M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

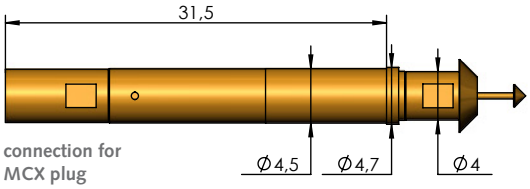
◎ SMA signal conductor female

up to 2 GHz (50 Ω)

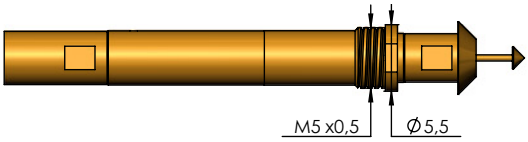
HFS-810 / HFS-810 M

Series:

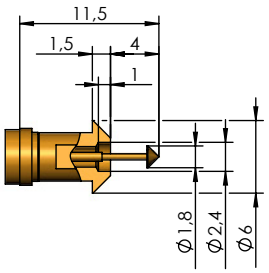
HFS-810 ...

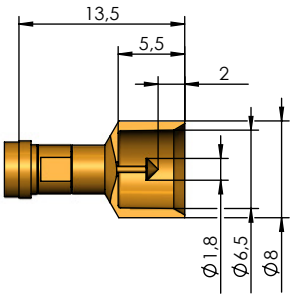


HFS-810 ... M (*)



Available tip styles:





Ordering description:

HFS-810 308 180 A **xx** 42 E
HFS-810 308 180 A **xx** 42 E M

Note:
Version with pre-centering via inner conductor.

Centring range: ± 0.3 mm

HFS-810 308 180 A **xx** 43 E
HFS-810 308 180 A **xx** 43 E M

Note:
Version with pre-centering via outer conductor.

Centring range: ± 1.0 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-810 HFS-810 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

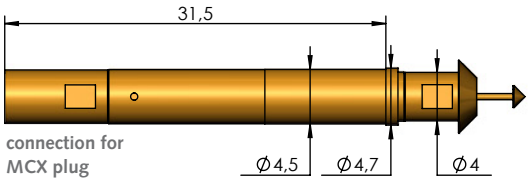
HFS-810 and HFS-810 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

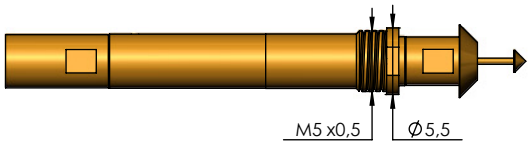
SMA signal conductor ◎ female

Series:

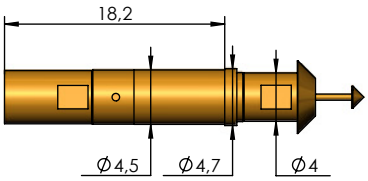
HFS-840 ...



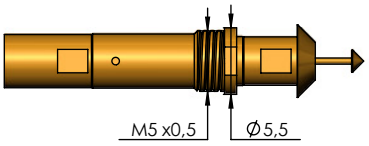
HFS-840 ... M (*)



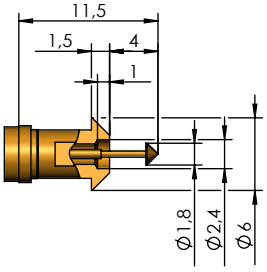
HFS-440 ...

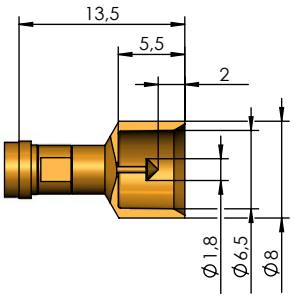


HFS-440 ... M (*)



Available tip styles:





Ordering description:

HFS-840 308 180 A **xx** 42 E
HFS-840 308 180 A **xx** 42 E M
HFS-440 308 180 A **xx** 42 E
HFS-440 308 180 A **xx** 42 E M

Note:
Version with pre-centering via inner conductor.

Centring range: ± 0.3 mm

HFS-840 308 180 A **xx** 43 E
HFS-840 308 180 A **xx** 43 E M
HFS-440 308 180 A **xx** 43 E
HFS-440 308 180 A **xx** 43 E M

Note:
Version with pre-centering via outer conductor.

Centring range: ± 1.0 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M			HFS-440 HFS-440 M
Spring force of inner conductor at working stroke (N)	1.3	2.0	2.0	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0	4.0
Designation for ordering	**53**	**80**	**99**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Mechanical data
HFS-440 and HFS-440 M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

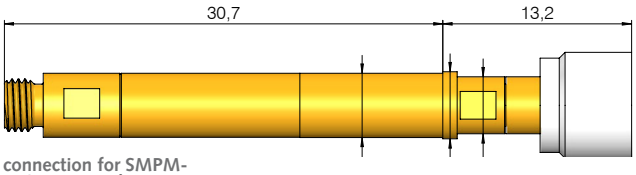
◎ SMA signal conductor female

up to 18 GHz (50 Ω)

HFS-890

Series:

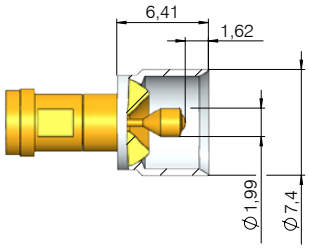
HFS-890 ...



connection for SMPM- or SMP M-T plug

Compatible SMPM cable:
SE-FLX405-0001

Available tip styles:



Ordering description:

HFS-890 305 123 A **93** 43 E

Note:
Best radio frequency performance for signal and data transmission.
SMPM connector acts as interface to test system, suitable for cable assemblies with SMPM (press-in) and SMPM-T (screw-in) interface for optimum signal transmission.
Long life expectancy due to low-wear internal structure.
Installation with floating mechanism required for optimal performance, e.g., receptacle with or without flange from the KS-810 or HAS-810 series, see page 178.

RF performance:

	S11	VSWR
0 - 12 GHz:	-20 dB	1.25
0 - 18 GHz:	-15 dB	1.45

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-890
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	8.0
Designation for ordering	**93**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-890

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	1.0 mm
Maximum stroke:	5.0 mm	

SMA-signal conductor ⊙ male

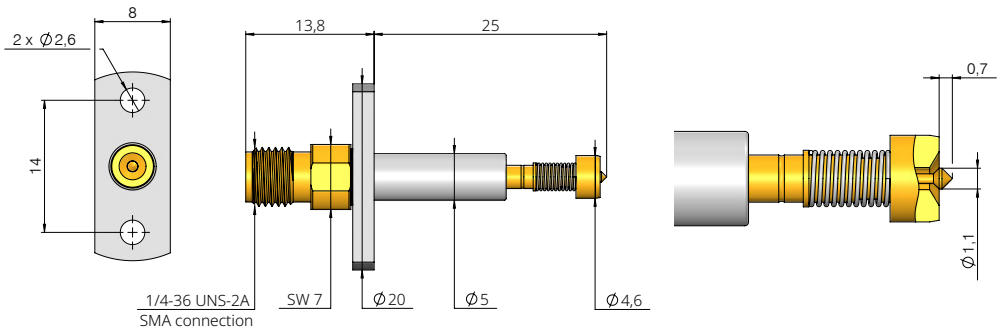
Series:

HFS-856 ... E1F-H

Available tip styles:

Ordering description:

HFS-856 308 110 A **63** 42 E1F-H



Note:
Precise mechanical accuracy due to exact guidance and re-positioning with new guiding barrel.
High degree of electrical repeating accuracy.
Protected signal conductor due to protruding ground (outer) conductor.
Long service life due to low-wear internal design.
Internationally preferred mounting via screw connection with flange.
Standardised SMA connection as interface to test system.

Centring range +/- 0.2mm

RF performance:

	RL-S11	VSWR
6 GHz:	-20 dB	1.25
12 GHz:	-15 dB	1.45

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-856
Spring force of inner conductor at working stroke (N)	1,5
Spring force of outer conductor at working stroke (N)	4,8
Designation for ordering	**63**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-856

	Outer cond.	Inner cond.
Working stroke:	4,2 mm	1,2 mm
Maximum stroke:	5,2 mm	2.0 mm

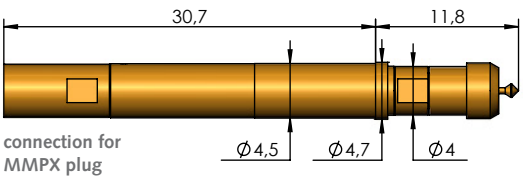
◎ PC 3.5 signal conductor female

up to 12 GHz
(50 Ω)

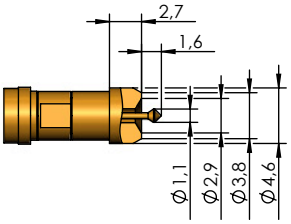
HFS-865

Series:

HFS-865 ...



Available tip styles:



Ordering description:

HFS-865 308 110 A **xx** 42 E2F

Note:
Version with pre-centering via inner conductor.

Centring range: ± 0.3 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-865
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**53**

Mechanical data

HFS-865

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	1.0 mm
Maximum stroke:	5.0 mm	1.5 mm

up to 6 GHz (50 Ω)

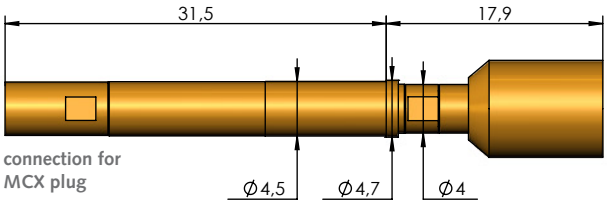
QMA signal conductor ◎ female

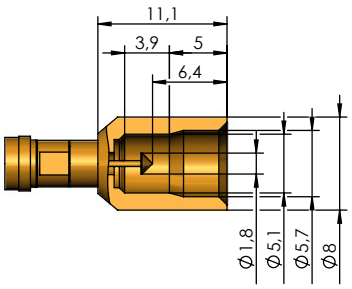
Series:

Available tip styles:

Ordering description:

HFS-860 ...



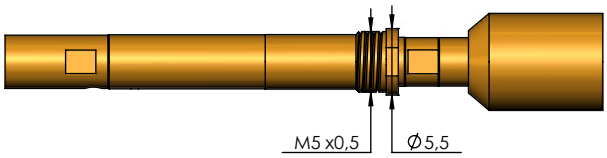


HFS-860 308 180 A **xx** 43 QMA
HFS-860 308 180 A **xx** 43 QMA M

Note:
Version with pre-centering via outer conductor.

Centring range: ± 0.8 mm

HFS-860 ... M (*)



SMA / PC3.5 / QMA

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-860 HFS-860 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-860 and HFS-860 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

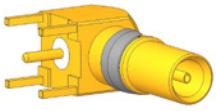
Contents

BMA / BNC / 1.0/2.3 plug connectors

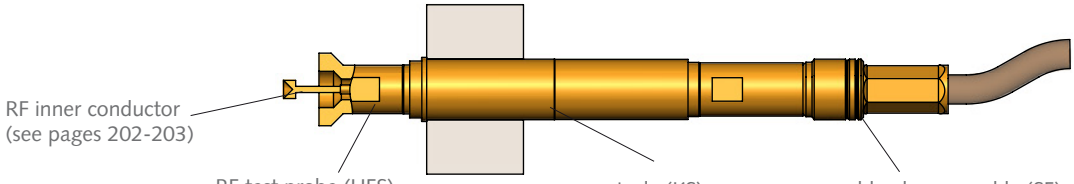
BMA signal conductor male

BNC signal conductor female

1.0 / 2.3 signal conductor female

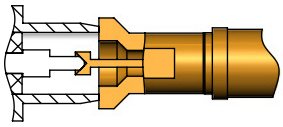


Dimensions featured in the accessories section, see page 186.

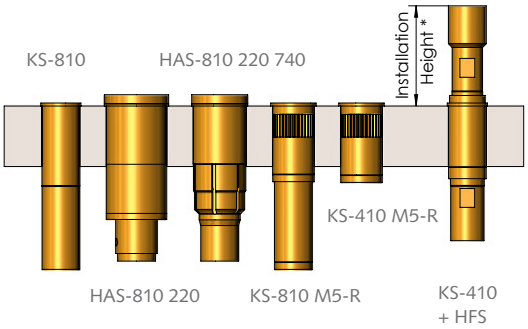


Contacting example BMA:

Contacting of BMA signal conductor male
HFS-810 303 150 A 5302 D



Customising example:



Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)
Version		*Installation height of HFS in KS	
BMA signal conductor male	... D / ... D M	11.8 mm	12.9 mm
BNC signal conductor female	... QS / ... QS M	14.8 mm	15.9 mm
1.0/2.3 signal conductor female	... T / ... T M	12.8 mm	13.9 mm

Electrical data
HFS-810 / 810 M **HFS-840 / 840 M**
HFS-860 / 860 M **HFS-865**

Frequency range with HFS-810:	up to 2 GHz
Frequency range with HFS-840:	up to 4 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical:	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance:	50 Ω

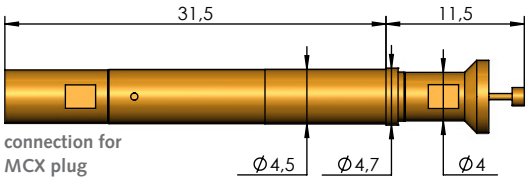
Operating temperature range
–40 up to +80° C

Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

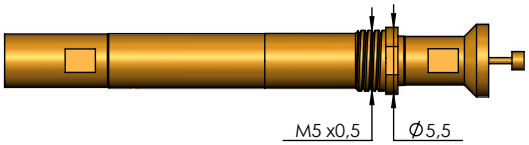
BMA signal conductor ⊙ male

Series:

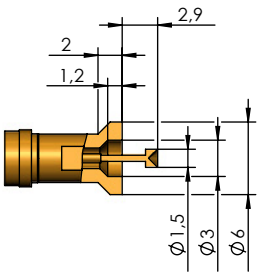
HFS-810 ...



HFS-810 ... M (*)



Available tip styles:



Ordering description:

HFS-810 303 150 A **xx** 02 D
HFS-810 303 150 A **xx** 02 D M

Note:
Version with pre-centering via inner conductor.

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-810 HFS-810 M
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**53**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-810 and HFS-810 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

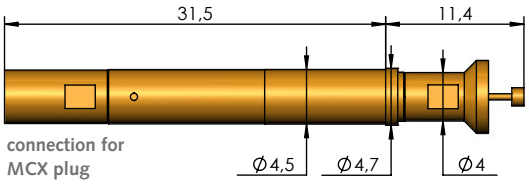
⊙ BMA signal conductor male

up to 4 GHz (50 Ω)

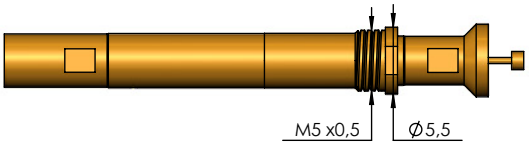
HFS-840 / HFS-840 M

Series:

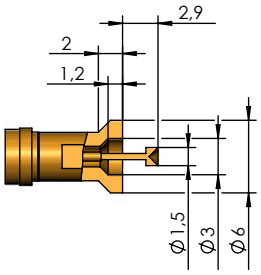
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 303 150 A **xx** 02 D
HFS-840 303 150 A **xx** 02 D M

Note:
Version with pre-centering via inner conductor.

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M			
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0	8.0
Designation for ordering	**53**	**80**	**93**	**99**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

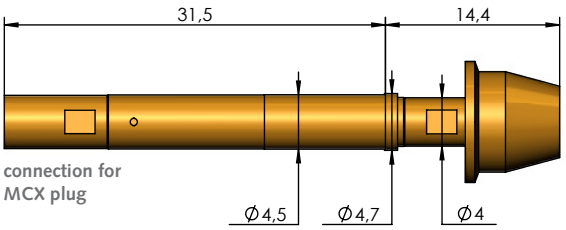
Mechanical data
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

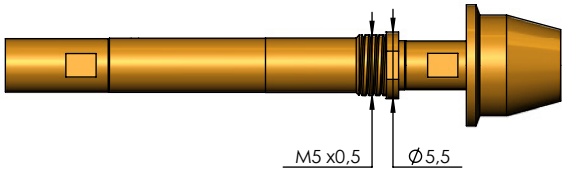
BNC signal conductor ◎ female

Series:

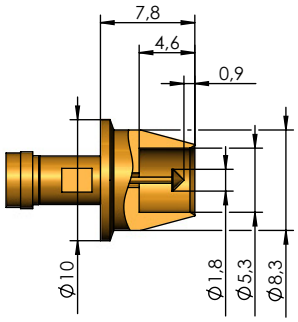
HFS-810 ...



HFS-810 ... M (*)



Available tip styles:



Ordering description:

HFS-810 358 180 A **xx** 42 QS
HFS-810 358 180 A **xx** 42 QS M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 1.4 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-810 HFS-810 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-810 and HFS-810 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.2 mm

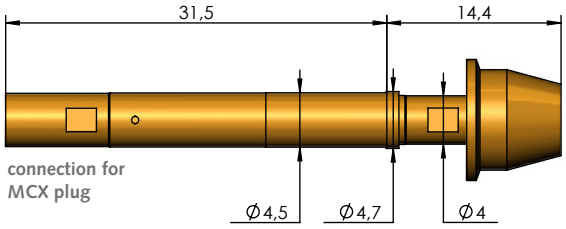
◎ BNC signal conductor female

up to 4 GHz (50 Ω)

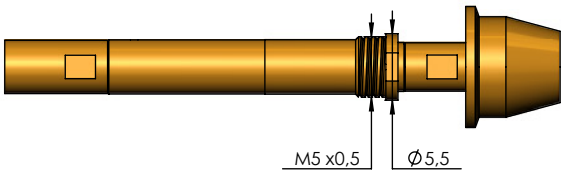
HFS-840 / HFS-840 M

Series:

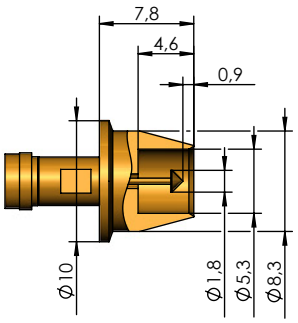
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 358 180 A **xx** 42 QS
HFS-840 358 180 A **xx** 42 QS M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 1.4 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

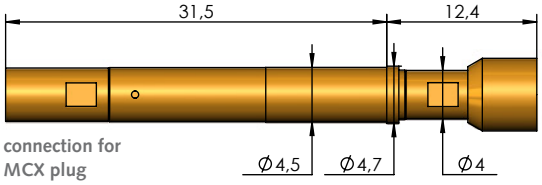
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

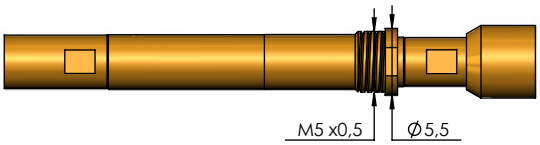
1.0/2.3 signal conductor ◎ female

Series:

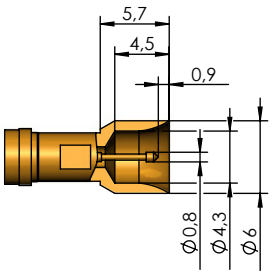
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 308 080 A **xx** 43 T
HFS-840 308 080 A **xx** 43 T M

Note:

Centring range: ± 0.6 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**53**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-840 and HFS-840 M

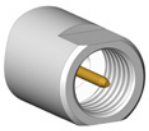
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Contents

N / FME / 7/16 plug connectors

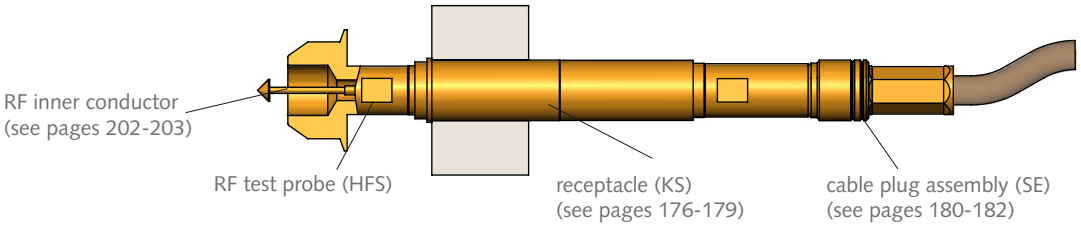
N signal conductor female

FME signal conductor male



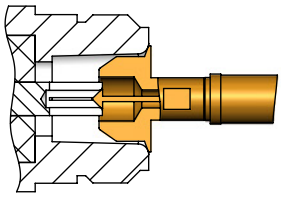
7/16 signal conductor female

Dimensions featured in the accessories section, see page 186.

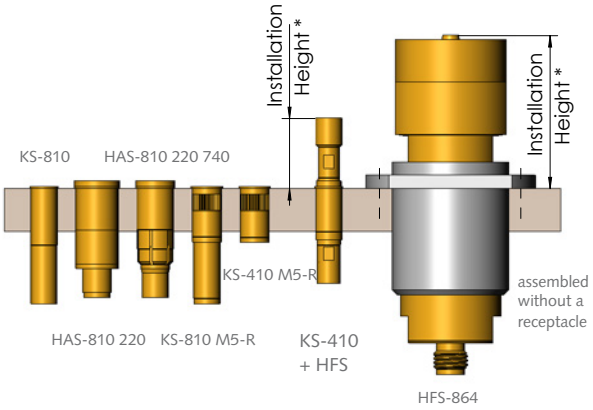


Contacting example N:

Contacting of N signal conductor female
HFS-810 358 180 A 5342 Q



Customising example:



Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)	Without KS
Version		*Installation height of HFS in KS		
N signal conductor female	... Q / ... Q M	13.9 mm	15.0 mm	---
	(HFS-860) ... Q / ... Q M	14.7 mm	15.8 mm	---
FME signal conductor male	... W / ... W M	13.9 mm	15.0 mm	---
7/16 signal conductor female	...F716	---	---	28.9 mm

Electrical data

HFS-810 / 810 M **HFS-840 / 840 M**
HFS-860 / 860 M **HFS-864**

Frequency range with HFS-810:	up to 2 GHz
Frequency range with HFS-840:	up to 4 GHz
Frequency range with HFS-860:	up to 6 GHz
Frequency range with HFS-864:	up to 7.5 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical:	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance:	50 Ω

Operating temperature range

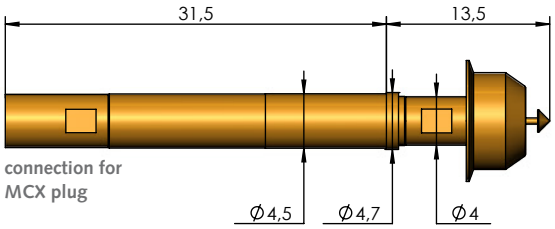
–40 up to +80° C

Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

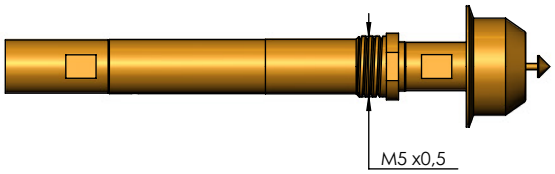
N signal conductor ◎ female

Series:

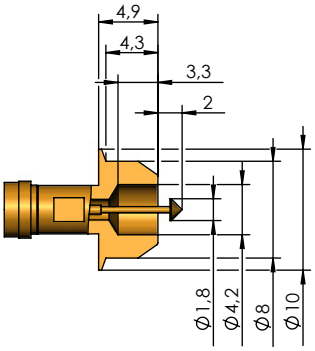
HFS-810 ...



HFS-810 ... M (*)



Available tip styles:



Ordering description:

HFS-810 358 180 A **xx** 42 Q
HFS-810 358 180 A **xx** 42 Q M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.8 mm

N / FME / 7/16

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-810 HFS-810 M	
Spring force of inner conductor at working stroke (N)	2.0	2.0
Spring force of outer conductor at working stroke (N)	6.0	8.0
Designation for ordering	**80**	**99**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-810 and HFS-810 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

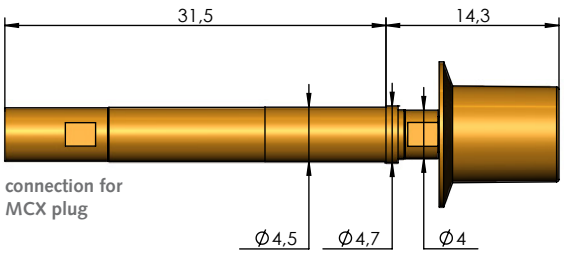
◎ N signal conductor female

up to 6 GHz (50 Ω)

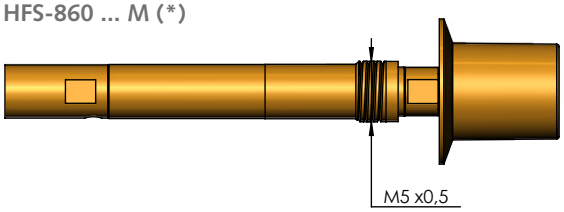
HFS-860 / HFS-860 M

Series:

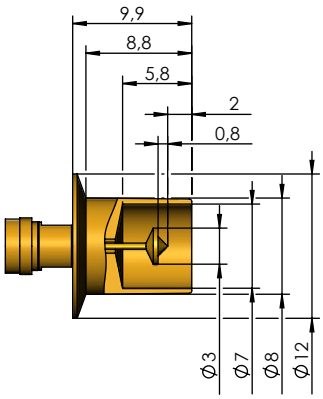
HFS-860 ...



HFS-860 ... M (*)



Available tip styles:



Ordering description:

HFS-860 358 300 A **xx** 42 Q
HFS-860 358 300 A **xx** 42 Q M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.8 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-860 HFS-860 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

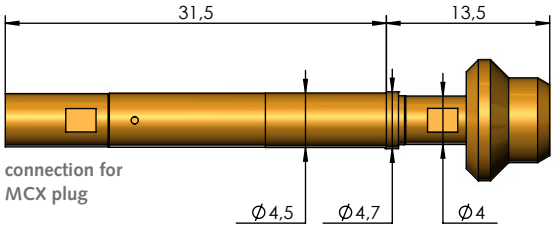
HFS-860 and HFS-860 M

	Outer cond.	Inner cond.
Working stroke:	2.7 mm	2.0 mm
Maximum stroke:	3.4 mm	3.7 mm

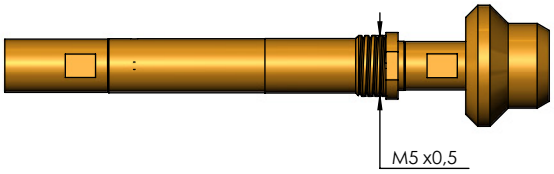
FME signal conductor ⊙ male

Series:

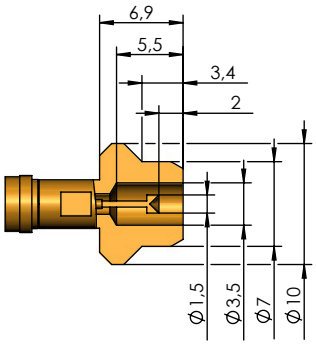
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 303 150 A **xx** 42 W
HFS-840 303 150 A **xx** 42 W M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.4 mm

N / FME / 7/16

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M
Spring force of inner conductor at working stroke (N)	2.0
Spring force of outer conductor at working stroke (N)	6.0
Designation for ordering	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

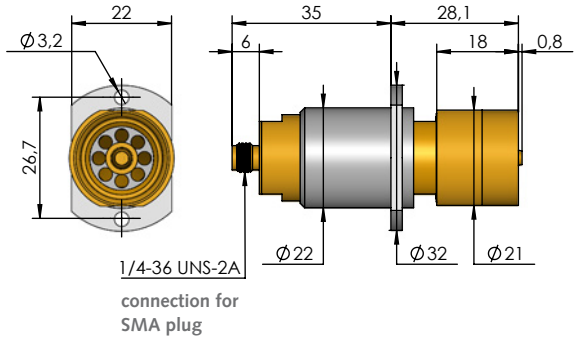
◎ 7/16 signal conductor female

up to 7.5 GHz (50 Ω)

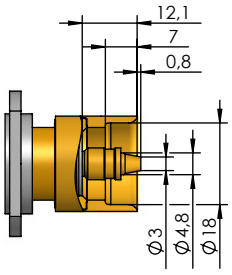
HFS-864

Series:

HFS-864 ...



Available tip styles:



Ordering description:

HFS-864 342 700 A **xxx** 43 F716

Note: Version with flange connection.

Centring range: ± 1.0 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

Note:
The RF test probes in the HFS-864 series are positioned and fixed using two screws in a flange connection.

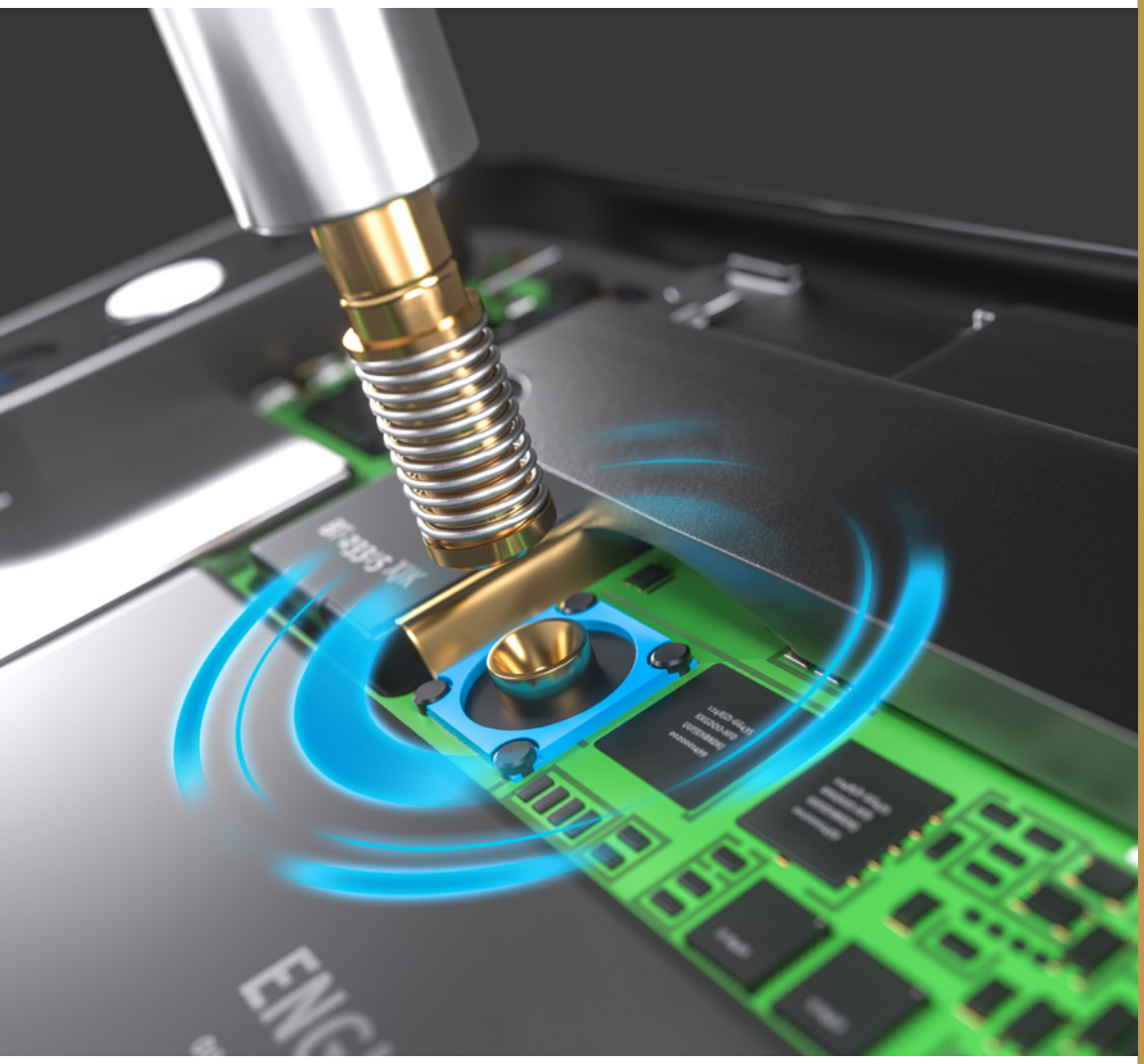
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

	HFS-864
Spring force of inner conductor at working stroke (N)	5.0
Spring force of outer conductor at working stroke (N)	23.6
Designation for ordering	**286**

Mechanical data

HFS-864

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	4.0 mm



Contents

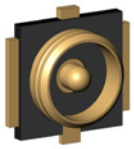
U.FL / W.FL / W.FL2 / X.FL / MM5829 plug connectors

U.FL signal conductor male

W.FL signal conductor male

W.FL 2 signal conductor male

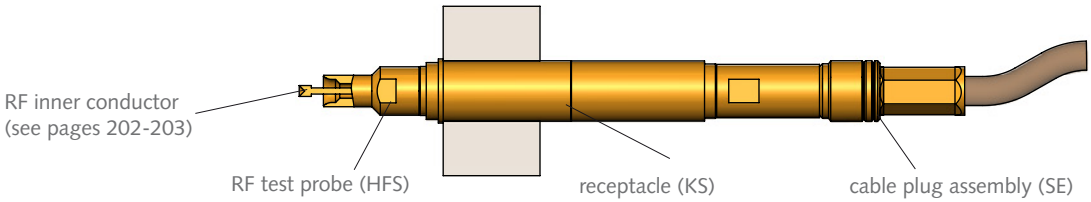
X.FL signal conductor male



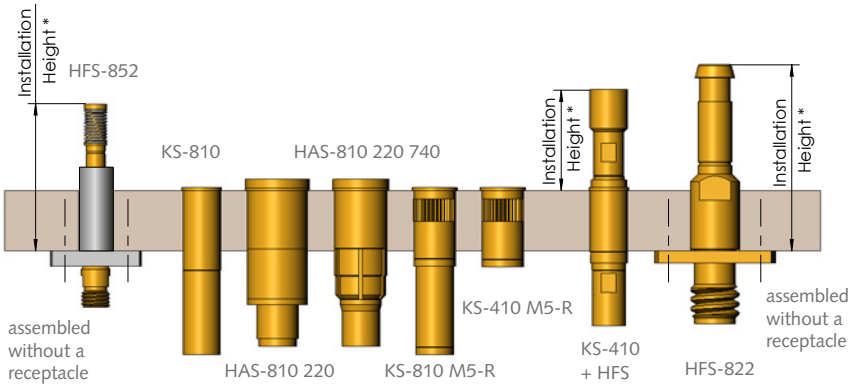
JSC signal conductor male

HSC, KSC, LSC signal conductor male

Dimensions featured in the accessories section, see page 186.

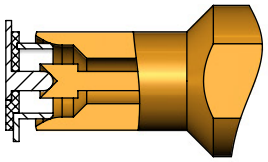


Customising example:



Contacting example U.FL:

Contacting of U.FL signal conductor male
HFS-810 303 090 A 5343 Y6



Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

Electrical data

HFS-810 / 810 M	**HFS-840 / 840 M**
HFS-410 / 410 M	**HFS-440 / 440 M**
HFS-822	**HFS-852**
HFS-856	**HFS-860 / 860 M**
Frequency range with HFS-810/410:	up to 2 GHz
Frequency range with HFS-840/440:	up to 4 GHz
Frequency range with HFS-822/852:	up to 6 GHz
Frequency range with HFS-856/860:	up to 6 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance:	50 Ω

Operating temperature range

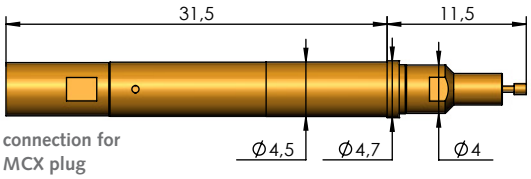
–40 up to +80° C

Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)	Without KS
Version		*Installation height of HFS in KS		
U.FL signal conductor male	...Y6 / ...Y6 M	11.9 mm	13 mm	---
	(HFS-822)	---	---	27.0 mm
	(HFS-852)	---	---	19.3 mm
	(HFS-856)	---	---	22.4 mm
	HFS-890...UFL / UFL M	9.8 mm	10.9 mm	---
W.FL signal conductor male	... Y52	9.8 mm	10.9 mm	---
	... XFL-H	---	---	22.4 mm
W.FL 2 signal conductor male	... Y52	9.8 mm	10.9 mm	---
	... XFL-H	---	---	22.4 mm
X.FL signal conductor male	... Y52	9.8 mm	10.9 mm	---
	... XFL-H	---	---	22.4 mm
MM5829 signal conductor male	... MM5829	---	---	23.1 mm

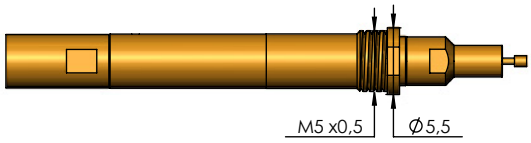
U.FL signal conductor ⊙ male

Series:

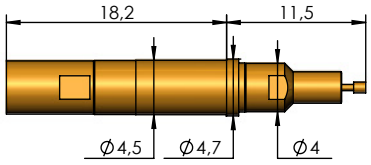
HFS-810 ...



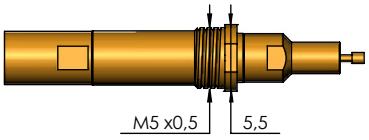
HFS-810 ... M (*)



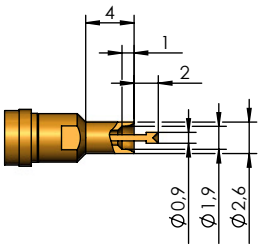
HFS-410 ...



HFS-410 ... M (*)



Available tip styles:



Ordering description:

HFS-810 303 090 A **xx** 43 Y6
HFS-810 303 090 A **xx** 43 Y6 M
HFS-410 303 090 A **xx** 43 Y6
HFS-410 303 090 A **xx** 43 Y6 M

Note:

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-810 HFS-810 M		HFS-410 HFS-410 M
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	4.0
Designation for ordering	**53**	**80**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-810 and HFS-810 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Mechanical data
HFS-410 and HFS-410 M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

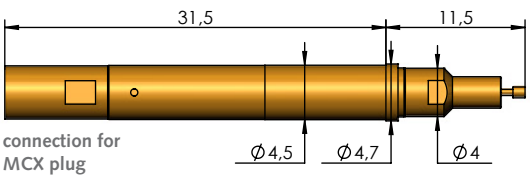
⊙ U.FL signal conductor male

up to 4 GHz (50 Ω)

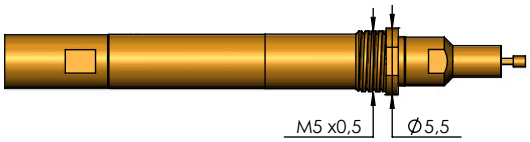
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

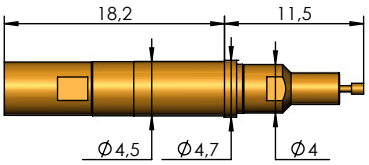
HFS-840 ...



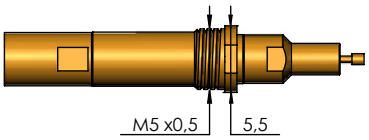
HFS-840 ... M (*)



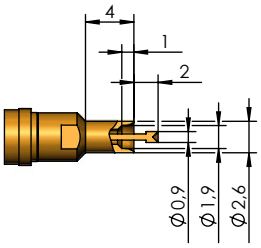
HFS-440 ...



HFS-440 ... M (*)



Available tip styles:



Ordering description:

HFS-840 303 090 A **xx** 43 Y6
HFS-840 303 090 A **xx** 43 Y6 M
HFS-440 303 090 A **xx** 43 Y6
HFS-440 303 090 A **xx** 43 Y6 M

Note:

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M			HFS-440 HFS-440 M
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.3	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0	4.0
Designation for ordering	**53**	**80**	**93**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

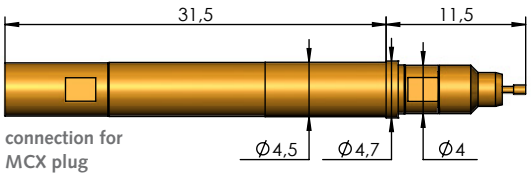
Mechanical data
HFS-440 and HFS-440 M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

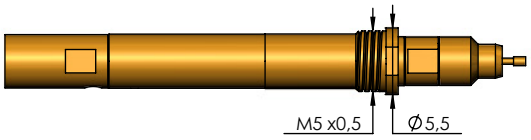
U.FL signal conductor ⊙ male

Series:

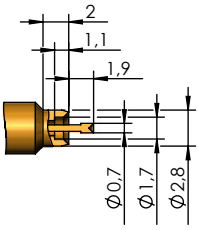
HFS-860 ...



HFS-860 ... M (*)



Available tip styles:



Ordering description:

HFS-860 303 074 A **xx** 43 Y6
HFS-860 303 074 A **xx** 43 Y6 M

Note:

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-860 HFS-860 M		
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.3
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0
Designation for ordering	**53**	**80**	**93**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-860 and HFS-860 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum Stroke	5.0 mm	3.7 mm

U.FL signal conductor male

up to 6 GHz (50 Ω)

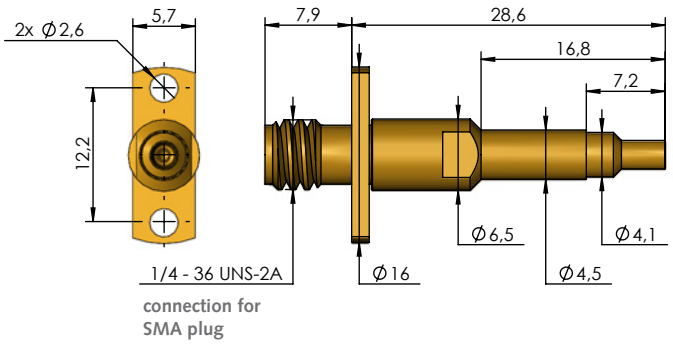
HFS-822

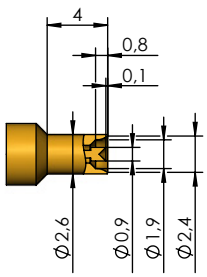
Series:

Available tip styles:

Ordering description:

HFS-822 ...





HFS-822 303 090 A **xx** 43 UFL

Note:
Version with flange connection. Connection does not move during stroke movement.

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-822
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**50**

Note:
The RF test probes in the HFS-822 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-822

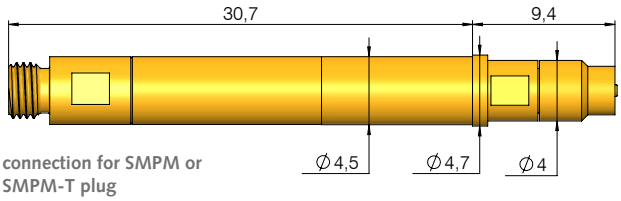
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	4.0 mm
Maximum Stroke	4.5 mm	4.5 mm

up to 12 GHz (50 Ω)

U.FL signal conductor ⊙ male

Series:

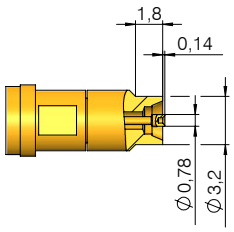
HFS-890 ...



connection for SMPM or SMPM-T plug

Compatible with SMPM cable SE-FLX405-0001.

Available tip styles:



Ordering description:

HFS-890 343 078 A **93** 43 UFL
HFS-890 343 078 A **93** 43 UFL M

Note:
- The best radio frequency performance for signal and data transmission
-SMPM connector acts as interface to test system, suitable for cable assemblies with SMPM (press-in) and SMPM-T (screw-in) interface for optimum signal transmission
-Long life expectancy due to low-wear internal structure
-A standard receptacle or a receptacle with two-bore flange KS-810 or HAS-810 can be used for installation

See pages 176-179 for an overview of accessories.

RF performance:

	S11	VSWR
0 - 12 GHz:	-20 dB	1.25

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with various spring forces. Please contact us for further information.

	HFS-890
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	8.0
Designation for ordering	**93**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-890

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	0.5 mm
Maximum Stroke	5.0 mm	

⊙ U.FL signal conductor male

up to 12 GHz (50 Ω)

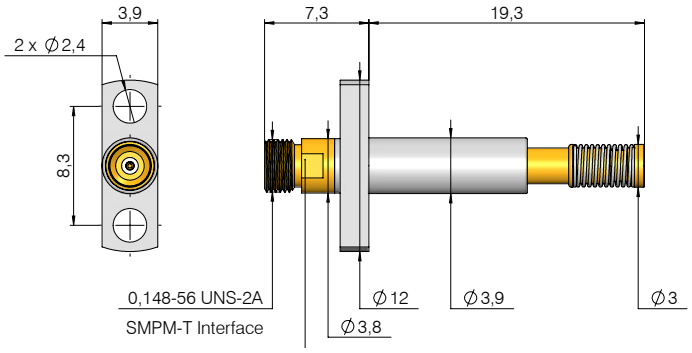
HFS-852

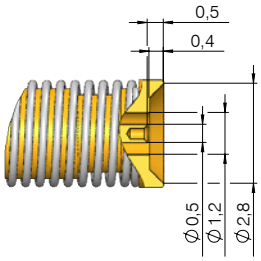
Series:

Available tip styles:

Ordering description:

HFS-852 ...





HFS-852 303 051 A **xx** 43 UFL-H

Note:
Compact design with SMPM cable connection for the best RF performance. The HFS-852 is moveable once installed (floating) and the connector moves during the working stroke. Compensation of radial positioning inaccuracies of the connector by up to ± 2,0°.

Centring range: ± 0.3 mm

RF performance:

	S11	VSWR
0 - 8 GHz:	-20 dB	1.25
8 - 12 GHz:	-15 dB	1.45

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-852
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	3.0
Designation for ordering	**40**

Note:
The RF test probes in the HFS-852 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-852

	Outer cond.	Inner cond.
Working stroke:	4.2 mm	1.0 mm
Maximum Stroke	5.2 mm	1.5 mm

up to 12 GHz (50 Ω)

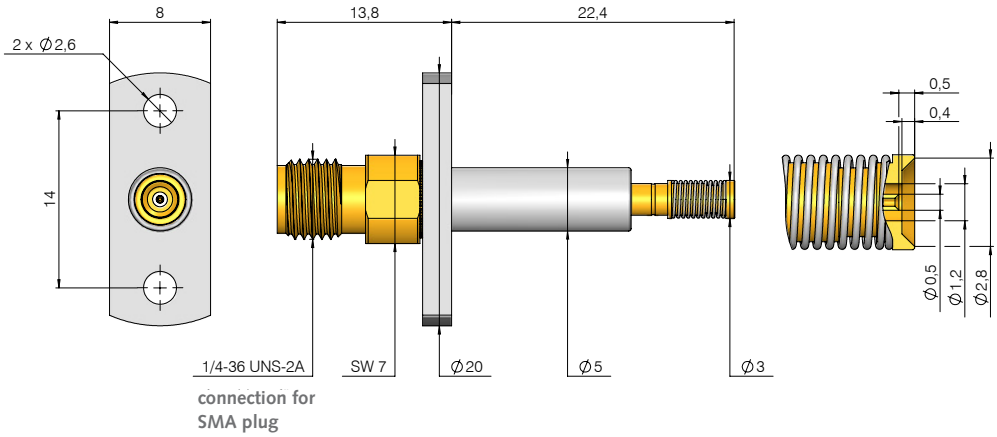
U.FL signal conductor ⊙ male

Series:

Available tip styles:

Ordering description:

HFS-856 ...



HFS-856 303 051 A **xx** 43 UFL-H

Note:
Robust design with guiding barrel ensures highly precise mechanical hitting accuracy and standard SMA cable connection. The HFS-856 is moveable once installed (floating) and the connector moves during the working stroke. Compensation of radial positioning inaccuracies of the connector by up to ± 3.0°.

Centring range: ± 0.3 mm

RF performance:

	S11	VSWR
0 - 8 GHz:	-20 dB	1.25
8 - 12 GHz:	-15 dB	1.45

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-856
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	4.2
Designation for ordering	**55**

Note:
The RF test probes in the HFS-856 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-856

	Outer cond.	Inner cond.
Working stroke:	4.2 mm	1.0 mm
Maximum Stroke	5.2 mm	2.0 mm

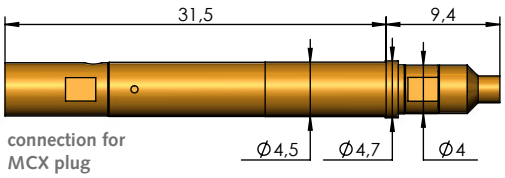
⊙ W.FL / W.FL2 / X.FL signal conductor male

up to 6 GHz (50 Ω)

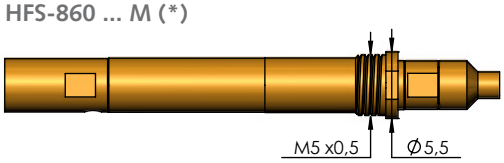
HFS-860 / HFS-860 M

Series:

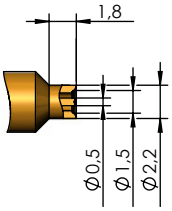
HFS-860 ...



HFS-860 ... M (*)



Available tip styles:



Ordering description:

HFS-860 353 051 A **xx** 43 Y52
HFS-860 353 051 A **xx** 43 Y52 M

Note:
Centring range: ± 0.3 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-860 HFS-860 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-860 and HFS-860 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	0.1 mm
Maximum stroke:	5.0 mm	1.8 mm

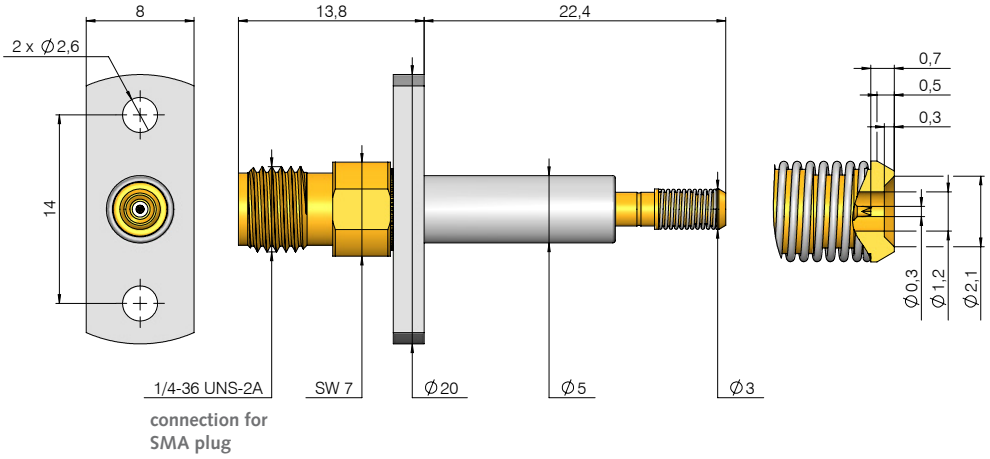
W.FL / W.FL2 / X.FL ⊙ signal conductor male

Series:

Available tip styles:

Ordering description:

HFS-856 ...



HFS-856 379 030 A **xx** 43 XFL-H

Note:
- Precise mechanical hitting accuracy due to exact guidance and re-positioning with new guiding barrel
- High degree of electrical repeating accuracy
- Protected signal (inner) conductor due to protruding ground (outer) conductor
- Long service life due to low-wear internal design
- Internationally preferred mounting via screw connection with flange
- Standardised SMA connection as interface to test system

Compensation of radial positioning inaccuracies of the connector by up to ± 3.0°.

Centring range: ± 0.3 mm

RF performance:

	S11	VSWR
0 - 8 GHz:	-20 dB	1.25

	HFS-856
Spring force of inner conductor at working stroke (N)	1.5
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**55**

Note:
The RF test probes in the HFS-856 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-856

	Outer cond.	Inner cond.
Working stroke:	4.2 mm	0,9 mm
Maximum stroke:	5.2 mm	1,5 mm

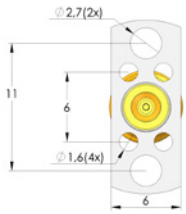
⊙ HSC, JSC, KSC, LSC signal conductor male

up to 12 GHz (50 Ω)

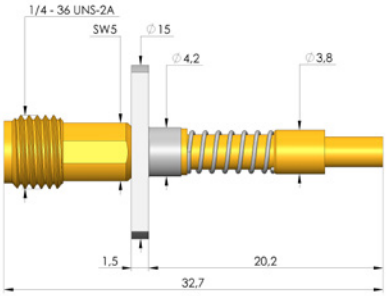
HFS-336

Series:

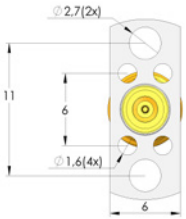
HFS-336 ...



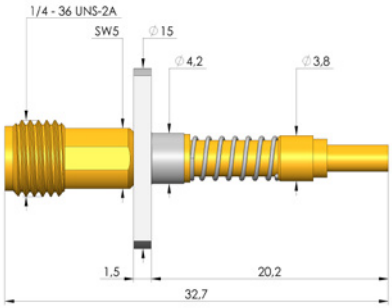
HSC



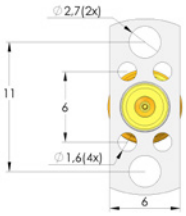
SMA female



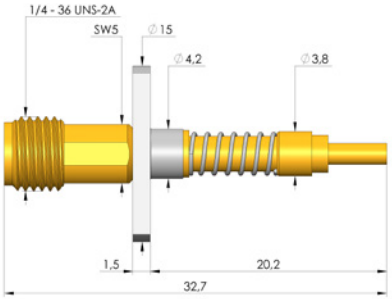
JSC



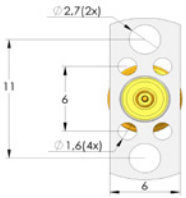
SMA female



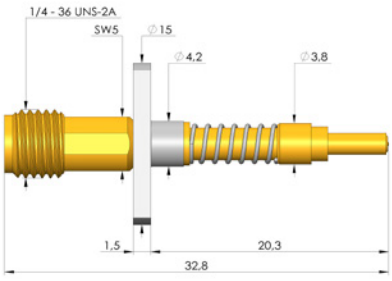
KSC



SMA female

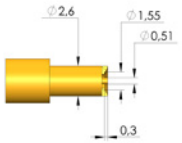


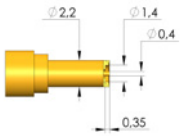
LSC

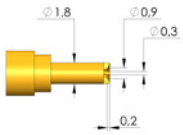


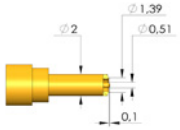
SMA female

Available tip styles:









Ordering description:

HFS-336 302 050 A 60 43 HSC
HFS-336 302 040 A 60 43 JSC
HFS-336 302 030 A 60 43 KSC
HFS-336 355 050 A 60 42 LSC

Note:
- Designed for testing RF coaxial sub-miniature connectors such as HSC, JSC, KSC and LSC (Murata).
- Excellent RF performance compared to original connectors and conventional test solutions.

Miniature plug connectors for the transmission of radio frequency signals are essential components of smartphones, tablets, and wearables, these connectors are commonly used in Internet-of-Things (IoT) applications. INGUN has developed high-performance RF test probes which transmit radio signals between circuits as well as components (e.g., antenna and motherboard) - with very low losses in comparison to competitors' products - for the micro connectors from Murata's HSC, JSC, KSC, LSC series.

Installation:
- Flange mounting
- Test probe interface: standard SMA female
- Mechanical dimensions are identical to Murata test solutions; HFS-336 is a compatible replacement which does not require modifications to the test set-up.
- Mechanical dimensions are identical to Murata test solutions - HFS-336 is a compatible replacement which does not require modifications to the test set-up.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

Note:
The RF test probes in the HFS-336 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

	HFS-336
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	5.0
Designation for ordering	**60**

Mechanical data

HFS-336

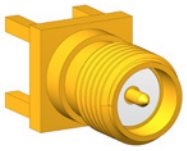
	Outer cond.	Inner cond.
Working stroke:	2.0 mm	0.35 mm
Maximum stroke:	4.0 mm	1.0 mm

R-SMA

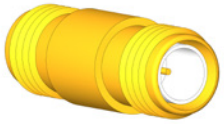
R-TNC

R-SMA / R-TNC
reverse polarity plug connectors

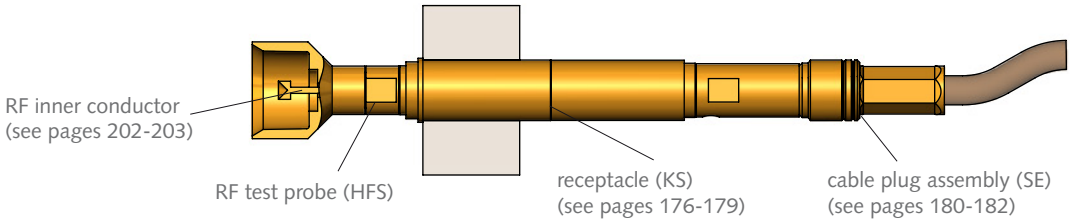
R-SMA signal conductor male



R-TNC signal conductor male

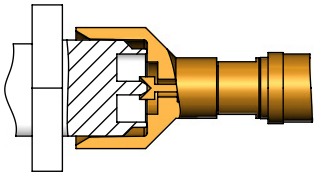


Dimensions featured in the accessories section, see page 186.

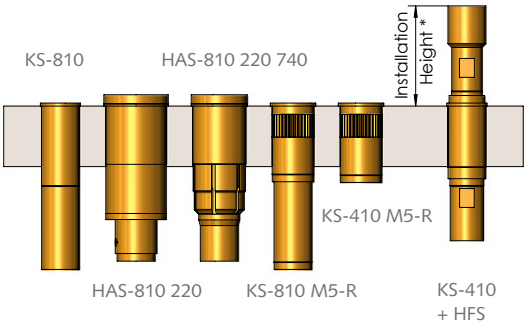


Contacting example R-SMA:

Contacting of R-SMA signal conductor male
HFS-860 303 150 A 5343 ER



Customising example:



Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)
Version		*Installation height of HFS in KS	
R-SMA signal conductor male	... ER / ... ER M	14.1 mm	15.2 mm
R-TNC signal conductor male	... QN / ... QN M	12.4 mm	13.5 mm

Electrical data
HFS-810 / 810 M **HFS-840 / 840 M**
HFS-410 / 410 M **HFS-440 / 440 M**
HFS-860 / 860 M

Frequency range with HFS-810/410:	up to 2 GHz
Frequency range with HFS-840/440:	up to 4 GHz
Frequency range with HFS-860:	up to 6 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance	50 Ω

Operating temperature range
–40 up to +80° C

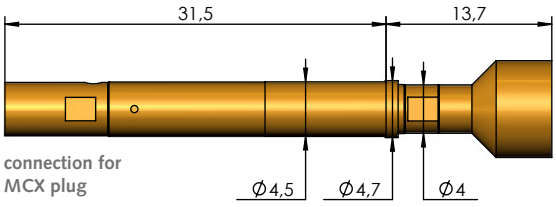
Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

up to 6 GHz (50 Ω)

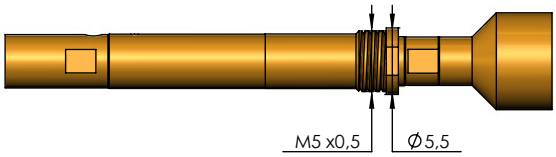
R-SMA signal conductor ⊙ male

Series:

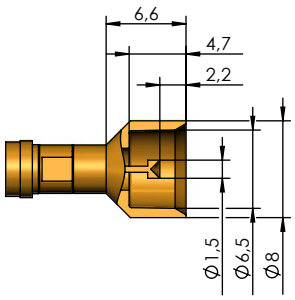
HFS-860 ...



HFS-860 ... M (*)



Available tip styles:



Ordering description:

HFS-860 303 150 A **xx** 43 ER
HFS-860 303 150 A **xx** 43 ER M

Note:
Version with pre-centring via outer conductor. The outer conductor centres itself on the connector from the outside.

Centring range: ± 1.0 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-860 HFS-860 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-860 and HFS-860 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

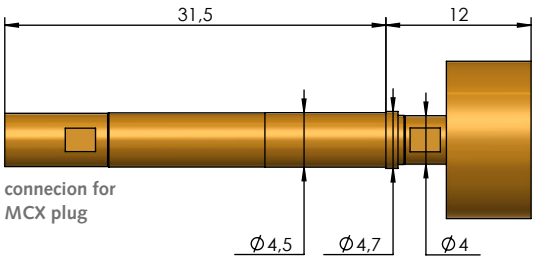
⊙ R-TNC signal conductor male

up to 4 GHz (50 Ω)

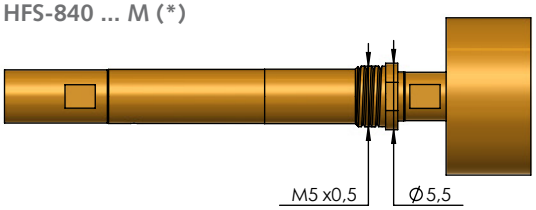
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

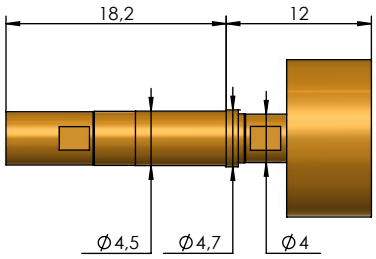
HFS-840 ...



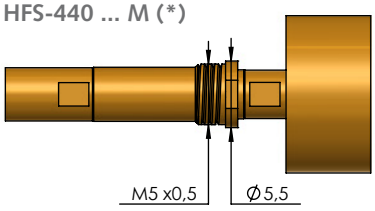
HFS-840 ... M (*)



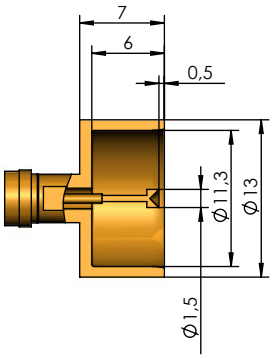
HFS-440 ...



HFS-440 ... M (*)



Available tip styles:



Ordering description:

HFS-840 303 150 A **xx** 43 QN
HFS-840 303 150 A **xx** 43 QN M
HFS-440 303 150 A **xx** 43 QN
HFS-440 303 150 A **xx** 43 QN M

Note:
Version with pre-centring via outer conductor. The outer conductor centres itself on the connector from the outside.

Centring range: ± 0.8 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M		HFS-440 HFS-440 M
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	4.0
Designation for ordering	**53**	**80**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	3.0 mm	1.7 mm
Maximum stroke:	4.0 mm	3.7 mm

Mechanical data
HFS-440 and HFS-440 M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	1.7 mm
Maximum stroke:	3.0 mm	3.0 mm

Contents

IEC

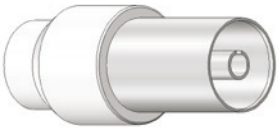
F

IEC / F (75 Ω)

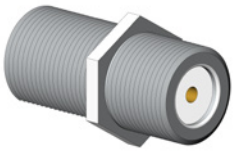
IEC / F plug connectors

IEC signal conductor male

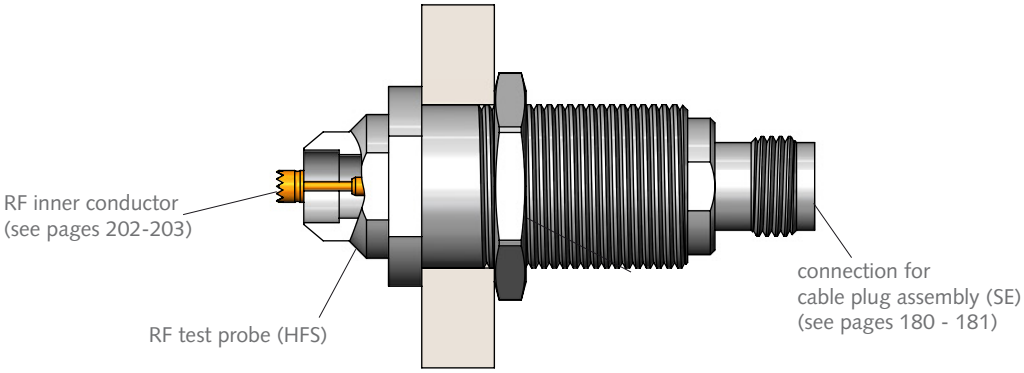
IEC signal conductor female



F signal conductor female

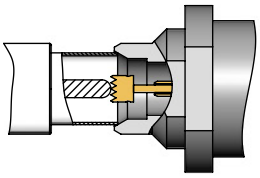


Dimensions featured in the accessories section, see page 186.

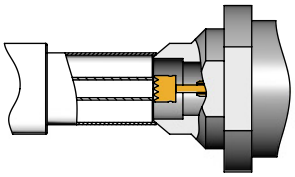


Contacting example IEC:

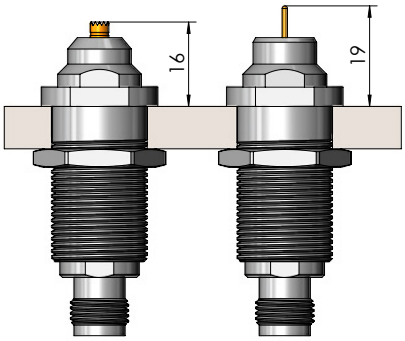
Contacting of signal conductor male
HFS-409 306 350 A 8343 M



Contacting of IEC signal conductor female
HFS-409 306 350 A 8342 M



Customising example:



HFS-409 306 350 A 8342 M HFS-409 305 100 A 8343 F MF

Electrical data
HFS-409

Frequency range with HFS-409:	up to 1.5 GHz
Outer conductor current rating:	10 A
Inner conductor current rating:	16 A
Inner conductor R_i typical	≤ 10 mΩ
Test probe impedance:	75 Ω
Cable impedance:	75 Ω

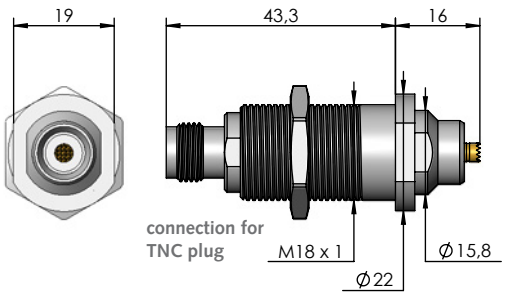
Operating temperature range

– 40 up to +80° C

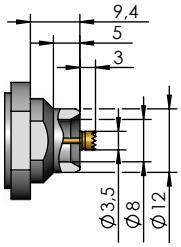
IEC signal conductor male ⊙ / female ◎

Series: male

HFS-409 ...



Available tip styles:



Ordering description:

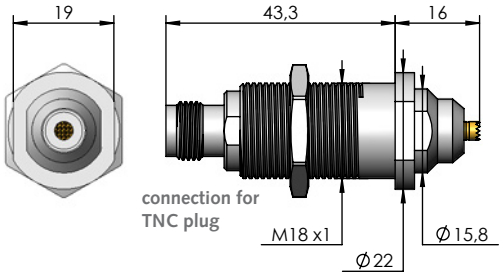
HFS-409 306 350 A **xx** 43 M

Note:
Version with outer centering on connector.

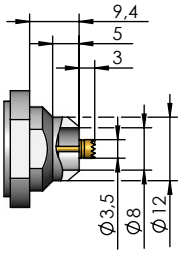
Centring range: ± 0.2 mm

Series: female

HFS-409 ...



Available tip styles:



Ordering description:

HFS-409 306 350 A **xx** 42 M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.2 mm

	HFS-409
Spring force of inner conductor at working stroke (N)	2.3
Spring force of outer conductor at working stroke (N)	6.0
Designation for ordering	**83**

Note:
The RF probes in the series HFS-409 are secured in a bore (Ø 18.5 mm) by means of an M18x1 thread and a nut.

Mechanical data
HFS-409

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.3 mm
Maximum stroke:	5.0 mm	5.3 mm

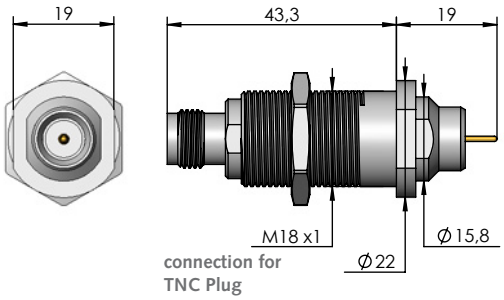
F signal conductor female

up to 1.5 GHz (75 Ω)

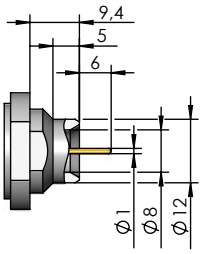
HFS-409

Series:

HFS-409 ...



Available tip styles:



Ordering description:

HFS-409 305 100 A **xx** 43 MF

Note:
Version with threaded connection. Connection does not move during stroke movement.

Centring range: ± 0.2 mm

	HFS-409
Spring force of inner conductor at working stroke (N)	2.3
Spring force of outer conductor at working stroke (N)	6.0
Designation for ordering	**83**

Note:
The RF probes in the HFS-409 series are secured in a bore (Ø 18.5 mm) by means of an M18x1 thread and a nut.

Mechanical data

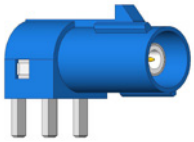
HFS-409

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.3 mm
Maximum stroke:	5.0 mm	8.0 mm

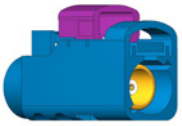
Contents

Mini FAKRA, FAKRA, GT13, GT16 plug connectors

FAKRA signal conductor male

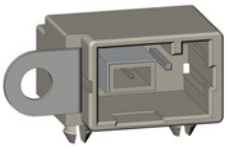


FAKRA signal conductor female



mini FAKRA signal conductor male

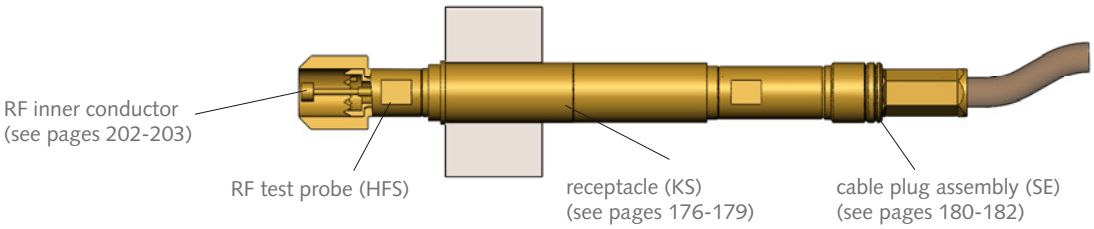
GT13 signal conductor male



GT16 signal conductor male

GT16 signal conductor female

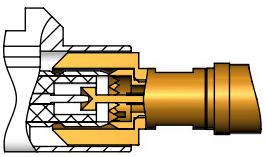
Dimensions featured in the accessories section see page 186.



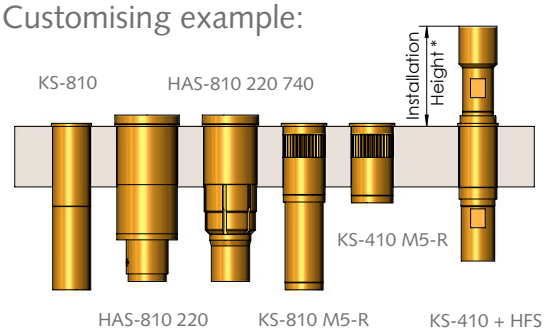
Contacting example FAKRA:

Contacting of FAKRA signal conductor male

HFS-810 303 150 A 5342 F



Customising example:



Electrical data

HFS-810/810 M/810 4M **HFS-840/840 M/840 4M**

HFS-410/410 M/410 4M **HFS-440/440 M/440 4M**

Frequency range with HFS-810/410:	up to 2 GHz
Frequency range with HFS-840/440:	up to 4 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical:	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance	50 Ω

Operating temperature range

–40 up to +80° C

Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)
Version		*Installation height of HFS in KS	
FAKRA signal conductor male	...F / ... F M	12.1 mm	13.2 mm
	... FS1 / ... FS1 M		
	... RF3 / ... RF3 M		
	HFS-890...F / F M		
FAKRA signal conductor female	... ZE3 / ... ZE3 M	12.3 mm	13.4 mm
GT13 signal conductor male	... GT13 / ... GT13 4M	13.9 mm	15.0 mm
GT16 signal conductor male	... GT16 / ... GT16 M	12.4 mm	13.5 mm
GT16 signal conductor female	... GT16 F/ ... GT16 F M	11.9 mm	13.0 mm

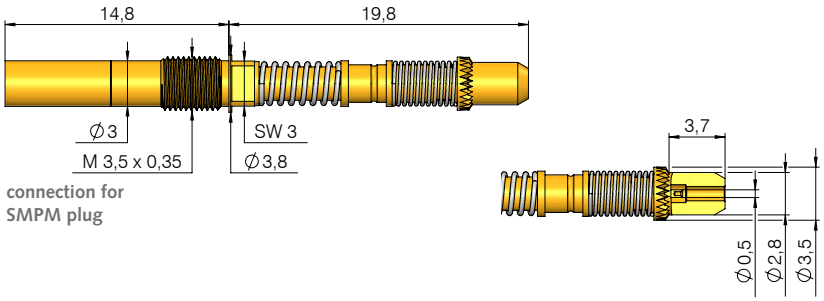
Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

FAKRA mini: HFM ⊙ Plug

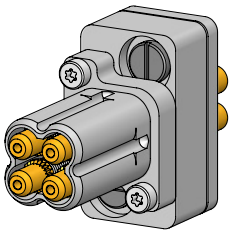
Series:

Data transmission up to 15 GHz and 20 Gbit/s

HFS-807 ... HFM-M

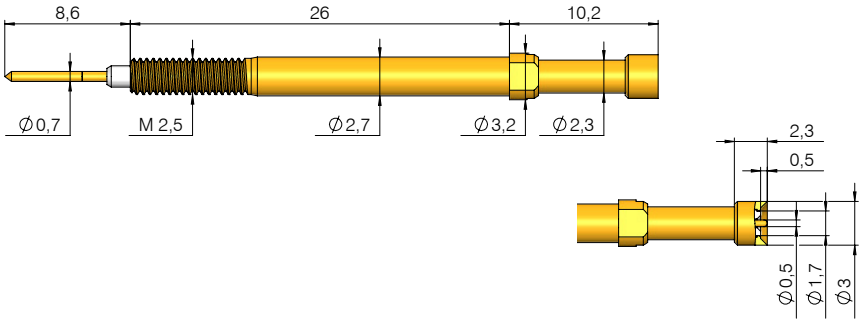


HAS-807-HFM-4-VZ



Continuity check:

DPS-465...M-HTEHFM



Available tip styles:

Ordering description:

HFS-807 303 051 A **68** 42 HFM-M

Note:
- For the testing of HFM (Rosenberger)
- Primarily used for future technologies in the automotive market (e.g. autonomous driving)
- The best radio frequency performance for data transmission.
- High-speed SMPM cable as interface to test system
- Modular mounting frame available for single, dual, or quadruple versions
- See page 179 for floating base plate and pre-centring

HAS-807-HFM-4-VZ

Note:
- Fully floating assembly including 4 HFS-807 303 051 A 68 42 HFM-M test probes
- Self-centring on plug housing thanks to the centring mask/ interface
- Simple exchange of probes from front by removing centring interface
- Floating base plate +/-0.4 mm

DPS-465 343 051 A **40** 42 M-HTEHFM

Note:
- For the testing of HFM (Rosenberger)
- Used for continuity check, RF measurement not possible
- Modular mounting frame available for single, dual, or quadruple versions
- Installed in KS-465 receptacle, see page 177

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-807	DPS-465
Spring force of inner conductor at working stroke (N)	1.0	1.0
Spring force of outer conductor at working stroke (N)	5.8	3.0
Designation for ordering	**68**	**40**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-807

	Outer cond.	Inner cond.
Working stroke:	3.2 mm	1.0 mm
Maximum stroke:	4.1 mm	1.5 mm

Mechanical data
DPS-465

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	4.0 mm
Maximum stroke:	5.0 mm	5.0 mm

FAKRA mini: HFM female

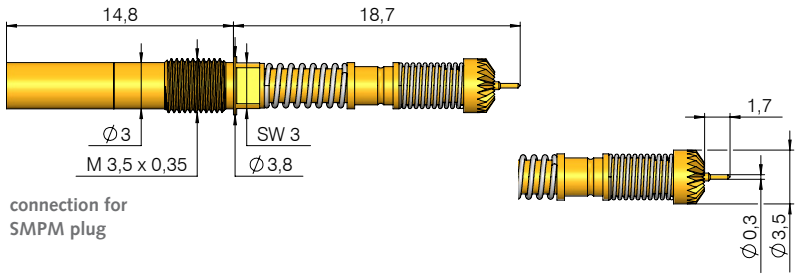
up to 15 GHz
20 Gbit/s

HFS-807
DPS-465

Series:

Data transmission up to 15 GHz and 20 Gbit/s

HFS-807 ... HFM-F-M



Available tip styles:

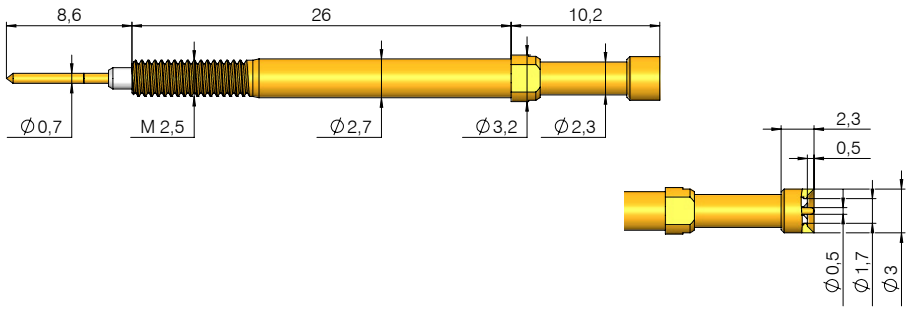
Ordering description:

HFS-807 308 030 A **68** 42 HFM-F-M

Note:
- For the testing of HFM (Rosenberger)
- Primarily used for future technologies in the automotive market (e.g. autonomous driving)
- The best radio frequency performance for data transmission.
- High-speed SMPM cable as interface to test system
- Modular mounting frame available for single, dual, or quadruple versions
- See page 179 for floating base plate and pre-centring

Continuity check:

DPS-465...M-HFM-F



DPS-465 305 050 A **40** 43 M-HFM-F

Note:
- For the testing of HFM (Rosenberger)
- Used for continuity check, RF measurement not possible
- Modular mounting frame available for single, dual, or quadruple versions
- Installed in KS-465 receptacle, see page 177

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-807	DPS-465
Spring force of inner conductor at working stroke (N)	1.0	1.0
Spring force of outer conductor at working stroke (N)	5.8	3.0
Designation for ordering	**68**	**4.0**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-807

	Outer cond.	Inner cond.
Working stroke:	3.2 mm	1.0 mm
Maximum stroke:	4.1 mm	1.5 mm

Mechanical data
DPS-465

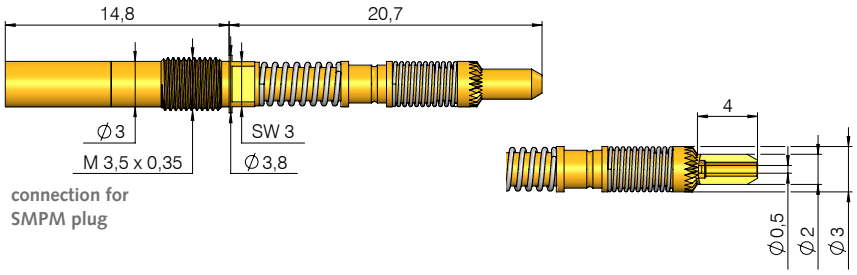
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	4.0 mm
Maximum stroke:	5.0 mm	5.0 mm

FAKRA mini: MATE AX ⊙ plug

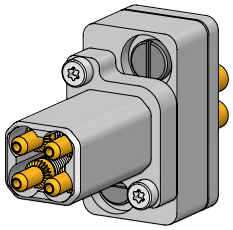
Series:

Data transmission up to 15 GHz and 20 Gbit/s

HFS-807 ... HTE-M

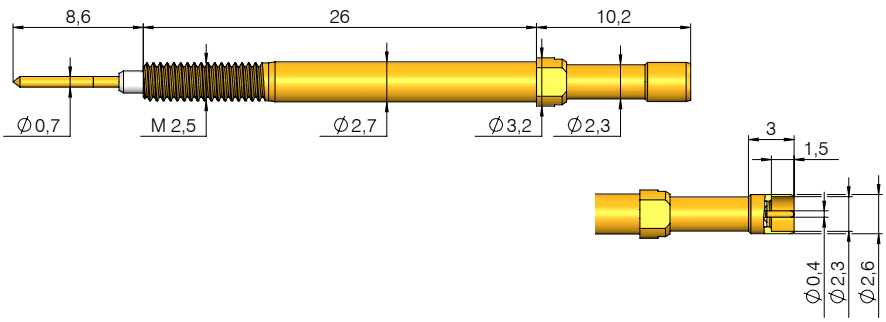


HAS-807-HTE-4-VZ



Continuity check:

DPS-465...M-HTEHFM



Available tip styles:

Ordering description:

HFS-807 303 051 A **68** 42 HTE-M

Note:
- For the testing of MATE-AX (TE Connectivity)
- Primarily used for future technologies in the automotive market (e.g. autonomous driving)
- The best radio frequency performance for data transmission.
- High-speed SMPM cable as interface to test system
- Modular mounting frame available for single, dual, or quadruple versions
- See page 179 for floating base plate and pre-centring

HAS-807-HTE-4-VZ

Note:
- Fully floating assembly including 4 HFS-807 303 051 A 68 42 HTE-M test probes
- Self-centring on plug housing thanks to the centring interface
- Simple exchange of probes from front by removing centring interface
- Floating base plate +/-0.4 mm

DPS-465 343 051 A **40** 42 M-HTEHFM

Note:
- For the testing of MATE-AX (TE Connectivity)
- Used for continuity check, RF measurement not possible
- Modular mounting frame available for single, dual, or quadruple versions
- Installed in KS-465 receptacle, see page 177

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-807	DPS-465
Spring force of inner conductor at working stroke (N)	1.0	1.0
Spring force of outer conductor at working stroke (N)	5.8	3.0
Designation for ordering	**68**	**40**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-807

	Outer cond.	Inner cond.
Working stroke:	3.2 mm	1.0 mm
Maximum stroke:	4.1 mm	1.5 mm

Mechanical data
DPS-465

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	4.0 mm
Maximum stroke:	5.0 mm	5.0 mm

◎ FAKRA mini: MATE AX female

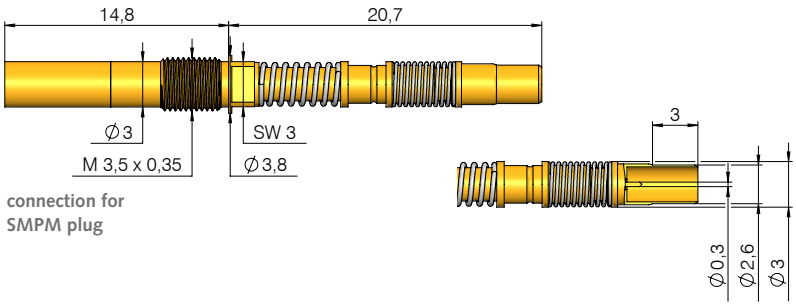
up to 15 GHz
20 Gbit/s

HFS-807
DPS-465

Series:

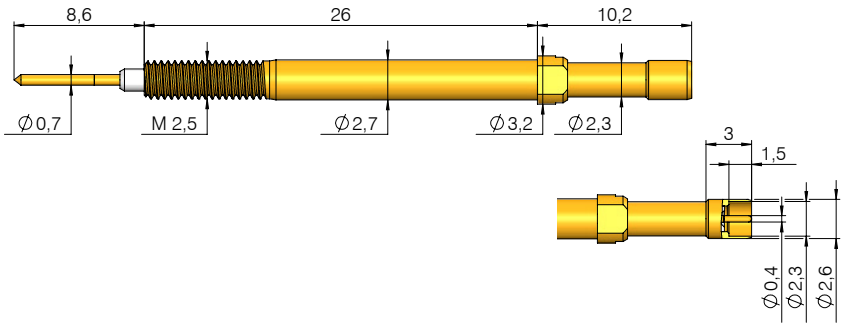
Data transmission up to 15 GHz and 20 Gbit/s

HFS-807 ... HTE-F-M



Continuity check:

DPS-465...M-HTE-F



Available tip styles:

Ordering description:

HFS-807 308 030 A **68** 42 HTE-F-M

Note:
- For the testing of MATE-AX (TE Connectivity)
- Primarily used for future technologies in the automotive market (e.g. autonomous driving)
- The best radio frequency performance for data transmission.
- High-speed SMPM cable as interface to test system
- Modular mounting frame available for single, dual, or quadruple versions
- See page 179 for floating base plate and pre-centring

DPS-465 305 042 A **40** 42 M-HTE-F

Note:
- For the testing of MATE-AX (TE Connectivity)
- Used for continuity check, RF measurement not possible
- Modular mounting frame available for single, dual, or quadruple versions
- Installed in KS-465 receptacle, see page 177

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-807	DPS-465
Spring force of inner conductor at working stroke (N)	1.0	1.0
Spring force of outer conductor at working stroke (N)	5.8	3.0
Designation for ordering	**68**	**40**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-807

	Outer cond.	Inner cond.
Working stroke:	3.2 mm	1.0 mm
Maximum stroke:	4.1 mm	1.5 mm

Mechanical data
DPS-465

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	4.0 mm
Maximum stroke:	5.0 mm	5.0 mm

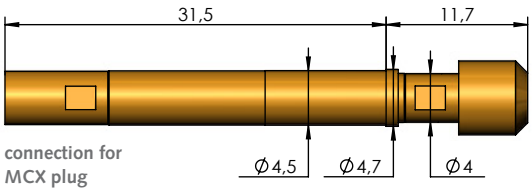
FAKRA signal conductor ⊙ male

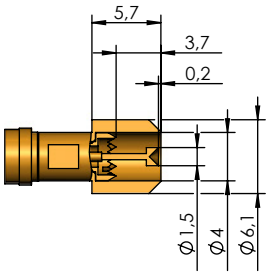
Series:

Available tip styles:

Ordering description:

HFS-810 ...

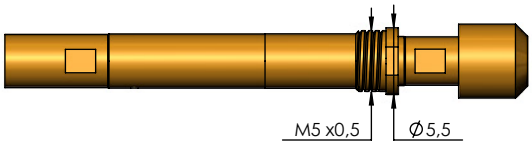


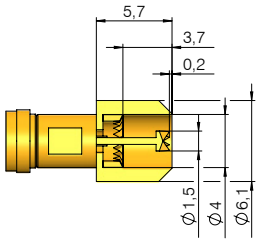


HFS-810 303 150 A **xx** 42 F
HFS-810 303 150 A **xx** 42 F M
HFS-410 303 150 A **xx** 42 F
HFS-410 303 150 A **xx** 42 F M

Note:
Standard test solution for FAKRA
Centring range: ± 0.8 mm

HFS-810 ... M (*)



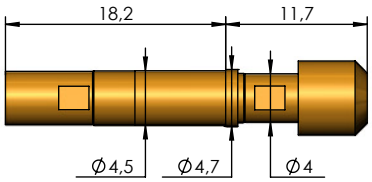


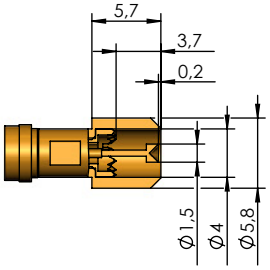
HFS-810 288 150 A **xx** 42 F88R
HFS-810 288 150 A **xx** 42 F88RM

Note:
- For test environments with coarse contamination
- Aggressive inner conductor tip style
- Less maintenance thanks to self-cleaning design

Centring range: +/- 0.8 mm

HFS-410 ...



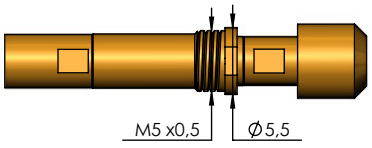


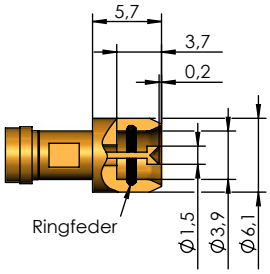
HFS-810 303 150 A **xx** 42 FS1
HFS-810 303 150 A **xx** 42 FS1 M

Note:
Outer housing Ø 5.8 mm for connector housings with small inner diameter

Centring range: +/- 0.8 mm

HFS-410 ... M (*)





HFS-810 303 150 A **xx** 42 RF3
HFS-810 303 150 A **xx** 42 RF3 M
HFS-410 303 150 A **xx** 42 RF3
HFS-410 303 150 A **xx** 42 RF3 M

Note:
- Garter spring in outer conductor
- For high manufacturing tolerances or excessive dielectrics
- Outer conductor spring stroke should be ≥ 6 N.

Centring range: +/- 0.5 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring force of inner conductor at working stroke (N)	1.3	1.3	2.0	1.3	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	6.0	8.0	4.0
Designation for ordering	**53**	**73**	**80**	**93**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-810 and HFS-810 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Mechanical data
HFS-410 and HFS-410 M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

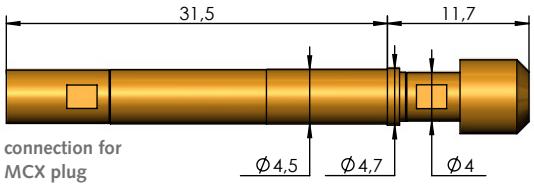
FAKRA signal conductor male

up to 4 GHz (50 Ω)

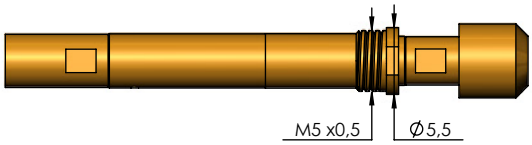
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

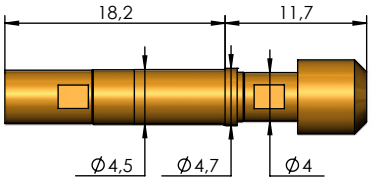
HFS-840 ...



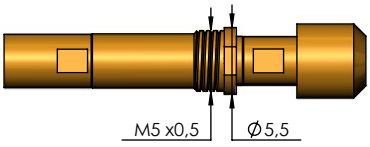
HFS-840 ... M (*)



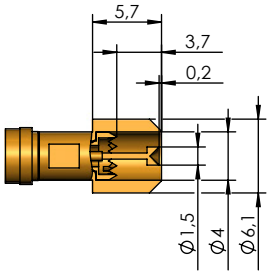
HFS-440 ...

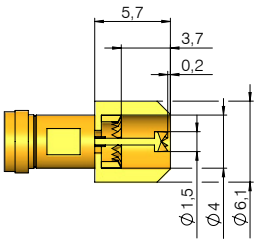


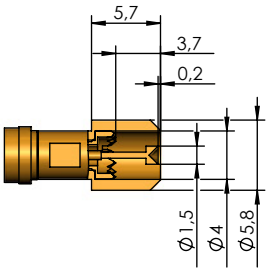
HFS-440 ... M (*)

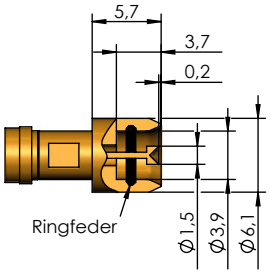


Available tip styles:









Ordering description:

HFS-840 303 150 A **xx** 42 F
HFS-840 303 150 A **xx** 42 F M
HFS-440 303 150 A **xx** 42 F
HFS-440 303 150 A **xx** 42 F M

Note:
- FAKRA standard solution for scratch-free contacting of inner conductor
Centring range: ± 0.8 mm

HFS-840 288 150 A **xx** 42 F88R
HFS-840 288 150 A **xx** 42 F88RM

Note:
- Standard test solution, also for test environments with severe contamination
- Effective contacting thanks to inner conductor's aggressive tip style
- Less maintenance thanks to self-cleaning design
Centring range: +/- 0.8 mm

HFS-840 303 150 A **xx** 42 FS1
HFS-840 303 150 A **xx** 42 FS1 M

Note:
Outer housing Ø 5.8 mm for connector housings with small inner diameter
Centring range: +/- 0.8 mm

HFS-840 303 150 A **xx** 42 RF3
HFS-840 303 150 A **xx** 42 RF3 M
HFS-440 303 150 A **xx** 42 RF3
HFS-440 303 150 A **xx** 42 RF3 M

Note:
- Garter spring in outer conductor
- For high manufacturing tolerances or excessive dielectrics.
- Outer conductor spring stroke should be ≥ 6 N.
Centring range: +/- 0.5 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M					HFS-440 HFS-440 M
Spring force of inner conductor at working stroke (N)	1.3	1.3	2.0	1.3	2.0	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	6.0	8.0	8.0	4.0
Designation for ordering	**53**	**73**	**80**	**93**	**99**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Mechanical data
HFS-440 and HFS-440 M

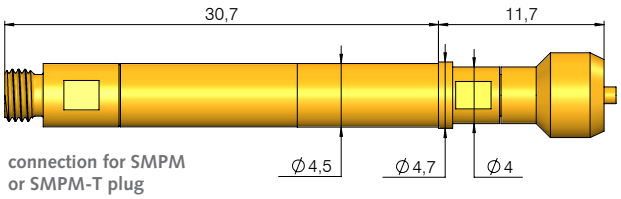
	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

up to 6 GHz
(20 Ω)

FAKRA signal conductor ⊙ male

Series:

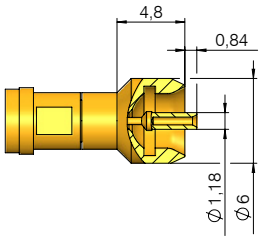
HFS-890 ... F



connection for SMPM or SMPM-T plug

compatible SMPM-cable:
SE-FLX405-0001

Available tip styles:



Ordering description::

HFS-890 343 118 A **93** 42 F
HFS-890 343 118 A **93** 42 F M

Note:
- The best radio frequency performance for data transmission.
- SMPM connector acts as interface to test system, suitable for cable assemblies with miniature SMPM (press-in) or SMPM-T (screw-in) interface for optimum signal transmission.
- Long service life due to low-wear internal structure.
- A standard receptacle or a receptacle with two-bore flange KS-810 or HAS-810 can be used for installation.

See pages 176-179 for an overview of accessories.

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

	HFS-890
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	8.0
Designation for ordering	**93**

Mechanical data

HFS-890

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	0.5 mm
Maximum stroke:	5.0 mm	

FAKRA signal conductor male

Continuity check

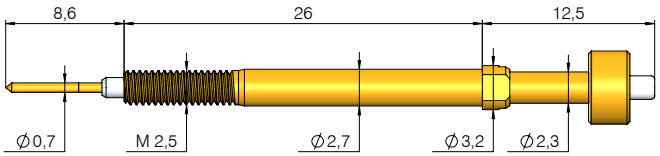
DPS-465

Series:

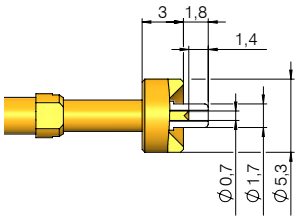
Available tip styles:

Ordering description:

DPS-465 ... M-F



connection for MCX plug



DPS-465 303 070 A **40** 43 M-F

Note:
For continuity check, ideal for detecting FAKRA inner conductors which are not correctly aligned, e.g. at an angle.

Centring range: +/- 0.5 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	DPS-465 ... M-F
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	3.0
Designation for ordering	**40**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

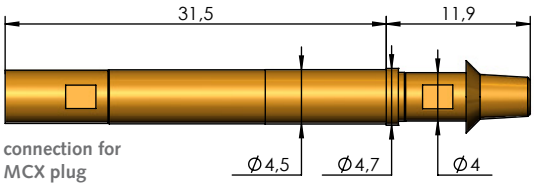
DPS-465 ... M-F

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	4.0 mm
Maximum stroke:	5.0 mm	5.0 mm

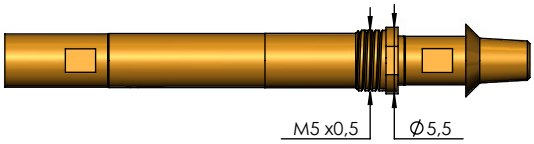
FAKRA signal conductor ◎ female

Series:

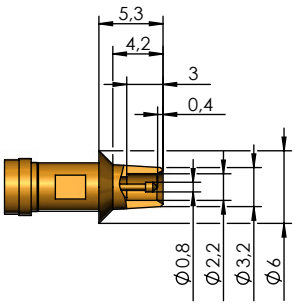
HFS-810 ...



HFS-810 ... M (*)



Available tip styles:



Ordering description:

HFS-810 308 080 A **xx** 42 ZE3
HFS-810 308 080 A **xx** 42 ZE3 M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-810 HFS-810 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-810 and HFS-810 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

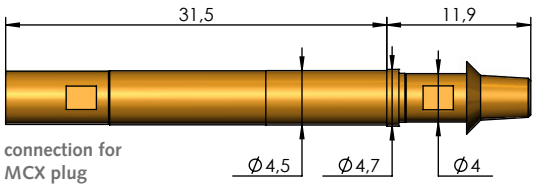
◎ FAKRA signal conductor female

up to 4 GHz (50 Ω)

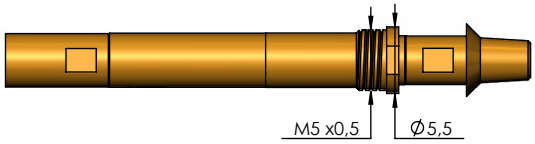
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

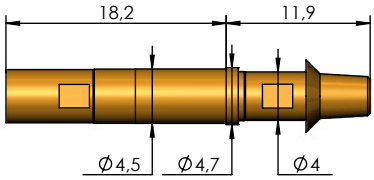
HFS-840 ...



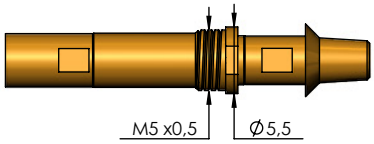
HFS-840 ... M (*)



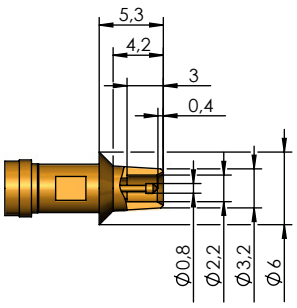
HFS-440 ...



HFS-440 ... M (*)



Available tip styles:



Ordering description:

HFS-840 308 080 A **xx** 42 ZE3
HFS-840 308 080 A **xx** 42 ZE3 M
HFS-440 308 080 A **xx** 42 ZE3
HFS-440 308 080 A **xx** 42 ZE3 M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.3	2.0	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0	8.0	4.0
Designation for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Mechanical data
HFS-440 and HFS-440 M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

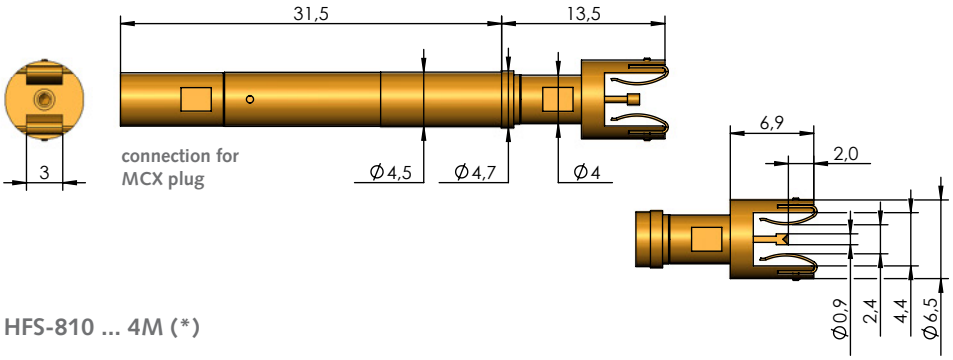
GT13 signal conductor ⊙ male

Series:

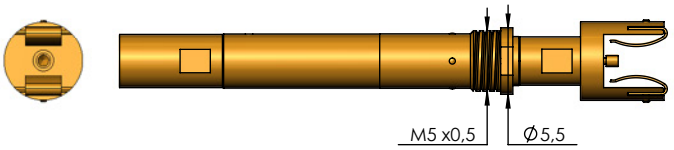
Available tip styles:

Ordering description:

HFS-810 ...



HFS-810 ... 4M (*)



HFS-810 303 090 A **xx** 40 GT13
HFS-810 303 090 A **xx** 40 GT13 4M

Note:
The connector's rectangular ground contact is contacted via overlapping contact lamellae. The test probe must be aligned accordingly.

Centring range: ± 0.3 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

	HFS-810 HFS-810 4M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Mechanical data

HFS-810 and HFS-810 4M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

⊙ GT13 signal conductor male

up to 4 GHz (50 Ω)

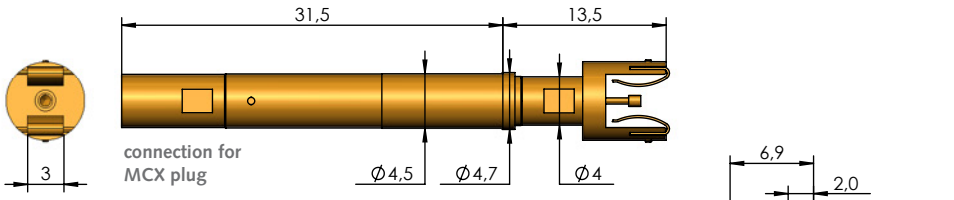
HFS-840 / HFS-840 4M

Series:

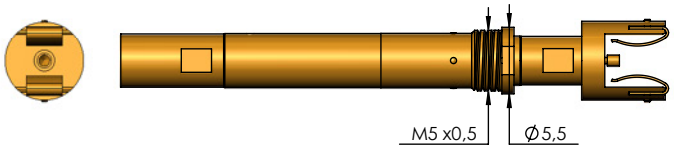
Available tip styles:

Ordering description:

HFS-840 ...



HFS-840 ... 4M (*)



HFS-840 303 090 A **xx** 40 GT13
HFS-840 303 090 A **xx** 40 GT13 4M

Note:
The connector's rectangular ground contact is contacted via overlapping contact lamellae. The test probe must be aligned accordingly.

Centring range: ± 0.3 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

	HFS-840 HFS-840 4M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Mechanical data

HFS-840 and HFS-840 4M

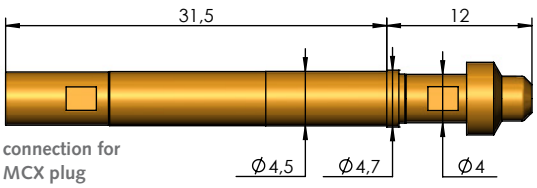
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

up to 4 GHz (50 Ω)

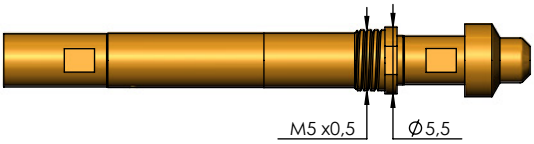
GT16 signal conductor ⊙ male

Series:

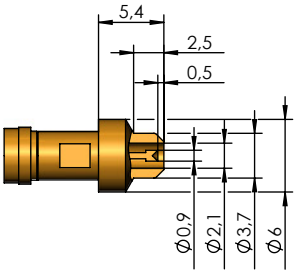
HFS-840 ...



HFS-840 ... M (*)



Available tip styles:



Ordering description:

HFS-840 303 090 A **xx** 42 GT16
HFS-840 303 090 A **xx** 42 GT16 M

Note:
Version with pre-centring on the inner side of connector's outer conductor.

Centring range: ± 0.5 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-840 and HFS-840 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

◎ GT16 signal conductor female

up to 4 GHz (50 Ω)

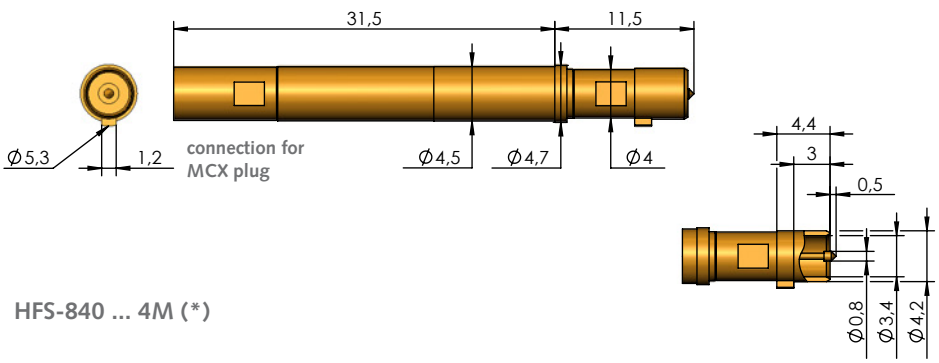
HFS-840 / HFS-840 M

Series:

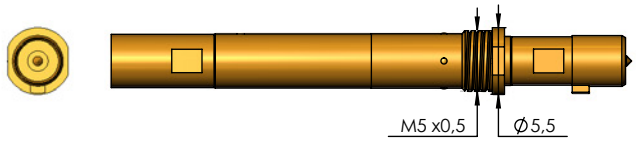
Available tip styles:

Ordering description:

HFS-840 ...



HFS-840 ... 4M (*)



HFS-840 308 080 A **xx** 42 GT16-F
HFS-840 308 080 A **xx** 42 GT16-F 4M

Note:
Version with pre-centring on the inner side of connector's outer conductor. Ground contact is made via the contact lug on the outside diameter of the outer conductor.

Centring range: ± 0.5 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-840 HFS-840 4M
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**53**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

Mechanical data

HFS-840 and HFS-840 M

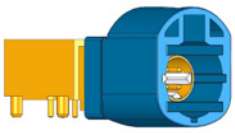
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Contents

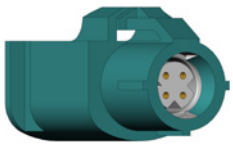
HSD / USB-Mini / MX plug connectors for differential signal transmission

Examples:

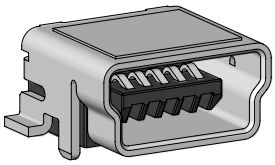
HSD plug



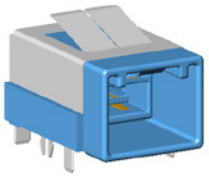
HSD female



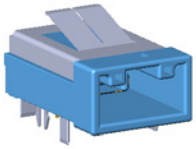
USCAR 30 (USB mini)



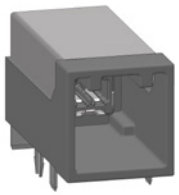
MX38 female



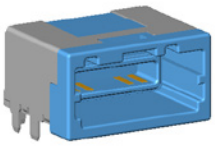
MX48 female



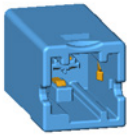
MX49 female



MX62 female



MX68 female



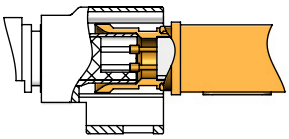
H-MTD female

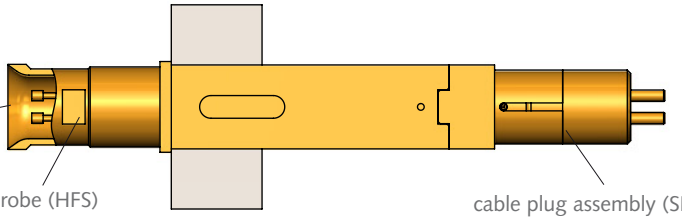
MateNet female

Dimensions featured in the accessories section, see page 186.

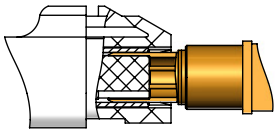
Contacting example HSD:

Contacting of HSD signal conductor male
HFS-819 303 090 A 12743-V2

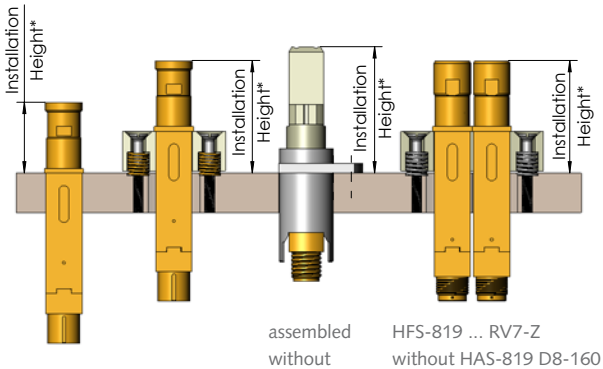




Contacting of HSD signal conductor female
HFS-819 355 051 A 12742-V4



Customising example:



HFS-819 without receptacle

HFS-819 with HAS-819

assembled without receptacle HFS-821

HFS-819 ... RV7-Z without HAS-819 D8-160

Electrical data

HFS-819	**HFS-821**	
Data transmission with HFS-819:		Gbit/s
Data transmission with HFS-821:		Gbit/s
Outer conductor current rating:		8–10 A
Inner conductor current rating:		2–3 A
Inner conductor R_i typical		≤ 10 mΩ
Test probe impedance:		100 Ω

Operating temperature range

–40 up to +80° C

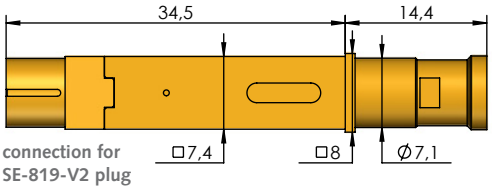
Installation height in receptacle		HAS-819	HAS-819 D8-160	Without KS
Version		*Installation height HFS in KS		
HSD- signal conductor male	... F2-Z	---	---	22.9 mm
	... V2	22.9 mm	---	14.4 mm
	... RV5			
	... V2-Z			
	... RV5-Z			
	... RV5-H3			
	... RV7-Z	22.9 mm	22.9 mm	14.4 mm
HSD- signal conductor female	... V8	25.8 mm	---	17.3 mm
	... V8-Z			
USB Mini signal conductor female	... USB-Mini	---	---	22.4 mm
MX38- signal conductor female	... MX38	---	---	27.0 mm
MX48- signal conductor female	... MX48	---	---	27.4mm
MX49- signal conductor female	... USB-T	---	---	25.7 mm
MX62- signal conductor female	...MX62	---	---	28.7 mm
MX68- signal conductor female	... MX68	---	---	27.7 mm

Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

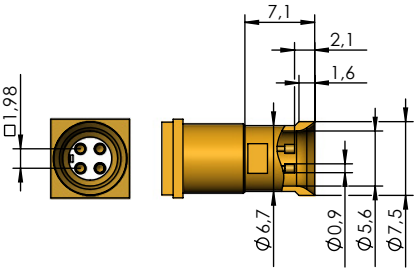
HSD signal conductor male

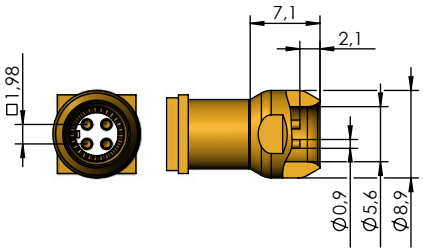
Series:

HFS-819 ... with plug connection



Available tip styles:





Ordering description:

HFS-819 303 090 A **xxx** 43 V2

Note:
Version with passive tip style on outer conductor and inner conductor with tip style 03 (inverse cone).

Centring range: ± 0.8 mm

HFS-819 303 090 A **xxx** 43 RV5

Note:
Version with larger centring range and aggressive serrated tip style on the outer conductor for better contacting reliability on contaminated surfaces. Inner conductor with tip style 03 (inverse cone).

Centring range: ± 1.0 mm

Digital automotive

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-819	
Spring force of inner conductor at working stroke (N)	4 x 1.3	4 x 1.3
Spring force of outer conductor at working stroke (N)	7.5	15.5
Designation for ordering	**127**	**207**

Note:
The HFS-819 series is non-rotating and equipped with position detection to contact coded 4-pole connectors. The HFS-819 can be either pressed directly into a mounting plate without a receptacle or with floating receptacle HAS-819 (see page 179 for receptacles).

Mechanical data

HFS-819

	Outer cond.	Inner cond.
Working stroke:	5.0 mm	2.0 mm
Maximum stroke:	6.0 mm	3.7 mm

HSD signal conductor male

GBit/s
(100 Ω)

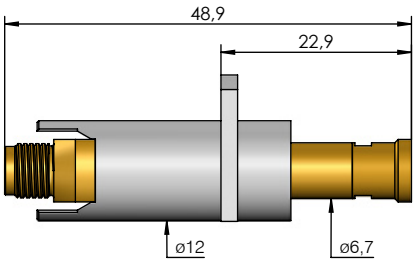
HFS-819
with screw-in connection

Series:

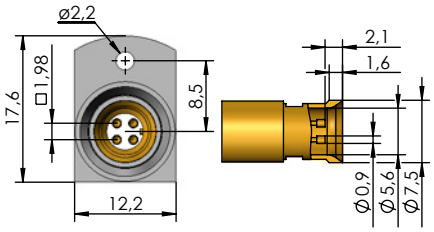
Available tip styles:

Ordering description:

HFS-819 ... with flange and flexible bearing



connection for screw-in
plug SE-819-V5-Z



HFS-819 303 090 A **xxx** 43 F2-Z

Note:
Centring range: ± 1.0 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-819	
Spring force of inner conductor at working stroke (N)	4 x 1.3	4 x 1.3
Spring force of outer conductor at working stroke (N)	7.5	15.5
Designation for ordering	**127**	**207**

Note:
The HFS-819 series is non-rotating and equipped with position detection to contact coded 4-pole connectors. The HFS-819 ...F2-Z is self-floating and can be screwed directly into a mounting plate without a receptacle (KS).

Mechanical data

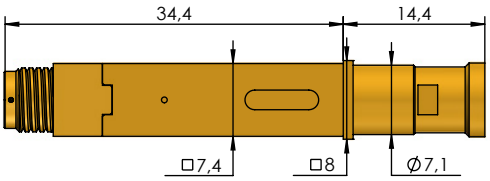
HFS-819

	Outer cond.	Inner cond.
Working stroke:	5.0 mm	2.0 mm
Maximum stroke:	6.0 mm	3.7 mm

HSD signal conductor male

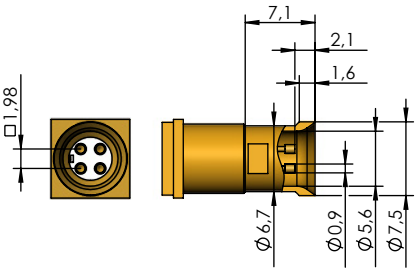
Series:

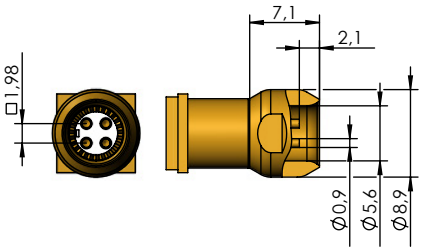
HFS-819 ... with screw-in connection

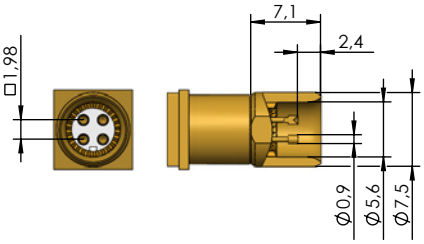


connection for screw-in
plug SE-819-V5-Z

Available tip styles:







Ordering description:

HFS-819 303 090 A **xxx** 43 V2-Z

Note:
Version with passive tip style on outer conductor and inner conductor with tip style 03 (inverse cone).

Centring range: ± 0.8 mm

HFS-819 303 090 A **xxx** 43 RV5-Z

Note:
Version with larger centering range and aggressive serrated tip style on the outer conductor for better contacting reliability on contaminated surfaces. Inner conductor with tip style 03 (inverse cone).

Centring range: ± 1.0 mm

HFS-819 303 090 A **xxx** 43 RV7-Z

Note:
Version with smaller tip diameter to contact double HSD connector. Two radio frequency probes (HFS) of this version, without receptacles, are mounted in the HAS-819 D8-160 probe plate (see page 194).

Centring range: ± 0.3 mm

Digital automotive

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

Note:
The HFS-819 series is non-rotating and equipped with position detection to contact coded 4-pole connectors. The HFS-819 can be either pressed directly into a mounting plate without a receptacle or with floating receptacle HAS-819 (see page 179 for receptacles).

	HFS-819	
Spring force of inner conductor at working stroke (N)	4 x 1.3	4 x 1.3
Spring force of outer conductor at working stroke (N)	7.5	15.5
Designation for ordering	**127**	**207**

Mechanical data

HFS-819

	Outer cond.	Inner cond.
Working stroke:	5.0 mm	2.0 mm
Maximum stroke:	6.0 mm	3.7 mm

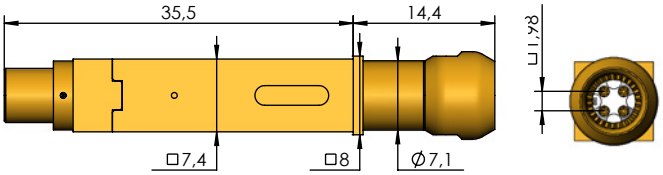
HSD signal conductor male

GBit/s
(100 Ω)

HFS-819
with plug connection

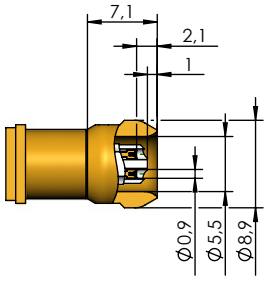
Series:

HFS-819 ... with connection for HSD socket



Note:
Connection for HSD signal conductor socket, available from INGUN, part number SE-HSD-100HSDFG100
Please note: the plastic housing has been removed from the connector.

Available tip styles:



Ordering description:

HFS-819 319 090 A **xxx** 43 RV5-H3

Note:
Version for the best RF signal transmission and connection with Rosenberger cables, featuring a larger centring range and aggressive serrated tip style on the outer conductor for better contacting reliability on contaminated surfaces.

Centring range: ± 1.0 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-819	
Spring force of inner conductor at working stroke (N)	4 x 1.3	4 x 1.3
Spring force of outer conductor at working stroke (N)	7.5	15.5
Designation for ordering	**127**	**207**

Note:
The HFS-819 series is non-rotating and equipped with position detection to contact coded 4-pole connectors. The HFS-819 can be either pressed directly into a mounting plate without a receptacle or with floating receptacle HAS-819 (see page 179 for receptacles).

Mechanical data

HFS-819

	Outer cond.	Inner cond.
Working stroke:	5.0 mm	2.0 mm
Maximum stroke:	6.0 mm	3.7 mm

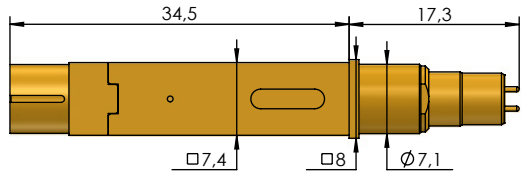
HSD signal conductor female

Series:

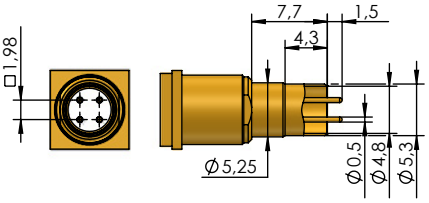
Available tip styles:

Ordering description:

HFS-819 ... V8 with plug connection



connection for plug SE-819-V2

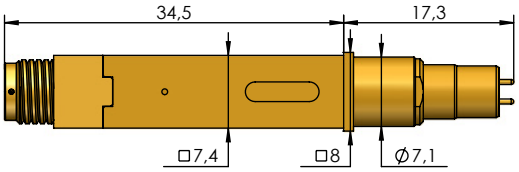


HFS-819 355 051 A **xxx** 42 V8

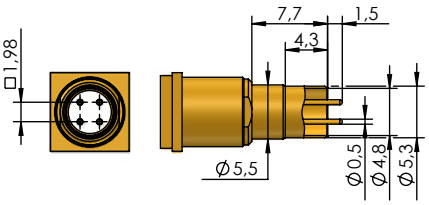
Note:
Version with plug connection.

Centring range: ± 0.2 mm

HFS-819 ... V8-Z with screw-in connection



connection for screw-in plug SE-819-V5-Z



HFS-819 355 051 A **xxx** 42 V8-Z

Note:
Version with screw-in connection.

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-819	
Spring force of inner conductor at working stroke (N)	4 x 1.3	4 x 1.3
Spring force of outer conductor at working stroke (N)	7.5	15.5
Designation for ordering	**127**	**207**

Note:
The HFS-819 series is non-rotating and equipped with position detection to contact coded 4-pole connectors. The HFS-819 can be either pressed directly into a mounting plate without a receptacle or with floating receptacle HAS-819 (see page 179 for receptacles).

Mechanical data

HFS-819

	Outer cond.	Inner cond.
Working stroke:	5.0 mm	2.0 mm
Maximum stroke:	6.0 mm	3.7 mm

Digital automotive

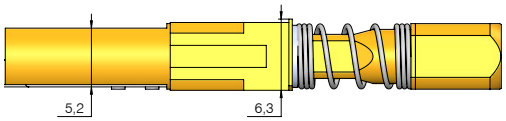
H-MTD signal conductor female

GBit/s (100 Ω)

HFS-802

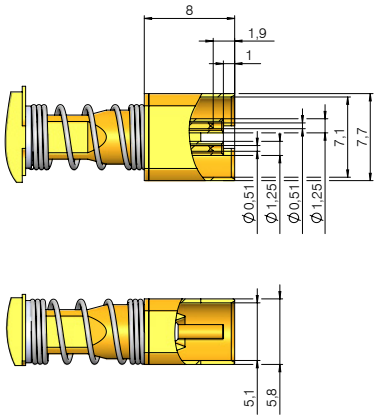
Series:

HFS-802 ... H-MTD



connection for SE-STPGG serie

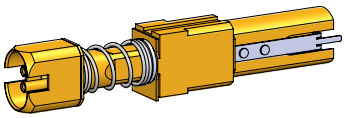
Available tip styles:

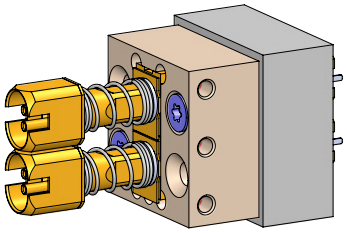


Ordering description:

HFS-802 314 051 A **xx** 42 HMTD

Note:
- For H-MTD differential connectors (LV 214 / USCAR).
- The best radio frequency performance for data transmission.
- Modular design, test probe combination for single, dual, or quadruple housing.
- Primarily used for future future technologies in the automotive market (e.g. autonomous driving).
- Installation example for double version shown below.
- Find mounting frames for single, dual, or quadruple installation on page 179.





Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

Note:
Modular mounting frames for single, dual, or quadruple installation

Single: with KS-802HMTD-1
Dual: with KS-802HMTD-2
Quadruple: with KS-802HMTD-4

INGUN cables for interface:
SE-STPGG-100HMTDFG050
(50 cm, open)
SE-STPGG-100HMTDFG100HMTDFGZ
(100 cm, female)

	HFS-802
Spring force of inner conductor at working stroke (N)	2 x 1.0
Spring force of outer conductor at working stroke (N)	6.0
Designation for ordering	**80**

Mechanical data

HFS-802

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.2 mm
Maximum stroke:	5.0 mm	2.8

Mechanical data

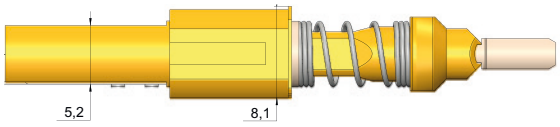
HFS-802

Angular error compensation:
± 3.0° (after min. 0.5 mm stroke)

MATEnet signal conductor female

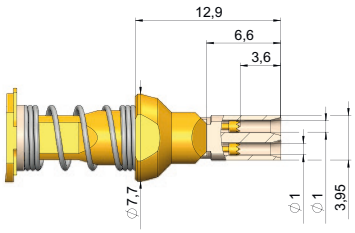
Series:

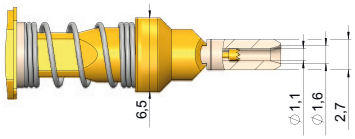
HFS-802 ...



Connection for cable jack series SE-STPGG

Available tip styles:

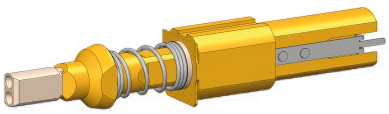


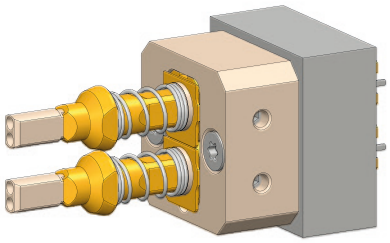


Ordering description:

HFS-802 306 100 A **76** 42 MTNT

Note:
- Designed for testing MATEnet (TE Connectivity): modular and scalable data connector system for automotive Ethernet
- Data rate up to 1 Gbit/s according to IEEE 100BASE-T1
- Modular design, test probe combination for single, dual, or quintuple housing
- Extended service life: service kit available for replacing inner conductors and insulation part
- Cable as interface to test system: length 50cm (female/open) or length 100cm (female/female)





Digital automotive

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

Note:
Modular mounting frames for single, dual, or quintuple installation

Single: with KS-802 MTNT-1
Dual: with KS-802 MTNT-2
Quintiple: with KS-802 MTNT-5

INGUN cables for interface::
SE-STPGG-100HMTDFG050
(50 cm, open)
SE-STPGG-100HMTDFG100HMTDFGZ
(100 cm, female)

	HFS-802
Spring force of inner conductor at working stroke (N)	2x 0.80
Spring force of outer conductor at working stroke (N)	6.0
Designation for ordering	**76**

Mechanical data
HFS-802

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.9 mm
Maximum stroke:	5.0 mm	3.4 mm

Mechanical data
HFS-802

Misalignment compensation: max. 0.3 mm
Angular error compensation: ± 3.0°

MX38 / MX48 signal conductor female

GBit/s (100 Ω)

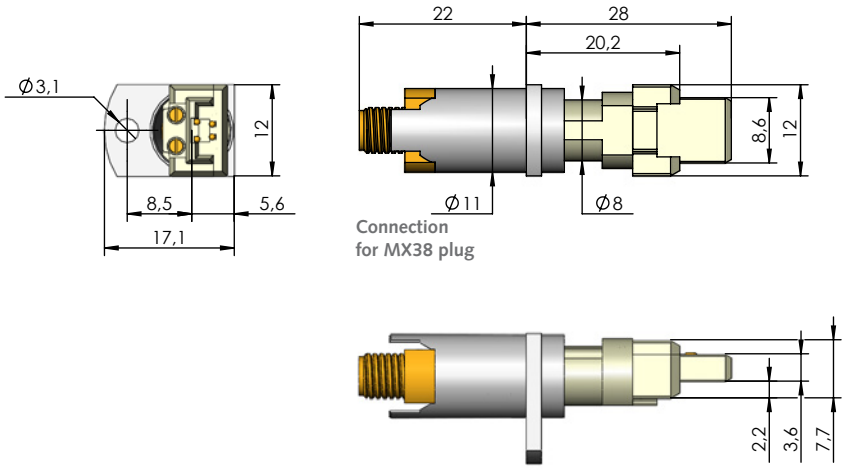
HFS-821

Series:

Available tip styles:

Ordering description:

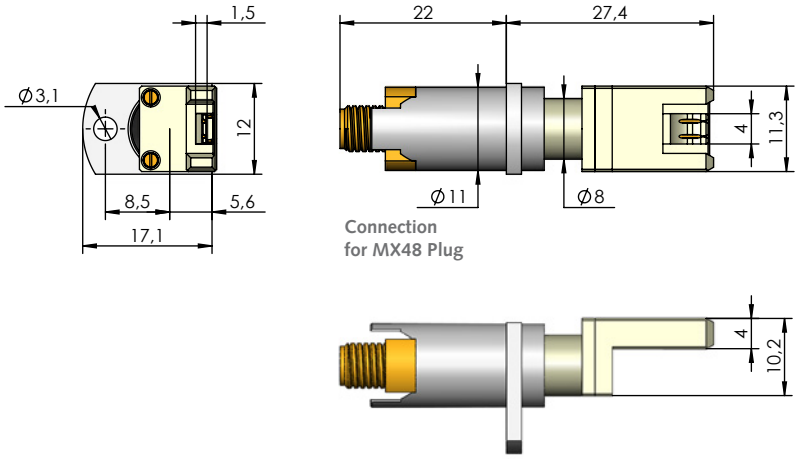
HFS-821 ...



HFS-821 305 080 A **xx** 05 MX38

Note:
Probes in the series HFS-821 are non-rotating and can be aligned to a MX38 connector. This probe is moveable once installed (floating) and can balance out an axial off-set of ± 1.0°. After a minimum contacting stroke of 0.5 mm the probe can balance out radial positioning inaccuracies of the connector by up to ± 3.5°.

Centring range: ± 0.6 mm



HFS-821 302 045 A **xx** 05 MX48

Note:
Probes in the HFS-821 series are non-rotating and can be aligned to a MX38 connector. This probe is moveable once installed (floating) and can balance out an axial off-set of + 1.0°. After a minimum contacting stroke of 0.5 mm the probe can balance out radial positioning inaccuracies of the connector by up to ± 3.5°.

Centring range: ± 0.6 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-821
Spring force of inner conductor at working stroke (N)	Inner conductor not spring-loaded
Spring force of outer conductor at working stroke (N)	10.0
Designation for ordering	**99**

Note:
The RF probes in the HFS-821 series are mounted by means of a flange connection and a screw.

Mechanical data
HFS-821

	Outer cond.	Inner cond.
Working stroke:	3.5 mm	not spring
Maximum stroke:	5.0 mm	loaded

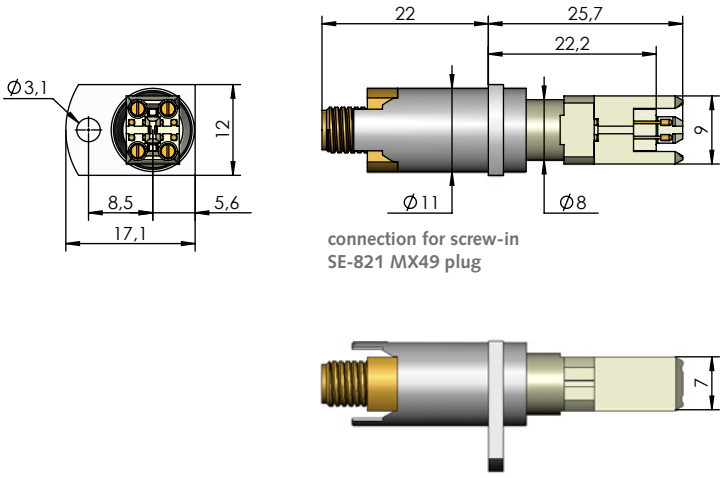
Mechanical data
HFS-821

Axial off-set:	± 1.0 mm
Angular error compensation:	± 3.5° (after min. 0.5 mm stroke)

MX49 signal conductor female

Series:

HFS-821 ...



connection for screw-in
SE-821 MX49 plug

Ordering description:

HFS-821 305 080 A **xx** 05 MX49

Note:
Probes in the HFS-821 series are non-rotating and can be aligned to a MX38 connector. This probe is moveable once installed (floating) and can balance out an axial off-set of + 1.0°. After a minimum contacting stroke of 0.5 mm the probe can balance out radial positioning inaccuracies of the connector by up to ± 3.5°.

Centring range: ± 0.6 mm

Digital automotive

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-821
Spring force of inner conductor at working stroke (N)	Inner conductor not spring-loaded
Spring force of outer conductor at working stroke (N)	10.0
Designation for ordering	**99**

Note:
The RF probes in the HFS-821 series are mounted by means of a flange connection and a screw.

Mechanical data
HFS-821

	Outer cond.	Inner cond.
Working stroke:	3.5 mm	not spring-loaded
Maximum stroke:	5.0 mm	

Mechanical data
HFS-821

Axial off-set:	± 1.0 mm
Radial positioning:	± 3.5° (after min. 0.5 mm stroke)

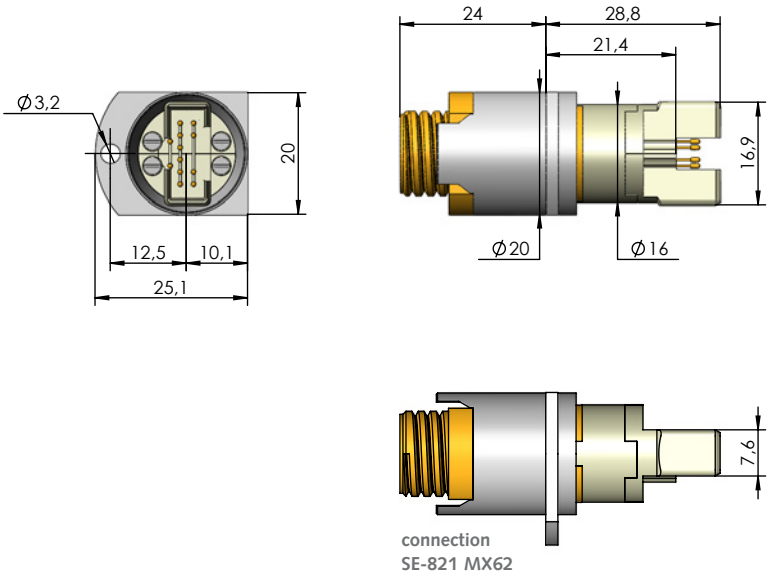
MX62 signal conductor female

GBit/s (100 Ω)

HFS-821

Series:

HFS-821 ...



connection
SE-821 MX62

Ordering description:

HFS-821 305 080 A **xx** 05 MX62

Note:
Probes in the HFS-821 series are non-rotating. This probe can be aligned to a MX62 connector. It is moveable once installed (floating) and can balance out an axial off-set of ± 0.9 mm. After a minimum contacting stroke of 0.5 mm the probe can balance out radial positioning inaccuracies of the connector by up to ± 3.5°.

Centring range: ± 0.7 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-821
Spring force of inner conductor at working stroke (N)	Inner conductor not spring-loaded
Spring force of outer conductor at working stroke (N)	10.0
Designation for ordering	**99**

Note:
The RF probes in the HFS-821 series are mounted by means of a flange connection and a screw.

Mechanical data
HFS-821

	Outer cond.	Inner cond.
Working stroke:	3.5 mm	not spring-loaded
Maximum stroke:	5.0 mm	

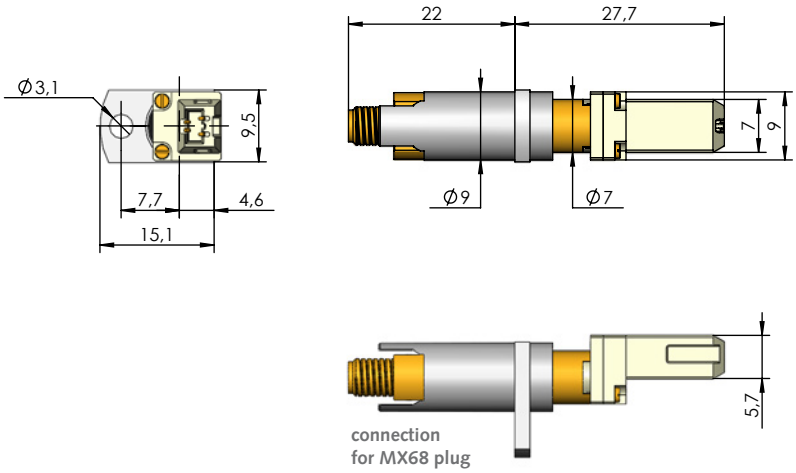
Mechanical data
HFS-821

Axial off-set:	± 0.9 mm
Radial positioning:	± 3.5° (after min. 0.5 mm stroke)

MX49 signal conductor female

Series:

HFS-821 ...



Ordering description:

HFS-821 302 045 A **xx** 05 MX68

Note:
Probes in the HFS-821 series are non-rotating. This probe can be aligned to a MX68 connector. It is moveable once installed (floating) and can balance out an axial off-set of ± 0.5 mm. After a minimum contacting stroke of 0.5 mm the probe can balance out radial positioning inaccuracies of the connector by up to ± 2.0°.

Centring range: ± 0.5 mm

Digital automotive

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-821
Spring force of inner conductor at working stroke (N)	Inner conductor not spring-loaded
Spring force of outer conductor at working stroke (N)	10.0
Designation for ordering	**99**

Note:
The RF probes in the HFS-821 series are mounted by means of a flange connection and a screw.

Mechanical data
HFS-821

	Outer cond.	Inner cond.
Working stroke:	3.5 mm	not spring-loaded
Maximum stroke:	5.0 mm	

Mechanical data
HFS-821

Axial off-set:	± 0.5 mm
Radial positioning:	± 2.0° (after min. 0.5 mm stroke)

USCAR (USB mini) signal cond. female

GBit/s (100 Ω)

HFS-821

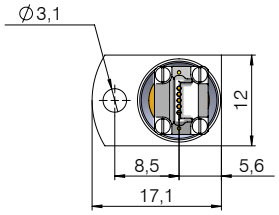
Series:

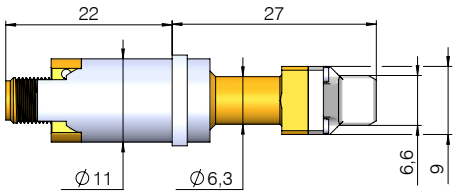
HFS-821 ...

Available tip styles:

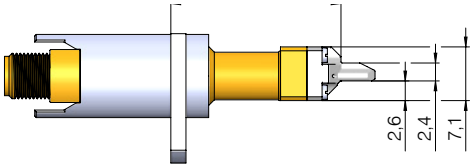
Ordering description:

HFS-821 313 050 A **99** 05 USBMINI-D





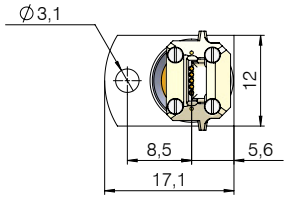
Connection for screw plug
SE-821 USB Mini

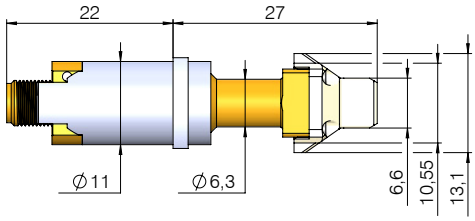


Note:
New version for USB-Mini, USCAR and HS AutoLink with improved long-term stability. This probe is non-rotating and can be aligned with the USB Mini. In addition, it is moveable once installed (floating) and can compensate for an axial offset of ± 1.0 mm. From a contact stroke of 0.5 mm, the probe can compensate radial positional inaccuracies of the connector of up to ± 3.5°.

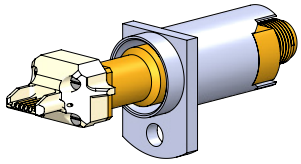
Centring range: ± 0,6 mm

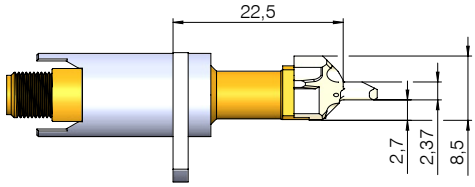
HFS-821 313 050 A **180** 05 USBMINI-D2





Note:
The USB-mini D2 version was developed especially for the automotive USCAR-30 contacting wraps.





Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. Other spring forces available upon request.

	HFS-821 ... USBMINI-D	
Spring force of inner conductor at working stroke (N)	Inner conductor not spring-loaded	Inner conductor not spring-loaded
Spring force of outer conductor at working stroke (N)	10.0	18,0
Designation for ordering	**99**	**180**

Note:
The RF probes in the HFS-821 series are mounted by means of a flange connection and a screw.

Mechanical data

HFS-821

	Outer cond.	Inner cond.
Working stroke:	3.5 mm	not spring
Maximum stroke:	5.0 mm	loaded

Mechanical data

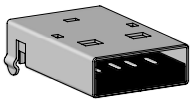
HFS-821

Axial off-set:	1.0 mm
Radial positioning:	± 3.5° (after min. 0.5 mm stroke)

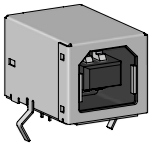
Contacting of USB plug connectors for differential signal transmission

Examples:

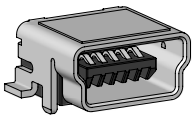
4-channel, Type A signal conductor female



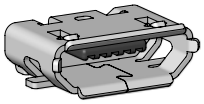
4-channel, Type B signal conductor female



Mini, 4-channel, Type B signal conductor female



Micro, 4-channel, Type B signal conductor female



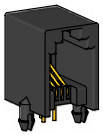
USB3.1 x-pole, Type C signal conductor female

Dimensions featured in the accessories section, see page 186.

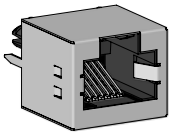
Contacting of RJ plug connectors for differential signal transmission

Examples:

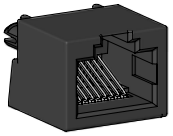
RJ-10, 4-channel signal conductor female



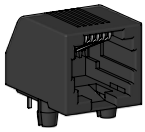
RJ-45, 8-channel signal conductor female



RJ-50, 10-channel signal conductor female



RJ-12, 6-channel signal conductor female

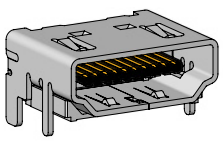


Dimensions featured in the accessories section, see page 186.

Contacting of HDMI, TAE, HSL AutoLink, SATA and DC plug connectors for differential signal transmission

Examples:

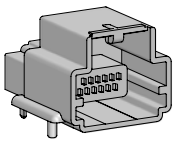
HDMI, 19-channel signal conductor female



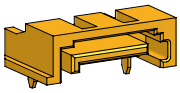
TAE, 6-channel signal conductor female

DC-Power, Ø 2,1 signal conductor female

HS Autolink II signal conductor female



SATA signal conductor female



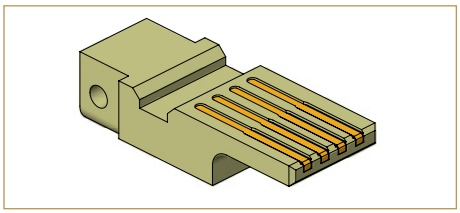
Dimensions featured in the accessories section, see page 186.

◎ USB signal conductor female

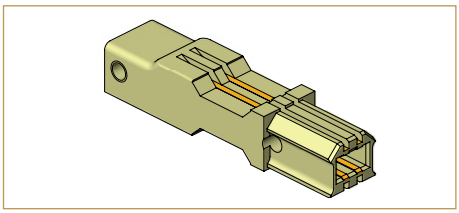
GBit/s
(100 Ω)

PS-USB

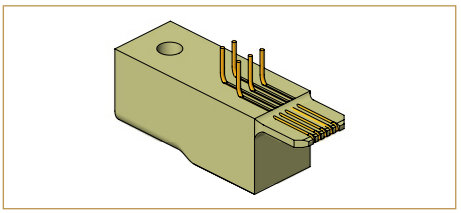
For continuity check



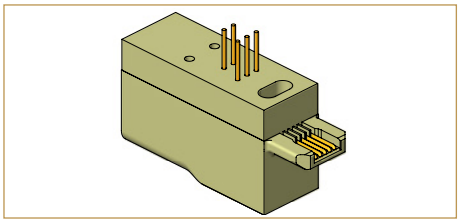
Description	USB connector, Type A
Plug	Four terminals
Casing material	High performance plastic
Electrical design	Max. 25 VAC / 60 VDC
Part number	21071
Connection cycles	Approx. 100,000



Description	USB connector, Type B
Plug	Four terminals
Casing material	High performance plastic
Electrical design	Max. 25 VAC / 60 VDC
Part number	17829
Connection cycles	Approx. 100,000



Description	USB connector Mini, Type B
Plug	Five terminals
Casing material	High performance plastic
Electrical design	Max. 25 VAC / 60 VDC
Part number	21072
Connection cycles	Approx. 70.000



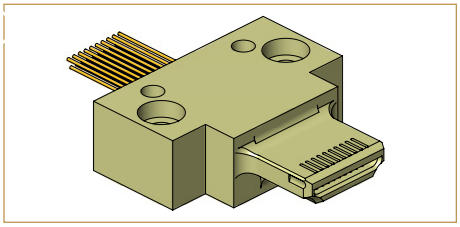
Description	USB connector Micro, Type B
Plug	Five terminals
Casing material	High performance plastic
Electrical design	Max. 25 VAC / 60 VDC
Part number	34816
Connection cycles	Approx. 50,000

Note:
The test plugs are designed solely for an electrical continuity check.

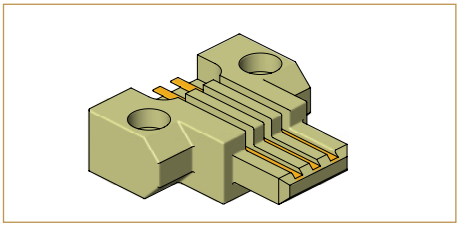
◎ HDMI / TAE / DC power signal conductor female

GBit/s
(100 Ω)

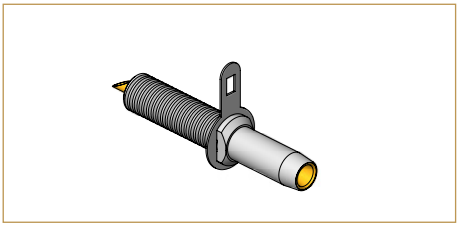
PS-HDMI
PS-TAE
PS power DC



Description	HDMI connector
Plug	Nineteen terminals
Casing material	High performance plastic
Electrical design	Max. 25 VAC / 60 VDC
Part number	34814
Connection cycles	Approx. 100,000



Description	TAE connector
Plug	Six terminals
Casing material	High performance plastic
Electrical design	Max. 25 VAC / 60 VDC
Part number	34847



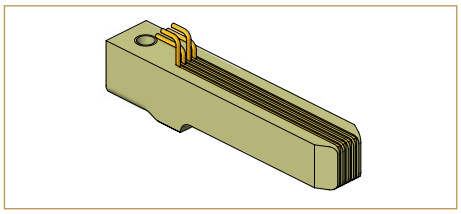
Description	Power DC connector, Ø 2,1
Plug	Two terminals
Electrical design	Max. 12 V
Part number	35640

PS-RJ

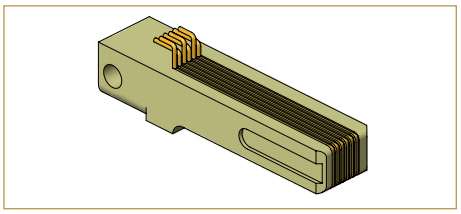
For continuity check

GBit/s
(100 Ω)

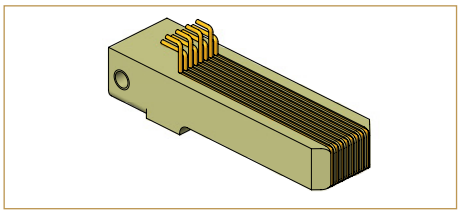
RJ signal conductor ◎ female



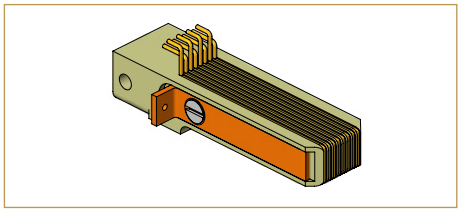
Description	RJ-10 connector
Plug	Four terminals
Casing material	High performance plastic
Electrical design	Max. 25 VAC / 60 VDC
Part number	17824
Connection cycles	Approx. 200,000



Description	RJ-12 connector
Plug	Six terminals
Casing material	High performance plastic
Electrical design	Max. 25 VAC / 60 VDC
Part number	17825
Connection cycles	Approx. 200,000



Description	RJ-45 connector
Plug	Eight terminals
Casing material	High performance plastic
Electrical design	Max. 25 VAC / 60 VDC
Part number	17826
Connection cycles	Approx. 200,000

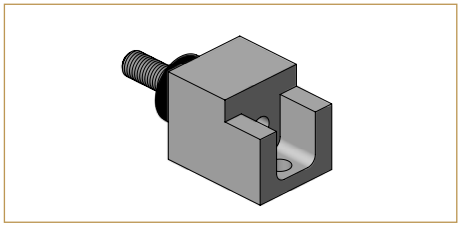


Description	RJ-45 connector with shield check
Plug	Eight terminals
Casing material	High performance plastic
Electrical design	Max. 25 VAC / 60 VDC
Part number	41164
Connection cycles	Approx. 200,000

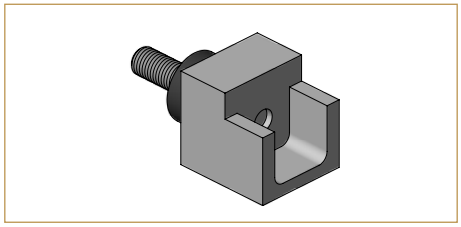
Note:
The test plug are designed for purely an electrical continuity check.

PSA

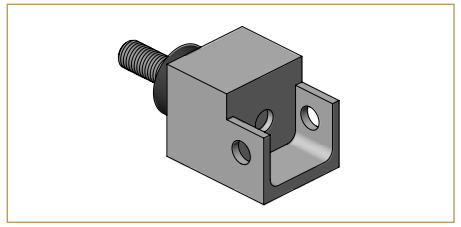
Test plug mounting



Description	Mounting adapter for four-terminal plug
Part number	17830
Suitable for	17824, 21072, 34816



Description	Mounting adapter for six-terminal plug
Part number	18198
Suitable for	17825, 17829, 21071

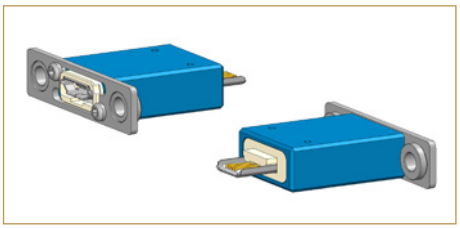


Description	Mounting adapter for ten-terminal plug
Part number	18199
Suitable for	17826, 41164

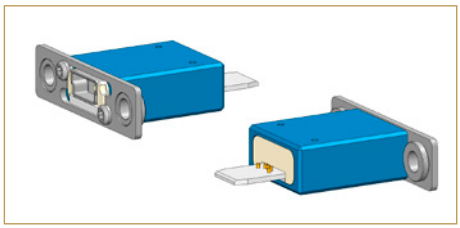
USB, HDMI, SATA, HSAutolink II signal conductor female

GBit/s (100 Ω)

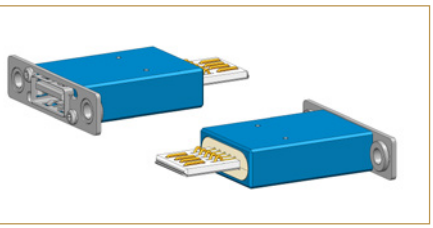
Plug connectors for RF check and continuity check



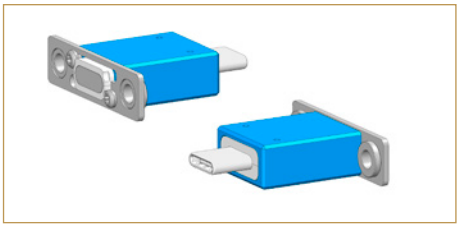
Type	USB 2.0 micro
Designation	PS-USB2.0MicroB-M-005-G5-B
Part no.	112621
Data rate	480 Mbit/s
No. mating cycles	100,000 (*)



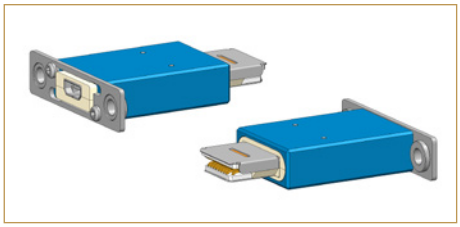
Type	USB 2.0 mini
Designation	PS-USB2.0MiniA-M-005-G5-B
Part no.	112619
Data rate	480 Mbit/s
No. mating cycles	100,000 (*)



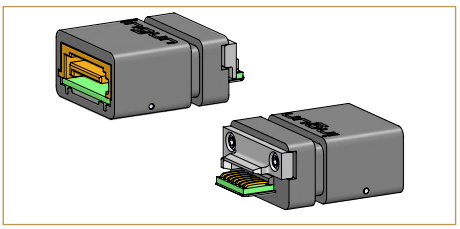
Type	USB A 3.0 (2.0)
Designation	PS-USB3.0A-M-005-G5-B
Part no.	112624
Data rate	5 Gbit/s
No. mating cycles	100,000 (*)



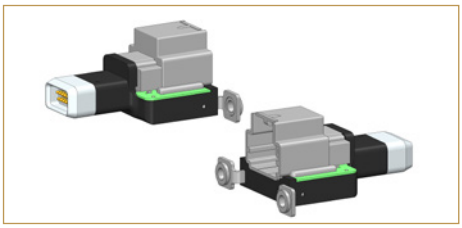
Type	USB 3.1C
Designation	PS-USB3.1C-M-024-G5-B
Part no.	112622
Data rate	10 Gbit/s
No. mating cycles	50,000 (*)



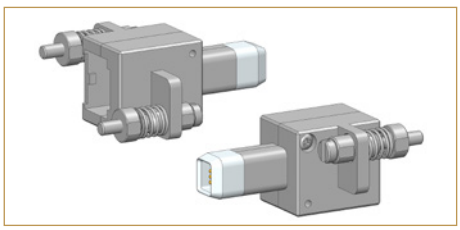
Type	HDMI 2.0 (1.4)
Designation	PS-HDMI2.0A-M-019-G5-B
Part no.	112626
Data rate	14 Gbit/s ready
No. mating cycles	50,000 (*)



Type	SATA
Designation	PS-SATA3.0-M-007-G5-B
Part no.	106534
Data rate	3 Gbit/s
No. mating cycles	50,000 (*)



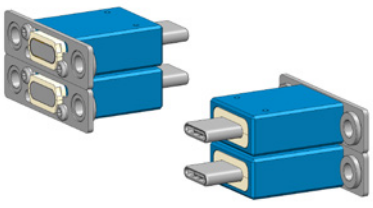
Type	HS Autolink II (12-pol.)
Designation	PS-HSAL2-M-012-G5-B
Part no.	105323
Data rate	5 Gbit/s
No. mating cycles	50,000 (*)

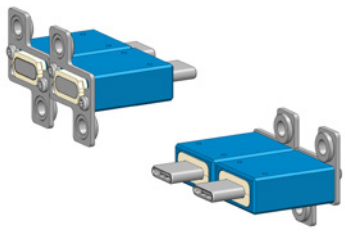


Type	HS Autolink II (6-pol.)
Designation	PS-HSAL2-M-006-G5-B
Part no.	112281
Data rate	5 Gbit/s
No. mating cycles	50,000 (*)

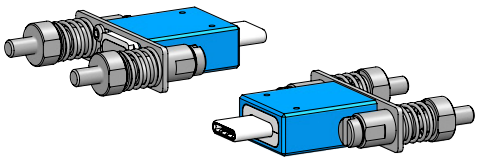
(*): Laboratory conditions

All plug connectors can be installed side by side or on top of one another using the attachments included in delivery:

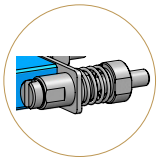




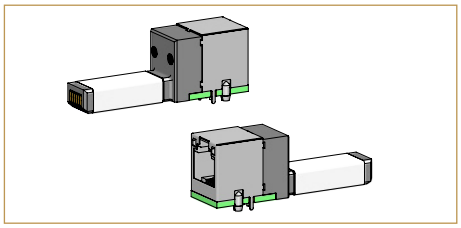
All plug connectors can be used in combination with two optional floating mounts:



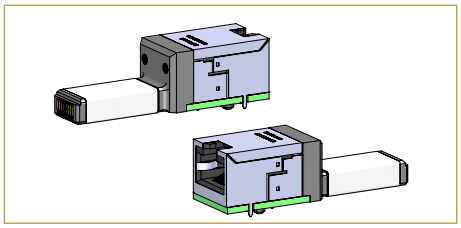
Part no.: 112863 (delivery unit 2 pieces)



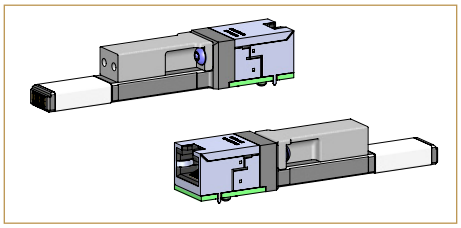
RJ signal conductor female



Type	RJ-12 (RJ-11)
Designation	PS-RJ12-M-006
Part no.	53767
Data rate	1 Gbit/s
No. of mating cycles	250,000 (*)

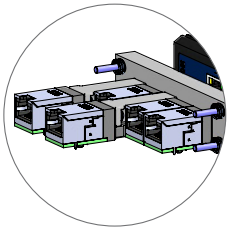


Type	RJ-45 standard
Designation Version Standard	PS-RJ45-M-008
Part no.	55140
Data rate	1 Gbit/s
No. of mating cycles	250,000 (*)



Type	RJ-45 XL (extended)
Designation Version XL	PS-RJ45-M-008-XL
Part no.	102216
Data rate	1 Gbit/s
No. of mating cycles	250,000 (*)

(*): Laboratory conditions

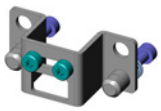


Installation example (55140 and 102216) of minimal achievable distance.

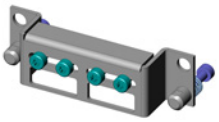
Designation:
Option without picture floating mount for part number 55140 or 102216

Part no.: 55146

PSA-F16,5-RJxx



PSA-F16,5-RJxx-Twin



55148

Test plugs (PS-RJ):
RJ test plugs are used to contact digital network and telephone plug connectors. These can be installed side by side and can be used in combination with a floating mount.

Contents

MM8030 / MM8130 / MM8430 / MS-156 HF / MS-156 C / MS-180 / Pico II, PN 1551372-1 switches

Examples:

MM8030 switch

MM8130 switch

MM8430 switch

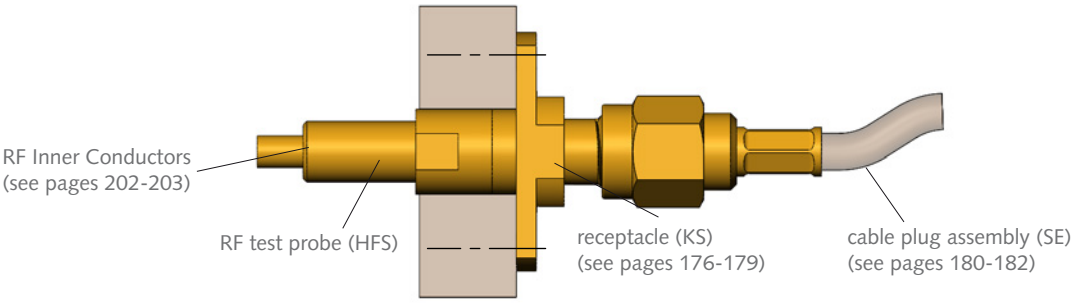
MS-156 (HF) switch

MS-156 C switch

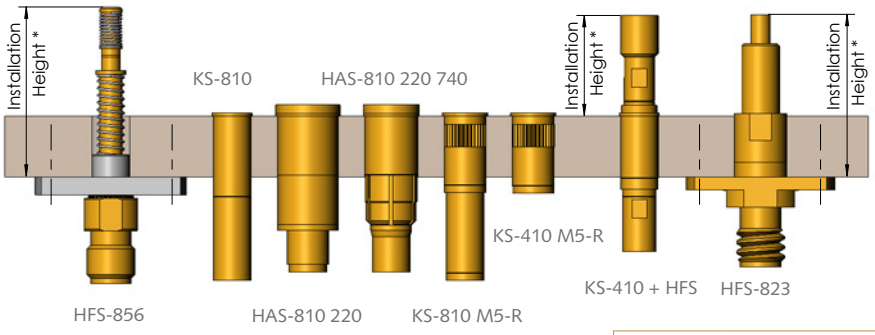
MS-180 switch

Pico II, PN 1551372-1 switch

Dimensions featured in the accessories section, see page 186.

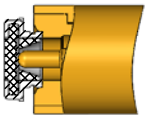


Customising example:



Contacting example MM8030:

Contacting of MM8030 switch
HFS-823 305 040 A 6043 MM310



Electrical data

HFS-823	**HFS-856**
HFS-860/860 M /890/890 M	**HFS-865**
Frequency range with HFS-856/860:	up to 6 GHz
Frequency range with HFS-823:	up to 6 GHz
Frequency range with HFS-865/890:	up to 12 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance	50 Ω

Operating temperature range

–40 up to +80° C

Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

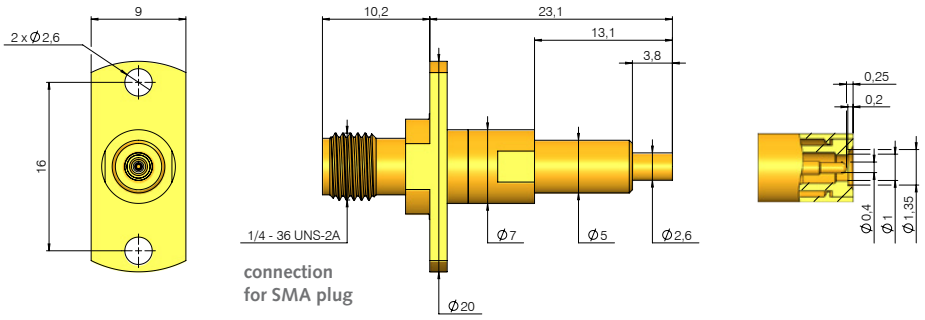
Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)	Without KS
Version		*Installation height of HFS in KS		
MM8030 switch	... MM310	---	---	21.4 mm
	... MM8030	---	---	22.4 mm
	... MM1 / ...MM1 M	9.4 mm	10.5 mm	---
	HFS-890 ...MM8030 / MM8030 M	7.9 mm	9.0 mm	---
MM8130 MM8430 MS-156 switch	MM036	---	---	21.6 mm
	... Y80 / ... Y80 M	11.9 mm	13.0 mm	---
	... Y82 / ... Y82 M	16.9 mm	18.0 mm	---
	... MS03	---	---	18.6 mm
	... MS06	---	---	18.6 mm
	... M156	---	---	22.7 mm
MS-180 switch	... MS180	---	---	22.4 mm
Pico II, PN 1551372-1 switch	... MM310	---	---	21.4 mm

Series:

Available tip styles:

Ordering description:

HFS-823 ...



HFS-823 305 040 A **xx** 43 MM310

Note: Version with flange connection. No movement of the connection during stroke movement.

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. .

	HFS-823
Spring force of inner conductor at working stroke (N)	2.0
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**60**

Note:
The RF test probes in the HFS-823 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-823

	Outer cond.	Inner cond.
Working stroke:	0.8 mm	0.3 mm
Maximum stroke:	1.5 mm	1.1 mm

MM8030 switch

up to 8 GHz (50 Ω)

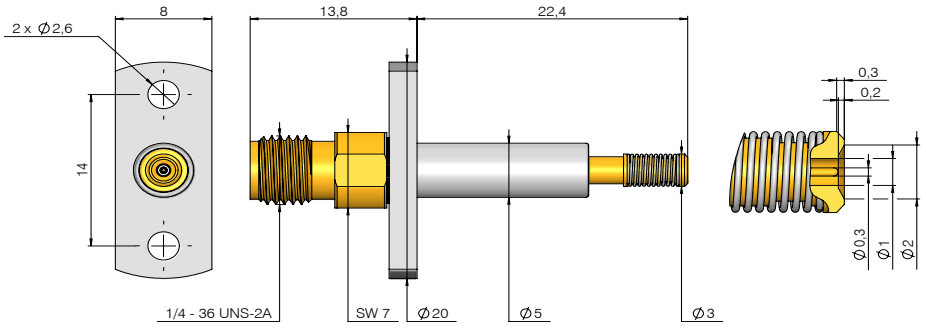
HFS-856

Series:

Available tip styles:

Ordering description:

HFS-856 ...



connection for SMA plug

HFS-856 305 030 A **xx** 43 MM8030-H

Note:
- Precise mechanical hitting accuracy due to exact guidance and re-positioning with new guiding barrel
- Consistent RF signal transmission, repeating accuracy ensured
- Protected signal (inner) conductor due to protruding ground (outer) conductor
- Long service life due to low-wear internal structural design
- Internationally preferred installation via screw connection with flange
- Standardised SMA connection interface to test system

Compensation of radial positioning inaccuracies of the connector by up to ± 3.0°.

Centring range: ± 0.4 mm

RF performance:

	S11	VSWR
0 - 6 GHz:	-20 dB	1.25
6 - 8 GHz:	-15 dB	1.45

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-856
Spring force of inner conductor at working stroke (N)	1.5
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**55**

Note:
The RF test probes in the HFS-856 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

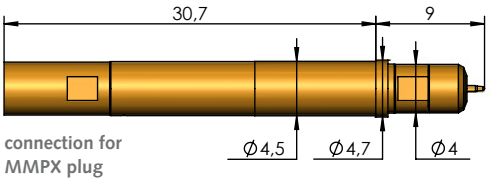
Mechanical data

HFS-856

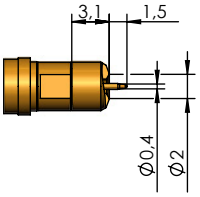
	Outer cond.	Inner cond.
Working stroke:	4.2 mm	0.8 mm
Maximum stroke:	5.2 mm	2.0 mm

Series:

HFS-865 ...



Available
tip styles:



Ordering description:

HFS-865 313 040 A **xx** 43 MM1

Note:

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-865		
Spring force of inner conductor at working stroke (N)	1.3	1.3	1.3
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0
Designation for ordering	**53**	**73**	**93**

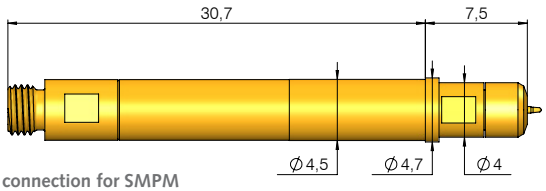
Mechanical data

HFS-865

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	1.0 mm
Maximum stroke:	5.0 mm	1.5 mm

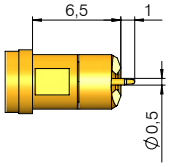
Series:

HFS-890 ...



connection for SMPM or SMPM-T plug

Available tip styles:



Ordering description:

HFS-890 313 040 A **93** 43 MM8030
HFS-890 313 040 A **93** 43 MM8030 M

Note:
- The best radio frequency performance for signal and data transmission
- SMPM connector acts as interface to test system, suitable for cable assemblies with SMPM (press-in) and SMPM-T (screw-in) interface for optimum signal transmission
- Long service life due to low-wear internal structure
-A standard receptacle or a receptacle with two-bore flange KS-810 or HAS-810 can be used for installation

See pages 176-179 for an overview of accessories.

RF performance:

	S11	VSWR
0 - 11 GHz:	-20 dB	1.25

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value. The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.
Please contact us for further information.

	HFS-856
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	8.0
Designation for ordering	**93**

Note:
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

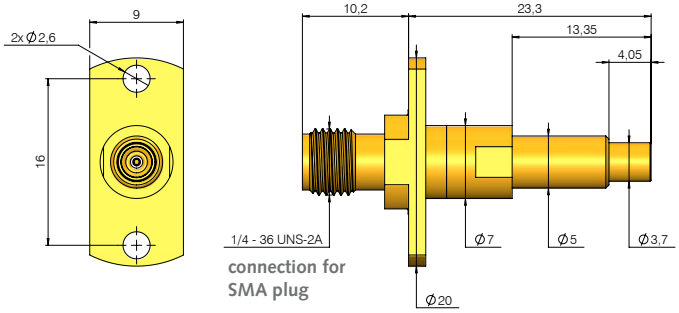
Mechanical Data

HFS-856

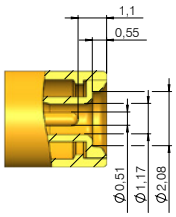
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	0.5 mm
Maximum stroke:	5.0 mm	

Series:

HFS-823 ...



Available tip styles:



Ordering description:

HFS-823 305 051 A **xx** 43 MM036

Note:
Version with flange connection.
No movement of the connection during stroke movement.

Centring range: ± 0.3 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-823
Spring force of inner conductor at working stroke (N)	2.0
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**60**

Note:
The RF test probes in the HFS-823 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

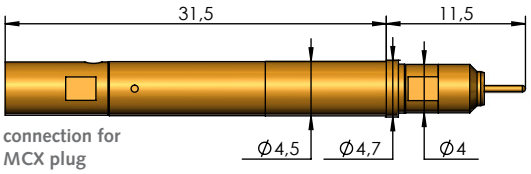
Mechanical data

HFS-823

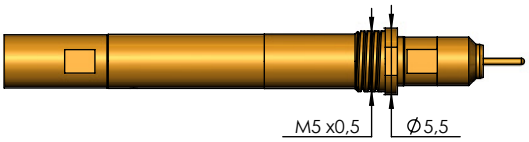
	Outer cond.	Inner cond.
Working stroke:	1.8 mm	0.3 mm
Maximum stroke:	3.4 mm	1.1 mm

Series:

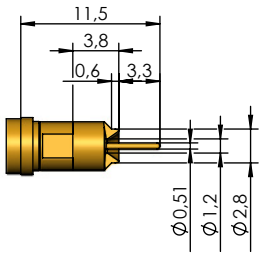
HFS-860 ...

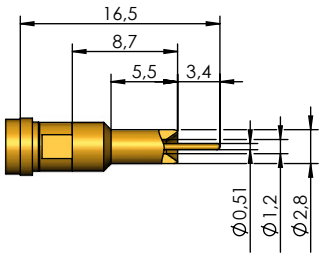


HFS-860 ... M (*)



Available tip styles:





Ordering description:

HFS-860 305 051 A **xx** 43 Y80
HFS-860 305 051 A **xx** 43 Y80 M

Note:
Centring range: ± 0.2 mm

HFS-860 305 051 A **xx** 43 Y82
HFS-860 305 051 A **xx** 43 Y82 M

Note:
Version with 16.5 mm installation height for applications with increased component height and guide plate.

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-860 HFS-860 M		
Spring force of inner conductor at working stroke (N)	1.3	2.0	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0
Designation for ordering	**53**	**80**	**99**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-860 and HFS-860 M

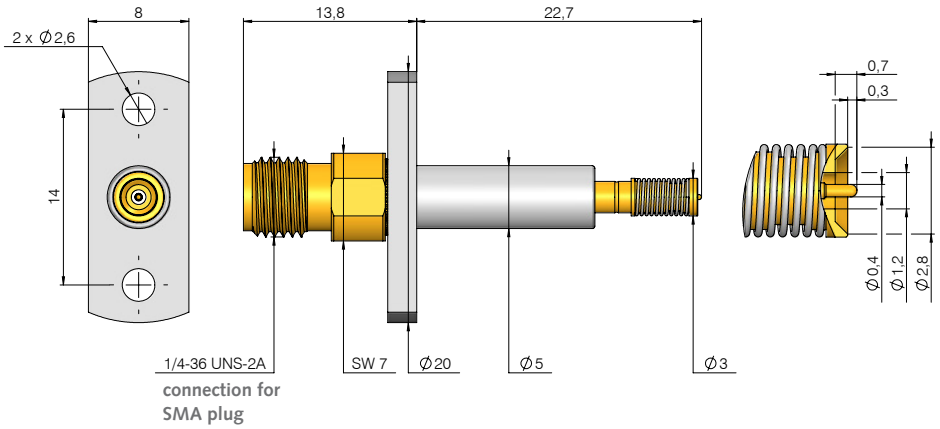
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Series:

Available tip styles:

Ordering description:

HFS-856 ...



HFS-856 305 040 A **xx** 43 MS156-H

Note:
- Precise mechanical hitting accuracy due to exact guidance and re-positioning with new guiding barrel
- Consistent RF signal transmission, repeating accuracy ensured
- Protected signal (inner) conductor due to protruding ground (outer) conductor
- Long service life due to low-wear internal structural design
- Internationally preferred installation via screw connection with flange
- Standardised SMA connection interface to test system

Compensation of radial positioning inaccuracies of the connector by up to ± 3.0°.

Centring range: ± 0.3 mm

RF performance:

	RL S11	VSWR
0 - 4 GHz:	-20 dB	1.25
4 - 6 GHz:	-15 dB	1.45

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-856
Spring force of inner conductor at working stroke (N)	1.5
Spring force of outer conductor at working stroke (N)	4.8
Designation for ordering	**63**

Note:
The RF test probes in the HFS-856 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-856

	Outer cond.	Inner cond.
Working stroke:	4.2 mm	0.8 mm
Maximum stroke:	5.2 mm	2.0 mm

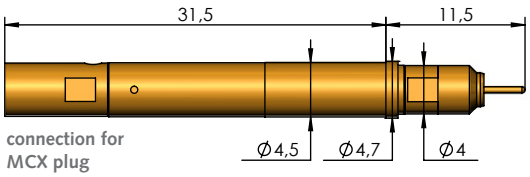
MS-156 (HF)
MS-156C

up to 6 GHz
(50 Ω)

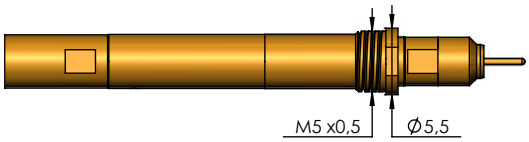
HFS-860 / HFS-860 M

Series:

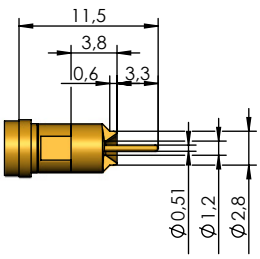
HFS-860 ...

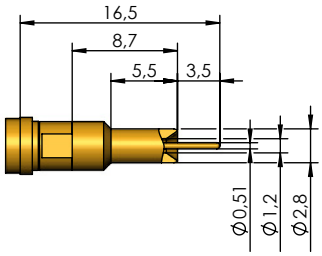


HFS-860 ... M (*)



Available tip styles:





Ordering description:

HFS-860 305 051 A **xx** 43 Y80
HFS-860 305 051 A **xx** 43 Y80 M

Note:
Centring range: ± 0.2 mm

HFS-860 305 051 A **xx** 43 Y82
HFS-860 305 051 A **xx** 43 Y82 M

Note:
Version with 16.5 mm installation height for applications with increased component height and guide plate.

Centring range: ± 0.2 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-860 HFS-860 M		
Spring force of inner conductor at working stroke (N)	1.3	2.0	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0
Designation for ordering	**53**	**80**	**99**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-860 and HFS-860 M

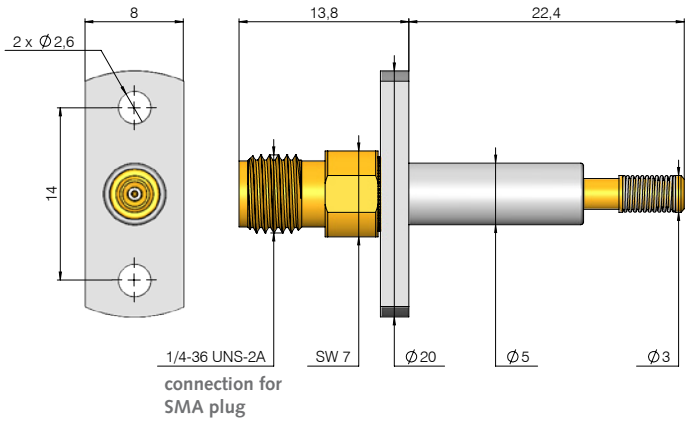
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Series:

Available tip styles:

Ordering description:

HFS-856 ...



HFS-856 305 030 A **xx** 43 MS180-H

Note:
- Precise mechanical hitting accuracy due to exact guidance and re-positioning with new guiding barrel
- Consistent RF signal transmission, repeating accuracy ensured
- Protected signal (inner) conductor due to protruding ground (outer) conductor
- Long service life due to low-wear internal structural design
- Internationally preferred installation via screw connection with flange
- Standardised SMA connection interface to test system

Compensation of radial positioning inaccuracies of the connector by up to ± 3.0°.

Centring range: ± 0.4 mm

RF performance:

	S11	VSWR
bis 6 GHz:	-20 dB	1.25
bis 8 GHz:	-15 dB	1.45

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-856
Spring force of inner conductor at working stroke (N)	1.5
Spring force of outer conductor at working stroke (N)	4.8
Designation for ordering	**63**

Note:
The RF test probes in the HFS-856 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-856

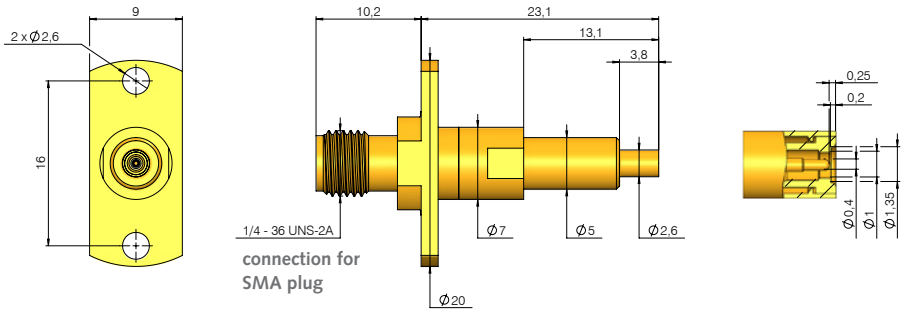
	Outer cond.	Inner cond.
Working stroke:	4.2 mm	0.8 mm
Maximum stroke:	5.2 mm	2.0 mm

Series:

Available tip styles:

Ordering description:

HFS-823 ...



HFS-823 305 040 A **xx** 43 MM310

Note:
Version with flange connection. No movement of the connection during stroke movement.

Centring range: ± 0.3 mm

Spring force value

For the order designation, "xx" must be replaced by the specific spring force value.

	HFS-823
Spring force of inner conductor at working stroke (N)	2.0
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**60**

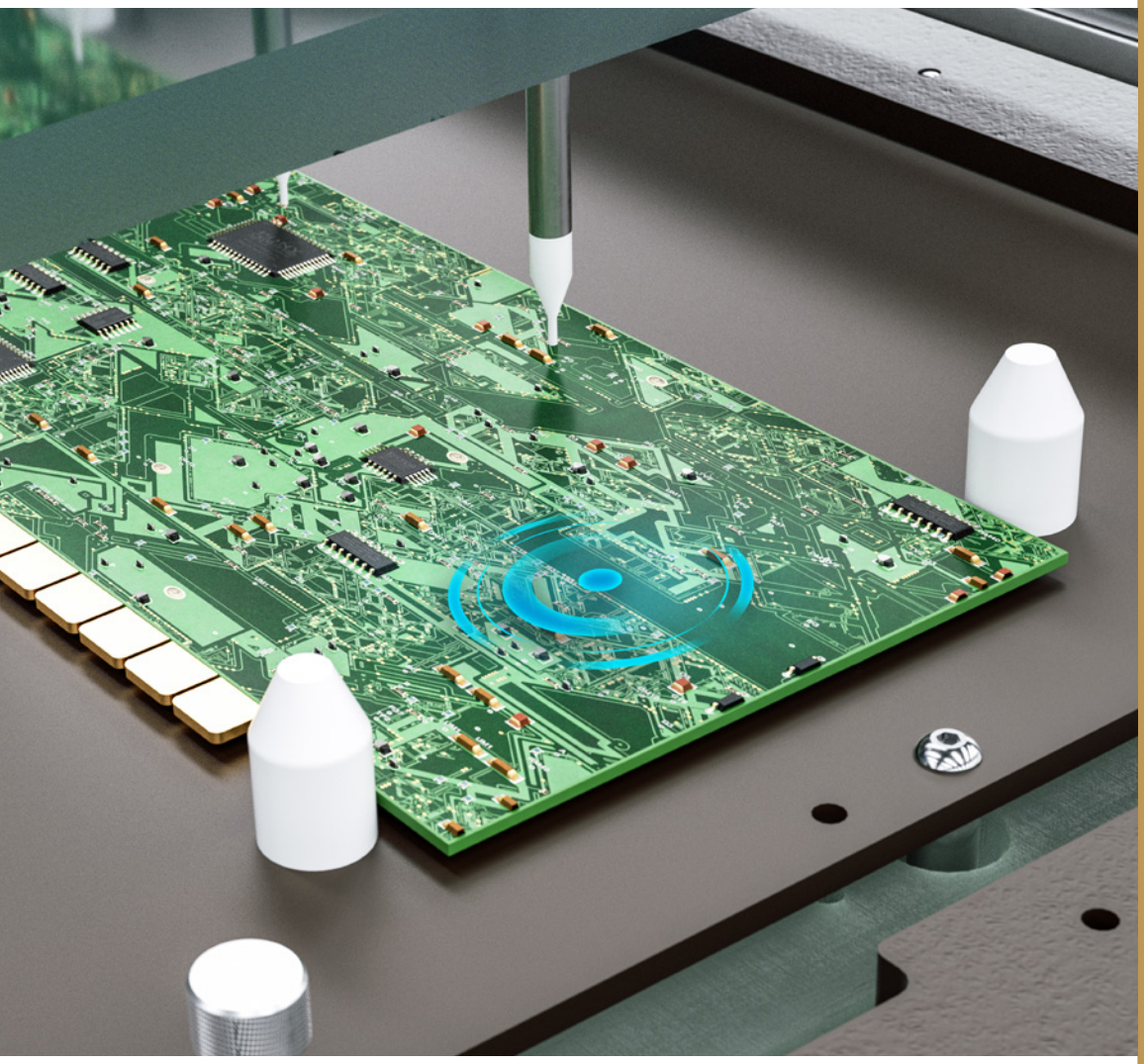
Note:
The RF test probes in the HFS-823 series are positioned and fixed using two screws in a flange connection.

For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data

HFS-823

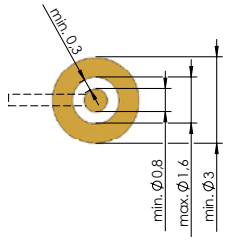
	Outer cond.	Inner cond.
Working stroke:	0.8 mm	0.3 mm
Maximum Strokeb:	1.5 mm	1.1 mm



Contents

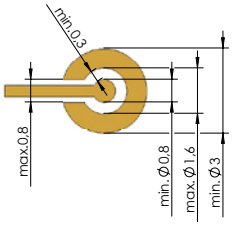
PCB layout

Signal guiding inwards (multilayer)



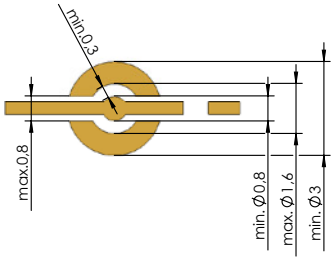
PCB coax closed

Signal guiding outwards

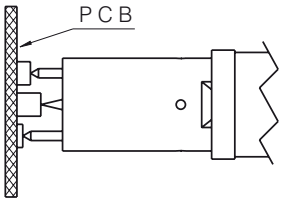


PCB coax open

Continuous signal guiding outwards

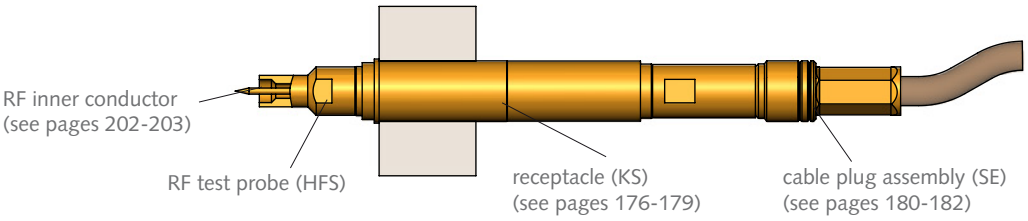


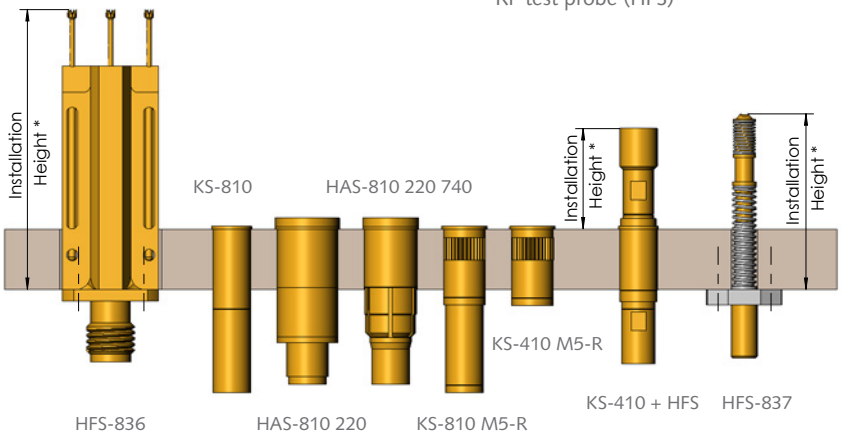
PCB coax kidney-shaped



HFS versions for PCB layouts	Signal (S)	Ground (G)
PCB-SG	1	1
PCB-GSG	1	2
PCB-GGSGG	1	4

Customising example:





Electrical data

HFS-810/810 M/810 4M **HFS-840/840 M/840 4M**
HFS-410/410 M/410 4M **HFS-440/440 M/440 4M**
HFS-836 **HFS-837**
HFS-858 **HFS-860/860 M**

Frequency range with HFS-858:	up to 1 GHz
Frequency range with HFS-810/410:	up to 2 GHz
Frequency range with HFS-836/840/440:	up to 4 GHz
Frequency range with HFS-860:	up to 6 GHz
Frequency range with HFS-837:	up to 12 GHz
Outer conductor current rating:	8 - 10 A
Inner conductor current rating:	2 - 3 A
Inner conductor R_i typical	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance:	50 Ω

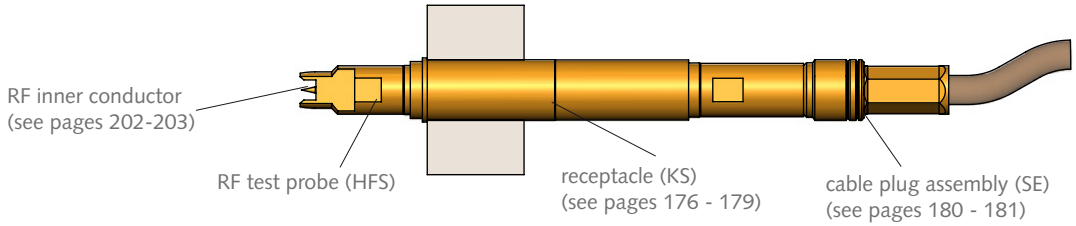
Operating temperature range

– 40 up to +80° C

Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F) KS-858	HAS-810 220 (F) HAS-810 220 740 (F)
Version		*Installation height of HFS in KS	
PCB coax closed (50 Ω / 75 Ω)	... / ... M	11.9 mm	13.0 mm
PCB coax open (50 Ω / 75 Ω)	... S / ... S 4M	11.9 mm	13.0 mm
PCB coax kidney-shaped (50 Ω)	... P / ... P 4M	11.9 mm	13.0 mm
PCB-SG PCB-SG-filter PCB-GSG PCB-GGSGG		See illustration on product page	

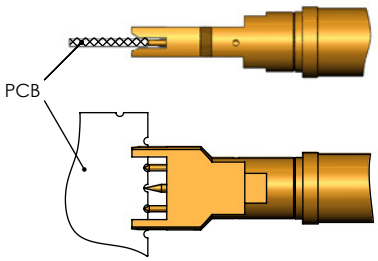
Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

PCB side

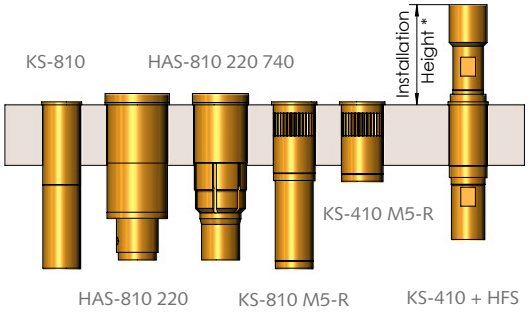


Contacting example PCB side:

Contacting of PCBs from the side
HFS-810 201 051 A 7629-V2-VZ



Customising example:



Electrical data

HFS-810 / 810 4M **HFS-840 / 840 4M**
HFS-410 / 410 4M **HFS-440 / 440 4M**

Frequency range with HFS-810/410:	up to 2 GHz
Frequency range with HFS-840/440:	up to 4 GHz
Outer conductor current rating:	8–10 A
Inner conductor current rating:	2–3 A
Inner conductor R_i typical:	≤ 10 mΩ
Test probe impedance:	50 Ω
Cable impedance:	50 Ω

Operating temperature range

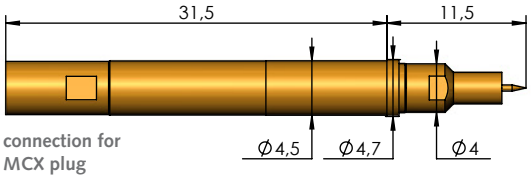
–40 up to +80° C

Installation height in receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)
Version		Installation height of HFS in KS	
PCB side	... V2-VZ / ... V2-VZ 4 M	12.7 mm	13.8 mm

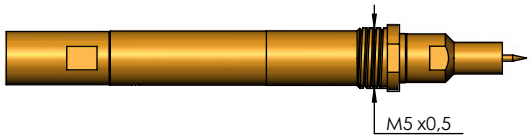
Note:
For further details of receptacles with and without flange connection (F) see pages 176 - 179.

Series:

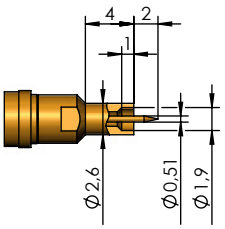
HFS-810 ...

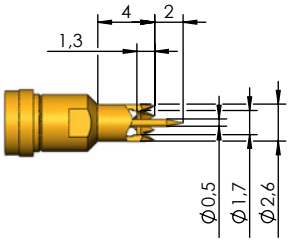


HFS-810 ... M (*)



Available tip styles:





Ordering description:

HFS-810 201 051 A **xx** 02
HFS-810 201 051 A **xx** 02 M

Note:
To contact closed ground rings with signal guiding to the inner side. The tip style 02 (flat) of the outer conductor is only used when contacting clean PC boards.

HFS-810 201 051 A **xx** 06
HFS-810 201 051 A **xx** 06 M

Note:
To contact closed ground rings with signal guiding to the inner side. The tip style 06 (serrated) of the outer conductor is only used when contacting contaminated PC boards.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

	HFS-810 HFS-810 M
Spring force of inner conductor at working stroke (N)	1.3
Spring force of outer conductor at working stroke (N)	4.0
Designation for ordering	**53**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

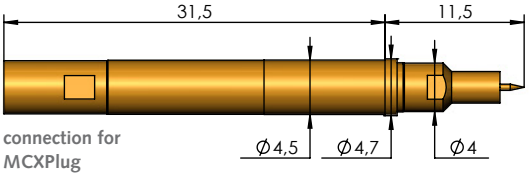
Mechanical data

HFS-810 and HFS-810 M

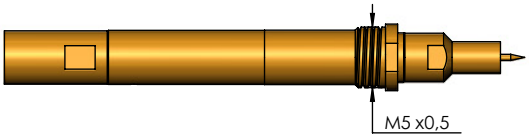
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Series:

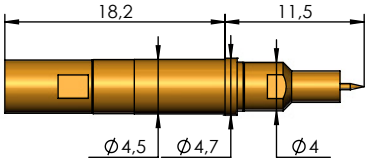
HFS-840 ...



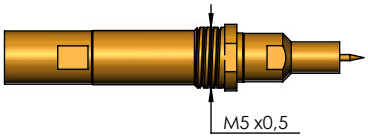
HFS-840 ... M (*)



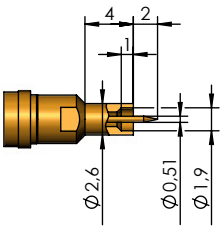
HFS-440 ...

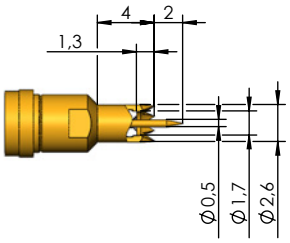


HFS-440 ... M (*)



Available tip styles:





Ordering description:

HFS-840 201 051 A **xx** 02
HFS-840 201 051 A **xx** 02 M
HFS-440 201 051 A **xx** 02
HFS-440 201 051 A **xx** 02 M

Note:
To contact closed ground rings with signal guiding to the inner side. The tip style 02 (flat) of the outer conductor is only used when contacting clean PC boards.

HFS-840 201 051 A **xx** 06
HFS-840 201 051 A **xx** 06 M
HFS-440 201 051 A **xx** 06
HFS-440 201 051 A **xx** 06 M

Note:
To contact closed ground rings with signal guiding to the inner side. The tip style 06 (serrated) of the outer conductor is only used when contacting contaminated PC boards.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

	HFS-840 HFS-840 M		HFS-440 HFS-440 M
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	4.0
Designation for ordering	**53**	**80**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

Mechanical data
HFS-840 and HFS-840 M

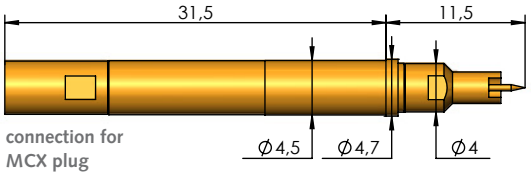
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Mechanical data
HFS-440 and HFS-440 M

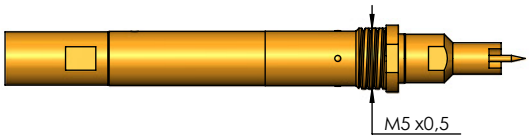
	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

Series:

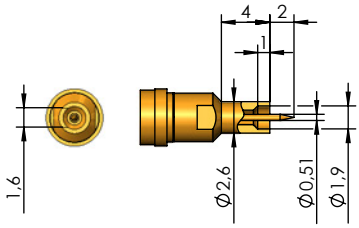
HFS-810 ...

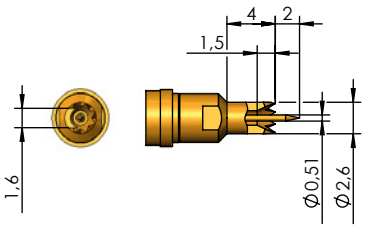


HFS-810 ... 4M (*)



Available tip styles:





Ordering description:

HFS-810 201 051 A **xx** 02 S
HFS-810 201 051 A **xx** 02 S 4M

Note:
To contact closed ground rings with signal guiding to the outer side. The slit tip style 02 S (flat - slit) of the outer conductor is only used when contacting clean PC boards.

HFS-810 201 051 A **xx** 06 S
HFS-810 201 051 A **xx** 06 S 4M

Note:
To contact closed ground rings with signal guiding to the outer side. The slit tip style 06 S (serrated - slit) of the outer conductor is only used when contacting contaminated PC boards.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

	HFS-810 HFS-810 4M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

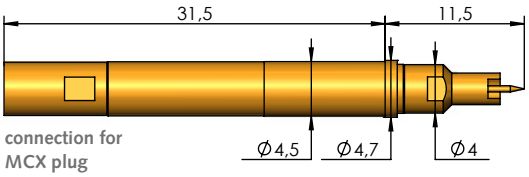
Mechanical data

HFS-810 and HFS-810 4M

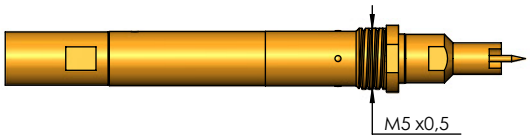
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Series:

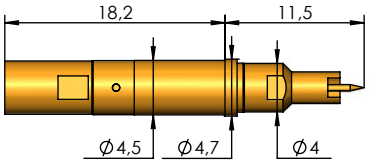
HFS-840 ...



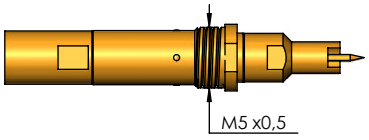
HFS-840 ... 4M (*)



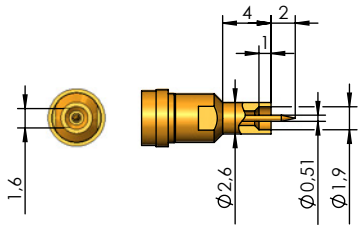
HFS-440 ...

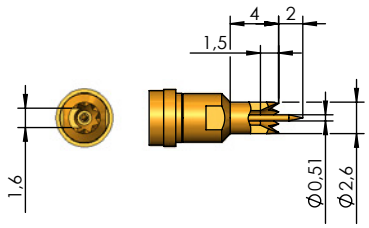


HFS-440 ... 4M (*)



Available tip styles:





Ordering description:

HFS-840 201 051 A **xx** 02 S
HFS-840 201 051 A **xx** 02 S 4M
HFS-440 201 051 A **xx** 02 S
HFS-440 201 051 A **xx** 02 S 4M

Note:
To contact open ground rings with signal guiding to the outer side. The slit tip style 02 S (flat - slit) of the outer conductor is only used when contacting clean PC boards.

HFS-840 201 051 A **xx** 06 S
HFS-840 201 051 A **xx** 06 S 4M
HFS-440 201 051 A **xx** 06 S
HFS-440 201 051 A **xx** 06 S 4M

Note:
To contact closed ground rings with signal guiding to the outer side. The slit tip style 06 S (serrated - slit) of the outer conductor is only used when contacting contaminated PC boards.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

	HFS-840 HFS-840 4M				HFS-440 HFS-440 4M
Spring force of inner conductor at working stroke (N)	1.3	2.0	1.3	2.0	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0	8.0	4.0
Designation for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

Mechanical data
HFS-840 and HFS-840 4M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Mechanical data
HFS-440 and HFS-440 4M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

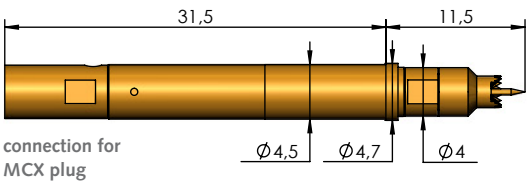
PCB-coax open

up to 6 GHz (50 Ω)

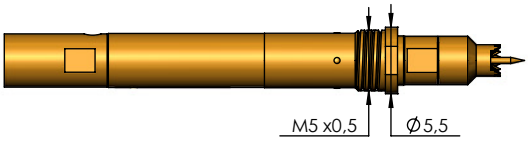
HFS-860 / HFS-860 4M

Series:

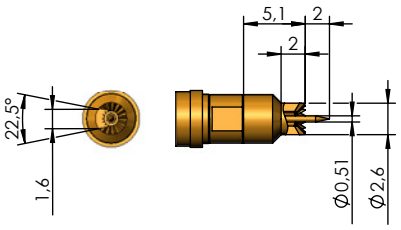
HFS-860 ...



HFS-860 ... 4M (*)



Available tip styles:



Ordering description:

HFS-860 201 051 A **xx** 06 S
HFS-860 201 051 A **xx** 06 S 4M

Note:
To contact open ground rings with signal guiding to the outer side. The slit tip style 06 S (serrated - slit) of the outer conductor is only used when contacting contaminated PC boards.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

	HFS-860 HFS-860 4M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

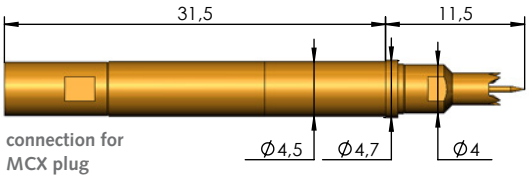
Mechanical data

HFS-860 and HFS-860 M

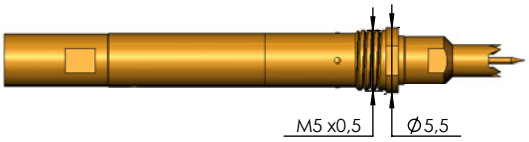
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Series:

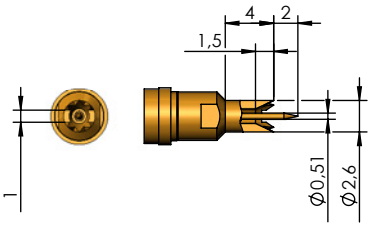
HFS-810 ...



HFS-810 ... 4M (*)



Available tip styles:



Ordering description:

HFS-810 201 051 A **xx** 06 P
HFS-810 201 051 A **xx** 06 P 4M

Note:
For contacting kidney-shaped ground rings with continuous signal guiding.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

	HFS-810 HFS-810 4M	
Spring force of inner conductor at working stroke (N)	1.3	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0
Designation for ordering	**53**	**80**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

Mechanical data

HFS-810 and HFS-810 4M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

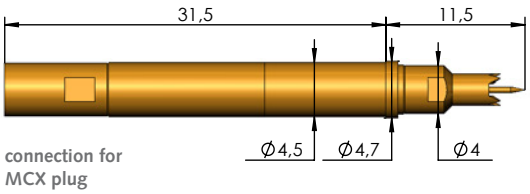
PCB-coax kidney-shaped

up to 4 GHz (50 Ω)

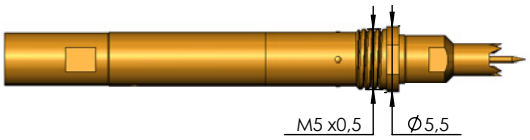
HFS-840 / HFS-840 4M
HFS-440 / HFS-440 4M

Series:

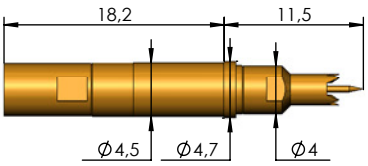
HFS-840 ...



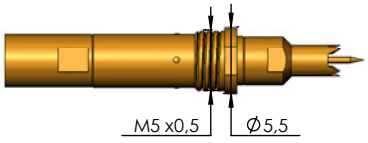
HFS-840 ... 4M (*)



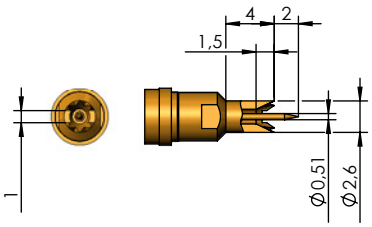
HFS-440 ...



HFS-440 ... 4M (*)



Available tip styles:



Ordering description:

HFS-840 201 051 A **xx** 06 P
HFS-840 201 051 A **xx** 06 P 4M
HFS-440 201 051 A **xx** 06 P
HFS-440 201 051 A **xx** 06 P 4M

Note:
For contacting kidney-shaped ground rings with continuous signal guiding.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

	HFS-840 HFS-840 4M			HFS-440 HFS-440 4M
Spring force of inner conductor at working stroke (N)	1.3	2.0	2.0	1.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0	4.0
Designation for ordering	**53**	**80**	**99**	**50**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

Mechanical data
HFS-840 and HFS-840 4M

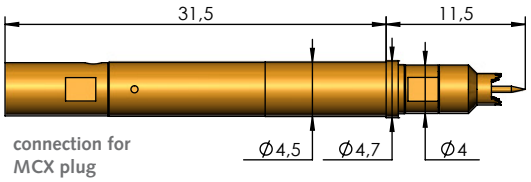
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

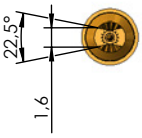
Mechanical data
HFS-440 and HFS-440 4M

	Outer cond.	Inner cond.
Working stroke:	2.0 mm	2.0 mm
Maximum stroke:	3.0 mm	3.0 mm

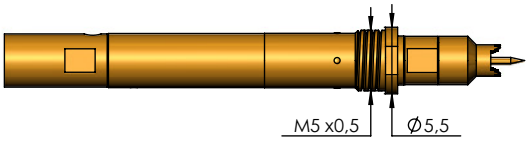
Series:

HFS-860 ...

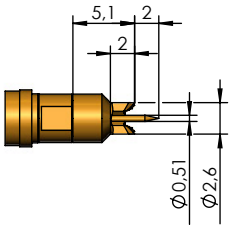




HFS-860 ... 4M (*)



Available tip styles:



Ordering description:

HFS-860 201 051 A **xx** 06 P
HFS-860 201 051 A **xx** 06 P 4M

Note:
For contacting kidney-shaped ground rings with continuous signal guiding.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

	HFS-860 HFS-860 4M		
Spring force of inner conductor at working stroke (N)	1.3	2.0	2.0
Spring force of outer conductor at working stroke (N)	4.0	6.0	8.0
Designation for ordering	**53**	**80**	**99**

Mechanical data

HFS-860 and HFS-860 4M

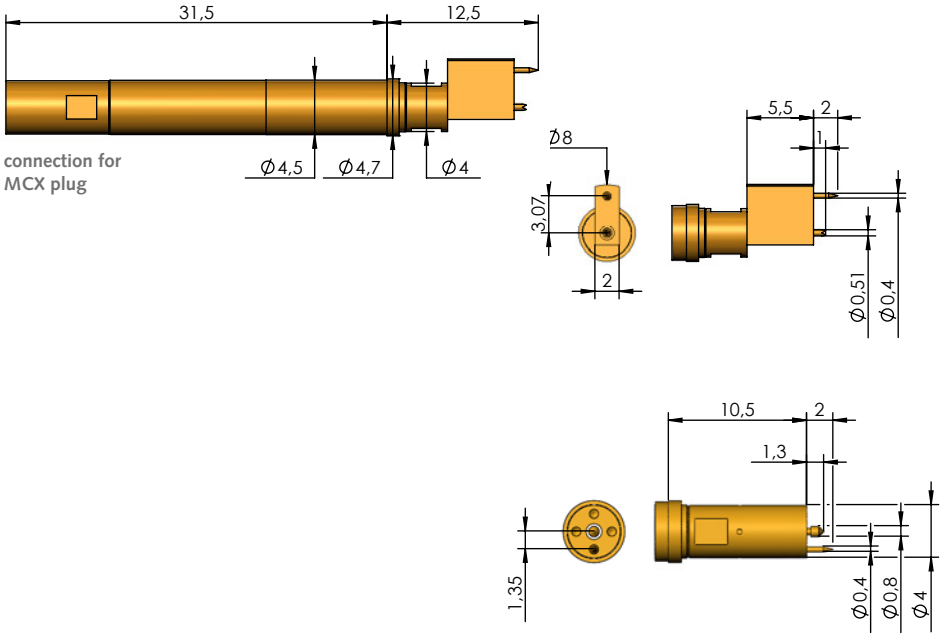
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	2.0 mm
Maximum stroke:	5.0 mm	3.7 mm

Series:

Available tip styles:

Ordering description:

HFS-810 ...



HFS-810 204 051 A **xx** 02 V1-AS3

Note:
(Version 1)
For contacting round pads with different heights. Outer conductor (ground) with one spring-loaded tip, (tip style 01 needle tip), working stroke 1.0 mm, spring force 0.8 N. Width of outer conductor 2.0 mm and asymmetric for applications with high component density.

HFS-810 358 080 A **xx** 02 V2-00S

Note:
(Version 2) **
For contacting ground pads with different heights. Outer conductor (ground) with one spring-loaded tip, (tip style 01 needle tip), working stroke 1.0 mm, spring force 0.8 N.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

	HFS-810	
Spring force of inner conductor at working stroke (N) (signal)	Inner conductor not spring-loaded	
Spring force at working stroke of spring-loaded tip (ground) on outer conductor main body (N)	0.8	0.8
Spring force of outer conductor main body (N)	4.0	6.0
Designation for ordering	**48**	**68**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

Mechanical data

HFS-810

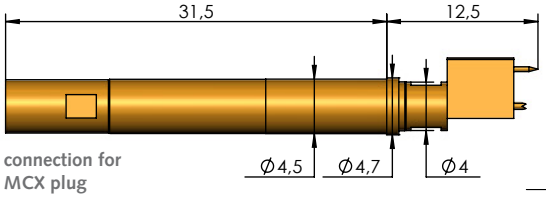
	Outer cond. main body	Outer cond. tip (ground)	Inner cond. (signal)
Working stroke:	3.5 mm (4.0 mm)**	1.0 mm	not spring-loaded
Max. stroke:	4.0 mm (5.0 mm)**	1.5 mm	

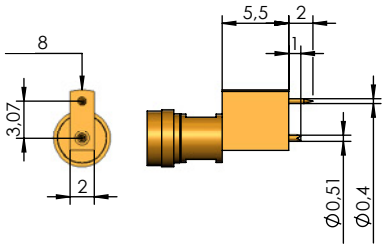
Series:

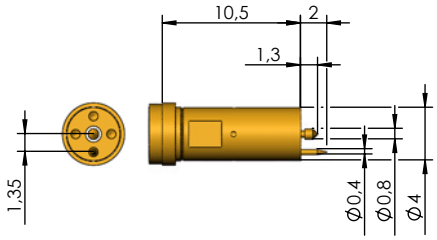
Available tip styles:

Ordering description:

HFS-840 ...







HFS-840 204 051 A **xx** 02 V1-AS3

Note:
(Version 1)
For contacting round pads with different heights. Outer conductor (ground) with one spring-loaded tip, (tip style 01 needle tip), working stroke 1.0 mm, spring force 0.8 N. Width of outer conductor 2.0 mm and asymmetric for applications with high component density.

HFS-840 358 080 A **xx** 02 V2-00S

Note:
(Version 2) **
For contacting ground pads with different heights. Outer conductor (ground) with one spring-loaded tip, (tip style 01 needle tip), working stroke 1.0 mm, spring force 0.8 N.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

	HFS-840		
Spring force of inner conductor at working stroke (N) (signal)	Inner conductor not spring-loaded		
Spring force at working stroke of spring-loaded tip (ground) on outer conductor main body (N)	0.8	0.8	0.8
Spring force of outer conductor main body (N)	4.0	6.0	8.0
Designation for ordering	**48**	**68**	**88**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

Mechanical data

HFS-840

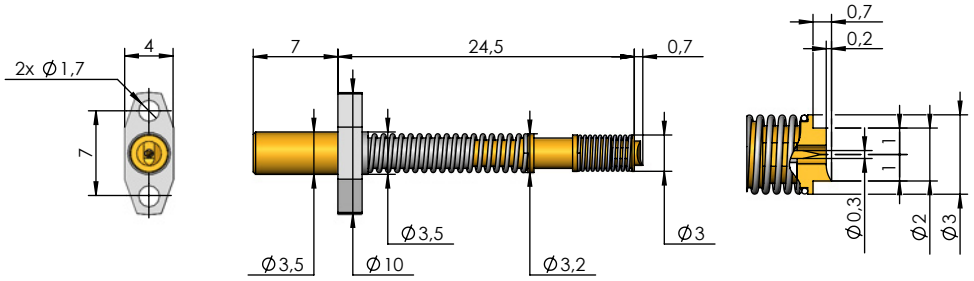
	Outer cond. main body	Outer cond. tip (ground)	Inner cond. (signal)
Working stroke:	3.5 mm (4.0 mm)**	1.0 mm	not spring-loaded
Max. Stroke :	4.0 mm (5.0 mm)**	1.5 mm	

Series:

Available tip styles:

Ordering description:

HFS-837 ...



connection for SMPM plug

HFS-837 201 030 A **XX** 78 F10

Note:
The HFS-837 is non-rotatable and the connection moves out during the working stroke movement. For contacting of the smallest RF test points on PCBs in the pitch distance of 1.0 mm.

Spring force value

The spring-loaded inner and outer conductors are available with additional spring forces, and some are available as a short version.

	HFS-837
Spring force of inner conductor at working stroke (N) (signal)	1.0
Spring force of outer conductor at working stroke (N) (ground)	3.8
Designation for ordering	**48**

Note:
The RF test probes in the HFS-837 series are positioned and fixed using two screws in a flange connection.

For use with high component density.

Mechanical data

HFS-837

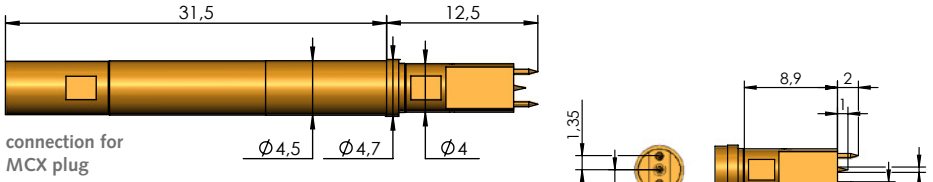
	Outer cond. (signal)	Inner cond. (ground)
Working stroke:	4.9 mm	1.0 mm
Maximum stroke:	5.7 mm	1.5 mm

Series:

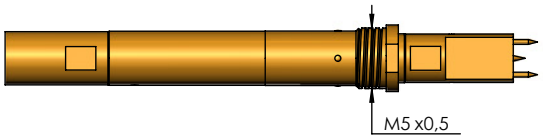
Available tip styles:

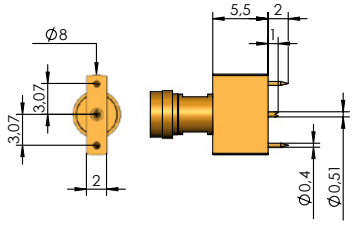
Ordering description:

HFS-810 ...



HFS-810 ... 4M (*)





HFS-810 201 051 A **xx** 29 V2
HFS-810 201 051 A **xx** 29 V2 4M

HFS-810 204 051 A **xx** 29 V2-S2

Note:
(Version 1 ** + Version 2)
For contacting ground pads with different heights. Outer conductor (ground) with two spring-loaded tip (tip style 01 needle tip), working stroke 1.0 mm, spring force 0.8 N. Width of outer conductor 2.0 mm and asymmetric for applications with high component density.

Version 1 + 2	HFS-810 HFS-810 4M	
Spring force of inner conductor at working stroke (N) (signal)	Inner conductor not spring-loaded	
Spring force at working stroke spring-loaded tip (ground) on outer conductor main body (N)	2 x 0.8	2 x 0.8
Spring force of outer conductor main body (N)	6.0	8.0
Designation for ordering	**76**	**96**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

Mechanical data

HFS-810 and HFS-810 4M

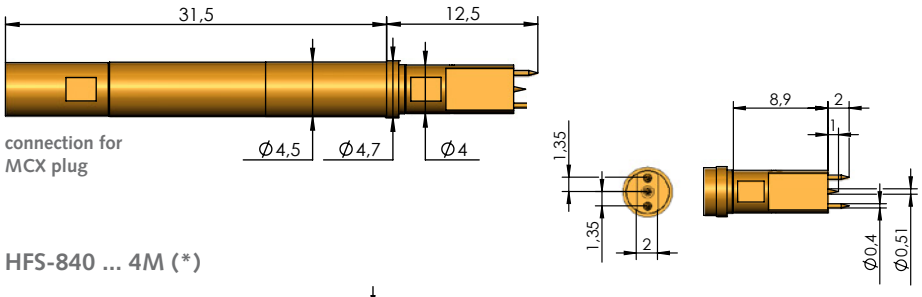
	Outer cond. main body	Outer cond. tip (ground)	Inner cond. (signal)
Working stroke:	3.5 mm (4.0 mm)**	1.0 mm	Not spring-loaded
Max. Stroke :	4.0 mm (5.0 mm)**	1.5 mm	

Series:

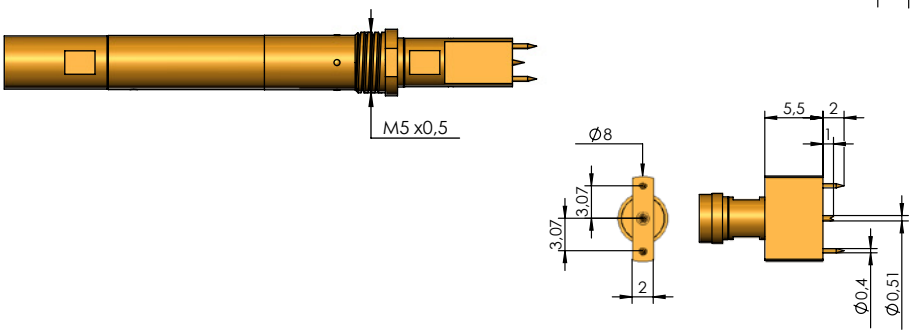
Available tip styles:

Ordering description:

HFS-840 ...



HFS-840 ... 4M (*)



HFS-840 201 051 A **xx** 29 V2
HFS-840 201 051 A **xx** 29 V2 4M

HFS-840 204 051 A **xx** 29 V2-S2
HFS-840 204 051 A **xx** 29 V2-S2 4M

Note:
(Version 1 ** + Version 2)
For contacting ground pads with different heights. Outer conductor (ground) with two spring-loaded tip (tip style 01 needle tip), working stroke 1.0 mm, spring force 0.8 N. Width of outer conductor 2.0 mm and asymmetric for applications with high component density.

Version 1 + 2	HFS-840 HFS-840 4M	
Spring force of inner conductor at working stroke (N) (signal)	Inner conductor not spring-loaded	
Spring force at working stroke spring-loaded tip (ground) on outer conductor main body (N)	2 x 0.8	2 x 0.8
Spring force of outer conductor main body (N)	6.0	8.0
Designation for ordering	**76**	**96**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

Mechanical data

HFS-840 and HFS-840 4M

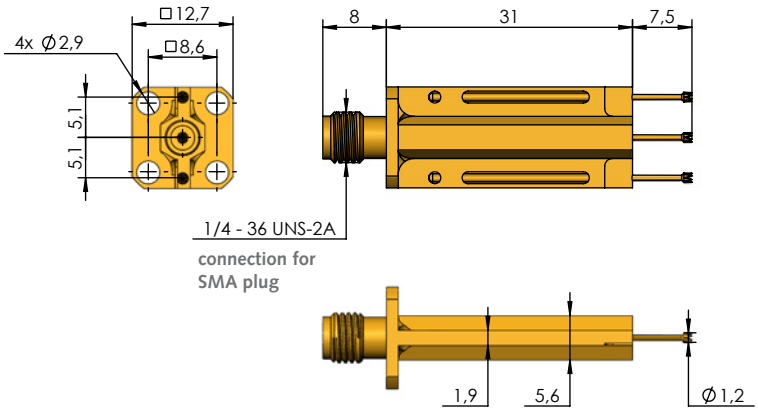
	Outer cond. main body	Outer cond. tip (ground)	Inner cond. (signal)
Working stroke:	3.5 mm (4.0 mm)**	1.0 mm	not spring-loaded
Max. Stroke :	4.0 mm (5.0 mm)**	1.5 mm	

Series:

Available tip styles:

Ordering description:

HFS-836 ...



HFS-836 288 120 A **xx** 88 A51F50L

Note:
The HFS-836 is characterised by a robust design and the quick, easy exchange of the inner and outer conductors.

Pitch distance: 5.1 mm

Spring force value

The spring-loaded outer conductors are available with various spring forces. The individual spring forces of the inner and outer conductors have to be added together for the order designation.

	HFS-836
Spring force of inner conductor at working stroke (N) (signal)	1.5
Spring force of outer conductor at working stroke (N) (ground)	2 x 1.5
Designation for ordering	**45**

Note:
The RF test probes in the HFS-836 series are positioned and fixed using two screws in a flange connection.

For use with high component density.

Mechanical data

HFS-836

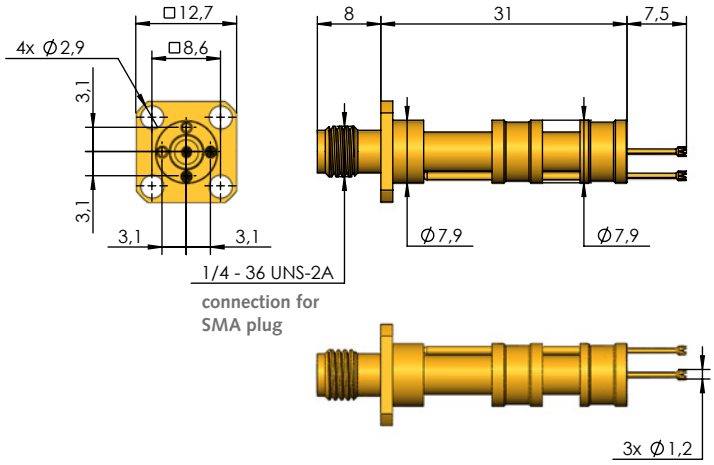
	Outer cond. (signal)	Inner cond. (ground)
Working stroke:	4.3 mm	4.3 mm
Maximum stroke:	6.2 mm	6.2 mm

Series:

Available tip styles:

Ordering description:

HFS-836 ...



HFS-836 288 120 A **xx** 88 A31R50L

Note:
The HFS-836 is characterised by a robust design and the quick, easy exchange of the inner and outer conductors.

Pitch distance: 3.05 mm

Spring force value

The spring-loaded outer conductors are available with various spring forces. The individual spring forces of the inner and outer conductors have to be added together for the order designation.

	HFS-836
Spring force of inner conductor at working stroke (N) (signal)	1.5
Spring force of outer conductor at working stroke (N) (ground)	2 x 1.5
Designation for ordering	**45**

Note:
The RF test probes in the HFS-836 series are positioned and fixed using two screws in a flange connection.

For use with high component density.

Mechanical data

HFS-836

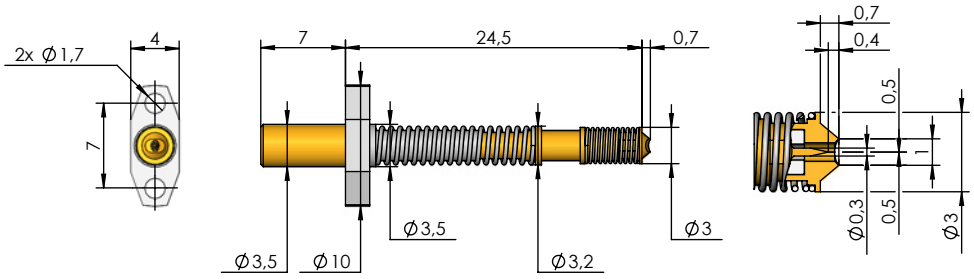
	Outer cond. (signal)	Inner cond. (ground)
Working stroke:	4.3 mm	4.3 mm
Maximum stroke:	6.2 mm	6.2 mm

Series:

Available tip styles:

Ordering description:

HFS-837 ...



connection for SMPM plug

HFS-837 201 030 A **xx** 23 F05

Note:
The HFS-837 is non-rotatable and the connection moves out during the working stroke movement. For contacting of the smallest RF test points on PCBs in the pitch distance of 0.5 mm.

Spring force value

The spring-loaded outer conductors are available with various spring forces. The individual spring forces of the inner and outer conductors have to be added together for the order designation.

	HFS-837
Spring force of inner conductor at working stroke (N) (signal)	1.0
Spring force of outer conductor at working stroke (N) (ground)	3.8
Designation for ordering	**48**

Note:
The RF test probes in the HFS-837 series are positioned and fixed using two screws in a flange connection.

For use with high component density.

Mechanical data

HFS-837

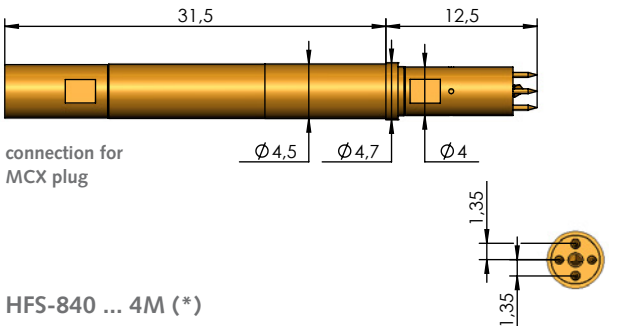
	Outer cond. (signal)	Inner cond. (ground)
Working stroke:	4.9 mm	1.0 mm
Maximum stroke:	5.7 mm	1.5 mm

Series:

Available tip styles:

Ordering description:

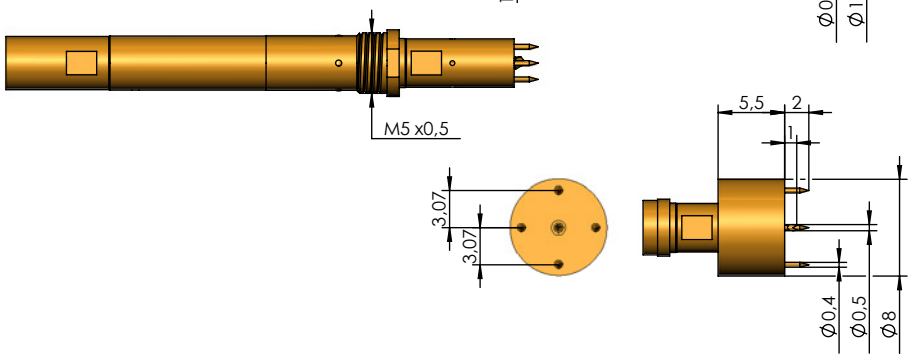
HFS-840 ...



HFS-840 307 100 A **xx** 02 V2-36S
HFS-840 307 100 A **xx** 02 V2-36S 4M

Note: (Version 1 **)
For contacting ground pads with different heights. Outer conductor (ground) with four spring-loaded tips, tip style 01, working stroke 1.0 mm, spring force 0.8 N.

HFS-840 ... 4M (*)



HFS-840 204 051 A **xx** 02 V2-360
HFS-840 204 051 A **xx** 02 V2-360 4M

Note: (Version 2)
For contacting ground pads with different heights. Outer conductor (ground) with four spring-loaded tips, tip style 01, working stroke 1.0 mm, spring force 0.8 N.

Spring force value

The spring-loaded outer conductors are available with various spring forces. The individual spring forces of the inner and outer conductors have to be added together for the order designation.

	HFS-840 HFS-840 4M	
Spring force of inner conductor at working stroke (N) (signal)	Inner conductor not spring-loaded	
Spring force at working stroke spring-loaded tip (ground) on outer conductor main body (N)	4 x 0.8	4 x 0.8
Spring force of outer conductor main body (N)	6.0	8.0
Designation for ordering	**92**	**11**

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

Mechanical data

HFS-840 and HFS-840 4M

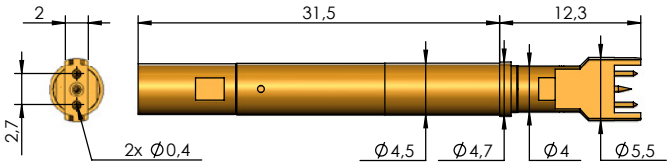
	Outer cond. main body	Outer cond. tip (ground)	Inner cond. (Signal)
Working stroke:	3.5 mm (4.0 mm)**	1.0 mm	not spring-loaded
Max. Stroke:	4.0 mm (5.0 mm)**	1.5 mm	

Series:

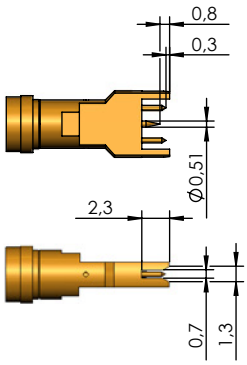
Available tip styles:

Ordering description:

HFS-810 ... / HFS-840 ...



connection for MCX plug



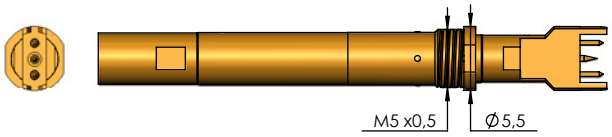
2 GHz

HFS-810 201 051 A **xx** 29 V2-VZ
HFS-810 201 051 A **xx** 29 V2-VZ 4M
HFS-410 201 051 A **xx** 29 V2-VZ
HFS-410 201 051 A **xx** 29 V2-VZ 4M

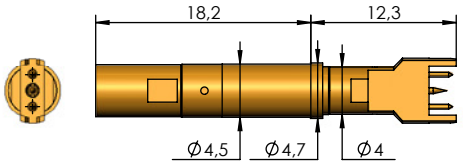
4 GHz

HFS-840 201 051 A **xx** 29 V2-VZ
HFS-840 201 051 A **xx** 29 V2-VZ 4M
HFS-440 201 051 A **xx** 29 V2-VZ
HFS-440 201 051 A **xx** 29 V2-VZ 4M

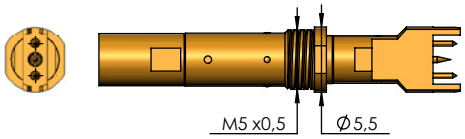
HFS-810 ... 4M / HFS-840 ... 4M (*)



HFS-410 ... / HFS-440 ...



HFS-410 ... 4M / HFS-440 ... 4M (*)



Note:
Version with spring-loaded inner conductor (signal) and two spring-loaded ground contacts. The pre-centering of the PC board is achieved thanks to the geometry of the main body of the outer conductor.
Recommended PCB thickness: 0.6 mm.

More versions for contacting PC boards from the side when their thickness and the pitch of the contacting pads vary available on request.

	HFS-810/840 HFS-810 4M/840 4M		HFS-410/440 HFS-410 4M/440 4M
Spring force of inner conductor at working stroke (N) (signal)	Inner conductor not spring-loaded		
Spring force at working stroke spring-loaded tip (ground) on outer conductor main body (N)	2 x 0.8	2 x 0.8	2 x 0.8
Spring force of outer conductor main body (N)	6.0	8.0	4.0
Designation for ordering	**76**	**96**	**56**

Spring force value

The spring-loaded outer conductors are available with various spring forces. The individual spring forces of the inner and outer conductors have to be added together for the order designation.

Note: (*)
For use in applications with vibrations, jolts, snap effects, or in overhead applications.

The 4M version has additional crimping points that prevent rotation of the test probe once in position. For applications with asymmetric plungers or outer conductors which have to be installed with correct alignment.

Mechanical data

HFS-810 and HFS-810 4M **HFS-840 and HFS-840 4M**

	Outer cond. main body	Outer cond. tip (ground)	Inner cond. (signal)
Working stroke:	4.0 mm	0.5 mm	not spring-loded
Maximum stroke:	5.0 mm	1.0 mm	

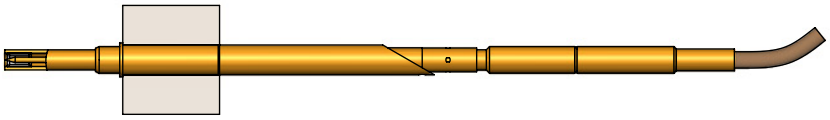
Mechanical data

HFS-410 and HFS-410 4M **HFS-440 and HFS-440 4M**

	Outer cond. main body	Outer cond. tip (ground)	Inner cond. (signal)
Working stroke:	2.0 mm	0.5 mm	not spring-loaded
Maximum stroke:	3.0 mm	1.0 mm	

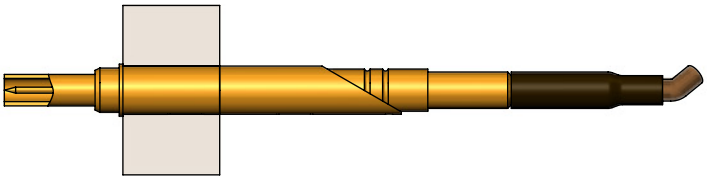
Contacting of PCBs using coaxial dipole probes

Coaxial dipole probe HFS-010 series



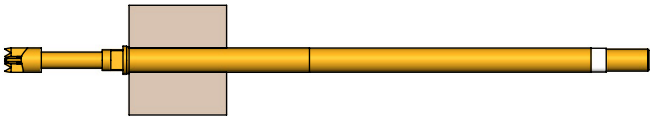
Contacting of PCBs using coaxial dipole probes

Coaxial dipole probe HFS-110 series



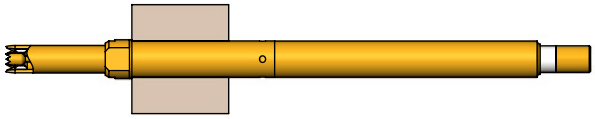
Contacting of PCBs using coaxial dipole probes

Coaxial dipole probe DPS-215 M series



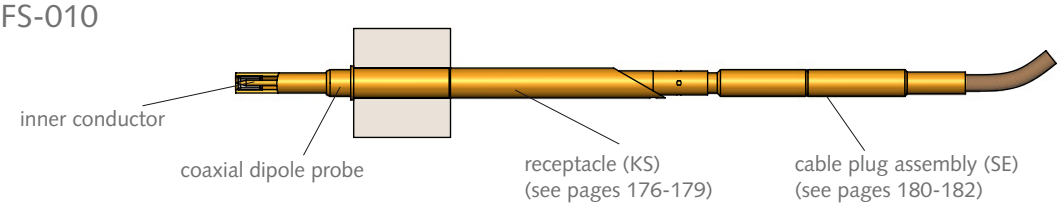
Contacting of PCBs using coaxial dipole probes

Coaxial dipole probe DPS-465 M series

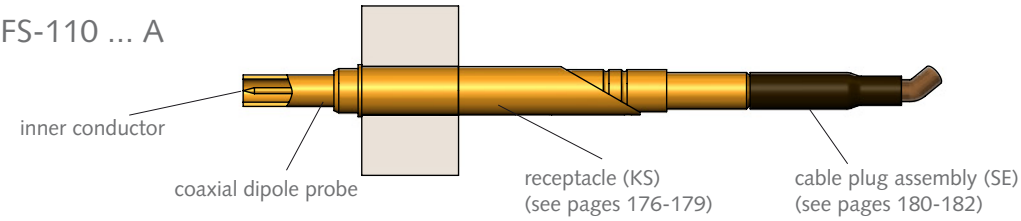


HFS-010 / HFS-110 / DPS-215 M / DPS-465 M coaxial dipole probes

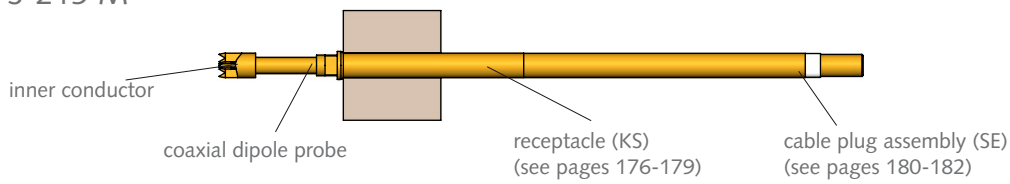
HFS-010



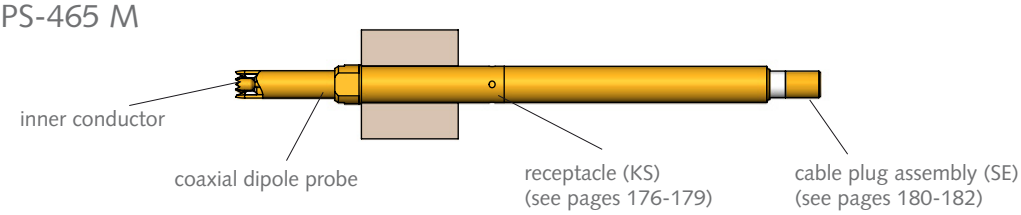
HFS-110 ... A



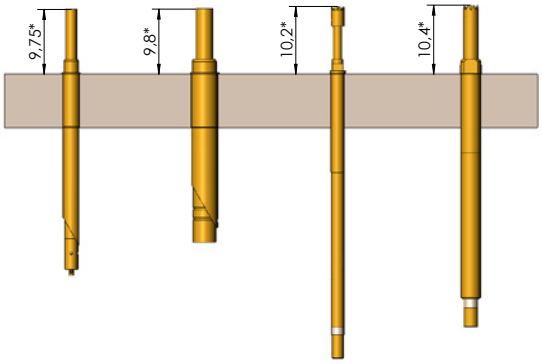
DPS-215 M



DPS-465 M



Customising example:



HFS-010 with KS-010 23 | HFS-110 ...A with KS-110 23 | DPS-215...06M with KS-215 M1,6 | DPS-465...02M with KS-465 M2,5

Installation height in receptacle		KS-010 23	KS-110 23
Version		*Installation height of HFS in KS	
HFS-010	... A	9.75 mm	---
HFS-110	... A	---	9.8 mm
	... B	---	

Installation height in receptacle		KS-215 M1,6 KS-215 M1,6-F KS 215 M1,6-F-R	KS-465 M2,5 KS-465 M2,5-F KS-465 M2,5-F-R
Version		*Installation height of HFS in KS	
DPS-215 M	... 06 M	10.2 mm	---
DPS-465 M	DPS-465 306 100 A 4002 M	---	10.4 mm
	DPS-465 306 100 A 4006 M	---	
	DPS-465 351 051 A 4002 M	---	
	DPS-465 351 051 A 4006 M	---	

Electrical data

HFS-010 HFS-110
DPS-215 M DPS-465 M

		HFS-010	HFS-110	DPS-215	DPS-465
Measurement current	Outer cond. Inner cond.	3 A 3 A	3 A 3 A	8 A 2 A	10 A 2 A
Measurement voltage		400 V	500 V	300 V	1000 V
Typical R_i I		≤ 20 mΩ	≤ 20 mΩ	≤ 20 mΩ	≤ 20 mΩ

Operating temperature range

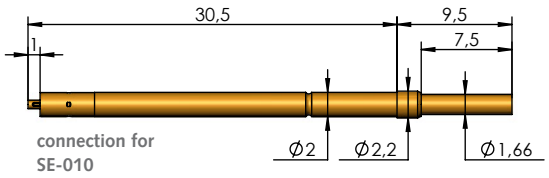
–40 up to +80° C

Grid: ≥ 2.54 mm (*)
≥ 100 Mil

HFS-010
coaxial dipole probe

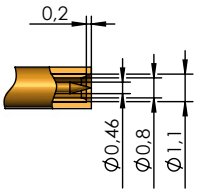
Series:

HFS-010 ...



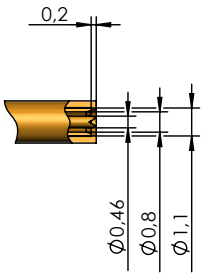
Available tip styles:

Ordering description:



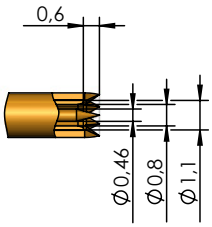
HFS-010 351 050 A **xx** 02 A

Note: Version with outer conductor tip style 02 (flat) and inner conductor tip style 51 (needle tip).



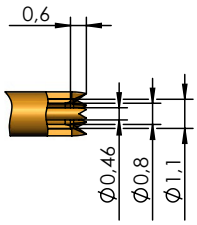
HFS-010 354 050 A **xx** 02 A

Note:
Version with outer conductor tip style 02 (flat) and inner conductor tip style 54 (crown).



HFS-010 351 050 A **xx** 06 A

Note:
Version with outer conductor tip style 06 (serrated) and inner conductor tip style 51 (needle tip) for contacting contaminated surfaces.



HFS-010 354 050 A **xx** 06 A

Note:
Version with outer conductor tip style 06 (serrated) and inner conductor tip style 54 (crown) for contacting contaminated surfaces.

	HFS-010
Spring force of inner conductor at working stroke (N)	0.8
Spring force of outer conductor at working stroke (N)	1.2
Designation for ordering	**20**

Note: (*)
The receptacle KS-010 23 can be used for grids larger than 120 mil (3.00 mm), see accessories (from page 175).

Note:
The inner conductor is secured in place and cannot be replaced.

The spring-loaded outer conductor used in the series HFS-010 is available with a shorter installation length on request.

Mechanical data
HFS-010

	Outer cond.	Inner cond.
Working stroke:	5.5 mm	5.5 mm
Maximum stroke:	7.0 mm	7.0 mm

Mouting hole in CEM1 and FR4
HFS-010

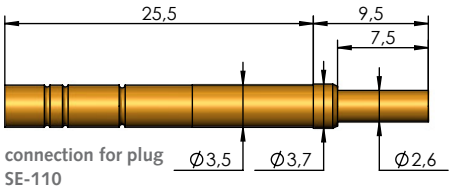
With receptacle:	Ø 2.48 - 2.49 mm
Without receptacle:	Ø 2.00 mm

HFS-110
coaxial dipole probe

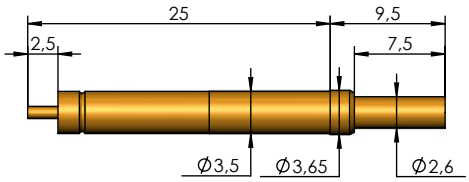
Grid: ≥ 4.50 mm (*)
≥ 180 Mil

Series:

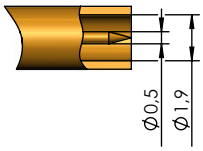
HFS-110 ... A

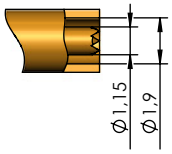


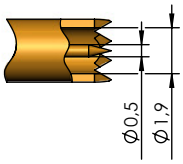
HFS-110 ... B

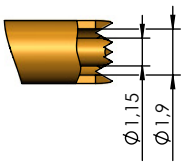


Available tip styles:









Ordering description:

HFS-110 301 050 A **xx** 02 A
HFS-110 301 050 A **xx** 02 B

Note:
Version with outer conductor tip style 02 (flat) and inner conductor tip style 01 (needle tip).

HFS-110 306 115 A **xx** 02 A
HFS-110 306 115 A **xx** 02 B

Note:
Version with outer conductor tip style 02 (flat) and inner conductor tip style 06 (serrated).

HFS-110 301 050 A **xx** 06 A
HFS-110 301 050 A **xx** 06 B

Note:
Version with outer conductor tip style 06 (serrated) and inner conductor tip style 01 (needle tip) for contacting contaminated surfaces.

HFS-110 306 115 A **xx** 06 A
HFS-110 306 115 A **xx** 06 B

Note:
Version with outer conductor tip style 06 (serrated) and inner conductor 06 (serrated) for contacting contaminated surfaces.

Spring force value

The spring-loaded outer conductors are available with various spring forces. The individual spring forces of the inner and outer conductors have to be added together for the order designation.

	HFS-110
Spring force of inner conductor at working stroke (N)	1.5
Spring force of outer conductor at working stroke (N)	3.0
Designation for ordering	**30**

Note: (*)
The receptacle KS-110 23 can be used for grids larger than 180 mil (4.5 mm), see accessories (from page 175).

Note:
The inner conductor is secured in place and cannot be replaced.

The series HFS-110 is available with other tip styles on request.

Mechanical data
HFS-110

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	4.0 mm
Maximum stroke:	5.0 mm	5.0 mm

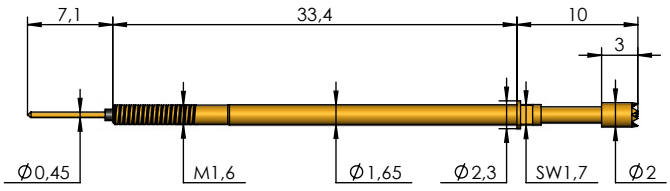
Mouting hole in CEM1 and FR4
HFS-110

With receptacle:	Ø 3.98 - 3.99 mm
Without receptacle:	Ø 3.50 mm

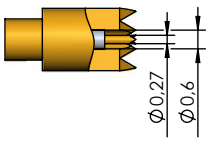
DPS-215 M
coaxial dipole probe

Series:

DPS-215 ... M



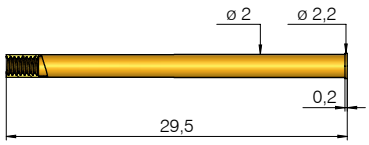
Available tip styles:



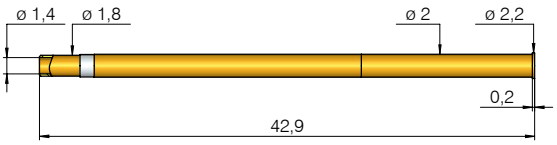
Ordering description:

DPS-215 304 027 A **xx** 06 M

Note:
Version with outer conductor tip style 06 (serrated) and inner conductor tip style 04 (crown).



KS-215 M1,6



KS-215 M1,6 -F

KS-215 M1,6-F-R (with knurl)

Spring force value

The spring-loaded outer conductors are available with various spring forces. The individual spring forces of the inner and outer conductors have to be added together for the order designation.

	DPS-215
Spring force of inner conductor at working stroke (N)	0.4
Spring force of outer conductor at working stroke (N)	1.6
Designation for ordering	**20**

Note: (*)
The receptacle KS-215 M1,6 (/-F/-R) can be used for grids larger than grids than 100 mil (2.54 mm), see accessories (from page 175).

Note:
The inner conductor is secured in place and cannot be replaced.

Mechanical data

DPS-215 M

	Outer cond.	Inner cond.
Working stroke:	4.0 mm	4.0 mm
Maximum stroke:	5.0 mm	5.0 mm

Mouting hole in CEM1 and FR4

DPS-215 M

With receptacle: Ø 1.98 - 1.99 mm

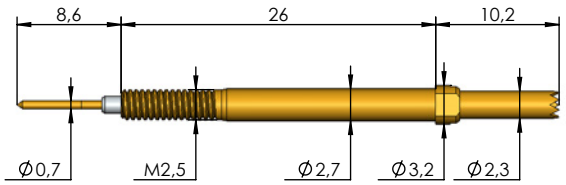
DPS-465
coaxial dipole probe

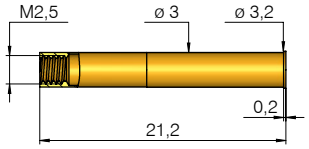
Grid: ≥ 3.50 mm (*)
≥ 140 Mil

DPS-465 M

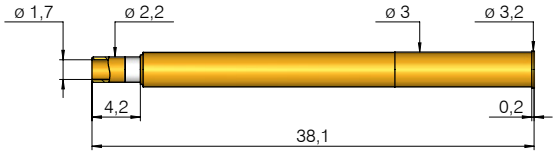
Series:

DPS-465 ... M





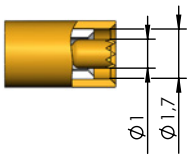
KS-465 M2,5

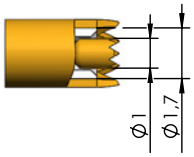


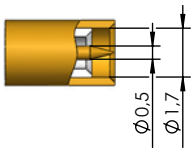
KS-465 M2,5-F

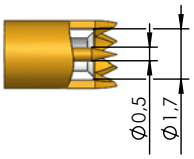
KS-465 M2,5-F-R
(with knurl)

Available tip styles:









Ordering description:

DPS-465 306 100 A **xx** 02 M

Note:
Version with outer conductor tip style 02 (flat) and inner conductor tip style 06 (serrated).

DPS-465 306 100 A **xx** 06 M

Note:
Version with outer conductor tip style 02 (serrated) and inner conductor tip style 06 (serrated).

DPS-465 351 050 A **xx** 02 M

Note:
Version with outer conductor tip style 02 (flat) and inner conductor tip style 51 (needle tip).

DPS-465 351 050 A **xx** 06 M

Note:
Version with outer conductor tip style 06 (serrated) and inner conductor 51 (needle tip).

Spring force value

The spring-loaded outer conductors are available with various spring forces. The individual spring forces of the inner and outer conductors have to be added together for the order designation.

Note: (*)
The receptacle KS-465 M2,5 (/-F/-R) can be used for grids larger than 140 mil (3.50 mm), see accessories (from page 175).

Note:
The inner conductor is secured in place and cannot be replaced.

	DPS-465
Spring force of inner conductor at working stroke (N)	1.0
Spring force of outer conductor at working stroke (N)	3.0
Designation for ordering	**40**

Mechanical data
DPS-465 M

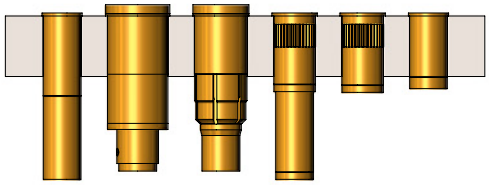
	Outer cond.	Inner cond.
Working stroke:	4.0 mm	4.0 mm
Maximum stroke:	5.0 mm	5.0 mm

Mouting hole in CEM1 and FR4
DPS-465 M

With receptacle: Ø 2.98 - 2.99 mm

Accessories

Receptacles (KS)



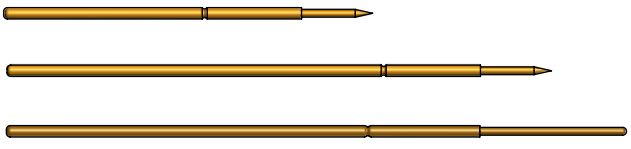
Spacers for receptacles (DS)

Cable connector assemblies (SE)

Adapters

Tools

Inner conductors / signal conductors



Contents

Accessories

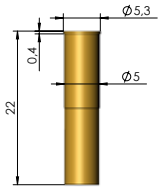
Receptacles

KS-810 Receptacle with crimp points
KS-810 R Receptacle with crimp points and knurl
KS-810 F Flange receptacle with crimp points

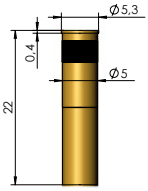
For all probes with no thread in the **HFS-810/840/860/865 series**

KS-810 M5-R Receptacle with inner thread and knurl
KS-810 M5-F Flange receptacle with inner thread

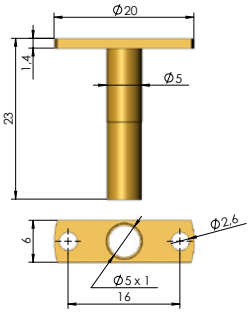
For all M (4M) probes with thread in the **HFS-810/840/860 series.**



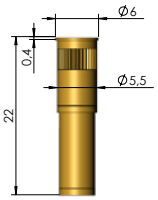
KS-810



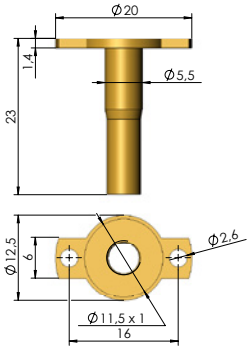
KS-810 R



KS-810 F



KS-810 M5-R



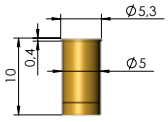
KS-810 M5-F

KS-410 Receptacle with crimp points
KS-410 F Flange receptacle with crimp points

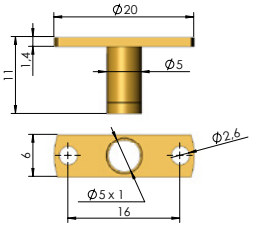
For all probes with no thread in the **HFS-410/440 series.**

KS-410 KM5-R Receptacle with inner thread and knurl
KS-410 KM5-F Flange receptacle with inner thread

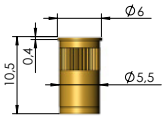
For all M (4M) probes with thread in the **HFS-410/440 series.**



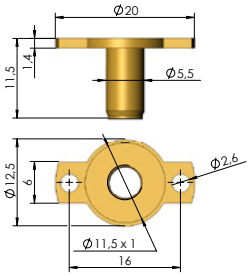
KS-410



KS-410 F



KS-410 KM5-R



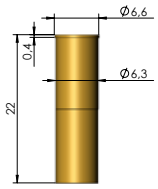
KS-410 KM5-F

Mounting hole in CEM1 and FR4:

With receptacle KS-810/KS-410:	Ø 4.98 - 4.99 mm
With receptacle KS-810 R:	Ø 5.00 - 5.02 mm
With receptacle KS-810 M5-R/KS-410 KM5-R:	Ø 5.50 - 5.52 mm

KS-858 Receptacle with crimp points

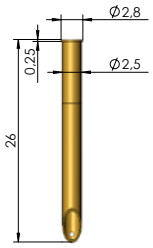
For all probes with no thread in **the HFS-858 series.**



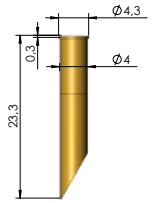
KS-858

KS-010 23 Receptacle with crimp points
KS-110 23 Receptacle with crimp points

For all probes in the **HFS-010 and HFS-110 series.**



KS-010 23



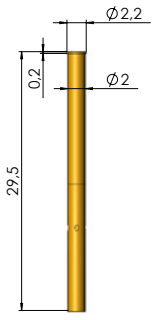
KS-110 23

KS-215 M1,6 Receptacle with crimp points
KS-215 M1,6-F Receptacle with crimp points (quick-exchange system)
KS-215 M1,6-F-R Receptacle with crimp points and knurl (quick-exchange system)

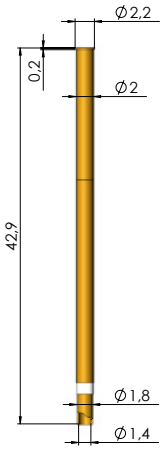
For all dipole probes in the **DPS-215 M series.**

KS-465 M2,5 Receptacle with crimp points
KS-465 M2,5-F Receptacle with crimp points (quick-exchange system)
KS-465 M2,5-F-R Receptacle with crimp points and knurl (quick-exchange system)

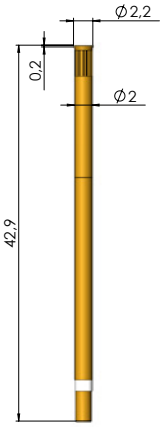
For all dipole probes in the **DPS-465 M series.**



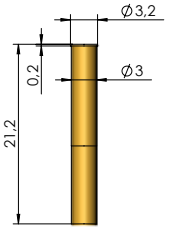
KS-215 M1,6



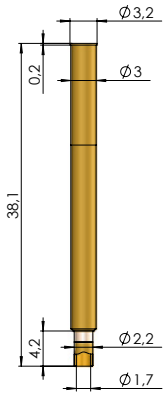
KS-215 M1,6-F



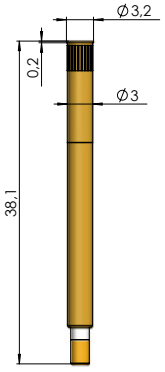
KS-215 M1,6-F-R



KS-465 M2,5



KS-465 M2,5-F



KS-465 M2,5-F-R

Mounting hole in CEM1 and FR4:

With receptacle KS-858:	Ø 6.28 - 6.29 mm
With receptacle KS-010 23:	Ø 2.48 - 2.49 mm
With receptacle KS-110 23:	Ø 3.98 - 3.99 mm
With receptacle KS-215 M1,6 (-F/-F-R):	Ø 1.98 - 1.99 mm
With receptacle KS-465 M2,5 (-F/-F-R):	Ø 2.98 - 2.99 mm

Receptacles
Spacers for receptacles

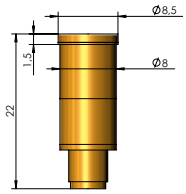
For all probes with no thread in the **HFS-810/840/860/865 series.**

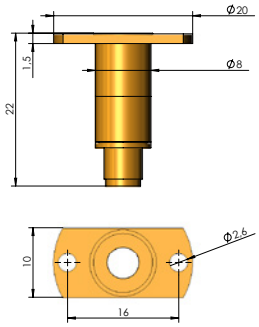
Due to its special design, the flexible receptacle can better absorb side-loads and positioning inaccuracies, which can occur due to misalignment of the PC board/RF plug connector.

HAS-810 220 Flexible receptacle (± 3.5° angular compensation, grid ≥ 9.0 mm)

HAS-810 220 F Flexible flange receptacle (± 3.5° angular compensation)

Operating temperature range -40° up to +80° C





HAS-810 220 **HAS-810 220 F**

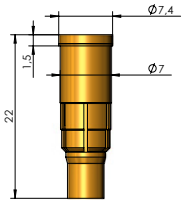
For all probes with no thread in the **HFS-810/840/860/865 series.**

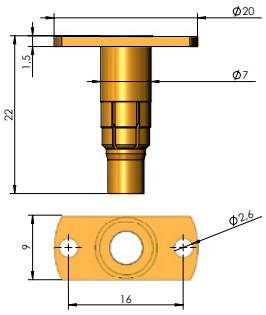
Due to its special design, the flexible receptacle can better absorb side-loads and positioning inaccuracies, which can occur due to misalignment of the PC board/RF plug connector.

HAS-810 220 740 Flexible receptacle (± 2.5° angular compensation, grid ≥ 8.0 mm)

HAS-810 220 740 F Flexible flange receptacle (± 2.5° angular compensation)

Operating temperature range -40° up to +80° C

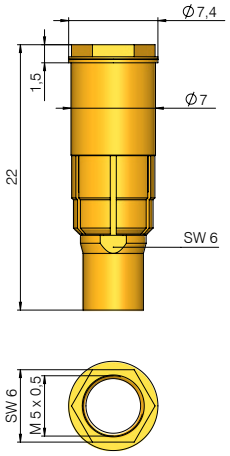




HAS-810 220 740 **HAS-810 220 740 F**

Compatible with all probes with thread (M) in the **HFS-810/840/860/865 series.**

HAS-810 220 740 M flexible receptacle (± 2.0° angular compensation, grid > 8.0 mm)



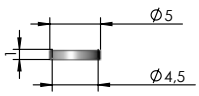
Mounting hole in CEM1 and FR4:

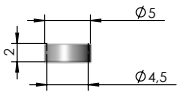
With flexible receptacle HAS-810 220:	Ø 7.98 - 7.99 mm
With flexible receptacle HAS-810 220 F:	Ø 8.10 mm
With flexible receptacle HAS-810 220 740:	Ø 6.98 - 6.99 mm
With flexible receptacle HAS-810 220 740 F:	Ø 7.10 mm
With flexible receptacle HAS-810 220 740 M:	Ø 6.98 - 6.99 mm

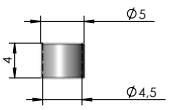
DS-810 0x 50 N Spacers for barrel of RF probes

To increase the installation height by 1, 2 or 4 mm, the spacers **DS-810 0x 50 N** can be placed over the barrel under the collar of the RF probe before it is pressed in.

For all probes with no thread in the following series:
HFS-410/440/810/840/860/865





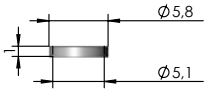


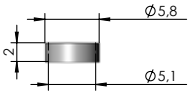
DS-810 01 50 N **DS-810 02 50 N** **DS-810 04 50 N**

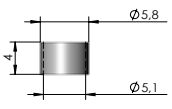
DS-810 0x N Spacers for receptacles KS-810 and KS-410

To increase the installation height by 1, 2 or 4 mm, the spacers **DS-810 0x N** can be placed under the collar of the receptacle before it is pressed into the mouting hole.

For the receptacles **KS-810 and KS-410.**



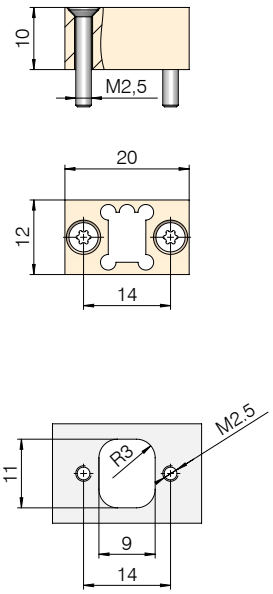




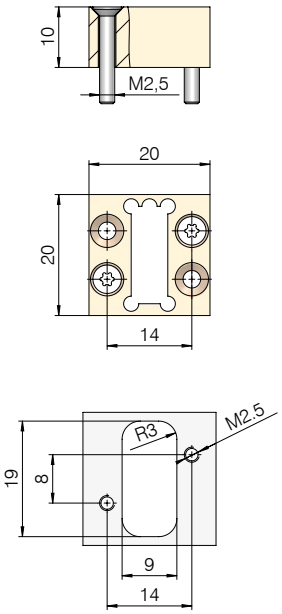
DS-810 01 N **DS-810 02 N** **DS-810 04 N**

For HFS-802

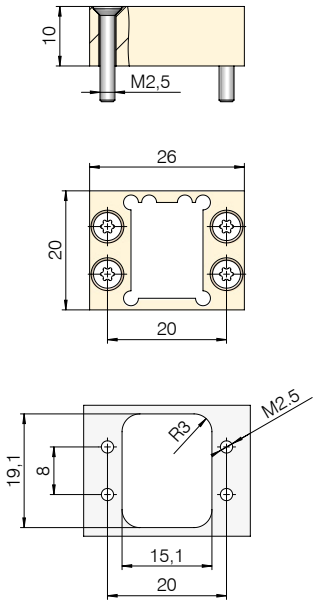
KS-802-HMTD-1



KS-802-HMTD-2

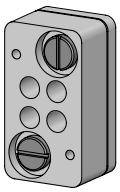


KS-802-HMTD-4

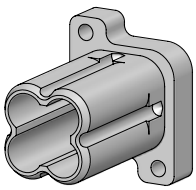


For HFS-807

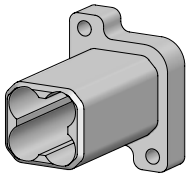
HAS-807-4
Tolerance compensation mount for all HFS-807 probes



VZ-807-HFM-4
Pre-centring for HFS-807 303 051 A 6842 HFM-M, can be combined with HFS-807-4.



VZ-807-HTE-4
Pre-centring for HFS-807 303 051 A 6842 HTE-M, can be combined with HFS-807-4.

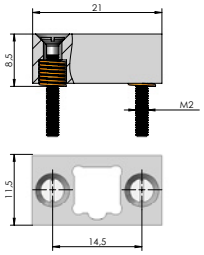


For HFS-819

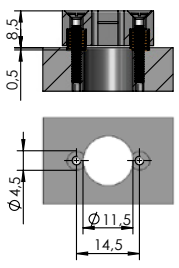
HAS-819 Flexible mount for all probes in the **HFS-819 series** with the **spring force index 127.**

HAS-819 160 Flexible mount with increased spring-force for all probes in the **HFS-819 series** with the **spring force index 207.**

Operating temperature range max. +40° C



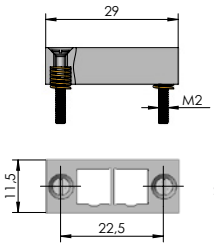
HAS-819/ HAS-819 160
(consists of contact mount, set screws, springs, and screws)



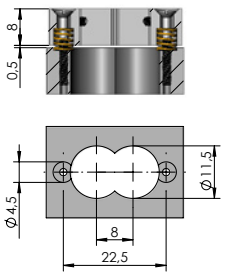
customising recommendation for mounting plate

HAS-819 D8-160 Flexible mount for the **HFS-819...RV7-Z, HFS-819...V8, HFS-819...V8-Z** version for contacting the **double 8 mm** plug connector.

Operating temperature range max. +40° C



HAS-819 D8-160
(consists of contact mount, set screws, springs, and screws)



customising recommendation for mounting plate

Coaxial cables and cable assemblies

Introduction

Apart from the RF probe itself, the cable plug assemblies provide the most important link between the test system and the device under test (DUT). Good signal transmission is an important factor to ensure high quality measurements. Therefore, choosing the right type of cable is crucial for guaranteeing low loss transmission along with other properties such as good matching and phase stability.

The higher the frequency, the higher the requirements are in terms of the signal transmission properties of the cable. INGUN offers various pre-wired cables for the RF product series.

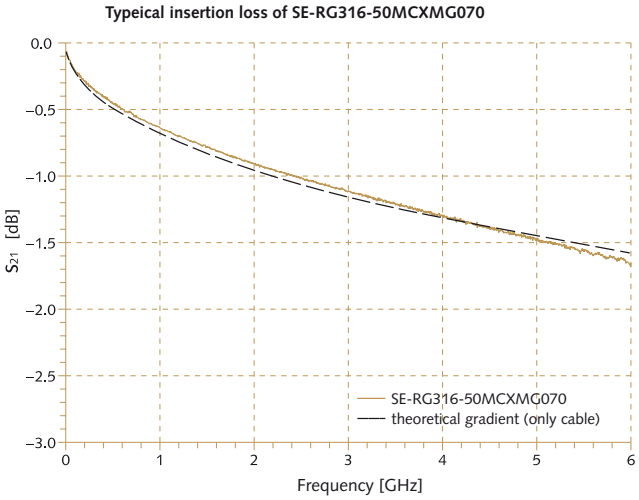
RF cable plug assembly

Loss calculation of the cable (without the plug connector)

The loss can be estimated by using the following equation:

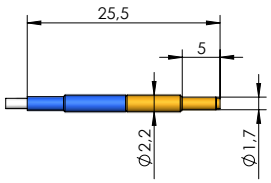
$$\alpha\ [\mathrm{dB}] = (a \cdot \sqrt{f} + b \cdot f) \cdot l \qquad f \text{ in [GHz], l in [m]}$$

Example: Loss calculation for the cable SE-RG316-50MCXMG070 (length: 70 cm at f = 1.5 GHz):
$\alpha = (0.7727 \cdot \sqrt{1.5} + 0.0972 \cdot 1.5) \cdot 0.7\ \mathrm{dB} \approx 0.8\ \mathrm{dB}$.
The correct loss coefficients a and b of the cable (here: RG316 /U) can be found in the table below. Using an assembly rather than just the cable, the loss properties of the MCX connector and the second coaxial interface (if available) have to be added. However for normal use, these values are mostly negligible.

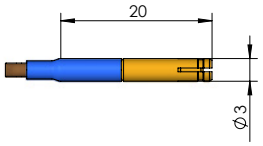


Cable Type	K_01152-07	RG178 B/U	ENVIROFLEX_178	RG316 /U	ENVIROFLEX_316_D	MULTIFLEX_86	RTK-FLEX405-SPC-FEP	RG59 B/U	RG179 B/U
Impedance [Ω]	50	50	50	50	50	50	50	75	75
fmax [GHz]	1	1	3	3	6	40	60	1	1
Shielding effectiveness [dB]	> 40 up to 1 GHz	> 40 up to 1 GHz	> 40 up to 3 GHz	> 38 up to 1 GHz	> 80 up to 6 GHz	> 90 up to 18 GHz	> 90 up to 1 GHz	> 40 up to 1 GHz	> 41 up to 1 GHz
Inner conductor material	Cu, Ag plated	St., Cu + Ag plated	St., Cu + Ag plated	St., Cu + Ag plated	St., Cu + Ag plated	Cu, Ag plated	Cu, Ag plated	Cu	St., Cu + Ag plated
Dielectric	PFA (εr ≈ 2.1)	PTFE (εr ≈ 2.1)	SPEX (εr ≈ 2.0)	PTFE (εr ≈ 2.1)	SPEX (εr ≈ 2.0)	PTFE (εr ≈ 2.0)	FEP (εr ≈ 2.0)	PE (εr ≈ 2.3)	PTFE (εr ≈ 2.1)
Loss coefficient a	2.21	1.408	1.4067	.7727	.7182	.71702	.6912	.3173	.73
Loss coefficient b	.259	.2296	.2229	.0972	.1682	.02892	.0412	.0499	.1014
Min. bending radius static [mm]	6	10	5	15	5	6	7.6	32	15
Min. bending radius dynamic [mm]	20	20 (for max. 50 identical movements)	30	37.5	30	20	15	65 (for max. 50 identical movements)	38

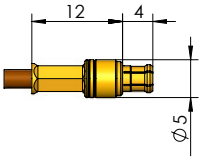
Plug versions: (see page 198 for ordering number)



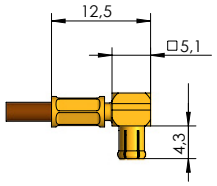
SE-010



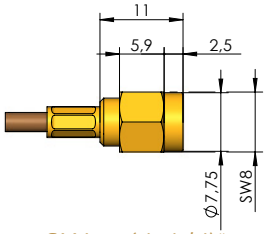
SE-110



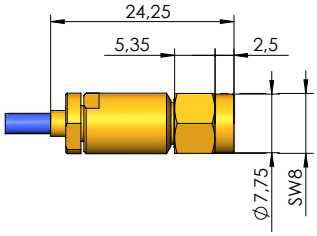
*MCX-plug (straight)**



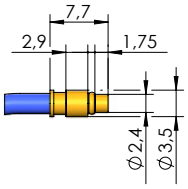
*MCX-m (angular 90°)**



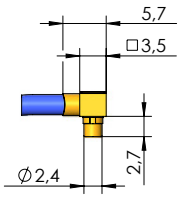
*SMA-m (straight)**



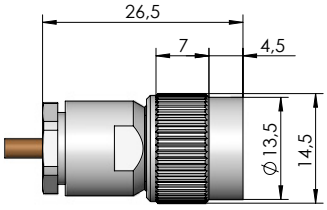
PC3.5-m (straight)



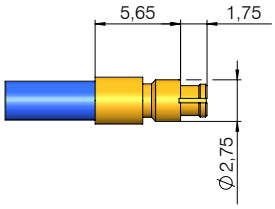
MMPX™-m (straight)



MMPX™-m (angular 90°)



TNC-m (straight)



SMPM-f, (straight)

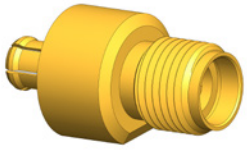
Note: (*)
Plug with bend protection. Version with shrink hose (20 mm).

Adapter

MCX-m adapter for SMA-f

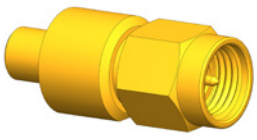
Ordering number
HFS-ADA-MCX-M-SMA-F

MCX-m adapter for PC3.5-f



Ordering number
HFS-ADA-MCX-M-PC35-F

PC3.5-m adapter for MCX-f



Ordering number
HFS-ADA-PC35-M-MCX-F

Cable plug assembly

HFS-810/840/410/440/860/865
HFS-409/807/822/823/836/837
HFS-852/856/858/864

Coaxial cables

Part number	Ordering number	Interface 1	Cable length and type	Interface 2	f_{max}
Cable plug assembly up to max. 0.2 GHz for HFS-010					
SE-K11527-50010MG075	SE-K11527-0001	SE-010	75 cm, K_01152-07	open	0.2 GHz
Cable plug assembly up to max. 0,7 GHz for HFS-110					
SE-RG178-50110MG075	SE-RG178-0005	SE-110	75 cm, RG178 B/U	open	0.7 GHz
Cable plug assembly up to max. 6 GHz for HFS-4(8)10, HFS-4(8)40 and HFS-860					
SE-RG316-50MCXMG070	SE-RG316-0011	MCX-m (straight)	70 cm, RG316 /U	open	3 GHz
SE-RG316-50MCXMW070	SE-RG316-0013	MCX-m (angular 90°)	70 cm, RG316 /U	open	3 GHz
SE-RG316-50MCXMG150	SE-RG316-0014	MCX-m (straight)	150 cm, RG316 /U	open	3 GHz
SE-RG316-50MCXMW150	SE-RG316-0015	MCX-m (angular 90°)	150 cm, RG316 /U	open	3 GHz
SE-RG316-50MCXMG058SMAMG	SE-RG316-0016	MCX-m (straight)	58 cm, RG316 /U	SMA-m (straight)	3 GHz
SE-RG316-50MCXMW040SMAMG	SE-RG316-0047	MCX-m (angular 90°)	40 cm, RG316 /U	SMA-m (straight)	3 GHz
SE-EF316D-50MCXMG080	SE-EF316D-0015	MCX-m (straight)	80 cm, ENVIROFLEX_316_D	open	6 GHz
SE-EF316D-50MCXMG080SMAMG	SE-EF316D-0016	MCX-m (straight)	80 cm, ENVIROFLEX_316_D	SMA-m (straight)	6 GHz
SE-EF316D-50MCXMW080	SE-EF316D-0017	MCX-m (angular 90°)	80 cm, ENVIROFLEX_316_D	open	6 GHz
SE-EF316D-50MCXMW080SMAMG	SE-EF316D-0018	MCX-m (angular 90°)	80 cm, ENVIROFLEX_316_D	SMA-m (straight)	6 GHz
Cable plug assembly up to max. 18 GHz for HFS-822, HFS-823 and HFS-856					
SE-RG316-50SMAMG080SMAMG	SE-RG316-0001	SMA-m (straight)	80 cm, RG316 /U	SMA-m (straight)	3 GHz
SE-EF316D-50SMAMG080SMAMG	SE-EF316D-0005	SMA-m (straight)	80 cm, ENVIROFLEX_316_D	SMA-m (straight)	6 GHz
SE-MF86-50SMAMG080SMAMG	SE-MF86-0001	SMA-m (straight)	80 cm, MULTIFLEX_86	SMA-m (straight)	18 GHz
Cable plug assembly up to max. 26.5 GHz for HFS-865					
SE-MF86-50MMPXMG080PC35MG	SE-MF86-0008	MMPX™-m (straight)	80 cm, MULTIFLEX_86	PC3.5-m (straight)	26.5 GHz
SE-MF86-50MMPXMW080PC35MG	SE-MF86-0009	MMPX™-m (angular 90°)	80 cm, MULTIFLEX_86	PC3.5-m (straight)	26.5 GHz

Part number	Ordering number	Interface 1	Cable length and Type	Interface 2	f_{max}	Application
Cable plug assembly for special applications						
SE-RG316-50MCXMG070S	SE-RG316-0012	MCX-m (straight)	70 cm, RG316/U	open	3 GHz	MCX-Plug with additional insulation
SE-RG316-50MCXMG150S	SE-RG316-0017	MCX-m (straight)	150 cm, RG316/U	open	3 GHz	MCX-Plug with additional insulation
SE-EF178-50MCXMG080	SE-EF178-0007	MCX-m (straight)	80 cm, ENVIROFLEX_178	open	3 GHz	highly flexible cable for the series HFS-4(8)10 and HFS-4(8)40
SE-EF178-50MCXMG080SMAMG	SE-EF178-0008	MCX-m (straight)	80 cm, ENVIROFLEX_178	SMA-m (straight)	3 GHz	highly flexible cable for the series HFS-4(8)10 and HFS-4(8)40
SE-EF178-50MCXMW080	SE-EF178-0009	MCX-m (angular 90°)	80 cm, ENVIROFLEX_178	open	3 GHz	highly flexible cable for the series HFS-4(8)10 and HFS-4(8)40
SE-EF178-50MCXMW080SMAMG	SE-EF178-0010	MCX-m (angular 90°)	80 cm, ENVIROFLEX_178	SMA-m (straight)	3 GHz	highly flexible cable for the series HFS-4(8)10 and HFS-4(8)40
SE-FLX405-50SMPMFG050SMAMG	SE-FLX405-0001	SMPM-f (straight)	50 cm, RTK-FLEX405-SPC-FEP	SMA-m (straight)	18 GHz	suitable for series HFS-837, 852 and 890
SE-RG59-75TNCMG070	SE-RG59-0002	TNC-m (straight)	70 cm, RG59/U	open	1 GHz	suitable for series HFS-409
SE-RG179-75MCXMG070	SE-RG179-0001	MCX-m (straight)	70 cm, RG179 B/U	open	1 GHz	suitable for series HFS-858

Digital cables

Part number	Ordering number	Interface 1	Cable length and Type	Interface 2	f_{max}	Application
SE-HSD-100HSDFG100	SE-HSD-0002	HSD-f	100 cm	open	digital	suitable for series HFS-819...RV5-H3
SE-STPGG-100HMTDFG050	SE-STPGG-0004	HMTD	50 cm	open	digital	suitable for series HFS-802
SE-STPGG-100HMTDFG100HMTDFGZ	SE-STPGG-0005	HMTD	100 cm	HMTD	digital	suitable for series HFS-802

Nomenclature	
f	female = Signal Conductor Jack
m	male = Signal Conductor Plug
f_{max}	max. frequency

Note:
Other configurations and specialised lengths available upon request.

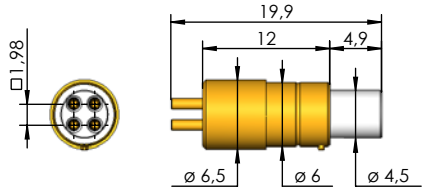
More information and data sheets regarding the cable assemblies can be downloaded from our homepage www.ingun.com, and are available upon request.

Cable plug assembly

SE-819 V2 for HFS-819 ... with plug connection

The SE-819 V2 connector is not pre-wired and is supplied as a solder version. The connector has a position detection marking to prevent confusing the pole designation.

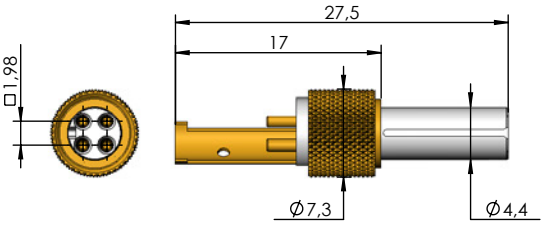
SE-819 V2 for HFS-819



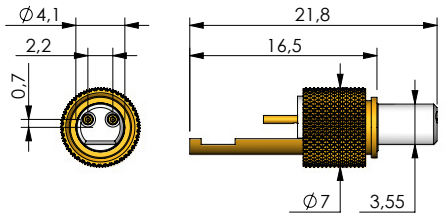
SE-819 V5-Z for HFS-819
SE-821 for HFS-821

The screw-on plug connector SE-819 V5-Z for HFS-819 and the plug connector SE-821… for HFS-821 with a lock nut for securing purposes is not pre-wired and is supplied as a solder version. To prevent damage of the solder connection due to improper tensile loading of the cable, the screw-on plug connectors are equipped with a strain relief. The connector has a position detection marking to prevent confusing the pole designation.

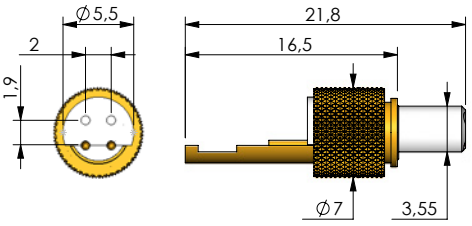
SE-819 V5-Z for HFS-819



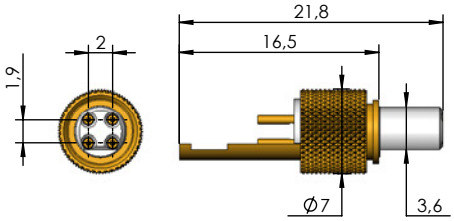
SE-821 MX38 for HFS-821



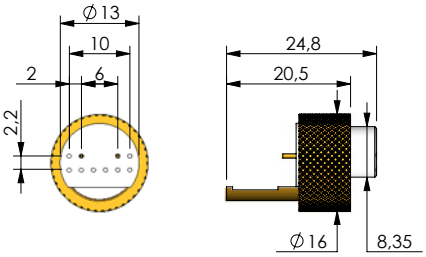
SE-821 MX48 for HFS-821



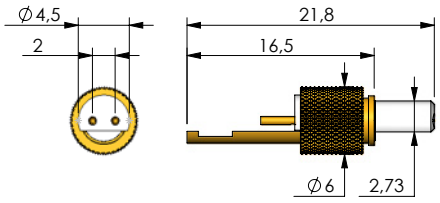
SE-821 MX49 for HFS-821



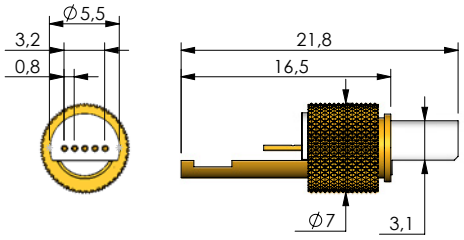
SE-821 MX62 for HFS-821



SE-821 MX68 for HFS-821



SE-821 USB-Mini for HFS-821



HFS test set / PCB simulator
Special RF test set, which simulates the test point on the PCB. The set consists of two SMA adaptations, two grounding plates and a connecting sleeve for the singular "back to back" measurement.

Part number:
SET-HFS-TEST-PCB29R

Ordering number:
SET-HFS-TEST-0001

Attenuators for RF test probes
Inline attenuators for modification or artificial improvement of return loss. 50 Ω attenuator with 3 dB and 2 Watt load capacity, as well as optional MCX or SMA connection interface. More attenuator values are available upon request.

Part number:
HFS-ADA-MCX-M-MCX-F-03DB

Ordering number MCX connection:
HFS-ADA-0001

Part number:
HFS-ADA-SMA-M-SMA-F-03DB

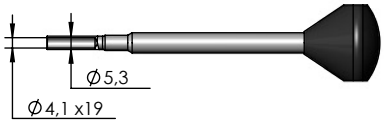
Ordering number SMA connection:
HFS-ADA-0002

Tools

SW-GKS (insertion tool for KS)
Universal insertion tool for receptacles. The SW-GKS consists of the **SW-H handle** and a **flat plastic insert E-SW GKS** with a diameter of 5.8 mm, which is screwed in.

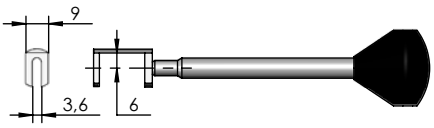
SW-GKS

SW-HFS-810-S (insertion tool for HFS)
Insertion tool for RF probe series HFS-410/440/810/840/ 860 with an outer conductor diameter < 4.0 mm. The SW-HFS-810-S consists of the **SW-H handle** and a screwed-in **insert E-SW-HFS-810-S**.



SW-HFS-810-S

SW-ZW-HFS-810 (Insertion and extraction tool for RF probes)
Insertion and extraction tool for RF probe series HFS-410/440/810/840/ 860 with an outer conductor diameter between 4.1 and 11.4 mm. The SW-HFS-810 consists of the **SW-H handle** and a screwed-in **insert E-SW-HFS-810**.

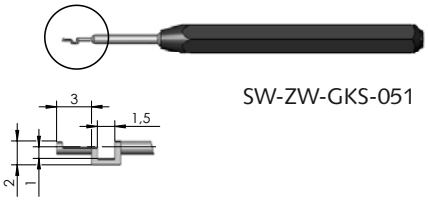


SW-ZW-HFS-810

SW-GKS-187 B (insertion tool for the inner conductor probe GKS-051)
insertion tool for the RF inner conductor probe series GKS-051 with tip-diameter ≤ 0.51 mm. The SW-GKS-187 B consists of the **SW-H handle** and a screwed-in **insert E-SW-GKS-187-B**.

SW-GKS-187-B

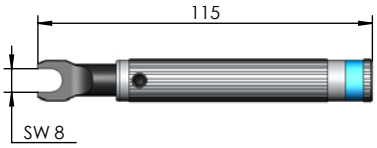
SW-ZW-GKS-051 (Insertion and extraction tool for the inner conductor probe GKS-051)
Insertion and extraction tool for the RF inner conductor probe series GKS-051 with inner conductor tip diameter > 0.51 mm and the smallest inner diameter of the outer conductor of > 4.0 mm. The SW-ZW-GKS-051 consists of the **SW-G handle** and a screwed-in **insert E-SW-ZW-GKS-051.**



SW-ZW-GKS-051

DW-GS-SW8-45 (torque wrench for SMA HF connector)
8 mm (5/16“) width across flats - 45 Ncm torque
DW-GS-SW8-100 (torque wrench for PC3.5 HF connector)
8 mm (5/16“) width across flats - 100 Ncm torque

The precision torque wrench is used to tighten the coupling nut on HF connectors.

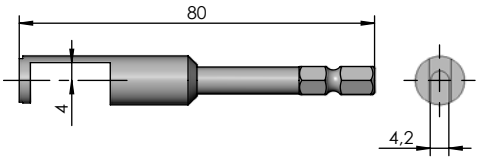


SMA, PC3.5 torque wrench

GS-810 SW 3.5 (wrench for HFS outer conductors)
GS-810 SW 4.0 (wrench for HFS main body)
Tools for dismantling and assembly of RF probes in the following series: HFS-810/840/410/440/860
GS-822 SW 8.0 (wrench for RF probe with SMA-/PC3.5 connection)
Tools for dismantling and assembly of RF probes with SMA or PC3.5 connection (SW8).

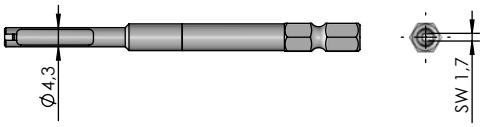
GS-810 SW 3.5 (4.0, 8.0)

BIT-HFS-810 M (screwing tool for HFS- ... M/4M)
Bit Tool for screwing in and unscrewing the RF probes **HFS-... M (4M)** with a maximum tip diameter of 8.0 mm.
The screwing tool is equipped with a 1/4“ bit insert system. If space is limited, thebit tools can also be used without the torque wrench.



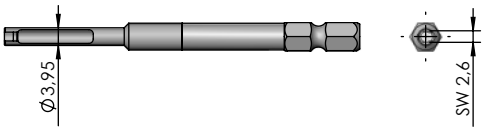
BIT-HFS-810 M

BIT-GKS-112 M (screwing tool for DPS-215 and HFS-409)
Screwing tool for screwing and unscrewing the DPS-215 series (3-5 Ncm), as well as for screwing and unscrewing the inner conductors in the HFS-409 series (3-5 Ncm).
The screwing tool is equipped with a 1/4“ bit insert system. If space is limited, the bit tools can also be used without the torque wrench.



BIT-GKS-112 M

BIT-SKS-465 M (screwing tool for DPS-465)
Screwing tool for screwing and unscrewing the **DPS-465** (3-5 Ncm).
The screwing tool is equipped with a 1/4“ bit insert system. If space is limited, the bit tools can also be used without the torque wrench.



BIT-SKS-465 M

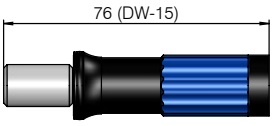
BIT-HFS-807 M-B (screwing tool for HFS-807)
Screwing tool for screwing and unscrewing the **HFS-807** (15 Ncm +/-5).
The screwing tool is equipped with a 1/4“ bit insert system. If space is limited, the bit tools can also be used without the torque wrench.

BIT-HFS-807 M-B

DW-5-40 (torque wrench for BIT-... M)
The adjustable torque wrench (5-40 Ncm) is used in combination with the bit tools.

DW-5-40

DW-15 (torque wrench for BIT-... M)
The pre-set torque wrench (15 Ncm) is used in combination with the bit tools.



DW-15

DW-5-S (torque wrench for BIT-... M)
The pre-set torque wrench (5 Ncm) is used in combination with the bit tools.

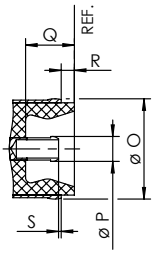
DW-5-S

MMBX / MMCX / MMPX / MBX / MCX chapter

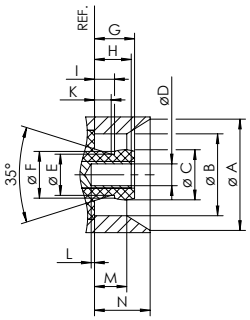
Series MMBX

Connection dimensions

signal conductor male



signal conductor female

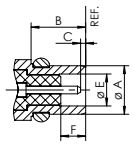


	Signal conductor male/ female	
	min.	max.
A	5.00 / *.197*	5.00 / *.197*
B	3.68 / *.145*	3.71 / *.146*
C	2.25 / *.089*	2.30 / *.091*
D	0.98 / *.039*	1.01 / .040
E	1.85 / *.073*	1.85 / *.073*
F	2.10 / *.083*	2.10 / *.083*
G	-	1.80 / *.071*
H	1.55 / *.061*	1.75 / *.069*
I	0.90 / .035	-
K	0.75 / .030	0.75 / .030
L	0 / 0	-
M	1.45 /.057	-
N	2.50 / .098	2.50 / .098
O	3.70 / .146	3.70 / .146
P	0.95 / .037	0.95 / .037
Q	1.85 / .073	1.85 / .073
R	0.50 / .020	0.50 / .020
S	0.10 / .004	0.10 / .004

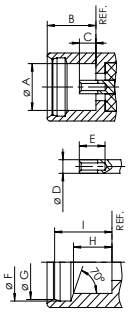
Series MMCX

Connection dimensions

signal conductor male



signal conductor female



	Signal conductor male		Signal conductor female	
	min.	max.	min.	max.
A	–	2.40 / *.094*	2.41 / *.095*	-
B	2.70 / *.106*	-	-	2.65 / *.104*
C	0.00 / *.000*	0.25 / *.010*	0.90 / *.035*	1.20 / *.047*
D	1.23 / *.048*	-	0.70 / *.028* nom.	
E	1.58 / *.062*	1.62 / *.064*	1.40 / *.055*	-
F	1.23 / *.048*	-	3.00 / *.118*	3.04 / *.120*
G*	0.38 / *.015*	0.42 / *.017*	2.88 / *.113*	2.92 / *.115*
H	-	0.20 / *.008*	1.57 / *.062*	1.63 / *.064*

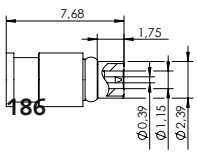
*	Buchse		
G	2.88 / *.113*	2.90 / *.114*	2.92 / *.115*
I	2.34 / *.092*	2.30 / *.091*	2.26 / *.089*

Note: I is related to G

Series MMPX

Connection dimensions

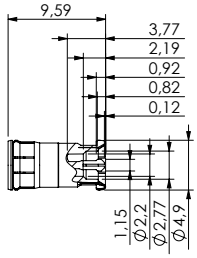
signal conductor female



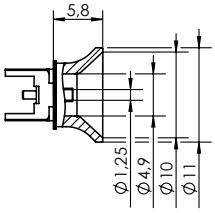
Series MBX

Connection dimensions

signal conductor male



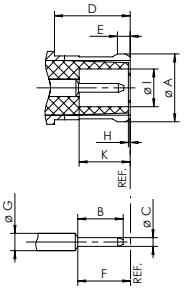
signal conductor female



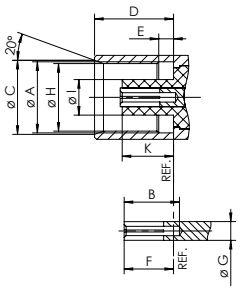
Series MCX

Connection dimensions

signal conductor male



signal conductor female



	Signal conductor male		Signal conductor female	
	min.	**max.**	**min.**	**max.**
A	3.72 / *.146**	3.80 / *.150**	3.60 / *.142*	3.70 / *.146*
B	2.49 / *.098*	2.59 / *.102*	2.80 / *.110*	-
C	0.48 / *.019*	0.53 / *.021*	3.75 / *.148*	3.85 / *.152*
D	4.15 / *.163*	-	4.00 / *.157*	4.12 / *.162*
E	0.70 / *.028*	0.75 / *.030*	0.75 / *.030*	0.85 / *.033*
F	2.80 / *.110*	3.20 / *.126*	2.30 / *.091*	2.80 / *.110*
G	0.95 / *.037* nom.		0.95 / *.037* nom.	
H	-	0.30 / *.012*	3.42 / *.135*	3.48 / *.137*
I	2.00 / *.079*	2.07 / *.081*	1.80 / *.071*	1.98 / *.078*
K	2.80 / .110	3.20 / .126	2.60 / .102	2.80 / .110

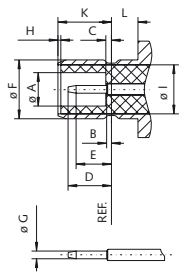
Technical details and dimensions

SMB / SMC

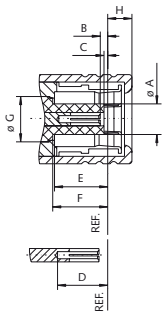
SMB series

Connection dimensions

signal conductor male



signal conductor female

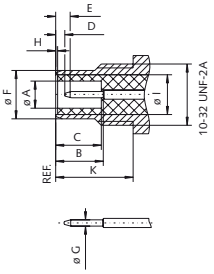


	Signal conductor male		Signal conductor female	
	min.	max.	min.	max.
A	2.08 / .082	-		2.06 / .081
B	-	0.18 / .007	0.18 / .007	0.94 / .037
C	-	0.18 / .007	0.18 / .007	-
D	-	2.97 / .117	2.97 / .117	-
E	1.32 / .052	-	3.58 / .141	-
F	3.66 / .144	3.71 / .146	3.58 / .141	-
G	0.48 / .019	0.53 / .021	3.05 / .120 nom.	
H	0.00 / .000	-	-	1.63 / .064
I	3.05 / .120 nom		-	-
K	3.33 / .131	3.58 / .141	-	-
L	1.65 / .065	-	-	-

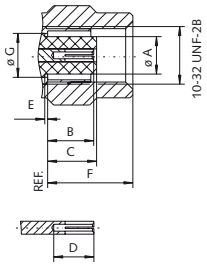
SMC series

Connection dimensions

signal conductor male



signal conductor female



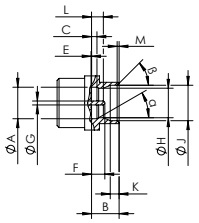
	Signal conductor male		Signal conductor female	
	min.	max.	min.	max.
A	2.08 / .082	-	-	2.06 / .081
B	3.40 / .134	-	2.85 / .112	3.40 / .134
C	3.40 / .134	-	-	3.40 / .134
D	0.61 / .024	-	2.97 / .117	-
E	-	2.13 / .084	0.00 / .000	-
F	-	3.71 / .146	-	5.92 / .233
G	0.48 / .019	0.53 / .021	3.05 / .120 nom.	
H	0.00 / .000	-	-	-
I	3.05 / .120 nom		-	-
K	5.94 / .234	-	-	-

SMP (X/MAX), SMP-L / SSMP / P-SMP

SMP series

Connection dimensions

signal conductor male

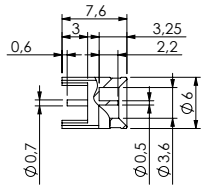


	Signal conductor male	
	min.	**max.**
A	3.15 / *.124*	3.20 / .126
B	2.74 / *.108*	2.84 / *.112*
C	0.52 / *.0205*	0.60 / *.0235*
E	0.00 / 0	-
F	1.14 / *.045*	1.40 / *.055*
G	0.36 / *.014*	0.41 / *.016*
H	2.90 / *.114*	3.00 / *.118*
	3.00 / *.118*	3.10 / *.122*
J	3.53 / *.139*	3.68 / *.145*
K	0.84 / *.033*	0.94 / *.037*
L	1.30 / *.051*	1.45/ *.057*
	1.37 / *.052*	1.52 / *.060*
M	0.08 / *.003*	1.20 / *.008*
α	30°	
β	*40 / 40*	50 / 50

SMP-L series

Connection dimensions

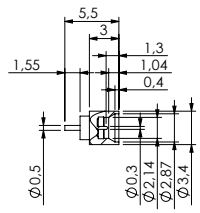
signal conductor male



SSMP series

Connection dimensions

signal conductor male



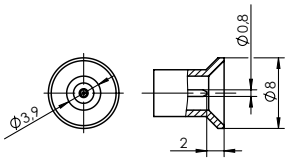
Technical details and dimensions

SMP (X/MAX), SMP-L / SSMP / P-SMP

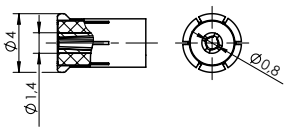
SMP-MAX series

Connection dimensions

signal conductor male



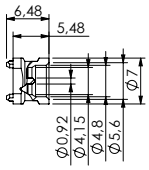
signal conductor female



P-SMP series

Connection dimensions

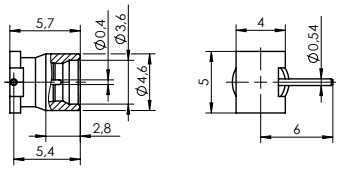
signal conductor male



SMPX series

Connection dimensions

signal conductor male

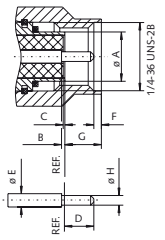


SMA / PC3.5 / QMA

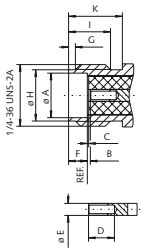
SMA series

Connection dimensions

signal conductor male



signal conductor female

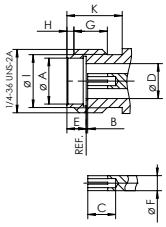


	Signal conductor male		Signal conductor female	
	min.	max.	min.	max.
A	-	4.59 / *.181*	4.59 / *.181*	-
B	0.00 / *.000*	0.25 / *.010*	0.00 / *.000*	0.25 / *.010*
C	0.00 / *.000*	0.25 / *.010*	0.00 / *.000*	0.25 / *.010*
D	-	2.54 / *.100*	2.67 / *.105*	-
E	1.24 / *.049*	1.29 / *.051*	1.24 / *.049*	1.29 / *.051*
F	0.38 / *.015*	1.14 / *.045*	1.88 / *.074*	1.98 / *.078*
G	-	3.43 / *.135*	0.38 / *.015*	1.14 / *.045*
H	0.90 / *.036*	0.94 / *.037*	5.28 / *.208*	5.49 / *.216*
I	-	-	4.32 / *.170*	-
K	-	-	5.54 / *.218*	-

PC3.5 series

Connection dimensions

signal conductor female

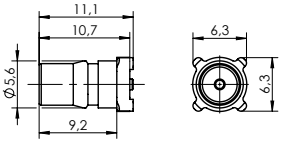


	Signal conductor female	
	min.	max.
A	4.60 / *.181*	4.63 / .182
B	0.00 / *.000*	0.08 / *.003*
C	2.79 / *.110*	3.18 / *.125*
D	3.49 / *.138*	3.51 / .138
E	1.88 / *.074*	1.98 / *.078*
F	1.51 / *.060*	1.52 / *.060*
G	3.35 / *.132*	4.62 / *.128*
H	0.38 / *.015*	1.14 / *.045*
I	5.30 / *.209*	5.40 / .213
K	5.54 / *.218*	-

QMA series

Connection dimensions

signal conductor female

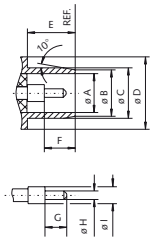


BMA / BNC / 1.0 / 2.3

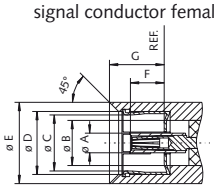
BMA series

Connection dimensions

signal conductor male



signal conductor female

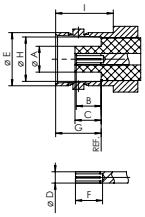


	Signal conductor male		Signal conductor female	
	min.	max.	min.	max.
A	4.09 / *.161 nom.*		1.78 / *.070 nom.*	
B	4.88 / *.192 nom.*		4.09 / *.161 nom.*	
C	5.31 / *.209*	5.35 / *.211*	-	5.08 / *.200*
D	7.62 / *.300 nom.*		5.71 / *.225*	-
E	5.03 / *.198*	-	7.37 / *.290*	-
F	3.25 / *.128*	-	3.05 / *.120*	3.23 / *.127*
G	2.29 / *.090 nom.*		-	5.03 / *.198*
H	0.90 / *.035*	0.94 / *.037*	-	-
I	1.78 / *.070 nom.*		-	-

BNC series

Connection dimensions

signal conductor female

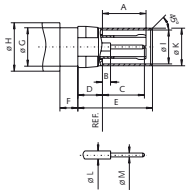


	Signal conductor female	
	min.	max.
A	-	4.72 / .186
B	4.72 / *.186*	5.23 / *.206*
C	4.78 / *.188*	5.28 / *.208*
D	2.06 / *.081*	2.21 / *.087*
E	9.60 / *.378*	9.70 / *.382*
F	4.95 / *.195*	-
G	8.31 / *.327*	8.51 / *.335*
H	8.10 / *.319*	8.15 / *.321*
I	10.52 / *.414*	-

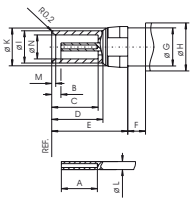
1.0 / 2.3 series

Connection dimensions

signal conductor male



signal conductor female



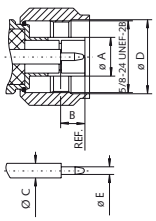
	Signal conductor male		Signal conductor female	
	min.	max.	min.	max.
A	5.40 / *.213*	5.70 / *.224*	4.50 / *.177*	-
B	-	1.15 / *.045*	1.15 / *.045*	1.45 / *.057*
C	5.20 / *.205*	5.50 / *.217*	5.80 / *.228*	5.90 / *.232*
D	3.05 / *.120*	3.20 / *.126*	6.40 / *.252*	6.50 / *.256*
E	9.25 / *.364*	9.35 / *.368*	9.50 / *.374*	9.60 / *.378*
F	2.22 / *.087*	2.40 / *.094*	2.22 / *.087*	2.40 / *.094*
G	4.76 / *.187*	4.79 / *.189*	4.76 / *.187*	4.79 / *.189*
H	-	6.00 / *.236*	-	6.00 / *.236*
I	4.20 / *.165*	4.28 / *.169*	4.03 / *.159*	4.15 / *.163*
K	4.66 / *.183*	4.78 / *.188*	4.72 / *.186*	4.75 / *.187*
L	1.00 / *.039 nom.*		1.00 / *.039 nom.*	
M	0.48 / *.019*	0.52 / *.020*	0.50 / *.020*	0.60 / *.024*
N	-	-	3.00 / *.118*	3.06 / *.120*

SMA / PC3.5 / QMA

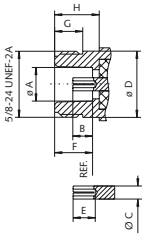
N series

Connection dimensions

signal conductor male



signal conductor female

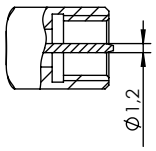


	Signal conductor male		Signal conductor Jjck	
	min.	max.	min.	max.
A	-	8.38 / *.330*	8.03 / *.316*	8.13 / *.320*
B	5.33 / *.210*	5.84 / *.230*	4.75 / *.187*	5.26 / *.207*
C	-	3.15 / *.124*	-	3.15 / *.124*
D	16.00 / *.630*	-	-	15.93 / *.627*
E	1.60 / *.063*	1.68 / *.066*	5.33 / *.210*	-
F	-	-	9.04 / *.356*	9.19 / *.362*
G	-	-	6.76 / *.266*	-
H	-	-	10.72 / *.422*	8.15 / *.321*

FME series

Connection dimensions

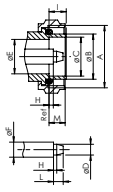
signal conductor male



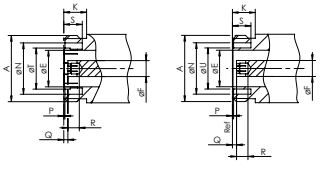
7/16 series

Connection dimensions

signal conductor male



signal conductor female



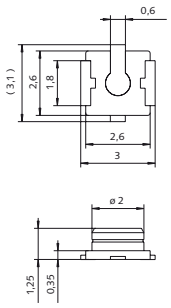
	Signal conductor male		Signal conductor female	
	min.	max.	min.	max.
A	M29 x 1.5		M29 x 1.5	
B	20.60 / *.811*	21.40 / *.843*	-	-
C	18.03 / .710	18.21 / *.717*	-	-
D	4.96 / *.195*	5.04 / .198	-	-
E	15.85 / *.624*	16.25 / *.640*	15.85 / *.624*	16.25 / .640
F	7.00 / .276 nom.		7.00 / .276 nom.	
G	1.40 / .055	1.60 / .063	-	-
H	1.47 / .058	1.77 / .070	-	-
I	7.00 / .276	8.00 / .315	-	-
K	-	-	*10.00 / .394*	-
L	-	4.50 / .177	-	-
M	7.00 / .276	9.00 / .354	-	-
N	-	-	*22.10 / .870*	*22.90 / .902*
P	-	-	*0.50 / .020*	*0.70 / .028*
Q	-	-	*1.77 / .070*	*2.07 / .082*
R	-	-	*5.00 / .197*	-
S	-	-	*8.10 / .319*	-
T	-	-	-	*18.50 / .728*
U	-	-	-	*18.00 / .709*

Technical details and dimensions

U.FL / W.FL / W.FL2 / X.FL / MM5829

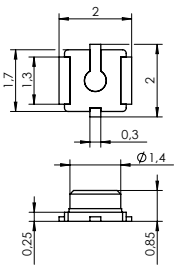
U.FL series

Connection dimensions



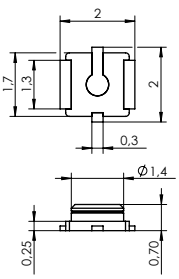
W.FL series

Connection dimensions



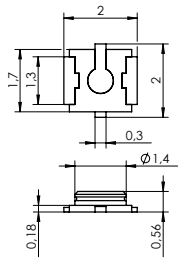
W.FL2 series

Connection dimensions



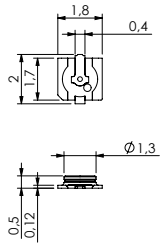
X.FL series

Connection dimensions



MM5829 series

Connection dimensions
signal conductor male

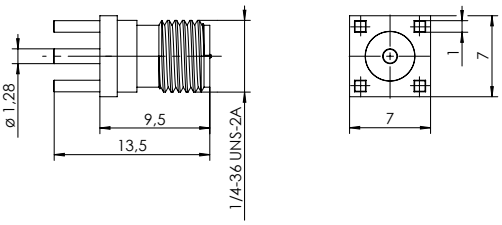


R-SMA / R-TNC

R-SMA series

Connection dimensions

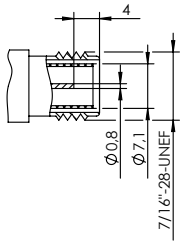
signal conductor male



R-TNC series

Connection dimensions

signal conductor male



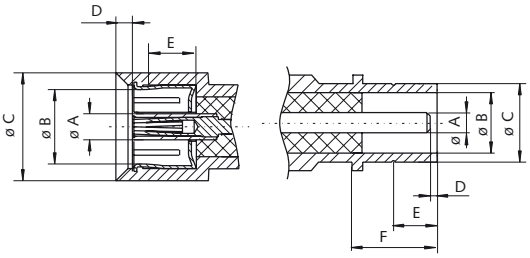
IEC, F

IEC series

Connection dimensions

signal conductor female

signal conductor male



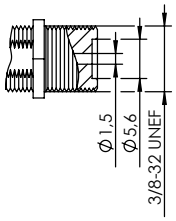
IEC (75 Ohm)				
	Signal conductor male		Signal conductor female	
	min.	max.	min.	max.
A	2.28 / *.089*	2.42 / *.095*	1)	
B	8.05 / *.317*		1)	
C	9.52 / *.375*	9.54 / *.376*	13.0 / *.512* nom.	
D	0.40 / *.016*	1.20 / *.047*	2.2 / *.087* nom.	
E	4.95 / *.195*	5.05 / *1.99*	6.40 / *.252*	6.80 / .268
F	9,10 / *.358*			

1) Can be expanded or contracted
(to fulfil electrical/mechanical demands)

F series

Connection dimensions

signal conductor female



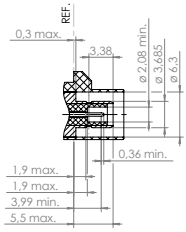
Technical details and dimensions

FAKRA, GT13, GT16

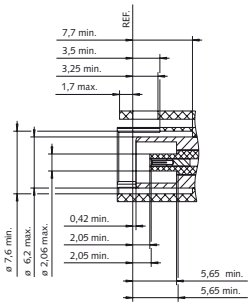
FAKRA series

Connection dimensions

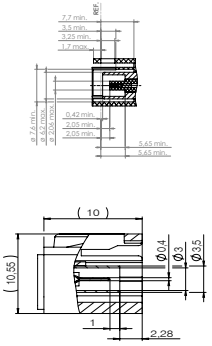
signal conductor male



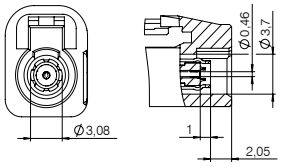
signal conductor female



mini FAKRA HFM male



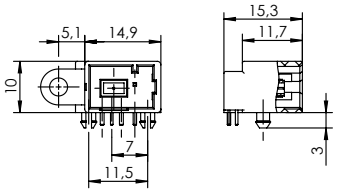
mini FAKRA HFM female



GT13 series

Connection dimensions

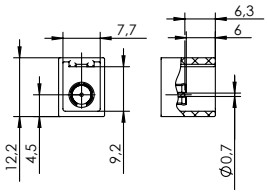
signal conductor male



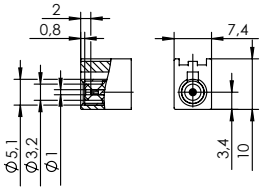
GT16 series

Connection dimensions

signal conductor male



signal conductor female

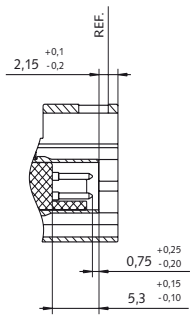


Digital automotive

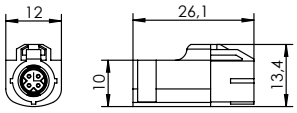
HSD series

Connection dimensions

signal conductor male



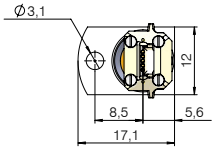
signal conductor female



Serie H-MTD

Connection dimensions

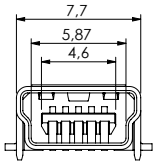
signal conductor female

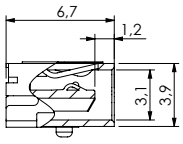


USB-Mini series

Connection dimensions

signal conductor female

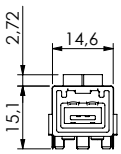


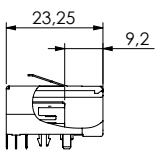


MX38 series

Connection dimensions

signal conductor female

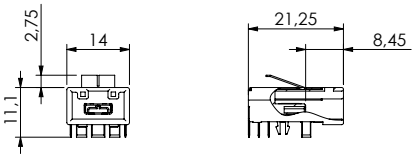




Digital automotive

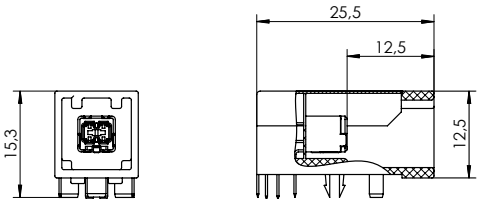
MX48 series

Connection dimensions
signal conductor female



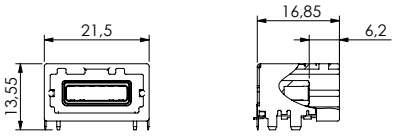
MX49 series

Connection dimensions
signal conductor female



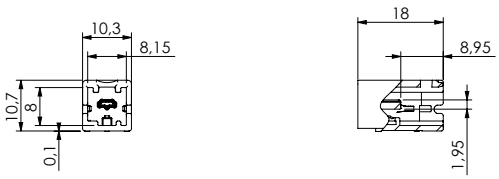
MX62 series

Connection dimensions
signal conductor female



MX68 series

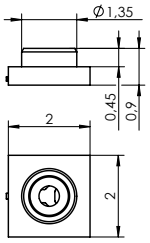
Connection dimensions
signal conductor female



Micro switches

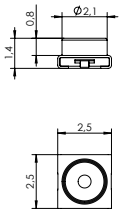
MM8030 series

Connection dimensions



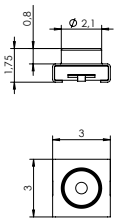
MM8130 series

Connection dimensions



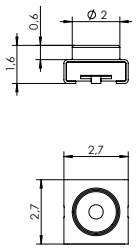
MM8430 series

Connection dimensions



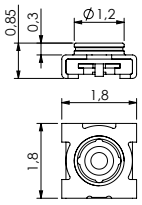
MS-156 (HF) series

Connection dimensions



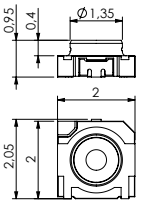
MS-180 series

Connection dimensions



PN 1551372-1 series

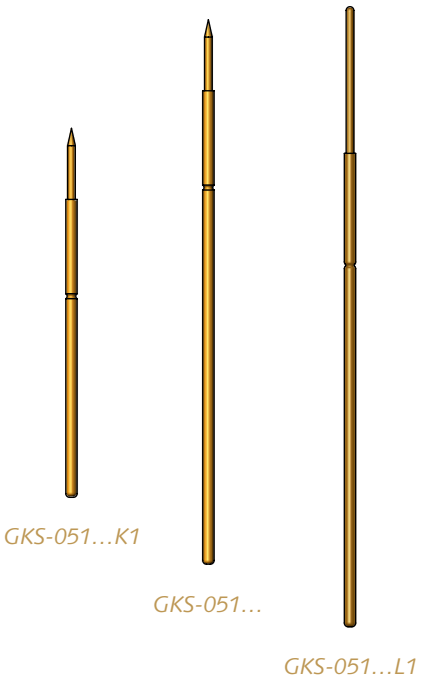
Connection dimensions



INGUN RF probes according to part number & inner conductor number

RF probe part number	Inner conductor part no.	Page
HFS-409 305 100 A 8343 MF	HSS-118 305 100 A 3005 M	96
HFS-409 306 350 8342 M	HSS-118 306 350 A 3002 M	95
HFS-409 306 350 8343 M	HSS-118 306 350 A 3002 M	95
HFS-4x0 201 051 A xx02 (M)	GKS-051 201 051 A 1000 K1	151
HFS-4x0 201 051 A xx02 S (4M)	GKS-051 201 051 A 1000 K1	153
HFS-4x0 201 051 A xx06 (M)	GKS-051 201 051 A 1000 K1	151
HFS-4x0 201 051 A xx06 S (4M)	GKS-051 201 051 A 1000 K1	153
HFS-4x0 201 051 A xx29 V2-VZ (4M)	GKS-051 201 051 A 0000 K1	167
HFS-4x0 303 090 A xx43 Y6 (M)	GKS-051 303 090 A 1000 K1	79
HFS-4x0 303 150 A xx42 F (M)	GKS-051 303 150 A 1000 K1	103/104
HFS-4x0 303 150 A xx42 FS1 (M)	GKS-051 303 150 A 1000 K1	103/104
HFS-4x0 303 150 A xx42 RF3 (M)	GKS-051 303 150 A 1000 K1	103/104
HFS-4x0 303 150 A xx43 E3 (M)	GKS-051 303 150 A 1000 K1	55
HFS-4x0 303 150 A xx43 F-Y14 (M)	GKS-051 303 150 A 1000 K1	40/41
HFS-4x0 303 150 A xx43 QN (M)	GKS-051 303 150 A 1000 K1	92
HFS-4x0 303 150 A xx43 Y (M)	GKS-051 303 150 A 1000 K1	40/41
HFS-4x0 303 150 A xx43 Y2 (M)	GKS-051 303 150 A 1000 K1	40/41
HFS-4x0 308 080 A xx42 ZE3 (M)	GKS-051 308 080 A 1000 K1	108
HFS-4x0 308 180 A xx42 E (M)	GKS-051 308 180 A 1000 K1	57
HFS-4x0 308 180 A xx43 E (M)	GKS-051 308 180 A 1000 K1	57
HFS-4x0 358 080 A xx42 Z (M)	GKS-051 358 080 A 1000 K1	29
HFS-810 358 180 A xx42 Q (M)	GKS-051 358 180 A xx00	73
HFS-8x0 201 051 A xx02 (M)	GKS-051 201 051 A xx00	150/151
HFS-8x0 201 051 A xx06 (M)	GKS-051 201 051 A xx00	150/151
HFS-8x0 201 051 A xx06 P (4M)	GKS-051 201 051 A xx00	155/157
HFS-8x0 201 051 A xx06 S (4M)	GKS-051 201 051 A xx00	152/153
HFS-8x0 201 051 A xx29 V2 (4M)	UKS-051 201 051 A	161/162
HFS-8x0 201 051 A xx29 V2-Sx (4M)	UKS-051 201 051 A	161/162
HFS-8x0 201 051 A xx29 V2-VZ (4M)	UKS-051 201 051 A	167
HFS-8x0 204 051 A xx02 V1-AS3 (4M)	UKS-051 201 051 A	158/159
HFS-8x0 204 051 A xx02 V2-360 (4M)	UKS-051 204 051 A	166
HFS-8x0 288 150 A xx42 F88R (M)	GKS-051 288 150 A xx00	103/104
HFS-8x0 303 090 A xx40 GT13 (4M)	GKS-051 303 090 A xx00	109/110
HFS-8x0 303 090 A xx43 Y6 (M)	GKS-051 303 090 A xx00	79/81
HFS-8x0 303 090 xx42 GT16 (M)	GKS-051 303 090 A xx00	111
HFS-8x0 303 150 A xx02 D (M)	GKS-051 303 150 A xx00	65/66
HFS-8x0 303 150 A xx42 E (M)	GKS-051 303 150 A xx00	47
HFS-8x0 303 150 A xx42 F (M)	GKS-051 303 150 A xx00	103/104
HFS-8x0 303 150 A xx42 FS1 (M)	GKS-051 303 150 A xx00	103/104
HFS-8x0 303 150 A xx42 RF3 (M)	GKS-051 303 150 A xx00	103/104
HFS-8x0 303 150 A xx42 W (M)	GKS-051 303 150 A xx00	75
HFS-8x0 303 150 A xx43 E3 (M)	GKS-051 303 150 A xx00	55
HFS-8x0 303 150 A xx43 F-Y14 (M)	GKS-051 303 150 A xx00	40/41
HFS-8x0 303 150 A xx43 QN (M)	GKS-051 303 150 A xx00	92
HFS-8x0 303 150 A xx43 Y (M)	GKS-051 303 150 A xx00	40/41
HFS-8x0 303 150 A xx43 Y2 (M)	GKS-051 303 150 A xx00	40/41
HFS-8x0 303 150 A xx43 Y5 (M)	GKS-051 303 150 A xx00	43
HFS-8x0 307 100 A xx02 V2-36S (4M)	UKS-051 307 100 A	166
HFS-8x0 308 080 A xx42 GT16-F (4M)	GKS-051 308 080 A xx00	112
HFS-8x0 308 080 A xx42 X4 (M)	GKS-051 308 080 A 1000 K1	34/35
HFS-8x0 308 080 A xx42 ZE (M)	GKS-051 308 080 A xx00	42
HFS-8x0 308 080 A xx42 ZE3 (M)	GKS-051 308 080 A xx00	107/108

Abbreviations	
f	female = signal conductor female
m	male = signal conductor male
S	signal
G	ground
Example: GSG	2 ground pins, 1 signal pin
x	part available as 410 (440) or 810 (840) (2 or 4 GHz)
xx	spring force
HFS-4(8)10	part available as HFS-410 and HFS-810
HFS-4(8)40	part available as HFS-440 and HFS-840
HFS-…(M)	part also available as screw-in version
HFS-…(4M)	part also available as adjustable screw-in version



GKS-051…K1

GKS-051…

GKS-051…L1

RF probe part number	Inner conductor part no.	Page
HFS-8x0 308 080 A xx43 T (M)	GKS-051 308 080 A xx00	69
HFS-8x0 308 080 A xx43 X (M)	GKS-051 308 080 A xx00	34/35
HFS-8x0 308 110 A xx42 BX (M)	GKS-051 308 110 A xx00	27
HFS-8x0 308 180 A xx42 E (M)	GKS-051 308 180 A xx00	56/57
HFS-8x0 308 180 A xx42 MBX (M)	GKS-051 308 180 A xx00	32
HFS-8x0 308 180 A xx43 E (M)	GKS-051 308 180 A xx00	56/57
HFS-8x0 358 080 Axx02 V2-00S	GKS-051 358 080 A 0000 L	158/159
HFS-8x0 358 080 A xx42 Z (M)	GKS-051 358 080 A xx00	29/30
HFS-8x0 358 180 A xx42 QS (M)	GKS-051 358 180 A xx00	67/68
HFS-819 303 090 A xxx43 F2-Z	GKS-051 303 090 A 1300*	116
HFS-819 303 090 A xxx43 RV5	GKS-051 303 090 A 1300*	115
HFS-819 303 090 A xxx43 RV5-Z	GKS-051 303 090 A 1300*	117
HFS-819 303 090 A xxx43 RV7-Z	GKS-051 303 090 A 1300	117
HFS-819 303 090 A xxx43 V2	GKS-051 303 090 A 1300*	115
HFS-819 303 090 A xxx43 V2-Z	GKS-051 303 090 A 1300*	117
HFS-819 319 090 A xxx43 RV5-H3	GKS-051 319 090 A 1300	118
HFS-819 355 051 A xxx42 V8 (-Z)	GKS-051 355 051 A 1300 L1*	119
HFS-822 303 051 A xx42 PSMP2	GKS-051 303 150 A 1000 K1	52
HFS-822 303 090 A xx42 SMPL	GKS-051 303 090 A 1000 K1	49
HFS-822 303 090 A xx42 SMPM(M)	GKS-051 303 090 A 1000 K1	51
HFS-822 303 090 A xx43 UFL	GKS-051 303 090 A 1000 UFL	82
HFS-822 303 150 A xx43 MBXF	GKS-051 303 150 A 1000 K1	31
HFS-822 308 180 A xx42 MBX2	GKS-051 308 180 A 1000 K1	33
HFS-823 305 040 A 6043 MM310	GKS-051 305 040 A 2000 K3 MM310	137/146
HFS-823 305 051 A 6043 MM036	GKS-051 305 051 A 2000 K3 MM036	141
HFS-836 288 120 A 4588 A51F50L	GKS-075 288 120 A 2000	163
HFS-836 288 120 A 4588 A31R50L	GKS-075 288 120 A 2000	164
HFS-860 201 051 A xx06 P (4M)	GKS-051 201 051 A xx00	157
HFS-860 201 051 A xx06 S (4M)	GKS-051 201 051 A xx00	154
HFS-860 303 074 A xx43 Y6 (M)	GKS-051 303 074 A xx00	81
HFS-860 303 090 A xx42 SSMP (M)	GKS-051 303 090 A xx00 N10	50
HFS-860 303 150 A xx43 ER (M)	GKS-051 303 150 A xx00	91
HFS-860 305 051 A xx43 Y80 (M)	GKS-051 305 051 A xx00	142/144
HFS-860 305 051 A xx43 Y82 (M)	GKS-051 355 051 A xx00 L1	142/144
HFS-860 308 090 A xx42 X (M)	GKS-051 308 090 A xx00	36
HFS-860 308 180 A xx43 QMA (M)	GKS-051 308 180 A xx00	61
HFS-860 353 051 A xx43 Y52 (M)	GKS-051 353 051 A xx00	86
HFS-860 358 300 A xx42 Q (M)	GKS-051 358 300 A xx00	74

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Receptacles (KS)	176/179
Tools	184/185

Note:
The inner conductor can be replaced in the RF probes listed on this page only. The inner conductor is available with various spring forces. The character "xx" for the ordering description of the inner conductor can be taken from the applicable catalogue page of the RF probe series – as spring force at working stroke of the inner conductor.

Example: GKS-051 201 051 A xx 00

Spring force at working stroke of the inner onductor (N):	1.3 N	2.0 N
Designation for ordering description of the inner conductor:	**13**	**20**

Example inner conductor part no. with 1.3 N: GKS-051 201 051 A **13** 00
Example: inner conductor part no. with 2.0 N: GKS-051 201 051 A **20** 00

Note: To exchange the inner conductor, the outer conductor of the RF probe has to be unscrewed. See page 152 for tools for dismantling and assembly.

Tip styles: inner conductor

01	
03	
04	
05	
06	
07	
08	
13	
19 ***	

Note: The recommended inner conductors are tailored to the probes. Use of different tip styles and tip diameters can negatively influence the RF performance, or the impedance.

* HFS-819… requires four of these inner conductors
** Inner conductor includes insulating part
*** Tip style **19**:
Alternative tip style to **03**, with 1.50 mm (width of slit 0.2 mm).
Available for inner conductors GKS-051… and GKS-051…K1
Part no.: GKS-051 319 150 A xx00 (K1)

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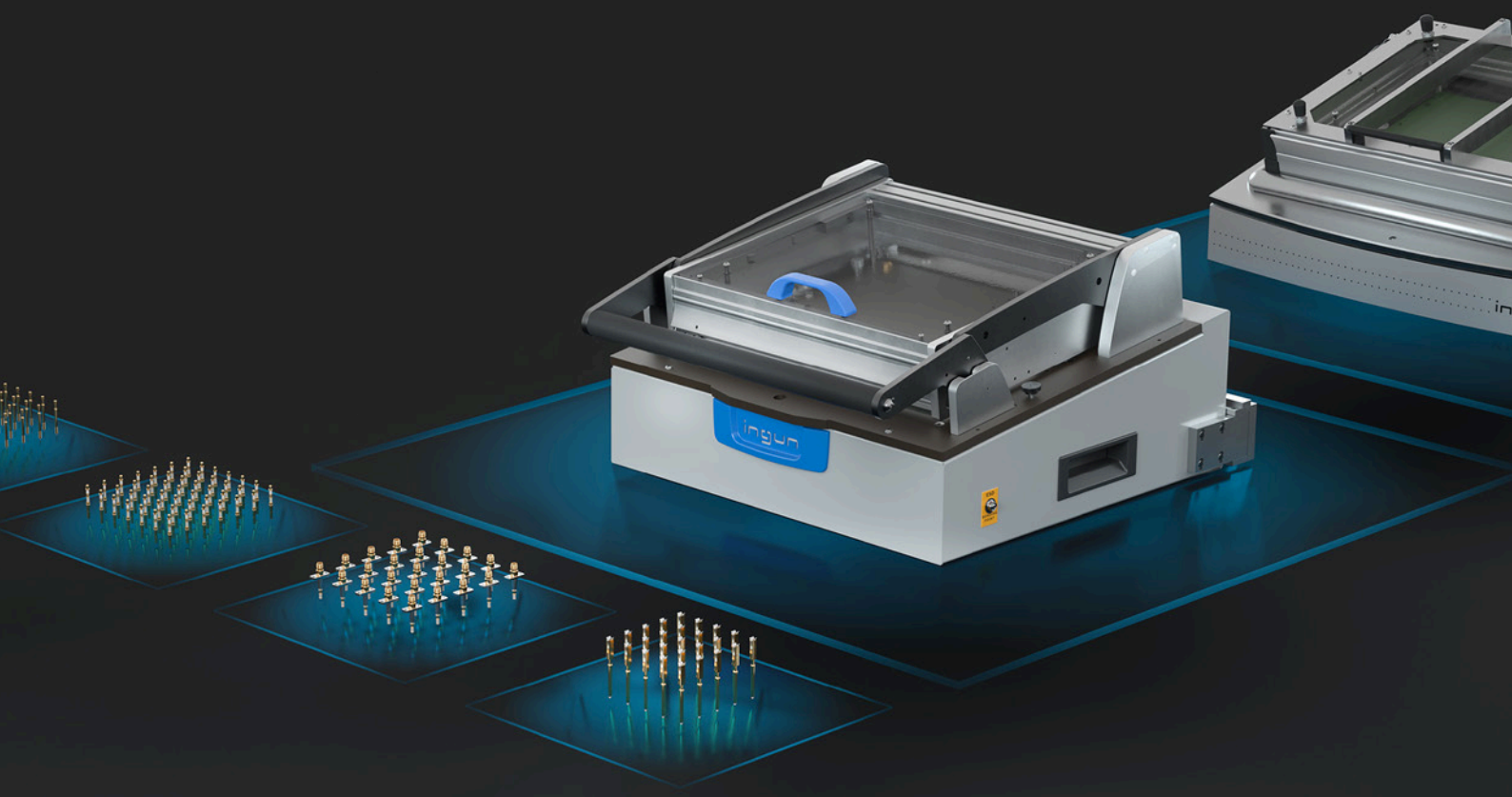

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INGUN RF probes according to type of contacting & interface

Type of contacting and interface	RF probe part number	Frequency range	Page
1.0/2.3-f	HFS-4(8)x0 308 080 A xx43 T (M)	2/4 GHz	69
7/16-f	HFS-864 342 700 A 28643 F716	7,5 GHz	76
BMA-m	HFS-4(8)x0 303 150 A xx02 D (M)	2/4 GHz	65/66
BNC-f	HFS-4(8)x0 358 180 A xx42 QS (M)	2/4 GHz	67/68
Dipol	HFS-010 35x 050 A 200x A	Dipol	171
Dipol	HFS-110 30x 050 A 300x x	Dipol	172
Dipol	DPS-215 304 027 A 2006 M	Dipol	173
Dipol	DPS-465 3xx 050 A 400x M	Dipol	174
HFM / Mate AX m	HFS-807 303 051 A 42 HFM-M ... HTE-M	Gbit/s 12 GHz	99
FAKRA-f	HFS-4(8)x0 308 080 A xx42 ZE3 (M)	2/4 GHz	107/108
HFM / Mate AX f	HFS-807 303 051 A 42 HFM-F-M ... HTE-F-M	Gbit/s 12 GHz	100
FAKRA-m	HFS-4(8)x0 303 150 A xx42 F (M)	2/4 GHz	103/104
FAKRA-m	HFS-4(8)x0 303 150 A xx42 FS1 (M)	2/4 GHz	103/104
FAKRA-m	HFS-4(8)x0 303 150 A xx42 RF3 (M)	2/4 GHz	103/104
FAKRA-m	HFS-890 343 118 A 93 43 F (M)	2/4 GHz	105
F-f	HFS-409 305 100 A 8343 MF	1,5 GHz	96
FME-m	HFS-4(8)x0 303 150 A xx42 W (M)	2/4 GHz	75
GT13-m	HFS-4(8)x0 303 090 A xx40 GT13 (4M)	2/4 GHz	109/110
GT16-f	HFS-4(8)x0 308 080 A xx42 GT16-F (4M)	2/4 GHz	112
GT16-m	HFS-4(8)x0 303 090 xx42 GT16 (M)	2/4 GHz	111
H-MTD	HFS-802 314 051 A 80 42 HMTD	Gbit/s	120
HDMI-f	34814, 112626 (PS-HDMI)	Gbit/s	130/132
HS Autolink II	105323 PS-HSAL2-M-012-G5-B	Gbit/s	132
HSC	HFS-336 302 050 A 6043 HSC	6 GHz	88
HSD-f	HFS-819 355 051 A xxx42 V8 (-Z)	Gbit/s	119
HSD-m	HFS-819 303 090 A xxx43 V2	Gbit/s	115
HSD-m	HFS-819 303 090 A xxx43 RV5	Gbit/s	115
HSD-m	HFS-819 303 090 A xxx43 F2-Z	Gbit/s	116
HSD-m	HFS-819 303 090 A xxx43 V2-Z	Gbit/s	117
HSD-m	HFS-819 303 090 A xxx43 RV5-Z	Gbit/s	117
HSD-m	HFS-819 303 090 A xxx43 RV7-Z	Gbit/s	117
HSD-m	HFS-819 319 090 A xxx43 RV5-H3	Gbit/s	118
IEC-f	HFS-409 306 350 8342 M	1,5 GHz	95
IEC-m	HFS-409 306 350 8343 M	1,5 GHz	95
JSC	HFS-336 302 040 A 6043 JSC	12 GHz	88
KSC	HFS-336 302 030 A 6043 KSC	6 GHz	88
LSC	HFS-336 355 050 A 6042 LSC	6 GHz	88
MATE net	HFS-802 306 100 A 7642 MTNT	1 GHz	121
MBX-f	HFS-4(8)x0 308 180 A xx42 MBX (M)	2/4 GHz	32
MBX-f	HFS-822 308 180 A xx42 MBX2	6 GHz	33
MBX-m	HFS-822 303 150 A xx43 MBXF	6 GHz	31
MCX-f	HFS-4(8)x0 308 080 A xx42 X4 (M)	2/4 GHz	34/35
MCX-f	HFS-4(8)x0 308 080 A xx43 X (M)	2/4 GHz	34/35
MCX-f	HFS-860 308 090 A xx42 X (M)	6 GHz	36
SSMP-m	HFS-860 303 090 A xx42 SSMP (M)	6 GHz	50
MM8030 / Pico II	HFS-823 305 040 A 6043 MM310	6 GHz	137/146
MM8030	HFS-856 305 030 A 5543 MM8030-H	6 GHz	138

INGUN RF probes according to type of contacting & interface

Type of contacting and interface	RF probe part number	Frequency range	Page
MM8030	HFS-890 313 040 A 93 43 MM8030 (M)	11 Ghz	140
MM8030	HFS-865 313 050 A xx43 MM	12 GHz	139
MM8130/8430	HFS-823 305 051 A 6043 MM036	6 GHz	141
MM8130/84230/MS156	HFS-860 305 051 A xx43 Y80 (M)	6 GHz	142/144
MM8130/84230/MS156	HFS-860 305 051 A xx43 Y82 (M)	6 GHz	142/144
MMBX-f	HFS-865 308 127 A xx42 BXF	12 GHz	28
MMBX-f	HFS-4(8)x0 308 110 A xx42 BX(M)	2/4 GHz	27
MMCX-f	HFS-4(8)x0 358 080 A xx42 Z (M)	2/4 GHz	29/30
MS-156 (HF) / MS-156 C	HFS-856 305 040 A 6343 MS156-H	6 GHz	143
MS-156 (HF) / MS-156 C	HFS-860 305 051 A xx43 Y80 (M)	6 GHz	142/144
MS-156 (HF) / MS-156 C	HFS-860 305 051 A xx43 Y82 (M)	6 GHz	142/144
MS-180	HFS-856 305 030 A 6343 MS180-H	6 GHz	145
MX38	HFS-821 305 080 A 9905 MX38	Gbit/s	122
MX48	HFS-821 302 045 A 9905 MX48	Gbit/s	122
MX49	HFS-821 305 080 A 9905 MX49	Gbit/s	123
MX62	HFS-821 305 080 A 9905 MX62	Gbit/s	124
MX68	HFS-821 302 045 A 9905 MX68	Gbit/s	125
N-f	HFS-4(8)10 358 180 A xx42 Q (M)	2 GHz	73
N-f	HFS-860 358 300 A xx42 Q (M)	6 GHz	74
PC3.5-f	HFS-865 308 110 A xx42 E2 F	12 GHz	60
PCB-GGSGG	HFS-4(8)x0 307 100 A xx02 V2-36S (4M)	2/4 GHz	166
PCB-GGSGG	HFS-4(8)x0 204 051 A xx02 V2-360 (4M)	2/4 GHz	166
PCB-GSG	HFS-4(8)x0 201 051 A xx29 V2 (4M)	2/4 GHz	161/162
PCB-GSG	HFS-4(8)x0 201 051 A xx29 V2-Sx (4M)	2/4 GHz	161/162
PCB-GSG	HFS-836 288 120 A 4588 A51F50L	4 GHz	163
PCB-GSG	HFS-836 288 120 A 4588 A31R50L	4 GHz	164
PCB-GSG	HFS-837 201 030 A 4823 F05	12 GHz	165
PCB-koax-closed	HFS-4(8)x0 201 051 A xx02 (M)	2/4 GHz	151
PCB-koax-closed	HFS-4(8)x0 201 051 A xx06 (M)	2/4 GHz	151
PCB-koax-niere	HFS-4(8)x0 201 051 A xx06 P (4M)	2/4 GHz	155
PCB-koax-open	HFS-4(8)x0 201 051 A xx02 S (4M)	2/4 GHz	152/153
PCB-koax-open	HFS-4(8)x0 201 051 A xx06 S (4M)	2/4 GHz	152/153
PCB-koax-open	HFS-860 201 051 A xx06 S (4M)	6 GHz	154
PCB-side	HFS-4(8)x0 201 051 A xx29 V2-VZ (4M)	2/4 GHz	167
PCB-SG	HFS-4(8)x0 204 051 A xx02 V1-AS3 (4M)	2/4 GHz	158/159
PCB-SG	HFS-4(8)x0 358 051 A xx02 V2-00S (4M)	2/4 GHz	158/159
PCB-SG	HFS-837 201 030 A 4823 F10	12 GHz	160
Power DC-f	35640 (PS-PowerDC)	Gbit/s	130
P-SMP-m	HFS-822 303 090 A xx42 PSMP2	6 GHz	52
QMA-f	HFS-860 308 180 A xx43 QMA (M)	6 GHz	61
RJ-10	17824 (PS-RJ)	Gbit/s	131
RJ-12	17825, 53767 (PS-RJ)	Gbit/s	131/133
RJ-45	17826, 55140, 102216 (PS-RJ)	Gbit/s	131/133
R-SMA-m	HFS-860 303 150 A xx43 ER (M)	6 GHz	91
R-TNC-m	HFS-4(8)x0 303 150 A xx43 QN (M)	2/4 GHz	92
SATA	106534 PS-SATA3.0-M-007-G5-B	Gbit/s	132
SMA-f	HFS-4(8)x0 308 180 A xx42 E (M)	2/4 GHz	57

Type of contacting and interface	RF probe part number	Frequency range	Page
SMA-f	HFS-4(8)x0 308 180 A xx43 E (M)	2/4 GHz	57
SMA-f	HFS-890 305 123 A 93 43 E (M)	2/4 GHz	58
SMB-f	HFS-4(8)x0 308 080 A xx42 ZE (M)	2/4 GHz	42
SMB mini	HFS-858 303 074 A 5 3 43 MSMB	2/4 GHz	39
SMB-m	HFS-4(8)x0 303 150 A xx43 Y (M)	2/4 GHz	40/41
SMB-m	HFS-4(8)x0 303 150 A xx43 Y2 (M)	2/4 GHz	40/41
SMB-m	HFS-4(8)x0 303 150 A xx43 F-Y14 (M)	2/4 GHz	40/41
SMC-m	HFS-4(8)x0 303 150 A xx43 Y5 (M)	2/4 GHz	43
SMP-L-m	HFS-822 303 090 A xx42 SMPL	6 GHz	49
SMP-m	HFS-8x0 303 150 A xx42 E (M)	2/4 GHz	47
SMP-m	HFS-856 303 051 A 5042 SMP-H	6 GHz	48
SMP-MAX-m	HFS-822 303 090 A xx42 SMPMM	6 GHz	51
TAE-f	34847 (PS-TAE)	Gbit/s	130
U.FL-m	HFS-890 343 078 A 98 43 UFL (M)	12 GHz	83
U.FL-m	HFS-4(8)x0 303 090 A xx43 Y6 (M)	2/4 GHz	79/80
U.FL-m	HFS-860 303 074 A xx43 Y6 (M)	6 GHz	81
U.FL-m	HFS-822 303 090 A xx43 UFL	6 GHz	82
U.FL-m	HFS-852 303 051 A 4043 UFL-H	6 GHz	84
U.FL-m	HFS-856 303 051 A 5543 UFL-H	6 GHz	85
USB Micro-f (Typ B)	34816, 112621 (PS-USB)	Gbit/s	130/132
USB Mini-f (USCAR30)	HFS-821 313 050 A 9905 USB Mini-D / -D2	Gbit/s	126
USB Mini-f (Typ B)	21072, 102619 (PS-USB)	Gbit/s	130/132
USB 3.1	112622 PS-USB3.1C-M-024-G5-B	Gbit/s	132
USB-f (Typ A)	21071, 112624 (PS-USB)	Gbit/s	130/132
USB-f (Typ B)	17829 (PS-USB)	Gbit/s	130
W.FL-m	HFS-860 353 051 A xx43 Y52 (M)	6 GHz	86
W.FL-m	HFS-856 379 030 A 5543 XFL-H	6 GHz	87
W.FL2-m	HFS-860 353 051 A xx43 Y52 (M)	6 GHz	86
W.FL2-m	HFS-856 379 030 A 5543 XFL-H	6 GHz	87
X.FL-m	HFS-860 353 051 A xx43 Y52 (M)	6 GHz	86
X.FL-m	HFS-856 379 030 A 5543 XFL-H	6 GHz	87

Abbreviations	
f	female = signal conductor female
m	male = signal conductor male
S	signal
G	ground
Example: GSG	2 ground pins, 1 signal pin
xx / xxx	spring force
HFS-4(8)10	part available as HFS-410 and HFS-810
HFS-4(8)40	part available as HFS-440 and HFS-840
HFS-4(8)x0	part available as 410 (810) or 440 (840) (2 or 4 GHz)
HFS-…(M)	part also available as screw-in version
HFS-…(4M)	part also available as adjustable screw-in version

INGUN RF probes according to part number

RF probe part numbers	Page
HFS-821 302 045 A 9905 MX68	125
HFS-821 305 080 A 9905 MX38	122
HFS-821 305 080 A 9905 MX49	123
HFS-821 305 080 A 9905 MX62	124
HFS-821 313 050 A 9905 USB Mini-D / -D2	126
HFS-822 303 090 A xx42 PSMP2	52
HFS-822 303 090 A xx42 SMPL	49
HFS-822 303 090 A xx42 SMPMM	51
HFS-822 303 090 A xx43 UFL	82
HFS-822 303 150 A xx43 MBXF	31
HFS-822 308 180 A xx42 MBX2	33
HFS-823 305 040 A 6043 MM310	137/146
HFS-823 305 051 A 6043 MM036	141
HFS-836 288 120 A 4588 A51F50L	163
HFS-836 288 120 A 4588 A31R50L	164
HFS-837 201 030 A 4823 F05	165
HFS-837 201 030 A 4878 F10	160
HFS-852 303 051 A 4043 UFL-H	84
HFS-856 303 051 A 5042 SMP-H	48
HFS-856 303 051 A 5543 UFL-H	85
HFS-856 305 030 A 5543 MM8030-H	138
HFS-856 305 030 A 6343 MS180-H	145
HFS-856 305 040 A 6343 MS156-H	143
HFS-856 379 030 A 5543 XFL-H	87
HFS-858 303 074 A 5 3 43 MSMB	39
HFS-860 201 051 A xx06 S (4M)	154
HFS-860 303 074 A xx43 Y6 (M)	81
HFS-860 303 090 A xx42 SSMP (M)	50
HFS-860 303 150 A xx43 ER (M)	91
HFS-860 305 051 A xx43 Y80 (M)	142/144
HFS-860 305 051 A xx43 Y82 (M)	142/144
HFS-860 308 090 A xx42 X (M)	36
HFS-860 308 180 A xx43 QMA (M)	61
HFS-860 353 051 A xx43 Y52 (M)	86
HFS-860 358 300 A xx42 Q (M)	74
HFS-864 342 700 A 28643 F716	76
HFS-865 308 110 A xx42 E2F	60
HFS-865 308 127 A xx42 BXF	28
HFS-865 313 050 A xx43 MM1	139
HFS-890 305 123 A 93 43 E (M)	58
HFS-890 343 078 A 98 43 UFL (M)	82
HFS-890 343 118 A 93 43 F (M)	105
HFS-890 313 040 A 93 43 MM8030 (M)	140

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Werkzeuge	184/185

Nomenclature	
f	female = signal conductor female
m	male = signal conductor male
S	signal
G	ground
Example: GSG	2 ground pins, 1 signal pin
xx	spring force
HFS-4(8)10	part available as HFS-410 and HFS-810 available
HFS-4(8)40	part also as HFS-440 and HFS-840 available
HFS-…(M)	part also available as screw-in version
HFS-…(4M)	Part no. additionally available as adjustable screw-in version

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